TECHNICAL DRAINAGE STUDY

LETTER OF MAP REVISION
FOR
EQUESTRIAN DETENTION BASIN

PDG PROJECT #1002005

BOOK 1

PREPARED FOR:
THE CITY OF HENDERSON
DRAFT
DECEMBER 18, 1998
PREPARED BY:

POGGEMEYER DESIGN GROUP, INC.
ENGINEERS – PLANNERS – SURVEYORS – LANDSCAPE ARCHITECTS
2601 NORTH TENAYA WAY
LAS VEGAS, NEVADA 89128
(702) 255-8100 FAX (702) 255-8375
pdg-lv@pdg-lv.com

DRAINAGE STUDY INFORMATION FORM

Name of Development: EQUESTRIAN DENTATION BASIN LOMR Date: 21-Dec-98

Location of Development: a) Descriptive Southwest corner of Cameron St. and Reno St.

b) Sect. 23,24, 25,35 Twn. 22 S Rng. 63 E

Name of Owner: City of Henderson Assessors Parcel No: N\A

Contact Person-Name: Stephen L. Weatherman P.E. Telephone No: (702) 255-8100

Firm: POGGEMEYER DESIGN GROUP, INC.

Address: 2601 North Tenaya Way - Las Vegas, Nevada 89128

Type of Land Development/Land Disturbance Process:

- [ ] Rezoning
- [ ] Parcel Map
- [ ] Large Parcel Map
- [ ] Subdivision Map
- [ ] Planned Unit Development
- [ ] Building Permit
- [ ] Clearing and Grading Only
- [x] Other (Please specify below) LOMR

1. Total Owned Land Area: At Site: 77 Acres Being Developed/Disturbed: 77 Acres

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? (YES*) NO

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? (YES*) NO

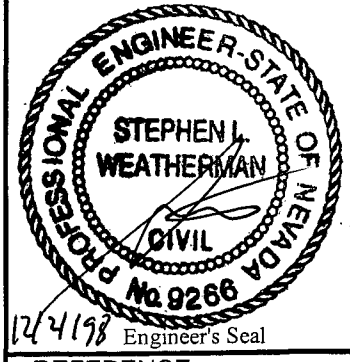
4. Proposed type of development (Residential, Commercial, Etc.)? DETENTION BASIN

5. Approximate upstream land area which drains to the subject site? 9.75 SM

6. Has the site drainage been evaluated in the past? (YES) NO If yes, please identify documentation:

7. If known, please briefly identify the proposed discharge points(s) of runoff from the site: Discharge towared C1 Channel

8. Briefly describe your proposed schedule for the subject project: Construction complete



12/4/98 Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

* Review and concurrence of the Clark County Regional flood Control District is required.

Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

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LETTER REPORT

INTRODUCTION

This submission is in response to the comments received concerning Case No. 96-09-943R for the Equestrian Detention Basin (EDB). The EDB was constructed by the City of Henderson through funding from the Clark County Regional Flood Control District. The project was designed by Poggemeyer Design Group, who also performed construction management for the basin.

On July 1, 1996, VTN Nevada submitted a CLOMR request for the basin as a consultant to the City of Henderson. VTN submitted Forms 1, 2, 3, 4, 5, 6, and 11. Also included was a proposed FIRM Map, the Design Memorandum for the EDB, and the Supplemental Design Calculations for the EDB. FEMA issued a CLOMR on February 19, 1997 with the conditions and comments as outlined in your letter of February 19, 1997. Poggemeyer Design Group (PDG) is responding to the comments with additional supporting information as a consultant for the City of Henderson.

PROJECT SUMMARY

The EDB is part of an overall regional flood control system as shown in the Clark County Regional Flood Control Master Plan. The EDB is designed to only collect the flows from the east or north side of the Boulder Highway in the ultimate condition. A future channel, on the west side of the Boulder Highway, north of the Wagon Wheel Interchange, is proposed to convey all flow west of Boulder Highway to the C1 channel. This channel is located approximately 4,000 feet north of the Wagon Wheel Interchange. The project is also designed to only collect the flows south of the "under construction" East C1 detention basin.

The interim conditions as described in the Design Memorandum and Supplemental Design Calculations for the EDB, included areas west of the Boulder Highway contributing to the basin inflow. Also included is a portion of the fan flow from the East C1 Detention Basin upstream area (C4C). The EDB's spillway was designed to pass the flows from west of the Boulder Highway and the flow from the East C1 area (C4C). The two HEC-1 evaluations were not linked and were evaluated separately.

This submission includes two HEC-1 evaluations. The first is an overall HEC-1 that includes areas west of the Boulder Highway and the area west of the "Under Construction" East C-1 Detention Basin. It does not include Basin C4C. This HEC-1 is a combination of the original EDB evaluation and the LOMR application/approval for Heritage II 97-09-105P. The run also includes as-built information concerning the EDB collection channel, new drop inlets at the Magic Way and Equestrian intersection, and the culverts under the Boulder Highway. This HEC-1 has an area of 9.75 square miles when the C4C basin is removed; an SDN of 5 was used to approximate the 97-09-105P LOMR.

The second HEC-1 is ultimate conditions with only one culvert crossing the Boulder Highway contributing flow to the basins. This area is 7.47 square miles, and an SDN of 3 was used. The evaluation matches the original design calculations, but includes as-built information, and new drop inlets at the Magic Way and Equestrian intersection. This flow was assumed to be the worst case conditions and was used to evaluate the eastern collection channel for sediment collection, erosion, and flow rate. A sub-critical HEC-RAS run was used to evaluate the unlined portions of the collection channel.

Overall sediment transport was covered in the EDB Design Memorandum and Supplemental Design Calculations. These calculations clearly indicated that there was deposition in the collection channel in the unlined portions. We have evaluated the possible scour and have compared it to the expected deposition. The sediment deposition in the basin was evaluated by determining the velocity of flow toward the outlet as the flow entered the detention basin. The deposition location was determined by sections across the basin using HEC-1 time steps, flow rates, and sediment transport data.

The outfall conditions were evaluated using aerial photography and topography obtained for the project. The new topography clearly identifies the location of the outlet flow path and its relationship to the existing housing on both sides of the flow path. A HEC-RAS was developed to analyze the flow conditions downstream from the basin low flow outlet. The width of impact is shown on the mapping, as is the depth of flow at each section. The velocity is 8.4 FPS maximum and averaging under 5 FPS, which has limited erosion potential. The existing flow path is under-laid by caliche, which has been exposed at several locations and also limits the potential for erosion.

1. *Detailed application and certification forms, which were used in processing this request, must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1, entitled "Revision Requester and Community Official Form," and Form 2, entitled "Certification by Registered Professional Engineer and/or Land Surveyor," must be included. (Copies of these forms are enclosed.)*

   Application and certification forms have been completed and are submitted with this addendum. Note that the original Consultant Submitter, VTN, has been replaced with Poggemeyer Design Group, Inc. All of the submitted information has been developed under the supervision of a Nevada-licensed Engineer. This is while preparing the original design notebooks for the Equestrian Detention Basin, the construction phase of the project, and the additional information and calculations submitted in support of this addendum.

2. *The detailed application and certification forms listed below may be required if as-built conditions differ from the preliminary plans. If required, please submit new forms (copies of which are enclosed) or annotated copies of the previously submitted forms showing the revised information.*

   Form 3, entitled "Hydrologic Analysis Form"

   Form 4, entitled "Riverine Hydraulic Analysis Form"

   Form 5, entitled "Riverine/Coastal Mapping Form"

   Form 6, entitled "Channelization Form"

   Form 11, entitled "Dam Form"

   Hydraulic analyses for as-built conditions, of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood), and the flood having a 0.2-percent chance of being equaled or exceeded in any given year, must be submitted with Form 4, and a topographic work map showing the revised floodplain boundaries must be submitted with Form 5.

   The above forms have been completed, including the required supporting information. An overall HEC-1 has been prepared providing a hydraulic analysis for as-built conditions of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). These HEC-1's are located in Appendix B. Topographic work maps have been provided in Appendices B and G.

3. *Effective October 1, 1996, FEMA revised the fee schedule for reviewing and processing requests for modifications to published flood information and maps. Under this schedule, FEMA established flat review and processing fees for most types of requests. All requests dated October 1, 1996, or later will be processed under this new schedule. The fee for your map revision request will be $2,300 and must be received before we can begin processing your request. Payment of this fee shall be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card. The payment must be forwarded to the following address:*

   Federal Emergency Management Agency
   Fee-Collection System Administrator
   P.O. Box 3173
   Merrifield, VA 22116-3173

   The required fee is being submitted by the City of Henderson.

4. *As-built plans, certified by a registered professional engineer, of all proposed project elements.*

   As-built plans, certified by a registered professional engineer, of all proposed project elements are included in this submission and are included in the following Appendices:

Equestrian Detention Basin Record Drawings	Appendix P
Wagon Wheel Interchange As-Built Drawings	Appendix M
Equestrian & Magic Way Drop Inlets	Appendix E

5. *Community acknowledgement of the map revision request.*

   Community acknowledgment of the map revision request is provided from the City of Henderson and the Clark County Regional Flood Control District. See Appendix C.

6. *An officially adopted maintenance and operation plan for the EDB and the diversion channel. This plan, which may be in the form of a written statement from the community Chief Executive Officer, an ordinance, or other legislation, must describe the nature of the maintenance activities, the frequency with which they will be performed, and the title of the local community official who will be responsible for ensuring that the maintenance activities are accomplished.*

   The officially adopted maintenance and operation plan for the Equestrian Detention Basin and diversion channel is included with this submission. See Appendix D.

7. *The submittal included the following five HEC-1 computer models of the base flood discharge entering the detention basin from contributory drainage basins north of South Boulder Highway and east of South Magic Way: "100-Year Design Model," dated April 6, 1994, and 100-Year HEC-1 Model Including Sub-basin C4C," dated April 13, 1994, both prepared by Poggemeyer Design Group, Inc., and "100-Year Clearwater Inflow, 5 Minute Interval, Inflow Hydrograph, Unmodified Volume," "100-Year Clearwater Inflow, 5-Minute Interval, Modified Volume," and "100-Year Clearwater Inflow, 7-Minute Interval, Modified Volume," all prepared by Poggemeyer Design Group, Inc., and dated October 4, 1995.*

   In addition, the undated report included with this submittal, entitled "Supplemental Design Calculations for The Equestrian Detention Basin," prepared by Poggemeyer Design Group, Inc., included a HEC-1 model, entitled "Runoff Evaluation for Flow Interception at Equestrian Drive," dated October 5, 1994, which analyzed the discharge entering the EDB at the Magic Way inlet.

It is unclear from the submitted hydrologic models how much discharge will flow west along East Equestrian Drive to South Magic Way during the base flood. It is also unclear what effect, if any, the discharge entering the basin at the Magic Way inlet will have on the detention basin outflow. Please submit a single hydrologic analysis which includes all drainage basins contributory to the EDB. Please also submit a topographic map showing the contributing watershed and delineations of all drainage basins used in the hydrologic model.

A single overall HEC-1 analysis is located in Appendix B. The HEC-1 incorporates all areas that contribute to the collection channel, the basin, and the flows crossing the Boulder Highway and concentrating at the inlets at the Equestrian and Magic Way intersection. The HEC-1 does not include flows from offsite Basin C4C. This area contributes to the new under-construction East C1 detention basin. The outfall from the basin is directed north in the new under-construction levee. The design notebook for the basin and levee are included under Appendix N.

The HEC-1 also indicates the flows continuing south in Magic Way toward the north. These flows combine with the flows from Wellington Manor (Basin OFF-24) directly west of the EDB. These flows then leave Magic Way near Greyhound Lane and travel southwest as they do in the existing condition. Please see Appendix B for the overall Basin Map.

8. *The HEC-1 model entitled "Runoff Evaluation for Flow Interception at Equestrian Drive" included several diversions of flow to the north across South Boulder Highway. Please submit analyses of all culvert and weir flows to the north across South Boulder Highway included in the hydrologic analysis requested in Item 7. Please also submit as-built plans, certified by a registered professional engineer, for all reaches of South Boulder Highway and culverts included in the model. The as-built culvert plans should include, at a minimum, inlet and outlet elevations, culvert lengths, slopes, and entrance geometries.*

   The information submitted in support of the Boulder Highway System is included in Appendices J and M. This information includes a reference study for the Wagon Wheel interchange, as-built plans from Nevada DOT for the Wagon Wheel interchange, and field survey of the other existing culverts used in the overall HEC-1 analysis.

9. *The report entitled "Supplemental Design Calculations for The Equestrian Detention Basin" stated that a peak flow of 850 cubic feet per second will be conveyed in an earthen channel along the east side of South Magic Way to the Magic Way inlet. The report further stated that this channel has been constructed as part of the Wellington Manor development. Please submit a hydraulic analysis of the flow in the earthen channel, as-built channel plans certified by a registered professional engineer, and a topographic map showing revised floodplain*

boundary delineations. The revised floodplain boundary delineations must tie into those shown on the effective FIRM at the upstream and downstream ends of the revised reach. The scale and topographic definition of the map must be sufficient to provide reasonable accuracy, and the map must be certified by a registered professional engineer.

This component of the system was not constructed as planned. The earthen channel was not constructed to collect and convey the flow to the Equestrian and Magic Way intersections. Both Magic Way and Equestrian Drive have been constructed as full curb and gutter roadways and collect the flow from the Boulder Highway crossings. This flow is now collected in catch basins at the intersection and crossroad vane grate inlets. The overall HEC-1 incorporates these features. The as-built plans and drainage calculations for the catch basins are included in Appendices E and O.

10. *The plans entitled "Equestrian Detention Basin, Contract No. 95-96-02" show a berm along the west side of the proposed diversion channel. Before we can revise the FIRM based on the effects of this proposed berm, we must receive documentation that demonstrates the berm meets the requirements of Section 65.10 of the NFIP regulations. If the berm is not designed to provide protection from the base flood for property west of the channel, please revise the hydrologic analysis requested in Item 7 and submit hydraulic analyses of the westward flow with and without the proposed berm. Also, please submit a topographic map, as described in Item 9, showing revised floodplain boundary delineations.*

The berm noted above is designed to meet the requirements of 65.10 of the NFIP regulations.

Freeboard: The berm is designed to provide a minimum of 3 feet of freeboard. This includes all areas subject to sediment deposition. The only exception to this is at the very beginning of the channel where the total flow being collected is 189 CFS and the basin contributing to this location is only 0.185 square miles.

Closures: None

Embankment Protection: The channel and levee are not lined, but have been designed to limit velocities to 10 FPS or less. The erosion of the levees is limited by the erosion-deposition cycle analyzed. See additional information in Item 12 below.

Embankment and Foundation Stability: The levees have been designed according to the requirements of Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual. The maximum slope of the water side of the levee is 3 horizontal to 1 vertical. On the downstream side of the levee the slope is

8 horizontal to 1 vertical. The levee is constructed on in-place soils compacted to 90% maximum density. The levee was constructed by benching into the native soil with 2 feet tall benches and the soil placed for compaction was no more than 8" thick.

The soil report is included in this submission in Appendix K, and to paraphrase the report. Slopes of 3:1 constructed per the construction specification having a factor of safety greater than 2. Under rapid draw down, the factor of safety is greater than 1.5. The permeability of the soil mass was estimated as 0.00002 cm per second, or 6.1 X 10^{-7} feet per second. The maximum time that the levee will retain water is 19.4 hours, which will allow the levee to be penetrated by 1.4 cm.

Settlement: The existing soils are thick, dense alluvial beds and the settlement of the levee is expected to be 0.25% for the levee (1/3 inch), and ½ inch due to the foundation.

Interior Drainage: The drainage of the area behind the levee drains directly to the detention basin in the collection channel. No flow is detained or ponded.

Operation Plans and Criteria & Maintenance Plans and Criteria: The City of Henderson and the Regional Flood Control District operate and maintain the channel and levee. The operation and maintenance manual is included in Appendix D.

11. *The request included a WSPG hydraulic computer model of flow in the EDB diversion channel, entitled "Equestrian Detention Basin, Model Headwater to Basin, Typical Channel Sections Used," prepared by Poggemeyer Design Group, Inc., dated July 10, 1995. A comparison of this model to the plans entitled "Equestrian Detention Basin, Contract No. 95-96*02," indicates that a number of the typical channel sections used in the WSPG model are not representative of the proposed channel geometry. Please submit a revised hydraulic model based on representative as-built channel sections. We note that many of the computed water-surface elevations in the WSPG model are based on supercritical flow. FEMA accepts supercritical hydraulic models in concrete-lined, engineered channels only. Because the upstream reach of the proposed diversion channel will be unlined, the hydraulic analysis for this portion of the channel must be based on sub-critical modeling. Critical depth is the minimum depth that can be used to map the base floodplain in the channel.*

The channel has been designed to operate in super-critical mode, but we understand the requirement noted above. A revised analysis of the unlined portion of the channel has been prepared using HEC-RAS with a sub-critical model. (See Appendix F.)

12. *The WSPG model mentioned in Item 11 indicates velocities within the diversion channel as high as 27.71 feet per second. Please provide documentation, including typical cross sections and calculations, demonstrating that erosion of the unlined portion of the east channel bank and erosion of the proposed berms will not occur.*

The channel design is based on sediment deposition in the channel from the off-channel upstream flow areas. Potential erosion of the berms is canceled by the deposition. The two exceptions to this is between (1) Stations 132+00 and 168+50, where the erosion is 0.16 acre feet or approximately 7000 ft^3 and (2) Stations 127+00 and 132+00 50, where the erosion is 0.92 acre feet or approximately 40,000 ft^3. The HEC-6 predicts this erosion to be along the full length of the reaches.

Reach 132+00 to 168+50 results in erosion of 1.9 ft^3 per foot of length, a negligible amount. The worst case scour in this reach is 17.5 feet near station 150+00. At this location, where the depth of flow is 4.12 feet and the channel depth is 12 feet, the channel is mostly set into the existing landform. Lateral erosion of 17.5 feet, though unlikely, will reduce the berm height by only 0.7 feet, which still provides more than the 3 foot of freeboard required. At this location, the top of the flow is also below the existing landform on the levee side of the channel.

Reach 127+00 to 132+00 results in erosion of 80 ft^3 per foot of length, **not** a negligible amount. The active portion of the channel at this location would approximate 67.5 feet for a depth of 1.2 feet. The worst case scour in this reach is 15.7 feet near station 132+500. At this location, where the depth of flow is 4.52 feet and the channel depth is 12 feet, the channel is mostly set into the existing landform. Lateral erosion of 15.7 feet, though unlikely, will reduce the berm height by only 0.3 feet, which still provides more than the 3 foot of freeboard required. At this location, the top of the flow is at the existing land form elevation on the levee side of the channel.

The erosion/deposition calculations appear to be the correct interpretation of the hydrologic-erosion-deposition cycle in the channel. The owning and maintaining agencies, the City of Henderson and the Regional Flood Control District, inspect these facilities on a yearly basis and after major storm events. Any major erosion or deposition is addressed by the governmental maintenance forces, which use funding provided by the Regional Flood Control District. The calculations are provided in Appendix H.

13. *Please submit documentation demonstrating that all water and sediment flows to the west along the north side of South Boulder Highway will enter the diversion channel at its south end. If all flow will not enter the diversion channel, but will instead continue westward, please revise the hydrologic analysis requested in Item*

7 to account for this additional flow. Please submit as-built plans, certified by a registered professional engineer, of the existing berm along South Boulder Highway shown on Sheet CI-10 of the channel plans.

The basin map and overall HEC-1 have been revised based on field verification, as-builts, and new flow pathways. The area contributing to the channel has been revised slightly. The field verified and certified as-built of the existing channel are included in Appendix H.

14. *Please submit documentation demonstrating that sediment or debris will not obstruct the detention basin outlet works and that sediment deposition in the EDB will not affect the detention basin outflow rate. If sediment deposition will affect the detention basin outflow rate, please submit an analysis of the effects of this deposition. The effects of sediment deposition over time on the storage capacity and outflow rate of a detention basin should also be addressed in the maintenance and operation plan mentioned in Item 6.*

A spreadsheet analysis is included with this submission in Appendix I. The spreadsheet evaluates the incoming flow rate, the incoming sediment transport, stage of storage in the basins, and flow velocity and deposition location based on velocity. The evaluation is based on 7-minute increments obtained from the HEC-1 evaluation of the basin sediment flow. See previous Supplemental Design Calculations for EDB.

The majority of the sands and gravels drop out at the upstream end of the basin. Some of the sands and much of the silts appear to remain in suspension and exit the basin through the low flow outlet. Some of these may deposit at the downstream end of the basin. The outlet of the basin will not be blocked because any of the small diameter fractions of sediment settling near the outlet will be conveyed out of the basin by virtue of the velocity of the flow in the area of the outlet. Those too large to be moved by this velocity will have been deposited upstream of the outlet as the particles enter the basin.

15. *Please submit documentation demonstrating that outflow from the detention basin will not create a Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, immediately downstream of the EDB, or submit a hydraulic analysis of the area downstream of the detention basin and a topographic map showing revised base floodplain delineations, as described in Item 9.*

A topographic map and HEC-RAS are included in this submission. The HEC-RAS indicates that the outlet flows are more than 1 foot deep for the first 924 feet where the flow widens and the depth is less than 1 foot deep. The flow pathway is an

existing wash that has been substantially modified by several residential projects. The flow pathway widens and narrows as it flows downstream.

16. *Please submit documentation demonstrating that the release of clearwater from the EDB will not result in scouring or head cutting of the downstream unnamed wash.*

The outfall conditions were evaluated using aerial photography and topography obtained for the project. The new topography clearly identifies the location of the outlet flow path and its relationship to the existing housing on both sides of the flow path. A HEC-RAS was developed to analyze the flow conditions downstream from the basin low flow outlet. The outlet is grouted riprap lined and discharges into an existing wash that meanders between two housing developments before discharging toward the existing C1 Channel. The width of impact is shown on the mapping, as is the depth of flow at each section. The velocity is 8.4 FPS maximum and averaging under 5 FPS, which has limited erosion potential. The existing flow path is under-laid by caliche, which has been exposed at several locations, which also limits the potential for erosion.

17. *Please submit a computer diskette containing the input and output files for all computer models used in your hydrologic, hydraulic, and sediment analyses.*

A recordable Compact Diskette has been prepared and is enclosed with this submission under Appendix Q.

APPENDIX A

FORMS

Form 1 .....Revision Requestor and Community Official Form

Form 2 .....Certification by Registered Professional Engineer and/or Land Surveyor Form

Form 3 ..... Hydrologic Analysis Form

Form 4 .....Riverine Hydraulic Analysis Form

Form 5 ..... Riverine/Coastal Mapping Form

Form 6 .....Channelization Form

Form 11 ..... Dam Form

APPENDIX A

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FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM**	*FEMA USE ONLY*	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. OVERVIEW

1. The basis for this revision request is (are): *(check all that apply)*
   - [X] Physical change
     - [X] Existing
     - [ ] Proposed
   - [ ] Improved methodology
   - [ ] Improved data
   - [ ] Floodway revision
   - [X] Other Completed Detention Basin

   Explain _____

2. Flooding Source: Unnamed Wash
3. Project Name/Identifier: Equestrian Detention Basin
4. FEMA zone designations affected: A

   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX: 480301	Katy,City	Harris, Fort Bend	TX	480301	0005D	02/08/83
480287	Harris County	Harris	TX	48201C	0220G	09/28/90
32005	City of Henderson	Clark	NV	32003C	2620D	08/16/95
32005	City of Henderson	Clark	NV	32003C	2615D	08/16/95

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding	Structures	Disciplines*
[X] Riverine	[X] Channelization	[X] Water Resources
[ ] Coastal	[ ] Levee/Floodwall	[X] Hydrology
[ ] Alluvial Fan	[ ] Bridge/Culvert	[X] Hydraulics
[ ] Shallow Flooding *(e.g. Zones AO and AH)*	[X] Dam	[X] Sediment Transport
[ ] Lakes	[ ] Coastal	[ ] Interior Drainage
	[ ] Fill	[ ] Structural
Affected by wind/wave action	[ ] Pump Station	[ ] Geotechnical
[ ] Yes	[ ] None	[ ] Land Surveying
[ ] No	[ ] Channel Relocation	[ ] Other *(describe)*
	[ ] Excavation	
	[ ] Other *(describe)*	

[ ] Other(describe) _____

- **Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)**

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? [ ] Yes [X] No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM [ ] Yes [X] No

   If yes, give reason: _____

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

9. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP? ☐ Yes ☒ No

If yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

3. PROPOSED ENCROACHMENTS

10. With floodways:

    a. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No

    b. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No

11. Without floodways:

    a. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☒ Yes ☐ No

    b. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot (*or other surcharge limit if community or state has adopted more stringent criteria)*? ☐ Yes ☒ No

If the answer to either Items 10b or 11b is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ☐ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ☒ Yes ☐ No

14. Does this revision request have the endorsement of the community? ☒ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and /or notification is required for all requests as outlined in Paragraph 65.4(b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g., levees, floodwalls, channelization, basins, dams)? ☒ Yes ☐ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by City of Henderson (entity)

_____ with a maximum interval of 12 months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities will be conducted by _____ (entity)

to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than 1 year, ☐ has ☐ has not been prepared for the flood control structure.

D. The community is willing to assume responsibility for ☒ performing ☐ overseeing compliance with the maintenance and operation plans of the Equestrian Detention Basin (Name)

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal Government.

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to National Flood Insurance Program Maps, A Guide for Community Officials," dated December 1993, this request is for a:

_____a.	CLOMR	A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.
XX b.	LOMR	A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. I Parts 60 and 65.)*
_____c.	PMR	A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. I, Parts 60 and 65.)*
_____d.	Other:	Describe_____

8. FORMS INCLUDED

17. Form 2 entitled, "Certification By Registered Professional Engineer and/or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	☒ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	☒ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	☐ Riverine /Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☒ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	☐ Bridge/Culvert Form (Form 7)
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☒ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. Has the minimum initial review fee for the appropriate request category been included? ☒ Yes ☐ No

Initial fee amount: $ _____

Check or money order only. Make check or money order payable to : **National Flood Insurance Program.** If paying by Visa or Mastercard please refer to the credit card information form which follows this form.

or

19. Is this request for a project that is for public benefit and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas which were in existence prior to the commencement of construction of the flood control project? ☒ Yes ☐ No

or

20. Is this request to correct map errors, to include the effects of natural changes within the areas of special flood hazard, or solely to provide more detailed data? ☐ Yes ☐ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Signature of Revision Requester

Stephen L. Weatherman, P.E.
Chief Flood Control Engineer

Printed Name and Title of Revision Requester

Poggemeyer Design Group

Company Name

(702) 255-8100

Telephone No. Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

Signature of Community Official

Curt Chandler, Land Development Mgr.

Printed Name and Title of Community Official

City of Henderson

Community Name

Date

Does this request impact any other communities? ☐ Yes ☒ No

If yes, attach letters from all affected jurisdictions acknowledging the revision request and approving the changes to the floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

FEDERAL EMERGENCY MANAGEMENT AGENCY **CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM**	*FEMA USE ONLY*	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average . 23 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2
2. I am licensed with expertise in Hydrology, Hydraulics, Sediment Transport
   [example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)** structural, geotechnical, land surveying.]
3. I have 12 years experience in the expertise listed above.
4. I have ☒ prepared and ☒ reviewed the attached supporting data and analyses related to my expertise.
5. I ☒ have ☐ have not visited and physically viewed the project.
6. In my opinion, the following analyses and /or designs, is/are being certified:
   To remove the Zone A based on a physical change.
7. Based on the following review, the modifications in place have been constructed in general accordance with plans and specifications.

   Basis for above statement: (check all that apply)
   - a. ☐ Viewed all phases of actual construction.
   - b. ☒ Compared plans and specifications with as-built survey information.
   - c. ☒ Examined plans and specifications and compared with completed projects.
   - d. ☐ Other *(Specify)*
8. All information submitted in support of this request is correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Stephen L. Weatherman, P.E.
(please print or type)

Title: Chief Flood Control Engineer
(please print or type)

Registration No. 9266 Expiration Date: 6/30/2000

State Nevada

Type of License Civil Engineering

Signature

12/18/98
Date

PROFESSIONAL ENGINEER-STATE OF NEVADA
STEPHEN L. WEATHERMAN
CIVIL
No. 9266

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) if statement does not apply.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS FORM**	*FEMA USE ONLY*	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: City of Henderson

Flooding Source: Unnamed Wash
(One form for each flooding source)

Project Name /Identifier: Equestrian Detention Basin

1. HYDROLOGIC ANALYSIS IN FIS

- [X] Approximate study stream (Zone A)
- [ ] Detailed study stream (briefly explain methodology)_____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

- [ ] No existing analysis
- [ ] Improved data *(see data revision on page 3)*
- [X] Changed physical conditions of watershed *(explain)* Construction of Flood Control Facility in the watershed, the Equestrian Detention Basin
- [ ] Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*
- [ ] Evaluation of proposed conditions (CLOMRs only) (explain)_____
- [ ] Other_____

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100 - and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

- [X] Approval of hydrologic analysis, including the resulting peak discharge value (s) has been provided by the appropriate local, state, or Federal Agency. (i.e., City of Henderson, Clark County Regional Flood Control District, Division of Water Resources, Dam Safety)
  Attach evidence of approval.
- [ ] Approval of the hydrologic analysis is not required by any local, State, or Federal Agency.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. REVIEW OF RESULTS

Stream: Unnamed Wash

Comparison of 100-year Flood Discharges

Location	Drainage area (Sq mi.)	FIS (cfs):	Revised (cfs):
Equestrian Detention Basin	9.75±	3300±	250±.

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*

With the construction of the Equestrian Detention Basin, the Zone A floodplain has been reduced and is confined to the existing washes downstream of the Detention Basin.

Attach a completed "review of results" page for each flooding source.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)*? ☐ Yes ☒ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

Note: FEMA does not normally revise NFIP maps solely due to flow changes when changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ☒ No

If yes, provide the following:

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*

N/A

Gaging Station: _____

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data (*New*) or as revising existing data (*Revised*). *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Hydrology Analysis	☒	☐	Clark County Regional Flood Control
Hydrology/Hydraulic Analysis	☒	☐	City of Henderson
Hydrology/Hydraulic Analysis	☒	☐	Nevada Dept. of Transportation
Hydrology/Hydraulic/Sediment Analysis	☒	☐	Poggemeyer Design Group
	☐	☐	

- The data source can be a Federal, State, or local government agency, or a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records (*use Attachment A*)

☐ Regional Regression Equations *(use Attachment B)*

☒ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

Gaging Station: N/A

Gage Location (latitude and longitude): _____

	FIS:	Revised:
1. Number of years of data		
Systematic		
Historical		
2. Homogeneous data?	☐ Yes ☐ No	☒ Yes ☐ No
3. Data adjustments?	☐ Yes ☐ No	☐ Yes ☐ No
4. Number of high outliers		
Low outliers		
Zero events		
5. Generalized skew		
6. Station skew		
7. Adopted skew		
8. Probability distribution used (justify if log-Pearson III was not used)		
9. Transfer equations to ungaged sites		☐ Yes ☐ No

If yes, specify method

_____

_____

_____

10. Expected probability* ☐ Yes ☒ No

11. Comparison of results with other analyses ☐ Yes ☐ No

If yes, describe comparison

_____

_____

_____

*FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data are not available, indicate with "N/A".

Attach analysis including plot of flood frequency curve.

ATTACHMENT B: REGIONAL REGRESSION EQUATIONS

1. Bibliographical Reference:

_____

_____

_____

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
   Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

_____

_____

_____

		FIS		Revised	
5.	Urbanized conditions calculations?	☐ Yes	☐ No	☐ Yes	☐ No
6.	Percent of watershed urbanization	_____		_____	
7.	Is the watershed controlled?	☐ Yes	☐ No	☐ Yes	☒ No
8.	Comparison with other analyses?	☒ Yes	☐ No	☐ Yes	☐ No

If the answer to questions 5, 7, or 8 is yes, explain methodology in Comments.

If data are not available, indicate with "N/A".

9. Comments

_____

_____

_____

_____

Attach computation and supporting maps delineating the watershed boundary and drainage area divides.

ATTACHMENT C: PRECIPITATION/RUNOFF MODEL

		FIS:	Revised
1.	Method or model used:	Unknown	HEC-1
	Version:	"	410
	Date:	"	3/23/93
2.	Source of rainfall depth:	"	NOAA Atlas II
3.	Source of rainfall distribution:	"	NSACE
4.	Rainfall duration:	"	6 hr
5.	Areal adjustment to precipitation (%):	"	Varies
6.	Maximum overland flow length	"	5001
7.	Hydrograph development method:	"	SCS
8.	Loss rate method:	"	SCS
	Source of soils information:	"	USDA Soil Survey
	Source of land use information	"	Current Zoning
9.	Channel routing method:	"	Kinematic
10.	Reservoir routing:	☐ Yes ☒ No	☒ Yes ☐ No
11.	Baseflow considerations:	☐ Yes ☒ No	☐ Yes ☒ No

If yes, explain how baseflow was determined:

12.	Snowmelt considerations?	☐ Yes ☐ No	☐ Yes	☒ No
13.	Model calibration?	☐ Yes ☐ No	☐ Yes	☒ No

If yes, explain how calibration was performed

14.	Future land use conditions?	☒ Yes ☐ No

If yes, explain why

Because this Detention Basin is a Clark County Regional Flood Control District Master Plan Facility; the Facility was designed using ultimate land use conditions.

NOTE: FEMA policy is to base flooding on existing conditions.
If data are not available, indicate with "N/A".

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: N/A

Selected location for Confidence Limits Evaluation (*describe location*): _____

_____

Discharges for selected location:

Exceedance Probability		FIS	Revised
10%	(10-year)	_____ cfs	_____ cfs
2%	(50-year)	_____ cfs	_____ cfs
1%	(100-year)	_____ cfs	_____ cfs
0.2%	(500-year)	_____ cfs	_____ cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs

95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs

75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

Note: An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	**FEMA USE ONLY**	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: City of Henderson

Flooding Source: Unnamed Wash
(One form for each flooding source)

Project Name/Identifier: Equestrian Detention Basin

1. REACH TO BE REVISED

Downstream limit: Cl/Drake Channel

Upstream limit: Equestrian Detention Basin

2. EFFECTIVE FIS

☐ Not studied

☒ Studied by approximate methods

Downstream limit of study _____

Upstream limit of study _____

☐ Studied by detailed methods

Downstream limit of detailed study _____

Upstream limit of detailed study _____

☐ Floodway delineated

Downstream limit of Floodway _____

Upstream limit of Floodway _____

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM. *(Check all that apply)*

☒ Not studied in FIS

☐ Improved hydrologic data/analysis. Explain: _____

☐ Improved hydraulic analysis. Explain: _____

☒ Flood control structure. Explain: Construction of the Equestrian Detention Basin and Appurtenant

☐ Other. Explain: _____

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

For areas which have detailed flooding:

Full input and output listings along with files on diskette (if available) for each of the models listed below (items 1, 2, 3, 4, and 5) and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (e.g. duplicate effective model to corrected effective model) At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

For areas which do not have detailed flooding:

Only the 100-year flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses for existing or pre-project conditions and revised or post-project conditions must be submitted. All calculations must be submitted for these analyses. (See Item 6 below.)

1. Duplicate Effective Model — Natural ☐ Floodway ☐

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models *(10-, 50-, 100-, and 500-year multi-profile runs and the floodway run)* must be obtained and then reproduced on the requestor's equipment to produce the duplicate effective model. This is required to assure that the effective model input data has been transferred correctly to the requestor's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model — Natural ☐ Floodway ☐

The corrected effective model is the model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the currently effective model. The corrected effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model — Natural ☒ Floodway ☐

The duplicate effective model or corrected effective model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective model or duplicate effective model.

4. Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective model or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this model must reflect proposed conditions.

5. Other: Please attach a sheet describing all other models submitted. — Natural ☒ Floodway ☐

6. Hydraulic Analyses (Only if Hydraulic Models are not developed)

Attach all calculations for the existing or pre-project conditions and the revised or post-project conditions. Proceed to Form 5, "Riverine/Coastal Mapping Form".

5. MODEL PARAMETERS *(from model used to revise 100-year water surface elevation)*

1. Discharges:

	Upstream Limit	Downstream Limit
10-year		
50-year		
100-year	Boulder Hwy. & Foothills Drive	Equestrian Detention Basin
500-year		

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined the water surface elevations were determined using the revised HEC-1 flow rates.

3. Give range of friction loss coefficients (*Manning's "N"*) Channel ..... .015 .025

Overbanks ..... .015 .025

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

From Design Drawing as-builts of the project.

5. Were natural channel banks selected as the location of the left and right channel banks in the model?

☐ Yes ☒ No If no, explain why not: Because this is a man-made channel and all of the flow is contained in the channel.

5. MODEL PARAMETERS (Cont'd)

6. Explain how reach lengths for channel and overbanks were determined:

From Construction Plans for the Channel see Design Calculation Notebook.

6. RESULTS (from model used to revise 100-year water surface elevations)

1. Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ☐ Yes ☒ No

b. Supercritical depth? ☐ Yes ☒ No

c. Critical depth? ☒ Yes ☐ No

d. Other unique situations ☒ Yes ☐ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

2. What is the maximum change in energy gradient between cross-sections? 0.00986 ft/ft

Specify location 163+00 - 162+00

3. What is the distance between the cross-sections in 2 above? 100 ft.

4. What is the maximum distance between cross-sections? 500

Specify location several

5. Floodway determination

a. What is the maximum surcharge allowed by the community or State? N/A foot

b. What is the maximum surcharge for the revised conditions? N/A foot

Specify location N/A

c. What is the maximum velocity? 34 fps

Specify location

d. Are there any negeative surcharge values at any cross-section? ☐ Yes ☒ No

If yes, the floodway may need to be widened. If it is not widened, please explain and indicate the maximum negative surcharge.

Explain: The unlined run was developed as sub-critical. The actual physical condition resulted in critical depth as the calculated flow elevation.

6. Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? ..... ☒ Yes ☐ No

If Yes, explain:

No Channel at this location for 100-year flood elevations new construction.

7. Do 100-year water surface elevations increase at any location? ..... ☐ Yes ☒ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases. *(For example: State if the increase is due to fill placed within the floodway fringe or placed within the currently adopted floodway limits)*

Attach a completed comparison table entitled: Water Surface Elevation Check (see page 6)

7. REVISED FIRM/FBFM AND FLOOD PROFILES

8. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section_____ within_____feet *(vertical)* and upstream of the project at cross section_____within_____feet *(vertical)*.

9. The revised floodway elevations tie into those computed by the effective FIS model, dowstream of the project at cross section_____within_____feet *(vertical)* and upstream of the project at cross section_____ within_____feet *(vertical)*.

10. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets.

11. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report.

Proceed to Riverine /Coastal Mapping Form (Form 5)

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	*FEMA USE ONLY*	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: City of Henderson

Flooding Source: Unnamed Wash

Project Name/Identifier: Equestrian Detention Basin

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included					
A.	Revised approximate 100-year floodplain boundaries (Zone A)?	☒	Yes	☐	No	☐	N/A
B.	Revised detailed 100- and 500-year floodplain boundaries?	☐	Yes	☐	No	☒	N/A
C.	Revised 100-year floodway boundaries?	☐	Yes	☒	No	☐	N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated?	☒	Yes	☐	No	☐	N/A
E.	Stream alignments, road and dam alignments?	☒	Yes	☐	No	☐	N/A
F.	Current community boundaries?	☐	Yes	☐	No	☒	N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map?	☒	Yes	☐	No	☐	N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries?	☐	Yes	☐	No	☒	N/A
I.	The requestor's property boundaries and community easements?	☐	Yes	☐	No	☒	N/A
J.	The signed certification of a registered professional engineer?	☒	Yes	☐	No	☐	N/A
K.	Location and description of reference marks?	☒	Yes	☐	No	☐	N/A
L.	Vertical datum (example: NGVD, NAVD etc.)?	☒	Yes	☐	No	☐	N/A
M.	Coastal zone designations tie into adjacent areas not being revised?	☐	Yes	☐	No	☒	N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses?	☐	Yes	☐	No	☒	N/A

If any of the items above are marked no or N/A, please explain: B&C Detail boundaries are not included on the FIRM map. F. Community boundaries have not been changed. H. N/A M. & N. Coastal Zones N/A

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? Air Photo 3-1-98

3. What is the scale and contour interval of the following workmaps?

a. Effective FIS N/A scale N/A Contour interval

b. Revision Request 1"=200' scale 4' Contour interval

NOTE: Revised topographic information must be of equal or greater detail.

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100- and 500-year floodplain and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies Attach additional pages if needed

PLEASE REFER TO THE INSTRUCTION FOR THE APPROPRIATE MAILING ADDRESS

5. Flood Boundaries and 100-year water surface elevations:

a. Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's ? ☐ Yes ☒ No

If yes, please give the location of shift or increase and an explanation for the increase.

b. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ..... ☐ Yes ☐ No

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

c. What is the number of insurable structures that will be impacted by this shift or increase? _____

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ..... ☐ Yes ☒ No

If yes, explain:

7. If a V- zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? ☐ Yes ☐ No

If no, explain:

N/A

8. Manual or digital map submission:

☒ Manual

☐ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☒ Proposed N/A Fill has not been utilized to remove the site from a Zone A.

2. Has fill been placed/will be placed in the regulatory floodway? ..... ☐ Yes ☒ No
If yes, please attach completed Riverine Hydraulic Analysis Form. (Form 4)

3. Has fill been/will be placed in floodway fringe *(area between the floodway and 100-year floodplain boundaries)*? ..... ☐ Yes ☒ No

If yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ..... ☐ Yes ☐ No

If yes, justify steeper slopes_____

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* ..... ☐ Yes ☐ No

If no, describe erosion protection provided_____

c. Has all fill placed in the revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If yes, provide certification of fill compaction (Item c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

4. Has fill been placed/will be placed in a V-zone? ☐ Yes ☒ No

If yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall? ☐ Yes ☐ No

If yes, attach the coastal structures form.

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION FORM**	**FEMA USE ONLY**	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472.

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Community Name: City of Henderson

Flooding Source: Unnamed Wash

Project ~~Name~~/Identifier: Equestrian Detention Basin

1. EXTENT OF CHANNELIZATION

Downstream limit: _____

Upstream limit: _____

2. CHANNEL DESCRIPTION

1. Describe the inlet to the channel _____

2. Briefly describe the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)* Trapezoidal concrete lined channel with a 25 ft. bottom width and :2:1:V side slopes. Unlined channel with varying channel bottom and side slopes.

3. Describe the outlet from the channel Equestrian Detention Basin

4. The channelization includes:

- ☐ Levees *(Attach Levee /Floodwall system analysis Form)*
- ☐ Drop structures
- ☐ Superelevated sections
- ☒ Transitions in cross sectional geometry
- ☒ Debris basin/detention basin
- ☒ Energy dissipater
- ☐ Other _____

5. Attach the following:

a. Certified engineering drawings showing channel alignment and locations of inlet, outlet, and items checked in item 4

b. Typical cross sections and profiles of channel banks and invert

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. HYDRAULIC CONSIDERATIONS

1. What is the 100-year flood discharge? ..... 2,900± cfs
2. Do the cross sections in the hydraulic model match the typical cross sections in the plans? ☒ Yes ☐ No
3. Are the channel banks higher than the 100- year flood elevations everywhere? ..... ☒ Yes ☐ No
4. Are the channel banks higher than the 100-year flood energy grade lines everywhere? .. ☒ Yes ☐ No
5. Is the land on both sides of the channel above the adjacent 100-year flood elevation at all points along the channel? ..... ☐ Yes ☒ No
6. What is the range of freeboard? ..... 3 – 11.5 feet
7. What is the range of the 100-year flood velocities? ..... 10.1 – λ ft/sec
8. What is the lining type (both bottom and sides)? concrete bottom & sides to Station the channel with native material

Explain how the channel lining prevents erosion and maintains channel stability *(attach documentation)*

See Design Calculation Notebook.

9. What is the design elevation in the channel based on?

- ☒ Subcritical flow
- ☐ Critical flow
- ☒ Supercritical flow
- ☐ Energy grade line

Is the 100-year flood profile based on the above type of flow? ..... ☐ Yes ☒ No

If no, explain: Unlined portion of channel is evaluated as sub-critical; lined portion of channel is evaluated as super-critical.

10. Is there the potential for a hydraulic jump at the following locations:

Inlet to channel? ..... ☐ Yes ☐ No
Outlet of channel? ..... ☒ Yes ☐ No
At Drop Structures? ..... ☐ Yes ☐ No
At Transitions? ..... ☒ Yes ☐ No
Other locations.? Explain:

If the answer to any of the above is yes, please explain how the hydraulic jump is controlled and the effects of the hydraulic jump on the stability of the channel.

Explain: Outlet of channel is into Equestrian Detention Basin which will control the depth of flow by the pool elevation. Minor jump occurs at junction where incoming flow impacts from west Station 162+00.

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. a. Is there any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year water surface elevations and/or the capacity of the channel? ..... ☒ Yes ☐ No

   b. Based on the conditions of the watershed and stream bed, is there a potential for sediment transport (including scour and deposition) to affect the 100-year water surface elevations and /or the capacity of the channel? ..... ☒ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

   a. What is the estimated sediment (bed) load?
   _____cfs (attach gradation curve)

   Explain method used to estimate load See Design Calculation Notebook.

   _____

   _____

   _____

   _____

   b. Is the 100-year flood velocity anywhere within the channel less than the 100-year flood velocity of the inlet? ☐ Yes ☒ No

   c. Will sediment accumulate anywhere within the channel? ☒ Yes ☐ No

   d. Will deposition or scour occur at or near the inlet? ☐ Yes ☒ No

   e. Will deposition or scour occur at or near the outlet? ☐ Yes ☒ No

Attach documentation showing affects on the hydrologic and hydraulic analyses

FEDERAL EMERGENCY MANAGEMENT AGENCY **DAM FORM**	**FEMA USE ONLY**	*O.M.B. No. 3067-0148* *Expires July 31, 1997*

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Community Name: City of Henderson

Flooding Source: Unnamed Wash

Project Name/Identifier: Equestrian Detention Basin

1. IDENTIFIER

Name of Dam: Equestrian Detention Basin

Location of dam along flood source (in terms of stream distance or cross section identifier):

Check one of the following:

- ☐ Existing dam
- ☒ New dam
- ☐ Modifications of existing dam (describe modifications)

Was the dam designed by: _____Federal agency _____State agency

_____Local government agency XX Private organization?

2. BACKGROUND

Does the dam have dedicated flood control storage? X☒ Yes ☐ No

Does the project involve revised hydrology? X☒ Yes ☐ No

If yes, complete Hydrologic Analysis Form (Form 3) and include calculations of the 100-year inflow flood hydrograph routed through the dam with the beginning pool at the normal pool elevation (spillway crest elevation for ungated spillway). Include any inflow hydrograph bulking by watershed sediment yield and provide necessary debris and sediment yield analysis.

Does the revised hydrology affect the 100-year water-surface elevation behind the dam or downstream of the dam? X☒ Yes ☐ No

If yes, complete the Riverine Hydraulic Analysis Form (Form 4) and complete the table shown on the following page.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS.

3. RESULTS

	Stillwater Elevation Behind the Dam	
	FIS	Revised
10-year		
50-year		
100-year		2069
500-year		
Normal Pool Elevation		-0-

Was long term sediment accumulation taken into consideration in determining the normal pool elevation? ☒ Yes ☐ No

Was the dam designed to withstand the hydrostatic and hydrodynamic forces associated with floods greater than the 100-year flood? ☒ Yes ☐ No

If no, and the dam has a reasonable probability of failure during the 100-year flood, please attach dam break analysis.

Provide the following data on the dam:

Dimensional Height: 28 ft.
Crest Elevation of top of dam: 2076 ft.
100-year flood storage capacity: 409 Ac-ft.
Freeboard (measured from 100-year water surface elevation): 7 ft.

Spillway(s):

Type: ☐ gated ☒ ungated

Dimensional Width: 900 ' Broad Crested Weir
Dimensional Height: 4.9
Crest Elevation of top of spillway: 2,069.00

Outlet(s):

Type: ☐ gated ☒ ungated

Width:
Height
Diameter: 48"
Invert Elevation: 2048

Explain flow regulation plan:

Are the project features, including the emergency spillway, designed to accommodate the 100-year flood discharge without overtopping the dam? ☒ Yes ☐ No

Was the dam designed in accordance with all currently applicable local, State, and Federal regulations? ☒ Yes ☐ No

If no, please provide explanation.

FEMA may request a list of regulations that have been complied with and supporting documentation demonstrating compliance with these regulations.

Attach copy of formal operation and maintenance plan

Answer N/A to any questions which are not applicable

APPENDIX B

HEC-1

EQUOAL1.HC1

HEC1 S/N: 1333000222 HMVersion: 6.40 Data File: equoall.HC1

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*           SEPTEMBER 1990              *
*            VERSION 4.0                *
*                                       *
*  RUN DATE  12/11/1998  TIME  14:48:42 *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

```
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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::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
:::                                    :::
:::  Full Microcomputer Implementation :::
:::                 by                 :::
:::        Haestad Methods, Inc.       :::
:::                                    :::
::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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  REPRODUCTION OF PBS&J RUN RACETRACK CONCEPTUAL STUDY
    2     ID  AND PDG EQUEST. DET. BASIN COMBINATION FOR NEW LOMR
    3     ID  FLOW EVALUATION INCLUDES NEW WAGON WHEEL INTERCHANGE AND CULVERTS CROSSING
    4     ID  BOLDER HIGHWAY AND NEW EQUESTRIAN & MAGIC WAY INLET
    5     ID  ASSUMES NEW CI-DETENTION BASIN IS COMPLETED
    6     ID  DOES NOT INCLUDE FLOWS NORTH IN RACETRACK
    7     ID  FILE NAME: EQUOALI.HC1
    8     ID  SDN 5 TOTAL BASIN AREA IS 9.75 SM
    9     ID  RAINFALL IS 3.43 WITH A DRAF OF .857 RESULTS IN A PB OF 2.94
   10     IT       5       0       0     300
   11     IO       5       0       0
   12     IN       5
   13     JR    PREC     1.0

   14     KK  OFF-16
   15     BA  0.1149
   16     PB    2.94
   17     PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
   18     PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
   19     PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
   20     PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
   21     PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
   22     PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
   23     PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
   24     PC    .997    .999   1.00
   25     LS       0      83
   26     UD   0.096

   27     KK    R-16
   28     RK    1000    .020    .035            TRAP      20       2

   29     KK  OFF-15
   30     BA  0.3274
   31     LS       0      87
   32     UD   0.323

   33     KK      C1
   34     HC       2

   35     KK    R-C1
   36     RK    4000   0.035   0.026            TRAP      40       2

   37     KK  OFF-14
   38     BA  0.2739
   39     LS       0      68
   40     UD   0.391

   41     KK    R-14
   42     RK    2500   0.030   0.025            TRAP      20       2
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  43      KK  OFF-10
  44      BA  0.4227
  45      LS       0      87
  46      UD   0.758

  47      KK  DIVERT
  48      KM   DIVERT1 FLOWS CONVEYED INTO CULVERT "A" STA 296+24
  49      DT  DIVER1
  50      DI       0      37     126     260     502
  51      DQ       0      10      20      30      40

  52      KK      C2
  53      HC       3

  54      KK    R-C2
  55      RK    2800   0.018   0.025           TRAP      70       2

  56      KK   OFF-9
  57      BA  0.1426
  58      LS       0      79
  59      UD   0.313

  60      KK     R-9
  61      RK    1900   0.021   0.025           TRAP      30       2

  62      KK   OFF-4
  63      BA  0.0837
  64      LS       0      88
  65      UD   0.359

  66      KK      C3
  67      HC       3

  68      KK    R-C3
  69      RK    1180   0.017   0.025           TRAP      70       2

  70      KK  OFF-13
  71      BA  0.5256
  72      LS       0      85
  73      UD   0.250

  74      KK    R-13
  75      RK    1000   0.030   0.035           TRAP      20       2

  76      KK   OFF-8
  77      BA  0.1315
  78      LS       0      79
  79      UD   0.257
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  80      KK     C4
  81      HC      2

  82      KK   OFF-3
  83      PB    3.29
  84      BA  0.1485
  85      LS       0      92
  86      UD   0.360

  87      KK     C5
  88      HC      3

  89      KK  DIVER2
  90      KM  DIVERT CULVERT AND BLDR. HWY. OVERFLOWS INTO MAGIC WAY 844+00, 843+52, 840+46
  91      DT  DIVER2
  92      DI       0    1255    2000
  93      DQ       0     116     900

  94      KK    R-C5
  95      KM  ROUTE COMBINATION 5 TO SUBBASIN OFF-2C
  96      RK    1300   0.010   0.025           TRAP      20       2

  97      KK  OFF-2C
  98      BA  0.0653
  99      LS       0      77
 100      UD   0.404

 101      KK     C6
 102      HC      2

 103      KK  DIVER3
 104      KM   DIVERT CULVERT FLOWS INTO SUBBASIN OFF-23 832+02, 825+52, 834+82
 105      DT  DIVER3
 106      DI       0    1171    2000
 107      DQ       0     217     900

 108      KK    R-C6
 109      RK    1300   0.011   0.025           TRAP      20       2

 110      KK  OFF-11
 111      PB    3.43
 112      BA  0.2168
 113      LS       0      85
 114      UD   0.328

 115      KK  OFF-12
 116      BA  0.0782
 117      LS       0      77
 118      UD   0.285
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  119     KK      C7
  120     HC       2

  121     KK   R-C7a
  122     RK     240   0.027   0.014           TRAP      10       0

  123     KK   R-C7b
  124     RK    1100   0.027   0.035           TRAP      20       2

  125     KK   OFF-6
  126     PB    3.29
  127     BA  0.0336
  128     LS       0      77
  129     UD   0.180

  130     KK      C8
  131     HC       2

  132     KK   R-C8a
  133     RK    2700   0.024   0.035           TRAP      30       2

  134     KK  OFF-2B
  135     BA  0.1359
  136     LS       0      77
  137     UD   0.404

  138     KK      C9
  139     HC       2

  140     KK     C10
  141     HC       2

  142     KK  DIVER4
  143     KM   DIVERT CULVERT FLOWS AND BOULDER HIGHWAY OVERFLOWS INTO SUBBASIN OFF-21
  144     KM  816+22, 819+84
  145     DT  DIVER4
  146     DI       0    1234    2000
  147     DQ       0     111    1000

  148     KK   R-C10
  149     RK    1200   0.010   0.025           TRAP      20       2

  150     KK  OFF-2A
  151     BA  0.0747
  152     LS       0      77
  153     UD   0.380

  154     KK     C11
  155     HC       2
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  156     KK  DIVER5
  157     KM   DIVERT CULVERT FLOWS INTO SUBBASIN OFF-19 807+37
  158     DT  DIVER5
  159     DI       0     798    2000
  160     DQ       0      70     970

  161     KK  OFF-21
  162     BA  0.0435
  163     LS       0      85
  164     UD   0.197

  165     KK    RET4
  166     DR  DIVER4

  167     KK     CD4
  168     HC       2

  169     KK    R-21
  170     RK    1700   0.005   0.016           TRAP     100       1

  171     KK  OFF-23
  172     BA  0.0587
  173     LS       0      85
  174     UD   0.250

  175     KK    RET3
  176     DR  DIVER3

  177     KK     CD3
  178     HC       2

  179     KK     C17
  180     HC       2

  181     KK   C5CAb
  182     BA  1.1309
  183     LS       0      68
  184     UD    0.28

  185     KK   QSPLT
  186     DT  DIVER9
  187     DI       0     148     200     300     400
  188     DQ       0       0      52     152     252

  189     KK    RET1
  190     DR  DIVER1

  191     KK   RDIV1
  192     RK    1200   0.004   0.016           TRAP       0      50
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  193     KK     CC1
  194     HC       2

  195     KK   C5CAa
  196     BA  0.3541
  197     LS       0      85
  198     UD   0.558

  199     KK    RET2
  200     DR  DIVER2

  201     KK     CD2
  202     HC       2

  203     KK     C19
  204     HC       2

  205     KK  DIVER7
  206     KM   DIVERT FLOW INTO DET BASIN AT EQUESTRIAN DRIVE MAGIC WAY INLET SYSTEM
  207     DT  DIVER7
  208     DI       0    1151
  209     DQ       0     488

  210     KK     C20
  211     HC       2

  212     KK    C5FD
  213     BA  0.1851
  214     PB    2.97
  215     LS       0      85
  216     UD   0.285

  217     KK    C5FB
  218     RK     500   0.015    0.25          TRAP      35       3

  219     KK    C5FA
  220     BA  0.5380
  221     LS       0      88
  222     UD    0.23

  223     KK    C5FB
  224     RK    4100  0.0615   0.040          TRAP     200       2

  225     KK    C5FB
  226     BA  0.1707
  227     LS       0      68
  228     UD    0.35

  229     KK    C5FB
  230     HC       3
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  231     KK     100
  232     RK    1500   0.015   0.030          TRAP      35       3

  233     KK     C5FC
  234     BA  0.1906
  235     LS       0      79
  236     UD    0.30

  237     KK     100
  238     HC       2       0

  239     KK     C5EA
  240     RK    1300   0.015   0.030          TRAP      35       3

  241     KK     C5EA
  242     BA  0.5191
  243     LS       0      86
  244     UD    0.62

  245     KK     C5EA
  246     HC       2

  247     KK     C5EC
  248     RK    2500   0.015   0.030          TRAP      35       3

  249     KK     C5EB
  250     BA  0.5885
  251     LS       0      73
  252     UD    0.64

  253     KK     C5EC
  254     RK    2000    0.05    0.40          TRAP     200       3

  255     KK     C5EC
  256     BA  0.2648
  257     LS       0      73
  258     UD    0.25

  259     KK     200
  260     HC       3

  261     KK     300
  262     RK    2100   0.005   0.030          TRAP      35       3

  263     KK     C5ED
  264     BA  0.1474
  265     LS       0      80
  266     UD    0.17
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  267     KK     300
  268     HC       2

  269     KK     400
  270     RK    1000   0.005   0.030          TRAP     35       3

  271     KK    C5DA
  272     BA  1.0241
  273     LS       0      86
  274     UD    0.40

  275     KK     400
  276     HC       2

  277     KK     500
  278     RK    1000    0.04    0.03          TRAP     35       6

  279     KK    C5DB
  280     BA  0.6505
  281     LS       0      85
  282     UD   0.515

  283     KK     500
  284     HC       2

  285     KK   BASIN
  286     RK    3000   0.015   0.015          TRAP     20       2

  287     KK    C5DC
  288     BA  1.0180
  289     LS       0      69
  290     UD   0.685

  291     KK   BASIN
  292     HC       2

  293     KK    RET9
  294     DR  DIVER9

  295     KK    C5CB
  296     BA  0.1654
  297     LS       0      58
  298     UD    0.49

  299     KK   BASIN
  300     HC       4

  301     KK     DET
  302     KO       1       1       0       0      21
  303     RS       1    STOR       0
  304     SV       0       2      13      31      61      97     118     140     171     200
  305     SV     229     261     290     315     344     379     409     437     470     504
  306     SE    2048    2050    2052    2054    2056    2058    2059    2060    2061    2062
  307     SE    2063    2064    2065    2066    2067    2068    2069    2070    2071    2072
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  308     SQ      0     37     80    117    142    163    173    182    191    198
  309     SQ    206    213    221    228    235    242    248   2755   7761  14467
  310     SS   2069    900    3.0    1.5

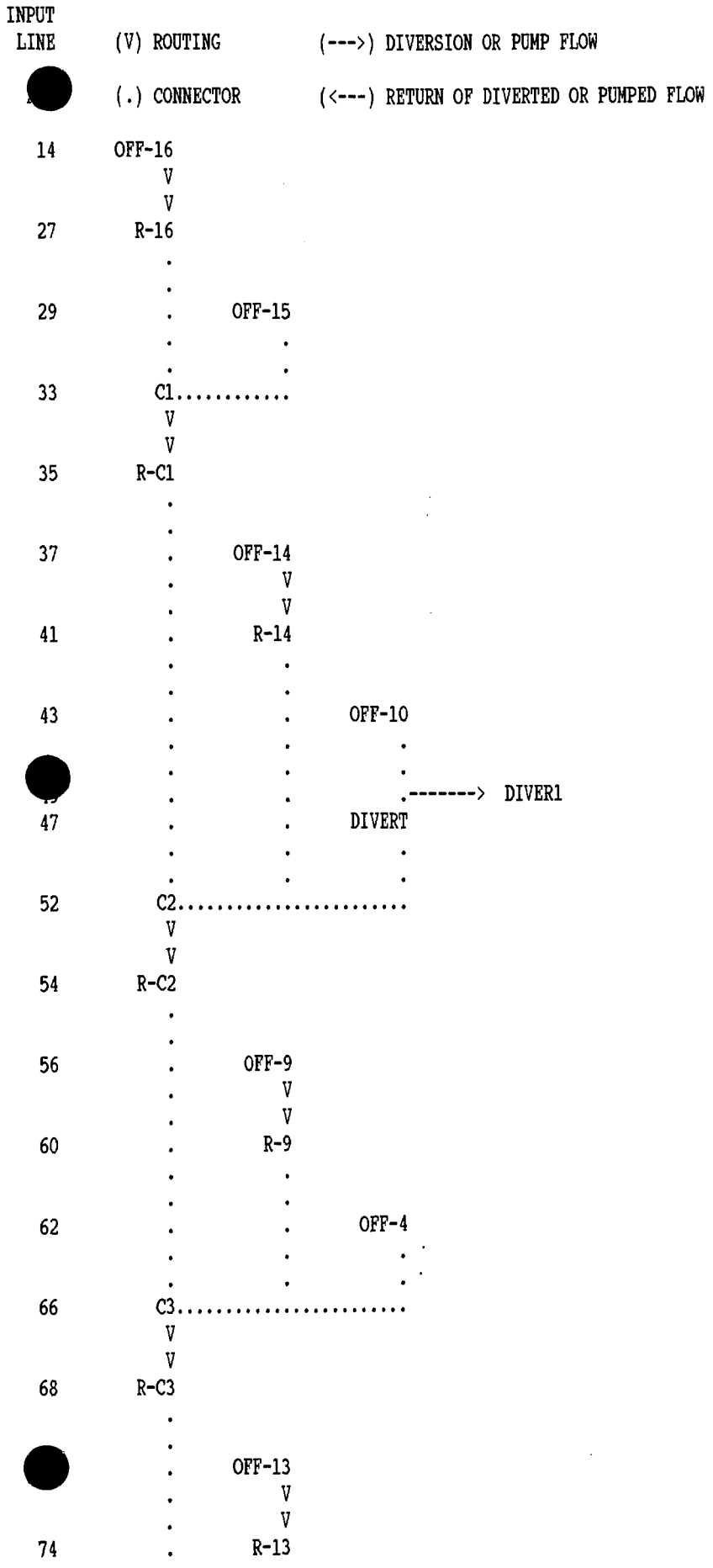
  311     KK  OFF-24
  312     BA  0.0581
  313     LS      0     85
  314     UD  0.183

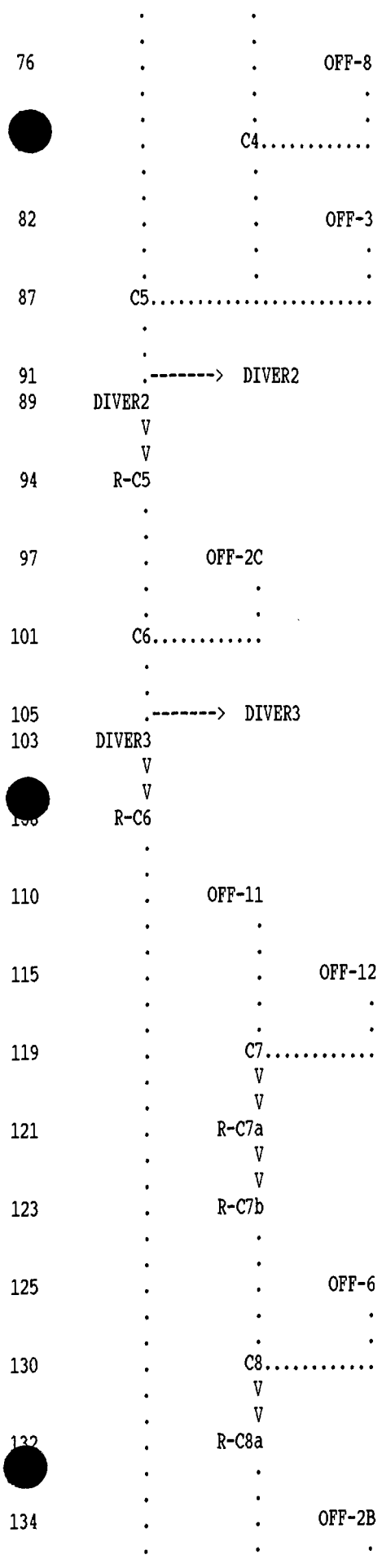
  315     KK   RET7
  316     DR  DIVER7

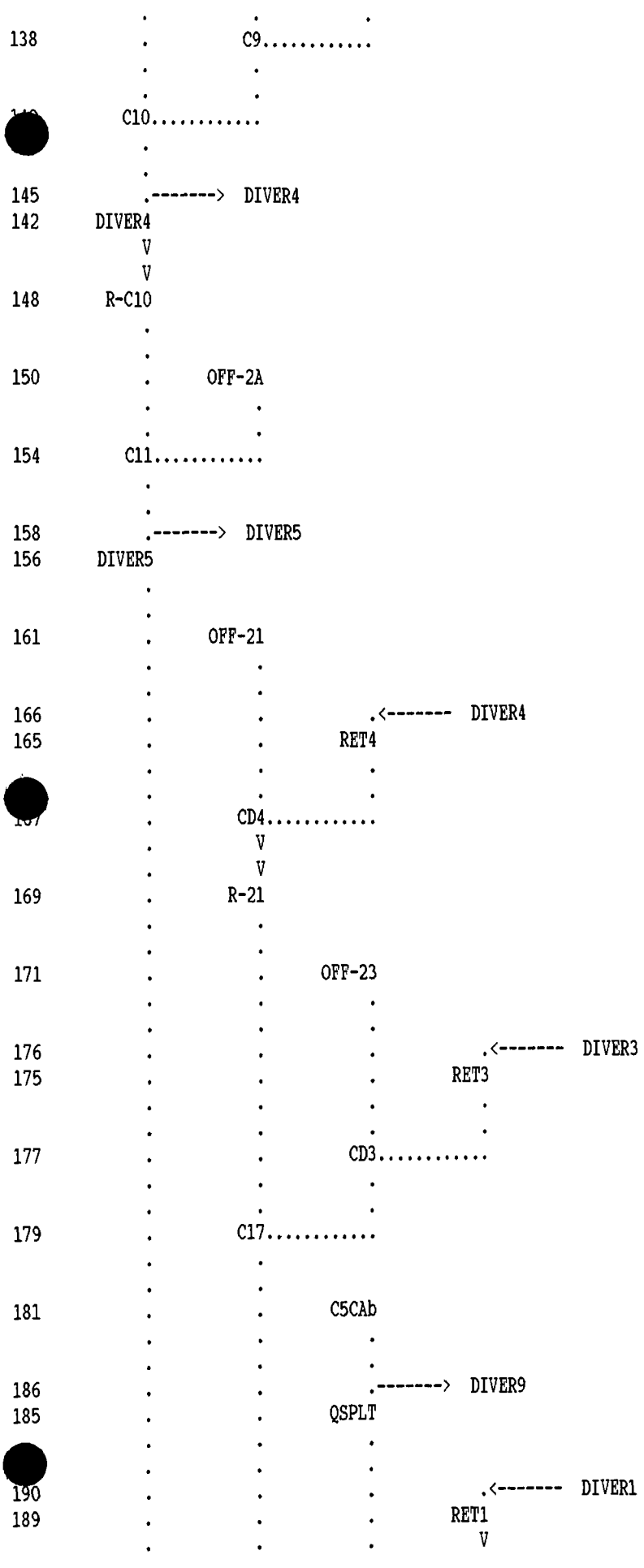
  317     KK    R24
  318     RK    500  0.012  0.020          TRAP    100       1

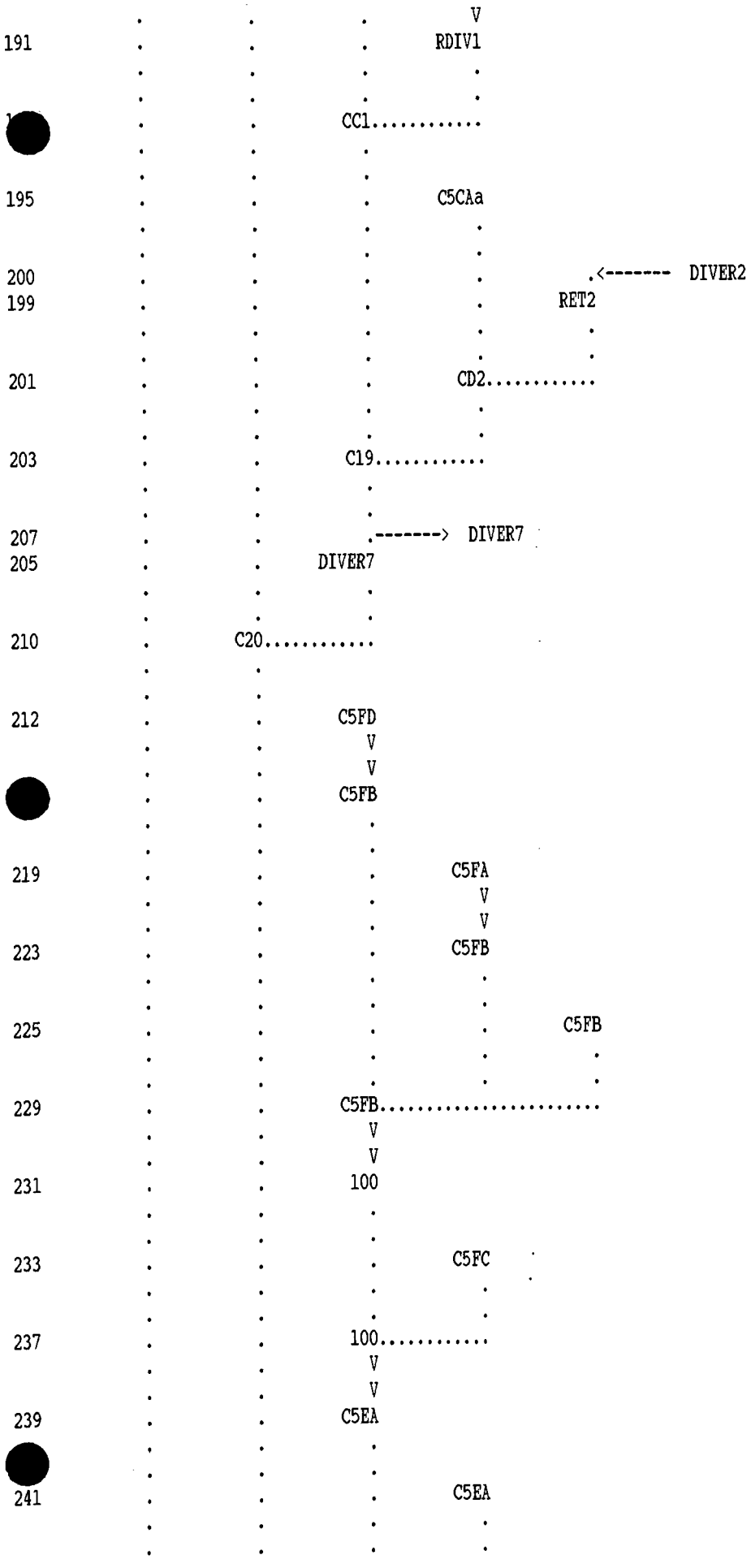
  319     KK  MAGIC
  320     HC      2
  321     ZZ
```

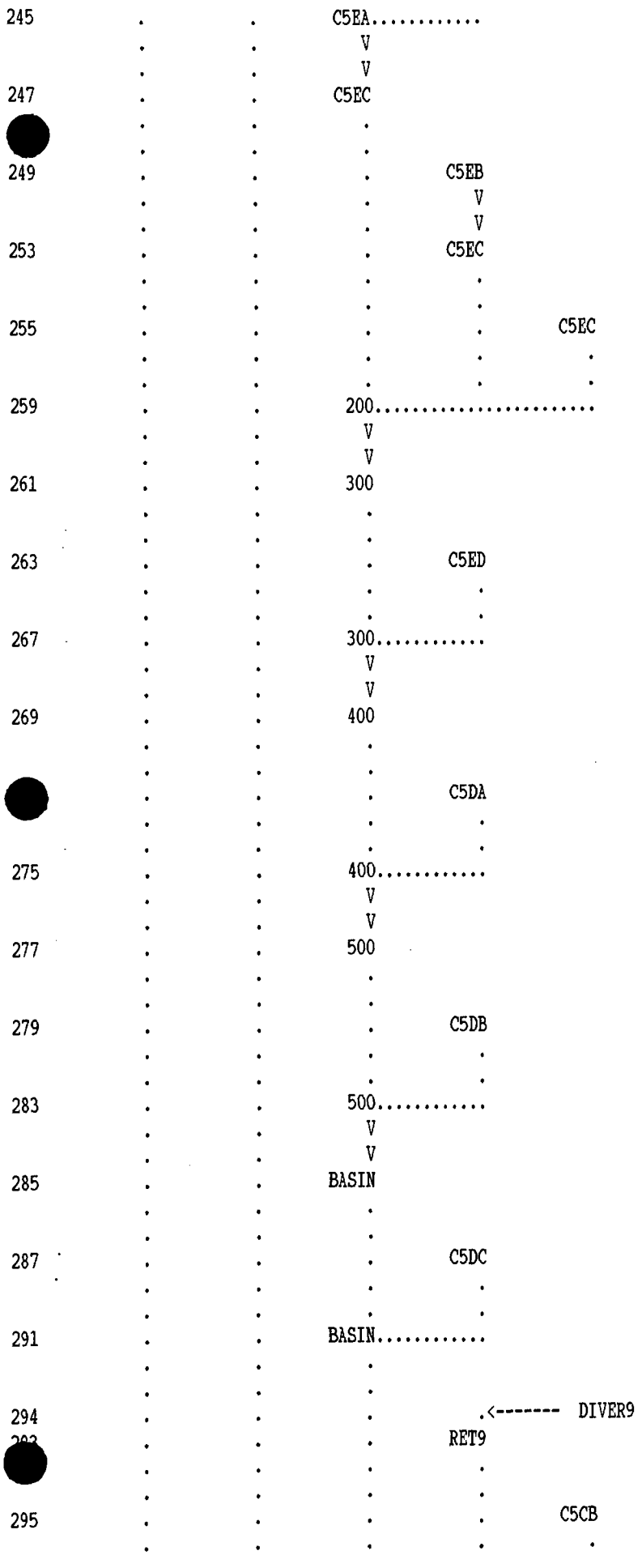
SCHEMATIC DIAGRAM OF STREAM NETWORK

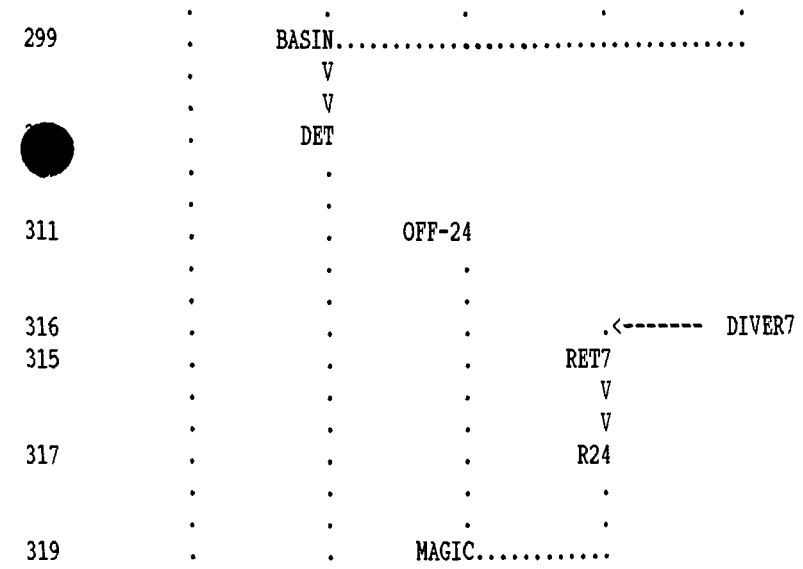



76
OFF-8
C4
82
OFF-3
87
C5
91
DIVER2
89
DIVER2
94
R-C5
97
OFF-2C
101
C6
105
DIVER3
103
DIVER3
R-C6
110
OFF-11
115
OFF-12
119
C7
121
R-C7a
123
R-C7b
125
OFF-6
130
C8
R-C8a
134
OFF-2B


138 C9
C10
145 DIVER4
142 DIVER4
148 R-C10
150 OFF-2A
154 C11
158 DIVER5
156 DIVER5
161 OFF-21
166 DIVER4
165 RET4
CD4
169 R-21
171 OFF-23
176 DIVER3
175 RET3
177 CD3
179 C17
181 C5CAb
186 DIVER9
185 QSPLT
190 DIVER1
189 RET1


V
191 RDIV1
CC1
195 C5CAa
200 .<------- DIVER2
199 RET2
201 CD2
203 C19
207 .-------> DIVER7
205 DIVER7
210 C20
212 C5FD
V
V
C5FB
219 C5FA
V
V
223 C5FB
225 C5FB
229 C5FB
V
V
231 100
233 C5FC
237 100
V
V
239 C5EA
241 C5EA


245
C5EA
247
C5EC
249
C5EB
253
C5EC
255
C5EC
259
200
261
300
263
C5ED
267
300
269
400
C5DA
275
400
277
500
279
C5DB
283
500
285
BASIN
287
C5DC
291
BASIN
294
DIVER9
RET9
295
C5CB



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

HEC1 S/N: 1333000222 HMVersion: 6.40 Data File: equoal1.HC1

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  12/11/1998  TIME  14:48:42 *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

REPRODUCTION OF PBS&J RUN RACETRACK CONCEPTUAL STUDY
AND PDG EQUEST. DET. BASIN COMBINATION FOR NEW LOMR
FLOW EVALUATION INCLUDES NEW WAGON WHEEL INTERCHANGE AND CULVERTS CROSSING
BOLDER HIGHWAY AND NEW EQUESTRIAN & MAGIC WAY INLET
ASSUMES NEW CI-DETENTION BASIN IS COMPLETED
DOES NOT INCLUDE FLOWS NORTH IN RACETRACK
FILE NAME: EQUOALI.HC1
SDN 5 TOTAL BASIN AREA IS 9.75 SM
RAINFALL IS 3.43 WITH A DRAF OF .857 RESULTS IN A PB OF 2.94

11 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		300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		0055	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 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

R MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
1.00

*** ***

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          **************
          *            *
301 KK    *       DET  *
          *            *
          **************
```

302 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	1	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	300	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.083	TIME INTERVAL IN HOURS

HYDROGRAPH ROUTING DATA

303 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

3[illegible]W STORAGE	.0	2.0	13.0	31.0	61.0	97.0	118.0	140.0	171.0	200.0
	229.0	261.0	290.0	315.0	344.0	379.0	409.0	437.0	470.0	504.0
306 SE ELEVATION	2048.00	2050.00	2052.00	2054.00	2056.00	2058.00	2059.00	2060.00	2061.00	2062.00
	2063.00	2064.00	2065.00	2066.00	2067.00	2068.00	2069.00	2070.00	2071.00	2072.00
308 SQ DISCHARGE	0.	37.	80.	117.	142.	163.	173.	182.	191.	198.
	206.	213.	221.	228.	235.	242.	248.	2755.	7761.	14467.

310 SS SPILLWAY

CREL	2069.00	SPILLWAY CREST ELEVATION
SPWID	900.00	SPILLWAY WIDTH
COQW	3.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	2.00	13.00	31.00	61.00	97.00	118.00	140.00	171.00	200.00
OUTFLOW	.00	37.00	80.00	117.00	142.00	163.00	173.00	182.00	191.00	198.00
ELEVATION	2048.00	2050.00	2052.00	2054.00	2056.00	2058.00	2059.00	2060.00	2061.00	2062.00
STORAGE	229.00	261.00	290.00	315.00	344.00	379.00	409.00	437.00	470.00	504.00
OUTFLOW	206.00	213.00	221.00	228.00	235.00	242.00	248.00	2755.00	7761.00	14467.00
ELEVATION	2063.00	2064.00	2065.00	2066.00	2067.00	2068.00	2069.00	2070.00	2071.00	2072.00

****

HYDROGRAPH AT STATION DET
PLAN 1, RATIO = 1.00

DA	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000	1	0.	.0	2048.0	1		0820	101	241.	374.0	2067.9	1		1640	201	204.	222.1	2062.8
1	0005	2	0.	.0	2048.0	1		0825	102	241.	372.4	2067.8	1		1645	202	204.	220.7	2062.7
1	0010	3	0.	.0	2048.0	1		0830	103	240.	370.9	2067.8	1		1650	203	203.	219.3	2062.7
1	0015	4	0.	.0	2048.0	1		0835	104	240.	369.3	2067.7	1		1655	204	203.	217.9	2062.6
1	0020	5	0.	.0	2048.0	1		0840	105	240.	367.7	2067.7	1		1700	205	203.	216.5	2062.6
1	0025	6	0.	.0	2048.0	1		0845	106	239.	366.1	2067.6	1		1705	206	202.	215.1	2062.5
1	0030	7	0.	.0	2048.0	1		0850	107	239.	364.5	2067.6	1		1710	207	202.	213.7	2062.5
1	0035	8	0.	.0	2048.0	1		0855	108	239.	362.9	2067.5	1		1715	208	201.	212.4	2062.4
1	0040	9	1.	.1	2048.1	1		0900	109	238.	361.4	2067.5	1		1720	209	201.	211.0	2062.4
1	0045	10	2.	.1	2048.1	1		0905	110	238.	359.8	2067.5	1		1725	210	201.	209.6	2062.3
1	0050	11	4.	.2	2048.2	1		0910	111	238.	358.2	2067.4	1		1730	211	200.	208.2	2062.3
1	0055	12	7.	.4	2048.4	1		0915	112	238.	356.6	2067.4	1		1735	212	200.	206.8	2062.2
1	0100	13	10.	.5	2048.5	1		0920	113	237.	355.0	2067.3	1		1740	213	200.	205.5	2062.2
1	0105	14	14.	.7	2048.7	1		0925	114	237.	353.4	2067.3	1		1745	214	199.	204.1	2062.1
1	0110	15	18.	1.0	2049.0	1		0930	115	237.	351.8	2067.2	1		1750	215	199.	202.7	2062.1
1	0115	16	21.	1.2	2049.2	1		0935	116	236.	350.2	2067.2	1		1755	216	198.	201.3	2062.0
1	0120	17	25.	1.4	2049.4	1		0940	117	236.	348.6	2067.1	1		1800	217	198.	200.0	2062.0
1	0125	18	29.	1.6	2049.6	1		0945	118	236.	347.0	2067.1	1		1805	218	198.	198.6	2062.0
1	0130	19	33.	1.8	2049.8	1		0950	119	235.	345.4	2067.0	1		1810	219	197.	197.3	2061.9
1	0135	20	37.	2.1	2050.0	1		0955	120	235.	343.8	2067.0	1		1815	220	197.	195.9	2061.9
1	0140	21	39.	2.6	2050.1	1		1000	121	235.	342.2	2066.9	1		1820	221	197.	194.6	2061.8
1	0145	22	42.	3.2	2050.2	1		1005	122	234.	340.6	2066.9	1		1825	222	196.	193.2	2061.8
1	0150	23	45.	4.0	2050.4	1		1010	123	234.	339.0	2066.8	1		1830	223	196.	191.8	2061.7
1	0155	24	48.	4.8	2050.5	1		1015	124	233.	337.4	2066.8	1		1835	224	196.	190.5	2061.7
1	0200	25	52.	5.8	2050.7	1		1020	125	233.	335.8	2066.7	1		1840	225	195.	189.2	2061.6
1	0205	26	56.	6.8	2050.9	1		1025	126	233.	334.3	2066.7	1		1845	226	195.	187.8	2061.6
1	0210	27	61.	8.1	2051.1	1		1030	127	232.	332.7	2066.6	1		1850	227	195.	186.5	2061.5
1	0215	28	66.	9.5	2051.4	1		1035	128	232.	331.1	2066.6	1		1855	228	194.	185.1	2061.5
1	0220	29	72.	11.0	2051.6	1		1040	129	231.	329.5	2066.5	1		1900	229	194.	183.8	2061.4
1	0225	30	78.	12.5	2051.9	1		1045	130	231.	327.9	2066.4	1		1905	230	194.	182.5	2061.4
1	0230	31	82.	14.0	2052.1	1		1050	131	231.	326.3	2066.4	1		1910	231	193.	181.1	2061.3
1	0235	32	85.	15.5	2052.3	1		1055	132	230.	324.8	2066.3	1		1915	232	193.	179.8	2061.3
1	0240	33	88.	17.0	2052.4	1		1100	133	230.	323.2	2066.3	1		1920	233	193.	178.5	2061.3
1	0245	34	91.	18.3	2052.6	1		1105	134	230.	321.6	2066.2	1		1925	234	192.	177.1	2061.2
1	0250	35	94.	19.7	2052.7	1		1110	135	229.	320.1	2066.2	1		1930	235	192.	175.8	2061.2
1	0255	36	96.	21.0	2052.9	1		1115	136	229.	318.5	2066.1	1		1935	236	192.	174.5	2061.1
1	0300	37	100.	22.5	2053.1	1		1120	137	228.	316.9	2066.1	1		1940	237	192.	173.2	2061.1
1	0305	38	103.	24.4	2053.3	1		1125	138	228.	315.4	2066.0	1		1945	238	191.	171.9	2061.0
1	0310	39	108.	26.8	2053.5	1		1130	139	228.	313.8	2066.0	1		1950	239	191.	170.5	2061.0
1	0315	40	115.	30.0	2053.9	1		1135	140	227.	312.2	2065.9	1		1955	240	190.	169.2	2060.9
1	0320	41	120.	34.5	2054.2	1		1140	141	227.	310.7	2065.8	1		2000	241	190.	167.9	2060.9
1	0325	42	125.	40.9	2054.7	1		1145	142	226.	309.1	2065.8	1		2005	242	190.	166.6	2060.9
1	0330	43	133.	50.1	2055.3	1		1150	143	226.	307.6	2065.7	1		2010	243	189.	165.3	2060.8
1	0335	44	143.	62.5	2056.1	1		1155	144	225.	306.0	2065.6	1		2015	244	189.	164.0	2060.8
1	0340	45	152.	78.5	2057.0	1		1200	145	225.	304.5	2065.6	1		2020	245	189.	162.7	2060.7
1	0345	46	163.	96.9	2058.0	1		1205	146	225.	302.9	2065.5	1		2025	246	188.	161.4	2060.7
1	0350	47	172.	116.5	2058.9	1		1210	147	224.	301.4	2065.5	1		2030	247	188.	160.1	2060.6
1	0355	48	180.	136.1	2059.8	1		1215	148	224.	299.9	2065.4	1		2035	248	187.	158.8	2060.6
1	0400	49	186.	155.0	2060.5	1		1220	149	223.	298.3	2065.3	1		2040	249	187.	157.5	2060.6
1	0405	50	191.	172.6	2061.1	1		1225	150	223.	296.8	2065.3	1		2045	250	187.	156.2	2060.5
1	0410	51	195.	188.7	2061.6	1		1230	151	222.	295.3	2065.2	1		2050	251	186.	155.0	2060.5
1	0415	52	199.	203.2	2062.1	1		1235	152	222.	293.7	2065.1	1		2055	252	186.	153.7	2060.4
1	0420	53	202.	216.3	2062.6	1		1240	153	222.	292.2	2065.1	1		2100	253	186.	152.4	2060.4

1	0425	54	206.	228.0	2063.0	*	1	1245	154	221.	290.7	2065.0	*	1	2105	254	185.	151.1	2060.4
1	0430	55	208.	238.7	2063.3	*	1	1250	155	221.	289.2	2065.0	*	1	2110	255	185.	149.9	2060.3
1	0435	56	210.	248.5	2063.6	*	1	1255	156	220.	287.7	2064.9	*	1	2115	256	184.	148.6	2060.3
1	0440	57	212.	258.0	2063.9	*	1	1300	157	220.	286.2	2064.9	*	1	2120	257	184.	147.3	2060.2
1	0445	58	215.	267.8	2064.2	*	1	1305	158	220.	284.7	2064.8	*	1	2125	258	184.	146.0	2060.2
1	0450	59	218.	278.4	2064.6	*	1	1310	159	219.	283.1	2064.8	*	1	2130	259	183.	144.8	2060.2
1	0455	60	221.	289.9	2065.0	*	1	1315	160	219.	281.6	2064.7	*	1	2135	260	183.	143.5	2060.1
1	0500	61	224.	302.3	2065.5	*	1	1320	161	218.	280.1	2064.7	*	1	2140	261	183.	142.3	2060.1
1	0505	62	228.	315.0	2066.0	*	1	1325	162	218.	278.6	2064.6	*	1	2145	262	182.	141.0	2060.0
1	0510	63	231.	327.4	2066.4	*	1	1330	163	217.	277.1	2064.6	*	1	2150	263	182.	139.8	2060.0
1	0515	64	234.	338.9	2066.8	*	1	1335	164	217.	275.7	2064.5	*	1	2155	264	181.	138.5	2059.9
1	0520	65	236.	349.2	2067.1	*	1	1340	165	217.	274.2	2064.5	*	1	2200	265	181.	137.3	2059.9
1	0525	66	238.	358.2	2067.4	*	1	1345	166	216.	272.7	2064.4	*	1	2205	266	180.	136.0	2059.8
1	0530	67	239.	365.9	2067.6	*	1	1350	167	216.	271.2	2064.4	*	1	2210	267	180.	134.8	2059.8
1	0535	68	241.	372.5	2067.8	*	1	1355	168	215.	269.7	2064.3	*	1	2215	268	179.	133.5	2059.7
1	0540	69	242.	378.0	2068.0	*	1	1400	169	215.	268.2	2064.2	*	1	2220	269	179.	132.3	2059.6
1	0545	70	243.	382.6	2068.1	*	1	1405	170	215.	266.8	2064.2	*	1	2225	270	178.	131.1	2059.6
1	0550	71	243.	386.4	2068.2	*	1	1410	171	214.	265.3	2064.1	*	1	2230	271	178.	129.8	2059.5
1	0555	72	244.	389.5	2068.4	*	1	1415	172	214.	263.8	2064.1	*	1	2235	272	177.	128.6	2059.5
1	0600	73	245.	392.1	2068.4	*	1	1420	173	213.	262.3	2064.0	*	1	2240	273	177.	127.4	2059.4
1	0605	74	245.	394.2	2068.5	*	1	1425	174	213.	260.9	2064.0	*	1	2245	274	176.	126.2	2059.4
1	0610	75	245.	395.8	2068.6	*	1	1430	175	213.	259.4	2064.0	*	1	2250	275	176.	125.0	2059.3
1	0615	76	246.	397.1	2068.6	*	1	1435	176	212.	258.0	2063.9	*	1	2255	276	175.	123.8	2059.3
1	0620	77	246.	398.0	2068.6	*	1	1440	177	212.	256.5	2063.9	*	1	2300	277	175.	122.6	2059.2
1	0625	78	246.	398.6	2068.7	*	1	1445	178	212.	255.0	2063.8	*	1	2305	278	174.	121.4	2059.2
1	0630	79	246.	398.9	2068.7	*	1	1450	179	211.	253.6	2063.8	*	1	2310	279	174.	120.2	2059.1
1	0635	80	246.	398.9	2068.7	*	1	1455	180	211.	252.1	2063.7	*	1	2315	280	173.	119.0	2059.0
1	0640	81	246.	398.6	2068.7	*	1	1500	181	211.	250.7	2063.7	*	1	2320	281	173.	117.8	2059.0
1	0645	82	246.	398.2	2068.6	*	1	1505	182	210.	249.2	2063.6	*	1	2325	282	172.	116.6	2058.9
1	0650	83	246.	397.6	2068.6	*	1	1510	183	210.	247.8	2063.6	*	1	2330	283	172.	115.4	2058.9
1	0655	84	246.	396.8	2068.6	*	1	1515	184	210.	246.3	2063.5	*	1	2335	284	171.	114.2	2058.8
1	0700	85	245.	396.0	2068.6	*	1	1520	185	209.	244.9	2063.5	*	1	2340	285	171.	113.0	2058.8
1	0705	86	245.	395.0	2068.5	*	1	1525	186	209.	243.5	2063.5	*	1	2345	286	170.	111.9	2058.7
1	0710	87	245.	393.9	2068.5	*	1	1530	187	209.	242.0	2063.4	*	1	2350	287	170.	110.7	2058.7
1	0715	88	245.	392.7	2068.5	*	1	1535	188	209.	240.6	2063.4	*	1	2355	288	169.	109.5	2058.6
1	0720	89	244.	391.5	2068.4	*	1	1540	189	208.	239.2	2063.3	*	2	0000	289	168.	108.4	2058.5
1	0725	90	244.	390.2	2068.4	*	1	1545	190	208.	237.7	2063.3	*	2	0005	290	168.	107.2	2058.5
1	0730	91	244.	388.8	2068.3	*	1	1550	191	208.	236.3	2063.2	*	2	0010	291	167.	106.1	2058.4
1	0735	92	244.	387.4	2068.3	*	1	1555	192	207.	234.9	2063.2	*	2	0015	292	167.	104.9	2058.4
1	0740	93	243.	386.0	2068.2	*	1	1600	193	207.	233.4	2063.1	*	2	0020	293	166.	103.8	2058.3
1	0745	94	243.	384.6	2068.2	*	1	1605	194	207.	232.0	2063.1	*	2	0025	294	166.	102.6	2058.3
1	0750	95	243.	383.1	2068.1	*	1	1610	195	206.	230.6	2063.0	*	2	0030	295	165.	101.5	2058.2
1	0755	96	243.	381.6	2068.1	*	1	1615	196	206.	229.2	2063.0	*	2	0035	296	165.	100.3	2058.2
1	0800	97	242.	380.1	2068.0	*	1	1620	197	206.	227.8	2063.0	*	2	0040	297	164.	99.2	2058.1
1	0805	98	242.	378.6	2068.0	*	1	1625	198	205.	226.3	2062.9	*	2	0045	298	164.	98.1	2058.1
1	0810	99	242.	377.1	2067.9	*	1	1630	199	205.	224.9	2062.9	*	2	0050	299	163.	97.0	2058.0
1	0815	100	241.	375.5	2067.9	*	1	1635	200	204.	223.5	2062.8	*	2	0055	300	162.	95.8	2057.9
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
246.	6.58	(CFS)	239.	194.	187.	187.
		(INCHES)	.316	1.022	1.022	1.022
		(AC-FT)	119.	384.	384.	384.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)		6-HR	24-HR	72-HR	24.92-HR
399.	6.58		367.	223.	215.	215.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
2068.66	6.58	2067.66	2062.27	2061.75	2061.75

CUMULATIVE AREA = 7.05 SQ MI

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 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
					1.00
HYDROGRAPH AT	OFF-16	.11	1	FLOW	109.
				TIME	3.50
ROUTED TO	R-16	.11	1	FLOW	101.
				TIME	3.50
HYDROGRAPH AT	OFF-15	.33	1	FLOW	239.
				TIME	3.67
2 COMBINED AT	C1	.44	1	FLOW	312.
				TIME	3.58
ROUTED TO	R-C1	.44	1	FLOW	308.
				TIME	3.67
HYDROGRAPH AT	OFF-14	.27	1	FLOW	64.
				TIME	3.83
ROUTED TO	R-14	.27	1	FLOW	63.
				TIME	3.92
HYDROGRAPH AT	OFF-10	.42	1	FLOW	204.
				TIME	4.17
DIVERSION TO	DIVER1	.42	1	FLOW	26.
				TIME	4.17
HYDROGRAPH AT	DIVERT	.42	1	FLOW	178.
				TIME	4.17
3 COMBINED AT	C2	1.14	1	FLOW	474.
				TIME	3.83
ROUTED TO	R-C2	1.14	1	FLOW	473.
				TIME	3.83
HYDROGRAPH AT	OFF-9	.14	1	FLOW	74.
				TIME	3.67
ROUTED TO	R-9	.14	1	FLOW	73.
				TIME	3.75
HYDROGRAPH AT	OFF-4	.08	1	FLOW	61.
				TIME	3.75
3 COMBINED AT	C3	1.37	1	FLOW	601.
				TIME	3.83
ROUTED TO	R-C3	1.37	1	FLOW	600.

				TIME	3.83
HYDROGRAPH AT	OFF-13	.53	1	FLOW	395.
				TIME	3.67
ROUTED TO	R-13	.53	1	FLOW	393.
				TIME	3.67
HYDROGRAPH AT	OFF-8	.13	1	FLOW	75.
				TIME	3.67
2 COMBINED AT	C4	.66	1	FLOW	468.
				TIME	3.67
HYDROGRAPH AT	OFF-3	.15	1	FLOW	141.
				TIME	3.75
3 COMBINED AT	C5	2.17	1	FLOW	1153.
				TIME	3.75
DIVERSION TO	DIVER2	2.17	1	FLOW	107.
				TIME	3.75
HYDROGRAPH AT	DIVER2	2.17	1	FLOW	1046.
				TIME	3.75
ROUTED TO	R-C5	2.17	1	FLOW	1045.
				TIME	3.75
HYDROGRAPH AT	OFF-2C	.07	1	FLOW	33.
				TIME	3.83
2 COMBINED AT	C6	2.24	1	FLOW	1078.
				TIME	3.75
DIVERSION TO	DIVER3	2.24	1	FLOW	200.
				TIME	3.75
HYDROGRAPH AT	DIVER3	2.24	1	FLOW	878.
				TIME	3.75
ROUTED TO	R-C6	2.24	1	FLOW	874.
				TIME	3.75
HYDROGRAPH AT	OFF-11	.22	1	FLOW	182.
				TIME	3.67
HYDROGRAPH AT	OFF-12	.08	1	FLOW	51.
				TIME	3.67
2 COMBINED AT	C7	.30	1	FLOW	234.
				TIME	3.67
ROUTED TO	R-C7a	.30	1	FLOW	233.
				TIME	3.67
ROUTED TO	R-C7b	.30	1	FLOW	230.
				TIME	3.75
HYDROGRAPH AT	OFF-6	.03	1	FLOW	25.

				TIME	3.58
2 COMBINED AT	C8	.33	1	FLOW	249.
				TIME	3.67
ROUTED TO	R-C8a	.33	1	FLOW	248.
				TIME	3.75
HYDROGRAPH AT	OFF-2B	.14	1	FLOW	70.
				TIME	3.83
2 COMBINED AT	C9	.46	1	FLOW	317.
				TIME	3.75
2 COMBINED AT	C10	2.70	1	FLOW	1191.
				TIME	3.75
DIVERSION TO	DIVER4	2.70	1	FLOW	107.
				TIME	3.75
HYDROGRAPH AT	DIVER4	2.70	1	FLOW	1084.
				TIME	3.75
ROUTED TO	R-C10	2.70	1	FLOW	1075.
				TIME	3.75
HYDROGRAPH AT	OFF-2A	.07	1	FLOW	40.
				TIME	3.75
2 COMBINED AT	C11	2.78	1	FLOW	1115.
				TIME	3.75
DIVERSION TO	DIVER5	2.78	1	FLOW	307.
				TIME	3.75
HYDROGRAPH AT	DIVER5	2.78	1	FLOW	808.
				TIME	3.75
HYDROGRAPH AT	OFF-21	.04	1	FLOW	43.
				TIME	3.58
HYDROGRAPH AT	RET4	.00	1	FLOW	107.
				TIME	3.75
2 COMBINED AT	CD4	.04	1	FLOW	140.
				TIME	3.67
ROUTED TO	R-21	.04	1	FLOW	139.
				TIME	3.75
HYDROGRAPH AT	OFF-23	.06	1	FLOW	52.
				TIME	3.67
HYDROGRAPH AT	RET3	.00	1	FLOW	200.
				TIME	3.75
2 COMBINED AT	CD3	.06	1	FLOW	246.
				TIME	3.67
2 COMBINED AT	C17	.10	1	FLOW	385.

				TIME	3.75
HYDROGRAPH AT	C5CAb	1.13	1	FLOW	417.
				TIME	3.67
DIVERSION TO	DIVER9	1.13	1	FLOW	269.
				TIME	3.67
HYDROGRAPH AT	QSPLT	1.13	1	FLOW	148.
				TIME	3.42
HYDROGRAPH AT	RET1	.00	1	FLOW	26.
				TIME	4.17
ROUTED TO	RDIV1	.00	1	FLOW	26.
				TIME	4.25
2 COMBINED AT	CC1	1.13	1	FLOW	174.
				TIME	4.25
HYDROGRAPH AT	C5CAa	.35	1	FLOW	219.
				TIME	3.92
HYDROGRAPH AT	RET2	.00	1	FLOW	107.
				TIME	3.75
2 COMBINED AT	CD2	.35	1	FLOW	312.
				TIME	3.83
2 COMBINED AT	C19	1.49	1	FLOW	483.
				TIME	3.92
DIVERSION TO	DIVER7	1.49	1	FLOW	205.
				TIME	3.92
HYDROGRAPH AT	DIVER7	1.49	1	FLOW	278.
				TIME	3.92
2 COMBINED AT	C20	1.59	1	FLOW	654.
				TIME	3.75
HYDROGRAPH AT	C5FD	.19	1	FLOW	135.
				TIME	3.67
ROUTED TO	C5FB	.19	1	FLOW	132.
				TIME	3.75
HYDROGRAPH AT	C5FA	.54	1	FLOW	472.
				TIME	3.58
ROUTED TO	C5FB	.54	1	FLOW	460.
				TIME	3.67
HYDROGRAPH AT	C5FB	.17	1	FLOW	43.
				TIME	3.75
3 COMBINED AT	C5FB	.89	1	FLOW	633.
				TIME	3.75
ROUTED TO	100	.89	1	FLOW	632.

				TIME	3.75
HYDROGRAPH AT	C5FC	.19	1	FLOW	103.
				TIME	3.67
2 COMBINED AT	100	1.08	1	FLOW	732.
				TIME	3.75
ROUTED TO	C5EA	1.08	1	FLOW	726.
				TIME	3.75
HYDROGRAPH AT	C5EA	.52	1	FLOW	272.
				TIME	4.00
2 COMBINED AT	C5EA	1.60	1	FLOW	950.
				TIME	3.75
ROUTED TO	C5EC	1.60	1	FLOW	941.
				TIME	3.83
HYDROGRAPH AT	C5EB	.59	1	FLOW	157.
				TIME	4.08
ROUTED TO	C5EC	.59	1	FLOW	155.
				TIME	4.42
HYDROGRAPH AT	C5EC	.26	1	FLOW	112.
				TIME	3.67
3 COMBINED AT	200	2.46	1	FLOW	1027.
				TIME	3.83
ROUTED TO	300	2.46	1	FLOW	1023.
				TIME	3.83
HYDROGRAPH AT	C5ED	.15	1	FLOW	108.
				TIME	3.58
2 COMBINED AT	300	2.60	1	FLOW	1075.
				TIME	3.83
ROUTED TO	400	2.60	1	FLOW	1066.
				TIME	3.83
HYDROGRAPH AT	C5DA	1.02	1	FLOW	664.
				TIME	3.75
2 COMBINED AT	400	3.63	1	FLOW	1719.
				TIME	3.83
ROUTED TO	500	3.63	1	FLOW	1714.
				TIME	3.83
HYDROGRAPH AT	C5DB	.65	1	FLOW	359.
				TIME	3.92
2 COMBINED AT	500	4.28	1	FLOW	2069.
				TIME	3.83
ROUTED TO	BASIN	4.28	1	FLOW	2052.

				TIME	3.83
HYDROGRAPH AT	C5DC	1.02	1	FLOW	198.
				TIME	4.17
2 COMBINED AT	BASIN	5.30	1	FLOW	2208.
				TIME	3.92
HYDROGRAPH AT	RET9	.00	1	FLOW	269.
				TIME	3.67
HYDROGRAPH AT	C5CB	.17	1	FLOW	17.
				TIME	5.17
4 COMBINED AT	BASIN	7.05	1	FLOW	3057.
				TIME	3.83
ROUTED TO	DET	7.05	1	FLOW	246.
				TIME	6.58

** PEAK STAGES IN FEET **

1	STAGE	2068.66
	TIME	6.58

HYDROGRAPH AT	OFF-24	.06	1	FLOW	51.
				TIME	3.58
HYDROGRAPH AT	RET7	.00	1	FLOW	205.
				TIME	3.92
ROUTED TO	R24	.00	1	FLOW	205.
				TIME	3.92
2 COMBINED AT	MAGIC	.06	1	FLOW	229.
				TIME	3.75

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= 1.00									
	R-16 MANE	.79	107.49	211.25	1.40	5.00	100.90	210.00	1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8569E+01 EXCESS= .0000E+00 OUTFLOW= .8582E+01 BASIN STORAGE= .1228E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00									
	R-C1 MANE	1.68	309.85	219.23	1.61	5.00	308.44	220.00	1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3804E+02 EXCESS= .0000E+00 OUTFLOW= .3809E+02 BASIN STORAGE= .1565E-03 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00									
	R-14 MANE	1.56	63.44	233.39	.60	5.00	62.95	235.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8705E+01 EXCESS= .0000E+00 OUTFLOW= .8711E+01 BASIN STORAGE= .8139E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00									
	R-C2 MANE	1.48	473.34	230.84	1.29	5.00	473.24	230.00	1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7834E+02 EXCESS= .0000E+00 OUTFLOW= .7838E+02 BASIN STORAGE= .4821E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00									
	R-9 MANE	1.39	73.78	222.97	1.15	5.00	73.39	225.00	1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8707E+01 EXCESS= .0000E+00 OUTFLOW= .8717E+01 BASIN STORAGE= .1169E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00									
	R-C3 MANE	.57	600.37	230.65	1.30	5.00	600.12	230.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9495E+02 EXCESS= .0000E+00 OUTFLOW= .9496E+02 BASIN STORAGE= .3468E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00									
	R-13 MANE	.50	393.56	220.34	1.54	5.00	392.88	220.00	1.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4311E+02 EXCESS= .0000E+00 OUTFLOW= .4312E+02 BASIN STORAGE= .1054E-05 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R-C5	MANE	.48	1045.50	225.38	1.30	5.00	1044.88	225.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1502E+03 EXCESS= .0000E+00 OUTFLOW= .1502E+03 BASIN STORAGE= .2219E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R-C6	MANE	.48	877.97	225.95	1.06	5.00	873.72	225.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1260E+03 EXCESS= .0000E+00 OUTFLOW= .1260E+03 BASIN STORAGE= .2210E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R-C7a	MANE	.10	233.40	220.20	1.80	5.00	233.07	220.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2836E+02 EXCESS= .0000E+00 OUTFLOW= .2836E+02 BASIN STORAGE= .5611E-07 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R-C7b	MANE	.60	232.97	221.20	1.80	5.00	230.02	225.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2837E+02 EXCESS= .0000E+00 OUTFLOW= .2837E+02 BASIN STORAGE= .2015E-05 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R-C8a	MANE	1.55	249.22	223.34	1.75	5.00	248.08	225.00	1.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3067E+02 EXCESS= .0000E+00 OUTFLOW= .3072E+02 BASIN STORAGE= .8389E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00

R-C10	MANE	.43	1082.35	226.04	1.05	5.00	1075.01	225.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1511E+03 EXCESS= .0000E+00 OUTFLOW= .1511E+03 BASIN STORAGE= .2301E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R-21	MANE	1.80	139.37	224.84	8.28	5.00	139.26	225.00	8.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1919E+02 EXCESS= .0000E+00 OUTFLOW= .1921E+02 BASIN STORAGE= .3676E-03 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00

RDIV1	MANE	2.33	25.81	253.61	-1.00	5.00	25.80	255.00	-1.00

FOR PLAN = 1 RATIO= 1.00

C5FB	MANE	1.68	134.46	223.30	1.57	5.00	131.76	225.00	1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1543E+02 EXCESS= .0000E+00 OUTFLOW= .1546E+02 BASIN STORAGE= .2303E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= 1.00

C5FB	MANE	2.64	470.25	221.61	1.80	5.00	460.03	220.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5141E+02 EXCESS= .0000E+00 OUTFLOW= .5173E+02 BASIN STORAGE= .2045E-02 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= 1.00

100	MANE	.76	632.43	225.40	1.53	5.00	632.06	225.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7272E+02 EXCESS= .0000E+00 OUTFLOW= .7275E+02 BASIN STORAGE= .5282E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

C5EA	MANE	.64	729.30	225.76	1.46	5.00	725.65	225.00	1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8464E+02 EXCESS= .0000E+00 OUTFLOW= .8467E+02 BASIN STORAGE= .5379E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

C5EC	MANE	1.04	947.77	227.60	1.52	5.00	940.59	230.00	1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1300E+03 EXCESS= .0000E+00 OUTFLOW= .1301E+03 BASIN STORAGE= .1201E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00

C5EC	MANE	5.00	156.32	268.09	.84	5.00	155.44	265.00	.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2633E+02 EXCESS= .0000E+00 OUTFLOW= .2639E+02 BASIN STORAGE= .1483E-01 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= 1.00

300	MANE	1.29	1024.12	232.08	1.29	5.00	1022.70	230.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1683E+03 EXCESS= .0000E+00 OUTFLOW= .1684E+03 BASIN STORAGE= .4311E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

400	MANE	.66	1072.59	231.53	1.28	5.00	1065.81	230.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1780E+03 EXCESS= .0000E+00 OUTFLOW= .1780E+03 BASIN STORAGE= .2291E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

500	MANE	.32	1718.29	230.61	1.38	5.00	1714.41	230.00	1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2675E+03 EXCESS= .0000E+00 OUTFLOW= .2674E+03 BASIN STORAGE= .9974E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

BASIN	MANE	.53	2067.08	231.24	1.41	5.00	2052.08	230.00	1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3218E+03 EXCESS= .0000E+00 OUTFLOW= .3218E+03 BASIN STORAGE= .2636E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R24	MANE	.37	204.74	235.64	-1.00	5.00	204.67	235.00	-1.00

*** NORMAL END OF HEC-1 ***

APPENDIX B

HEC-1

EQUOAL4.HC1

HEC1 S/N: 1333000222 HMVersion: 6.40 Data File: equoal4.HC1

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  12/11/1998  TIME  13:08:15 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
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
```

```
:::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::
:::                                   :::
:::  Full Microcomputer Implementation :::
:::                 by                :::
:::        Haestad Methods, Inc.      :::
:::                                   :::
:::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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  EVALUATION OF ORIGIONAL DESIGN OF EQUESTRIAN BASIN USEING AS BUILT BASINS
    2     ID  THIS RUN IS USED TO EVALUATE THE CHANNEL FLOW AND BASIN BASED ON FINAL
    3     ID  FLOW DESIGN
    4     ID  FLOW EVALUATION DOES NOT INCLUDE NEW BOULDER HIGHWAY CULVERT
    5     ID  EVALUATION BUT DOES INLCUDE NEW EQUESTRIAN & MAGIC WAY INLET
    6     ID  ASSOMES NEW CI-DETENTION BASIN IS COMPLETED
    7     ID  DOES NOT INCLUDE FLOWS NORTH IN RACETRACK
    8     ID  FILE NAME: EQUOAL4.HC1
    9     IT      5       0       0     300
   10     IO      5       0       0
   11     IN      5
   12     JR    PREC     1.0

   13     KK  OFF-10
   14     BA  0.4227
   15     PB    3.05
   16     PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
   17     PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
   18     PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
   19     PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   20     PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
   21     PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   22     PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   23     PC    .998    .999   1.00
   24     LS       0      87
   25     UD   0.758

   26     KK  DIVERT
   27     KM   DIVERT1 FLOWS CONVEYED INTO CULVERT "A" STA 296+24
   28     DT  DIVER1
   29     DI       0      37     126     260     502
   30     DQ       0      10      20      30      40

   31     KK  OFF-21
   32     BA  0.0435
   33     LS       0      85
   34     UD   0.197

   35     KK    R-21
   36     RK    1700   0.005   0.016           TRAP     100       1

   37     KK  OFF-23
   38     BA  0.0587
   39     LS       0      85
   40     UD   0.250

   41     KK     C17
   42     HC       2
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  43      KK   C5CAb
  44      BA  1.1309
  45      LS     0      68
  46      UD   0.28

  47      KK   QSPLT
  48      DT  DIVER9
  49      DI     0     148     200     300     400
  50      DQ     0       0      52     152     252

  51      KK    RET1
  52      DR  DIVER1

  53      KK   RDIV1
  54      RK    1200   0.004   0.016           TRAP       0      50

  55      KK     CC1
  56      HC       2

  57      KK   C5CAa
  58      BA  0.3541
  59      LS     0      85
  60      UD   0.558

  61      KK     C19
  62      HC       2

  63      KK  DIVER7
  64      KM   DIVERT FLOW INTO DET BASIN AT EQUESTRIAN DRIVE MAGIC WAY INLET SYSTEM
  65      DT  DIVER7
  66      DI     0    1151
  67      DQ     0     488

  68      KK     C20
  69      HC       2

  70      KK    C5FD
  71      BA  0.1851
  72      PB    2.97
  73      LS     0      85
  74      UD   0.285

  75      KK    C5FB
  76      RK     500   0.015    0.25           TRAP      35       3

  77      KK    C5FA
  78      BA  0.5380
  79      LS     0      88
  80      UD    0.23
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  81      KK    C5FB
  82      RK    4100  0.0615   0.040          TRAP     200       2

  83      KK    C5FB
  84      BA  0.1707
  85      LS       0      68
  86      UD    0.35

  87      KK    C5FB
  88      HC       3

  89      KK     100
  90      RK    1500   0.015   0.030          TRAP      35       3

  91      KK    C5FC
  92      BA  0.1906
  93      LS       0      79
  94      UD    0.30

  95      KK     100
  96      HC       2       0

  97      KK    C5EA
  98      RK    1300   0.015   0.030          TRAP      35       3

  99      KK    C5EA
 100      BA  0.5191
 101      LS       0      86
 102      UD    0.62

 103      KK    C5EA
 104      HC       2

 105      KK    C5EC
 106      RK    2500   0.015   0.030          TRAP      35       3

 107      KK    C5EB
 108      BA  0.5885
 109      LS       0      73
 110      UD    0.64

 111      KK    C5EC
 112      RK    2000    0.05    0.40          TRAP     200       3

 113      KK    C5EC
 114      BA  0.2648
 115      LS       0      73
 116      UD    0.25
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  117     KK     200
  118     HC       3

  119     KK     300
  120     RK    2100   0.005   0.030          TRAP     35       3

  121     KK    C5ED
  122     BA  0.1474
  123     LS       0      80
  124     UD    0.17

  125     KK     300
  126     HC       2

  127     KK     400
  128     RK    1000   0.005   0.030          TRAP     35       3

  129     KK    C5DA
  130     BA  1.0241
  131     LS       0      86
  132     UD    0.40

  133     KK     400
  134     HC       2

  135     KK     500
  136     RK    1000    0.04    0.03          TRAP     35       6

  137     KK    C5DB
  138     BA  0.6505
  139     LS       0      85
  140     UD   0.515

  141     KK     500
  142     HC       2

  143     KK   BASIN
  144     RK    3000   0.015   0.015          TRAP     20       2

  145     KK    C5DC
  146     BA  1.0180
  147     LS       0      69
  148     UD   0.685

  149     KK   BASIN
  150     HC       2

  151     KK    RET9
  152     DR  DIVER9
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  153     KK    C5CB
  154     BA  0.1654
  155     LS       0      58
  156     UD    0.49

  157     KK   BASIN
  158     HC       4

  159     KK     DET
  160     KO       1       1       0       0      21
  161     RS       1    STOR       0
  162     SV       0       2      13      31      61      97     118     140     171     200
  163     SV     229     261     290     315     344     379     409     437     470     504
  164     SE    2048    2050    2052    2054    2056    2058    2059    2060    2061    2062
  165     SE    2063    2064    2065    2066    2067    2068    2069    2070    2071    2072
  166     SQ       0      37      80     117     142     163     173     182     191     198
  167     SQ     206     213     221     228     235     242     248    2755    7761   14467
  168     SS    2069     900     3.0     1.5

  169     KK  OFF-24
  170     BA  0.0581
  171     LS       0      85
  172     UD   0.183

  173     KK    RET7
  174     DR  DIVER7

  175     KK     R24
  176     RK     500   0.012   0.020            TRAP     100       1

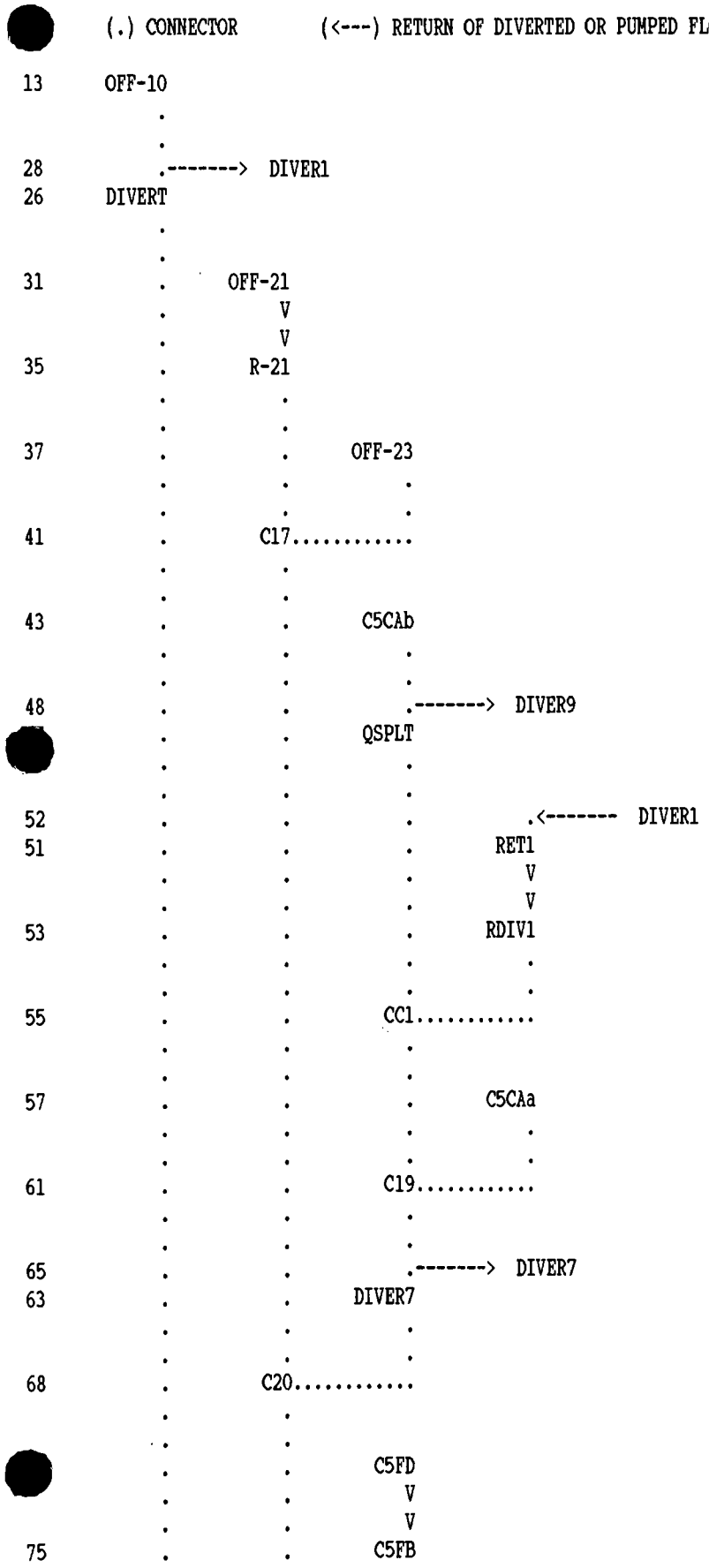
  177     KK   MAGIC
  178     HC       2
  179     ZZ
```

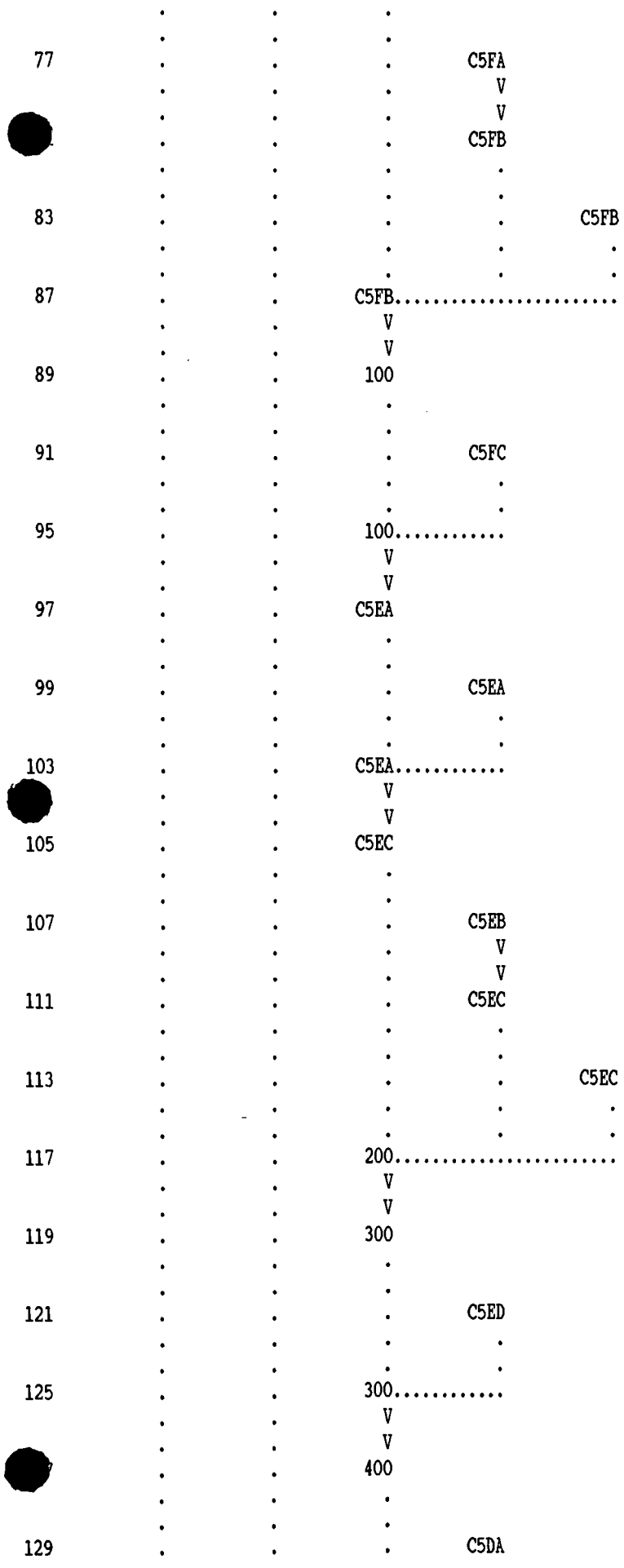
SCHEMATIC DIAGRAM OF STREAM NETWORK

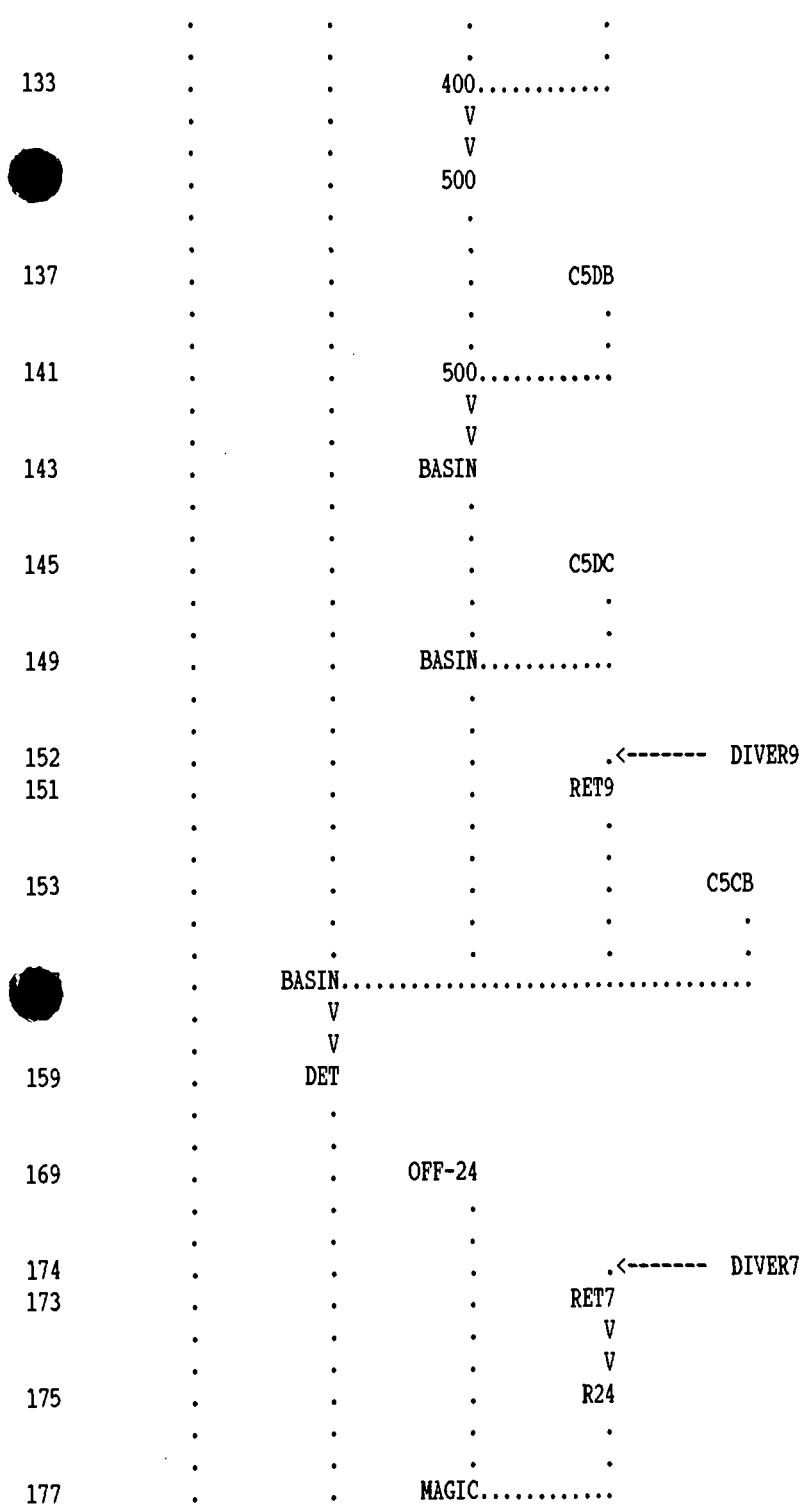
INPUT LINE

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW




77
C5FA
83
C5FB
87
C5FB
89
100
91
C5FC
95
100
97
C5EA
99
C5EA
103
C5EA
105
C5EC
107
C5EB
111
C5EC
113
C5EC
117
200
119
300
121
C5ED
125
300
129
C5DA



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

HEC1 S/N: 1333000222 HMVersion: 6.40 Data File: equoal4.HC1

```
*****************************************
*                                       *
*  [redacted]OD HYDROGRAPH PACKAGE (HEC-1)  *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  12/11/1998  TIME  13:08:15 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

EVALUATION OF ORIGIONAL DESIGN OF EQUESTRIAN BASIN USEING AS BUILT BASINS
THIS RUN IS USED TO EVALUATE THE CHANNEL FLOW AND BASIN BASED ON FINAL
FLOW DESIGN
FLOW EVALUATION DOES NOT INCLUDE NEW BOULDER HIGHWAY CULVERT
EVALUATION BUT DOES INLCUDE NEW EQUESTRIAN & MAGIC WAY INLET
ASSUMES NEW CI-DETENTION BASIN IS COMPLETED
DOES NOT INCLUDE FLOWS NORTH IN RACETRACK
FILE NAME: EQUOAL4.HC1

10 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

[redacted]T HYDROGRAPH TIME DATA

NMIN	5	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	0055	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 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
[redacted] RATIOS OF PRECIPITATION
1.00

*** ***

```
          **************
          *            *
159 KK    *       DET  *
          *            *
          **************
```

160 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	1	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	300	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.083	TIME INTERVAL IN HOURS

HYDROGRAPH ROUTING DATA

161 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

162 SV	STORAGE	.0	2.0	13.0	31.0	61.0	97.0	118.0	140.0	171.0	200.0
		229.0	261.0	290.0	315.0	344.0	379.0	409.0	437.0	470.0	504.0
164 SE	ELEVATION	2048.00	2050.00	2052.00	2054.00	2056.00	2058.00	2059.00	2060.00	2061.00	2062.00
		2063.00	2064.00	2065.00	2066.00	2067.00	2068.00	2069.00	2070.00	2071.00	2072.00
166 SQ	DISCHARGE	0.	37.	80.	117.	142.	163.	173.	182.	191.	198.
		206.	213.	221.	228.	235.	242.	248.	2755.	7761.	14467.

168 SS SPILLWAY

CREL	2069.00	SPILLWAY CREST ELEVATION
SPWID	900.00	SPILLWAY WIDTH
COQW	3.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	2.00	13.00	31.00	61.00	97.00	118.00	140.00	171.00	200.00
OUTFLOW	.00	37.00	80.00	117.00	142.00	163.00	173.00	182.00	191.00	198.00
ELEVATION	2048.00	2050.00	2052.00	2054.00	2056.00	2058.00	2059.00	2060.00	2061.00	2062.00
STORAGE	229.00	261.00	290.00	315.00	344.00	379.00	409.00	437.00	470.00	504.00
OUTFLOW	206.00	213.00	221.00	228.00	235.00	242.00	248.00	2755.00	7761.00	14467.00
ELEVATION	2063.00	2064.00	2065.00	2066.00	2067.00	2068.00	2069.00	2070.00	2071.00	2072.00

****

HYDROGRAPH AT STATION DET

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	2048.0	1		0820	101	230.	324.2	2066.3	1		1640	201	193.	180.1	2061.3
1		0005	2	0.	.0	2048.0	1		0825	102	230.	322.7	2066.3	1		1645	202	193.	178.8	2061.3
1		0010	3	0.	.0	2048.0	1		0830	103	229.	321.2	2066.2	1		1650	203	193.	177.4	2061.2
1		0015	4	0.	.0	2048.0	1		0835	104	229.	319.7	2066.2	1		1655	204	192.	176.1	2061.2
1		0020	5	0.	.0	2048.0	1		0840	105	229.	318.1	2066.1	1		1700	205	192.	174.8	2061.1
1		0025	6	0.	.0	2048.0	1		0845	106	228.	316.6	2066.1	1		1705	206	192.	173.5	2061.1
1		0030	7	0.	.0	2048.0	1		0850	107	228.	315.1	2066.0	1		1710	207	191.	172.2	2061.0
1		0035	8	0.	.0	2048.0	1		0855	108	228.	313.6	2065.9	1		1715	208	191.	170.8	2061.0
1		0040	9	0.	.0	2048.0	1		0900	109	227.	312.1	2065.9	1		1720	209	191.	169.5	2061.0
1		0045	10	0.	.0	2048.0	1		0905	110	227.	310.5	2065.8	1		1725	210	190.	168.2	2060.9
1		0050	11	0.	.0	2048.0	1		0910	111	226.	309.0	2065.8	1		1730	211	190.	166.9	2060.9
1		0055	12	0.	.0	2048.0	1		0915	112	226.	307.5	2065.7	1		1735	212	189.	165.6	2060.8
1		0100	13	0.	.0	2048.0	1		0920	113	225.	306.0	2065.6	1		1740	213	189.	164.3	2060.8
1		0105	14	0.	.0	2048.0	1		0925	114	225.	304.4	2065.6	1		1745	214	189.	163.0	2060.7
1		0110	15	1.	.0	2048.0	1		0930	115	225.	302.9	2065.5	1		1750	215	188.	161.7	2060.7
1		0115	16	1.	.1	2048.1	1		0935	116	224.	301.4	2065.5	1		1755	216	188.	160.4	2060.7
1		0120	17	1.	.1	2048.1	1		0940	117	224.	299.9	2065.4	1		1800	217	188.	159.1	2060.6
1		0125	18	1.	.1	2048.1	1		0945	118	223.	298.4	2065.3	1		1805	218	187.	157.8	2060.6
1		0130	19	2.	.1	2048.1	1		0950	119	223.	296.9	2065.3	1		1810	219	187.	156.5	2060.5
1		0135	20	2.	.1	2048.1	1		0955	120	222.	295.3	2065.2	1		1815	220	186.	155.3	2060.5
1		0140	21	4.	.2	2048.2	1		1000	121	222.	293.8	2065.2	1		1820	221	186.	154.0	2060.5
1		0145	22	5.	.3	2048.3	1		1005	122	222.	292.3	2065.1	1		1825	222	186.	152.7	2060.4
1		0150	23	8.	.4	2048.4	1		1010	123	221.	290.8	2065.0	1		1830	223	185.	151.4	2060.4
1		0155	24	12.	.6	2048.6	1		1015	124	221.	289.3	2065.0	1		1835	224	185.	150.1	2060.3
1		0200	25	16.	.9	2048.9	1		1020	125	220.	287.8	2064.9	1		1840	225	185.	148.9	2060.3
1		0205	26	20.	1.1	2049.1	1		1025	126	220.	286.3	2064.9	1		1845	226	184.	147.6	2060.2
1		0210	27	25.	1.3	2049.3	1		1030	127	220.	284.8	2064.8	1		1850	227	184.	146.3	2060.2
1		0215	28	29.	1.5	2049.5	1		1035	128	219.	283.3	2064.8	1		1855	228	183.	145.1	2060.2
1		0220	29	33.	1.8	2049.8	1		1040	129	219.	281.8	2064.7	1		1900	229	183.	143.8	2060.1
1		0225	30	37.	2.1	2050.0	1		1045	130	218.	280.3	2064.7	1		1905	230	183.	142.6	2060.1
1		0230	31	39.	2.6	2050.1	1		1050	131	218.	278.8	2064.6	1		1910	231	182.	141.3	2060.0
1		0235	32	41.	3.1	2050.2	1		1055	132	218.	277.3	2064.6	1		1915	232	182.	140.0	2060.0
1		0240	33	44.	3.8	2050.3	1		1100	133	217.	275.8	2064.5	1		1920	233	182.	138.8	2059.9
1		0245	34	47.	4.4	2050.4	1		1105	134	217.	274.4	2064.5	1		1925	234	181.	137.5	2059.9
1		0250	35	49.	5.2	2050.6	1		1110	135	216.	272.9	2064.4	1		1930	235	180.	136.3	2059.8
1		0255	36	52.	5.9	2050.7	1		1115	136	216.	271.4	2064.4	1		1935	236	180.	135.1	2059.8
1		0300	37	56.	6.8	2050.9	1		1120	137	215.	269.9	2064.3	1		1940	237	179.	133.8	2059.7
1		0305	38	59.	7.7	2051.0	1		1125	138	215.	268.4	2064.3	1		1945	238	179.	132.6	2059.7
1		0310	39	63.	8.8	2051.2	1		1130	139	215.	267.0	2064.2	1		1950	239	178.	131.4	2059.6
1		0315	40	68.	10.0	2051.5	1		1135	140	214.	265.5	2064.2	1		1955	240	178.	130.1	2059.6
1		0320	41	75.	11.7	2051.8	1		1140	141	214.	264.0	2064.1	1		2000	241	177.	128.9	2059.5
1		0325	42	83.	14.6	2052.2	1		1145	142	213.	262.6	2064.1	1		2005	242	177.	127.7	2059.4
1		0330	43	94.	19.6	2052.7	1		1150	143	213.	261.1	2064.0	1		2010	243	176.	126.5	2059.4
1		0335	44	112.	28.5	2053.7	1		1155	144	213.	259.7	2064.0	1		2015	244	176.	125.3	2059.3
1		0340	45	127.	42.5	2054.8	1		1200	145	212.	258.2	2063.9	1		2020	245	175.	124.0	2059.3
1		0345	46	142.	61.5	2056.0	1		1205	146	212.	256.7	2063.9	1		2025	246	175.	122.8	2059.2
1		0350	47	155.	84.0	2057.3	1		1210	147	212.	255.3	2063.8	1		2030	247	174.	121.6	2059.2
1		0355	48	168.	107.8	2058.5	1		1215	148	211.	253.8	2063.8	1		2035	248	174.	120.4	2059.1
1		0400	49	178.	131.3	2059.6	1		1220	149	211.	252.4	2063.7	1		2040	249	174.	119.2	2059.1
1		0405	50	186.	153.1	2060.4	1		1225	150	211.	250.9	2063.7	1		2045	250	173.	118.1	2059.0
1		0410	51	191.	172.8	2061.1	1		1230	151	210.	249.5	2063.6	1		2050	251	172.	116.9	2058.9
1		0415	52	196.	190.3	2061.7	1		1235	152	210.	248.0	2063.6	1		2055	252	172.	115.7	2058.9
1		0420	53	200.	205.8	2062.2	1		1240	153	210.	246.6	2063.6	1		2100	253	171.	114.5	2058.8
1		0425	54	203.	219.4	2062.7	1		1245	154	210.	245.2	2063.5	1		2105	254	171.	113.3	2058.8

1	0430	55	207.	231.6	2063.1	*	1	1250	155	209.	243.7	2063.5	*	1	2110	255	170.	112.1	2058.7
1	0435	56	209.	242.5	2063.4	*	1	1255	156	209.	242.3	2063.4	*	1	2115	256	170.	111.0	2058.7
1	0440	57	211.	252.6	2063.7	*	1	1300	157	209.	240.9	2063.4	*	1	2120	257	169.	109.8	2058.6
1	0445	58	213.	262.1	2064.0	*	1	1305	158	208.	239.4	2063.3	*	1	2125	258	169.	108.6	2058.6
1	0450	59	216.	271.3	2064.4	*	1	1310	159	208.	238.0	2063.3	*	1	2130	259	168.	107.5	2058.5
1	0455	60	218.	280.3	2064.7	*	1	1315	160	208.	236.6	2063.2	*	1	2135	260	167.	106.3	2058.4
1	0500	61	221.	289.2	2065.0	*	1	1320	161	207.	235.1	2063.2	*	1	2140	261	167.	105.2	2058.4
1	0505	62	223.	297.8	2065.3	*	1	1325	162	207.	233.7	2063.1	*	1	2145	262	166.	104.0	2058.3
1	0510	63	225.	306.0	2065.6	*	1	1330	163	207.	232.3	2063.1	*	1	2150	263	166.	102.9	2058.3
1	0515	64	228.	313.6	2065.9	*	1	1335	164	206.	230.9	2063.1	*	1	2155	264	165.	101.8	2058.2
1	0520	65	229.	320.5	2066.2	*	1	1340	165	206.	229.5	2063.0	*	1	2200	265	165.	100.6	2058.2
1	0525	66	231.	326.6	2066.4	*	1	1345	166	206.	228.0	2063.0	*	1	2205	266	164.	99.5	2058.1
1	0530	67	232.	331.8	2066.6	*	1	1350	167	205.	226.6	2062.9	*	1	2210	267	164.	98.4	2058.1
1	0535	68	233.	336.2	2066.7	*	1	1355	168	205.	225.2	2062.9	*	1	2215	268	163.	97.2	2058.0
1	0540	69	234.	339.8	2066.9	*	1	1400	169	205.	223.8	2062.8	*	1	2220	269	162.	96.1	2058.0
1	0545	70	235.	342.7	2067.0	*	1	1405	170	204.	222.4	2062.8	*	1	2225	270	162.	95.0	2057.9
1	0550	71	235.	345.1	2067.0	*	1	1410	171	204.	221.0	2062.7	*	1	2230	271	161.	93.9	2057.8
1	0555	72	236.	347.0	2067.1	*	1	1415	172	203.	219.6	2062.7	*	1	2235	272	161.	92.8	2057.8
1	0600	73	236.	348.4	2067.1	*	1	1420	173	203.	218.2	2062.6	*	1	2240	273	160.	91.7	2057.7
1	0605	74	236.	349.5	2067.2	*	1	1425	174	203.	216.8	2062.6	*	1	2245	274	159.	90.6	2057.6
1	0610	75	236.	350.2	2067.2	*	1	1430	175	202.	215.4	2062.5	*	1	2250	275	159.	89.5	2057.6
1	0615	76	236.	350.7	2067.2	*	1	1435	176	202.	214.0	2062.5	*	1	2255	276	158.	88.4	2057.5
1	0620	77	236.	350.9	2067.2	*	1	1440	177	201.	212.6	2062.4	*	1	2300	277	157.	87.3	2057.5
1	0625	78	236.	350.9	2067.2	*	1	1445	178	201.	211.3	2062.4	*	1	2305	278	157.	86.2	2057.4
1	0630	79	236.	350.7	2067.2	*	1	1450	179	201.	209.9	2062.3	*	1	2310	279	156.	85.1	2057.3
1	0635	80	236.	350.3	2067.2	*	1	1455	180	200.	208.5	2062.3	*	1	2315	280	155.	84.1	2057.3
1	0640	81	236.	349.7	2067.2	*	1	1500	181	200.	207.1	2062.2	*	1	2320	281	155.	83.0	2057.2
1	0645	82	236.	349.0	2067.1	*	1	1505	182	200.	205.8	2062.2	*	1	2325	282	154.	81.9	2057.2
1	0650	83	236.	348.1	2067.1	*	1	1510	183	199.	204.4	2062.2	*	1	2330	283	154.	80.9	2057.1
1	0655	84	236.	347.2	2067.1	*	1	1515	184	199.	203.0	2062.1	*	1	2335	284	153.	79.8	2057.0
1	0700	85	235.	346.2	2067.1	*	1	1520	185	198.	201.6	2062.1	*	1	2340	285	152.	78.8	2057.0
1	0705	86	235.	345.1	2067.0	*	1	1525	186	198.	200.3	2062.0	*	1	2345	286	152.	77.7	2056.9
1	0710	87	235.	343.9	2067.0	*	1	1530	187	198.	198.9	2062.0	*	1	2350	287	151.	76.7	2056.9
1	0715	88	235.	342.7	2067.0	*	1	1535	188	197.	197.6	2061.9	*	1	2355	288	151.	75.6	2056.8
1	0720	89	234.	341.4	2066.9	*	1	1540	189	197.	196.2	2061.9	*	2	0000	289	150.	74.6	2056.8
1	0725	90	234.	340.1	2066.9	*	1	1545	190	197.	194.8	2061.8	*	2	0005	290	149.	73.6	2056.7
1	0730	91	234.	338.7	2066.8	*	1	1550	191	196.	193.5	2061.8	*	2	0010	291	149.	72.6	2056.6
1	0735	92	233.	337.3	2066.8	*	1	1555	192	196.	192.1	2061.7	*	2	0015	292	148.	71.5	2056.6
1	0740	93	233.	335.9	2066.7	*	1	1600	193	196.	190.8	2061.7	*	2	0020	293	148.	70.5	2056.5
1	0745	94	233.	334.5	2066.7	*	1	1605	194	195.	189.5	2061.6	*	2	0025	294	147.	69.5	2056.5
1	0750	95	232.	333.1	2066.6	*	1	1610	195	195.	188.1	2061.6	*	2	0030	295	146.	68.5	2056.4
1	0755	96	232.	331.6	2066.6	*	1	1615	196	195.	186.8	2061.5	*	2	0035	296	146.	67.5	2056.4
1	0800	97	232.	330.1	2066.5	*	1	1620	197	194.	185.4	2061.5	*	2	0040	297	145.	66.5	2056.3
1	0805	98	231.	328.7	2066.5	*	1	1625	198	194.	184.1	2061.5	*	2	0045	298	145.	65.5	2056.2
1	0810	99	231.	327.2	2066.4	*	1	1630	199	194.	182.8	2061.4	*	2	0050	299	144.	64.5	2056.2
1	0815	100	231.	325.7	2066.4	*	1	1635	200	194.	181.4	2061.4	*	2	0055	300	143.	63.5	2056.1
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
(CFS)	(HR)		6-HR	24-HR	72-HR	24.92-HR
236.	6.33	(CFS)	229.	179.	173.	173.
		(INCHES)	.302	.945	.945	.945
		(AC-FT)	114.	355.	355.	355.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
-FT)	(HR)		6-HR	24-HR	72-HR	24.92-HR
351.	6.33		321.	186.	179.	179.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE

(FEET)	(HR)	6-HR	24-HR	72-HR	24.92-HR
2067.20	6.33	2066.16	2060.75	2060.28	2060.28

CUMULATIVE AREA = 7.05 SQ MI

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
					1.00
HYDROGRAPH AT	OFF-10	.42	1	FLOW	283.
				TIME	4.25
DIVERSION TO	DIVER1	.42	1	FLOW	31.
				TIME	4.25
HYDROGRAPH AT	DIVERT	.42	1	FLOW	252.
				TIME	4.25
HYDROGRAPH AT	OFF-21	.04	1	FLOW	53.
				TIME	3.58
ROUTED TO	R-21	.04	1	FLOW	52.
				TIME	3.67
HYDROGRAPH AT	OFF-23	.06	1	FLOW	67.
				TIME	3.67
2 COMBINED AT	C17	.10	1	FLOW	119.
				TIME	3.67
HYDROGRAPH AT	C5CAb	1.13	1	FLOW	473.
				TIME	3.75
DIVERSION TO	DIVER9	1.13	1	FLOW	325.
				TIME	3.75
HYDROGRAPH AT	QSPLT	1.13	1	FLOW	148.
				TIME	3.50
HYDROGRAPH AT	RET1	.00	1	FLOW	31.
				TIME	4.25
ROUTED TO	RDIV1	.00	1	FLOW	31.
				TIME	4.25
2 COMBINED AT	CC1	1.13	1	FLOW	179.
				TIME	4.25
HYDROGRAPH AT	C5CAa	.35	1	FLOW	266.
				TIME	4.00
2 COMBINED AT	C19	1.49	1	FLOW	442.
				TIME	4.00
DIVERSION TO	DIVER7	1.49	1	FLOW	187.
				TIME	4.00
HYDROGRAPH AT	DIVER7	1.49	1	FLOW	255.

				TIME	4.00
2 COMBINED AT	C20	1.59	1	FLOW	335.
				TIME	3.83
[redacted]GRAPH AT	C5FD	.19	1	FLOW	189.
				TIME	3.75
ROUTED TO	C5FB	.19	1	FLOW	188.
				TIME	3.75
HYDROGRAPH AT	C5FA	.54	1	FLOW	684.
				TIME	3.67
ROUTED TO	C5FB	.54	1	FLOW	672.
				TIME	3.75
HYDROGRAPH AT	C5FB	.17	1	FLOW	60.
				TIME	3.83
3 COMBINED AT	C5FB	.89	1	FLOW	915.
				TIME	3.75
ROUTED TO	100	.89	1	FLOW	901.
				TIME	3.75
HYDROGRAPH AT	C5FC	.19	1	FLOW	145.
				TIME	3.75
2 COMBINED AT	100	1.08	1	FLOW	1046.
[redacted]				TIME	3.75
ROUTED TO	C5EA	1.08	1	FLOW	1025.
				TIME	3.75
HYDROGRAPH AT	C5EA	.52	1	FLOW	366.
				TIME	4.08
2 COMBINED AT	C5EA	1.60	1	FLOW	1315.
				TIME	3.83
ROUTED TO	C5EC	1.60	1	FLOW	1300.
				TIME	3.83
HYDROGRAPH AT	C5EB	.59	1	FLOW	207.
				TIME	4.17
ROUTED TO	C5EC	.59	1	FLOW	204.
				TIME	4.50
HYDROGRAPH AT	C5EC	.26	1	FLOW	153.
				TIME	3.75
3 COMBINED AT	200	2.46	1	FLOW	1438.
				TIME	3.83
[redacted]D TO	300	2.46	1	FLOW	1408.
				TIME	3.92
HYDROGRAPH AT	C5ED	.15	1	FLOW	149.

				TIME	3.58
2 COMBINED AT	300	2.60	1	FLOW	1494.
				TIME	3.83
R[redacted] TO	400	2.60	1	FLOW	1478.
				TIME	3.92
HYDROGRAPH AT	C5DA	1.02	1	FLOW	933.
				TIME	3.83
2 COMBINED AT	400	3.63	1	FLOW	2402.
				TIME	3.83
ROUTED TO	500	3.63	1	FLOW	2385.
				TIME	3.92
HYDROGRAPH AT	C5DB	.65	1	FLOW	491.
				TIME	4.00
2 COMBINED AT	500	4.28	1	FLOW	2873.
				TIME	3.92
ROUTED TO	BASIN	4.28	1	FLOW	2867.
				TIME	3.92
HYDROGRAPH AT	C5DC	1.02	1	FLOW	258.
				TIME	4.25
2 COMBINED AT	BASIN	5.30	1	FLOW	3058.
				TIME	3.92
HYDROGRAPH AT	RET9	.00	1	FLOW	325.
				TIME	3.75
HYDROGRAPH AT	C5CB	.17	1	FLOW	17.
				TIME	4.08
4 COMBINED AT	BASIN	7.05	1	FLOW	3658.
				TIME	3.92
ROUTED TO	DET	7.05	1	FLOW	236.
				TIME	6.33

** PEAK STAGES IN FEET **

	1	STAGE	2067.20
		TIME	6.33

HYDROGRAPH AT	OFF-24	.06	1	FLOW	71.
				TIME	3.58
HYDROGRAPH AT	RET7	.00	1	FLOW	187.
				TIME	4.00
ROUTED TO	R24	.00	1	FLOW	187.
				TIME	4.00
2 COMBINED AT	MAGIC	.06	1	FLOW	214.
				TIME	3.92

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= 1.00									
R-21	MANE	2.51	53.21	221.68	1.64	5.00	52.26	220.00	1.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3782E+01 EXCESS= .0000E+00 OUTFLOW= .3798E+01 BASIN STORAGE= .1714E-03 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= 1.00									
RDIV1	MANE	2.17	30.93	256.89	-1.00	5.00	30.92	255.00	-1.00
FOR PLAN = 1 RATIO= 1.00									
C5FB	MANE	1.55	188.35	226.45	1.56	5.00	187.79	225.00	1.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1543E+02 EXCESS= .0000E+00 OUTFLOW= .1545E+02 BASIN STORAGE= .3204E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00									
C5FB	MANE	2.34	674.26	223.36	1.81	5.00	671.54	225.00	1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5141E+02 EXCESS= .0000E+00 OUTFLOW= .5182E+02 BASIN STORAGE= .2102E-02 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= 1.00									
100	MANE	.67	911.56	226.11	1.53	5.00	900.74	225.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7282E+02 EXCESS= .0000E+00 OUTFLOW= .7286E+02 BASIN STORAGE= .5282E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00									
C5EA	MANE	.51	1045.08	226.06	1.47	5.00	1025.07	225.00	1.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8477E+02 EXCESS= .0000E+00 OUTFLOW= .8481E+02 BASIN STORAGE= .5258E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00									
C5EC	MANE	.97	1309.61	231.28	1.52	5.00	1300.35	230.00	1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1302E+03 EXCESS= .0000E+00 OUTFLOW= .1303E+03 BASIN STORAGE= .1187E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00									
C5EC	MANE	4.63	205.78	266.53	.84	5.00	204.46	270.00	.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2633E+02 EXCESS= .0000E+00 OUTFLOW= .2636E+02 BASIN STORAGE= .1475E-01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= 1.00

300	MANE	1.10	1432.94	232.57	1.29	5.00	1408.48	235.00	1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1685E+03 EXCESS= .0000E+00 OUTFLOW= .1685E+03 BASIN STORAGE= .4279E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

400	MANE	.62	1492.76	231.37	1.28	5.00	1478.24	235.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1782E+03 EXCESS= .0000E+00 OUTFLOW= .1782E+03 BASIN STORAGE= .2247E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

500	MANE	.29	2401.42	230.67	1.38	5.00	2384.51	235.00	1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2677E+03 EXCESS= .0000E+00 OUTFLOW= .2677E+03 BASIN STORAGE= .9903E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

BASIN	MANE	.52	2870.24	235.51	1.41	5.00	2867.31	235.00	1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3220E+03 EXCESS= .0000E+00 OUTFLOW= .3221E+03 BASIN STORAGE= .2550E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R24	MANE	.48	187.36	241.14	-1.00	5.00	186.75	240.00	-1.00

*** NORMAL END OF HEC-1 ***
NORMAL END OF HEC-1

This section is used to determine the flow split in basin C5Cab. The flow that stays in the south side of Equestrian splits to the Magic Way inlet where the remainder of the flow is conveyed to the detention basin.

Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	EQUESTRIAN 1/2 ROW
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.020000	ft/ft
Water Surface Elevation	100.38	ft

Elevation range: 99.39 ft to 100.38 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	50.00	0.017
5.50	99.98			
5.50	99.39			
7.00	99.51			
7.00	99.55			
50.00	100.38			

Results		
Wtd. Mannings Coefficient	0.017	
Discharge	148.05	ft^3/s
Flow Area	21.38	ft^2
Wetted Perimeter	51.02	ft
Top Width	50.00	ft
Depth	0.99	ft
Critical Water Elev.	100.60	ft
Critical Slope	0.005057	ft/ft
Velocity	6.92	ft/s
Velocity Head	0.74	ft
Specific Energy	101.12	ft
Froude Number	1.87	
Full Flow Capacity	148.05	ft^3/s

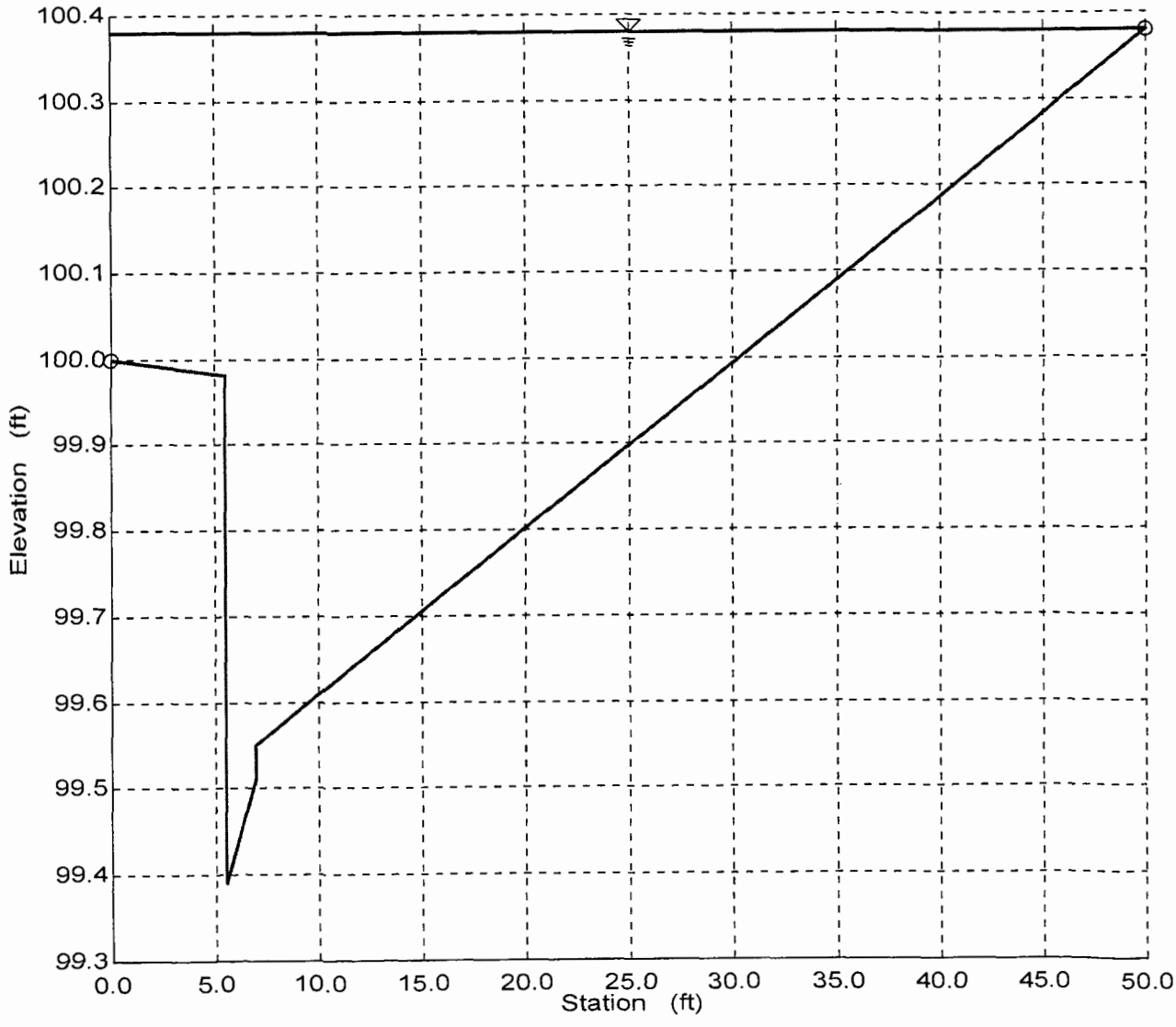
Flow is supercritical.

Water elevation exceeds lowest end station by 0.38 ft.

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	EQUESTRIAN 1/2 ROW
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.020000	ft/ft
Water Surface Elevation	100.38	ft
Discharge	148.05	ft^3/s



APPENDIX C

COMMUNITY ACKNOWLEDGEMENT

APPENDIX D

OFFICIALLY ADOPTED

MAINTENANCE AND

OPERATION PLAN

APPENDIX E

MAGIC WAY INLET

CALCULATIONS

AND PLANS

December 24, 1997

POGGEMEYER
DESIGN GROUP
ENGINEERS + PLANNERS + SURVEYORS
LANDSCAPE ARCHITECTS

City of Henderson
240 Water Street
Henderson, NV 89105

ATTN: Mr. Saeed U. Ahmad, Project Manager

RE: MAGIC WAY COLLECTION INLET
EQUESTRIAN DETENTION BASIN
PDG PROJECT NO: 1002005

Dear Saeed:

Please find enclosed our initial evaluation of the Magic Way and Equestrian Drive intersection. We propose two transverse drainage structures. The first crossing Equestrian drive on the east side of the intersection and the second crossing Magic Way on the north side of the intersection. The transverse drainage structures outfall into 5 X 5 box culverts and then join together in a 5 X 7 box culvert . The design is planned to collect a minimum of 300 CFS at the intersection, allowing 65 CFS to flow north in Magic Way. Of the 65 CFS bypassing the transverse drainage structure, approximately 32 CFS will be collected by the new drop inlet to be constructed by the Equestrian / Appaloosa Road Improvement Plans.

We have performed a field survey of the intersection, researched the underground utility records and evaluated the Equestrian / Appaloosa Road Improvement Plans and drainage study.

From this information we have determined that the design flow in Equestrian Drive as it reaches Magic Way from the east is 310 CFS. At this point additional flows from west in Equestrian Drive (87 CFS) and flows from the south in Magic Way (33 CFS) combine for a total flow of 430 CFS. Of the total, 65 CFS is collected in the intersection by a 4 foot drop inlet at the southwest corner and a 20 foot drop inlet at the southeast corner. The remainder (365 CFS) flows north in Magic Way.

Both roads are 100 foot ROW with center medians. The medians keep flows on one side of the road from easily crossing the road way to the other side. This condition and the fact that only the west side of Magic has been constructed prevents the long weir opening on the east side of Magic from collecting much flow into the Equestrian Basin.

Poggemeyer Design Group, Inc.
2601 North Tenaya Way
Las Vegas, Nevada 89128
(702) 255-8100
FAX (702) 255-8375

Our proposed collection plan is to construct 2 transverse drainage structures across Equestrian Drive on the east side of the intersection and across Magic Way on the north side of the intersection. This solution was chosen because of the volume of the flow and the current and planned design of the intersection. Very long drop inlets,120 feet on each side of Equestrian Drive, were considered but discarded because of the lengths and pipe sizes.

As the flow approaches the intersection from the east it passes west of the median and reaches equilibrium. The depth of flow at this point is 1.23 feet above the gutter. With this type of flow spreading across the full roadway width the transverse drainage structures can collect up to 3 CFS per foot of width depending on the depth of flow and velocity. Our estimate is that the first 26 feet will collect approximately 3 CFS per foot, with the remainder of width collecting a lesser amount. The Equestrian Drive transverse drainage structure is planed to collect 100 CFS per side of street for a total of 200 CFS. This flow will be collected into a 28 inch wide trough running south to north deepening to the north. At the north end the trough transitions into a 5 X 5 box culvert.

The flow not captured by the transverse drainage structures joins with flows from the west side of the intersection via Equestrian Drive and the south side via Magic Way. The flows not captured by the existing drop inlets on the west side of the intersection turn and flow north in magic. The depth of flow is approximately 0.77 feet in the gutter. The flow does not completely cover the road and less length of transverse drainage structure is planned to collect approximately 100 CFS. This flow will be collected into a 28 inch wide trough running west to east deepening to the east. At the east end the trough transitions into a 5 X 5 box culvert. This box and the one from the Equestrian Drive transverse drainage structure join into the outfall 5 X 7 box discharging into the upper Equestrian basin collection area. The remainder for the flow (65CFS) will continue north until 32 CFS will be collected on the east side by the new drop inlet.

We evaluated the existing utilities located at the intersection and found that the system can be constructed without conflict with the sewer and water. Telephone and gas will be impacted but relocating these is much easier then water or sewer.

The following information is provided as backup for the above discussion.

- Draft plan of facility location with field survey and utilities
- Draft profiles of drainage trough showing underground utilities
- Calculations for Equestrian Drive and Magic Way showing depth of flow

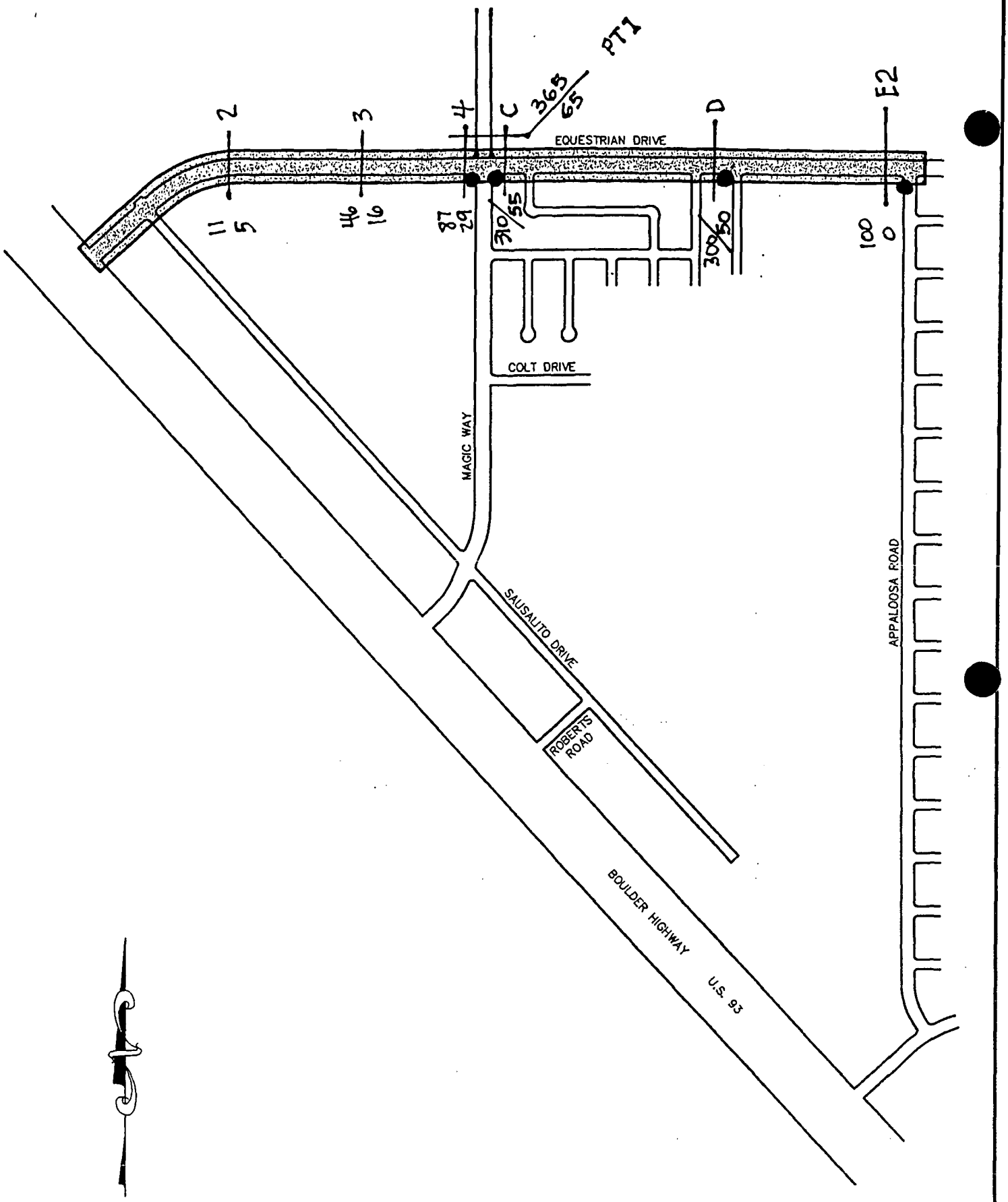
- Figure 2 showing flow in Equestrian drive from Equestrian / Appaloosa Road Improvement plans Drainage Study.
- Spread sheet showing flow collection by transverse drainage structure
- Neenah catalog cut for proposed transverse drainage structure
- Headwater depth for concrete box culverts with inlet control.
- Rating curve for 28" trough
- Critical depth calculations for 5 X 7 box culvert

Please review the concept presented and provide comments or re-direction as necessary. If you have any question or require additional information please call me at your convenience.

Very Truly Yours,

POGGEMEYER DESIGN GROUP, INC.

Stephen L. Weatherman, P.E.
Chief Flood Control Engineer



Equestrian Drive
Appaloosa Road to Boulder Highway

FIG. 2

water sur	100.6		Equesterian									
OFFSET	0	1	2.6875	4.375	6.0625	7.75	9.4375	11.125	12.8125	14.5	16.1875	17.875
	LIP GUT											
ELEV	99.55	99.57	99.60375	99.6375	99.67125	99.705	99.73875	99.7725	99.80625	99.84	99.87375	99.9075
DEPTH	1.05	1.03	0.99625	0.9625	0.92875	0.895	0.86125	0.8275	0.79375	0.76	0.72625	0.6925
Q		5.354664	5.354664	5.354664	5.354664	5.354664	5.354664	5.354664	5.354664	5.354664	5.354664	5.354664

water sur	100.15		Magic									
OFFSET	0	1	2.6875	4.375	6.0625	7.75	9.4375	11.125	12.8125	14.5	16.1875	17.875
	LIP GUT											
ELEV	99.55	99.57	99.60375	99.6375	99.67125	99.705	99.73875	99.7725	99.80625	99.84	99.87375	99.9075
DEPTH	0.6	0.58	0.54625	0.5125	0.47875	0.445	0.41125	0.3775	0.34375	0.31	0.27625	0.2425
Q		6.299605	6.299605	6.299605	5.859735	5.187563	4.548552	3.943588	3.373659	2.839877	2.343512	1.886034

19.5625	21.25	22.9375	24.625	26.3125	28	29.6875	31.375	33.0625	34.75	36.4375	38.125	39.8125
99.94125	99.975	100.0088	100.0425	100.0763	100.11	100.1438	100.1775	100.2113	100.245	100.2788	100.3125	100.3463
0.65875	0.625	0.59125	0.5575	0.52375	0.49	0.45625	0.4225	0.38875	0.355	0.32125	0.2875	0.25375
5.354664	5.354664	5.354664	5.354664	5.354664	5.177368	4.59678	4.044146	3.520191	3.025725	2.561656	2.129015	1.728989

19.5625	21.25	22.9375	24.625	26.3125	28	29.6875	31.375	33.0625	34.75	36.4375	38.125	39.8125
99.94125	99.975	100.0088	100.0425	100.0763	100.11	100.1438	100.1775	100.2113	100.245	100.2788	100.3125	100.3463
0.20875	0.175	0.14125	0.1075	0.07375	0.04	0.00625	-0.0275	-0.06125	-0.095	-0.12875	-0.1625	-0.19625
1.469177	1.095032	0.766203	0.486083	0.259398	0.093569	0.004241	0	0	0	0	0	0

41.5	
100.38	
0.22	
1.362971	113.8214733

41.5	
100.38	
-0.23	
0	53.05503913

ENGINEERS PLANNERS SURVEYORS

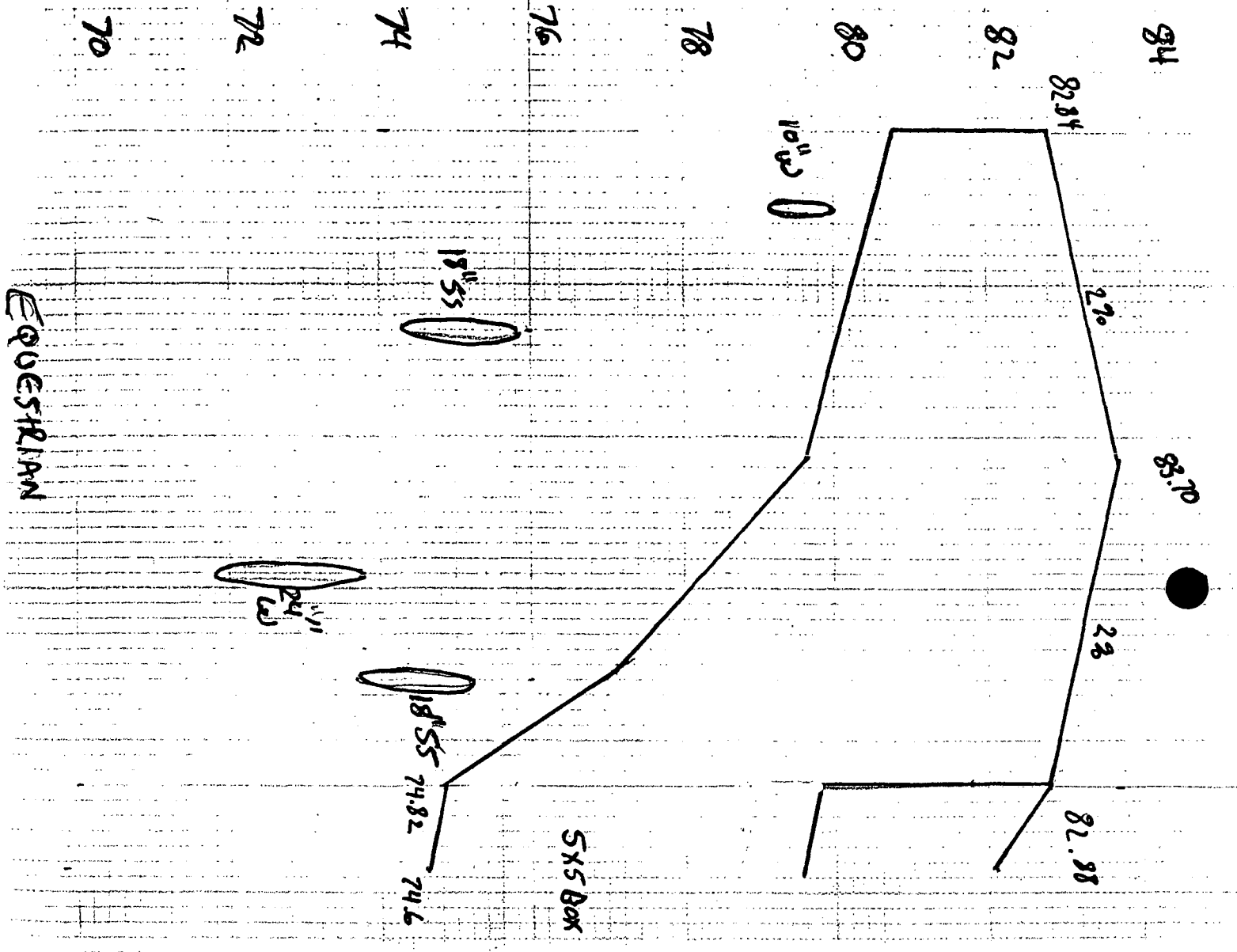
POGGEMEYER DESIGN GROUP

CLIENT COH

PROJECT MAGIC WAY Inlet

ENGINEER SLW JOB NO. 1002005

DATE 12/22/97 SHEET NO. 1/2



POGGEMEYER DESIGN GROUP

ENGINEERS PLANNERS SURVEYORS

CLIENT COH

PROJECT MAGIC WAY INLET

ENGINEER SLW JOB NO. 1002005

DATE 12/22/97 SHEET NO. 2/2

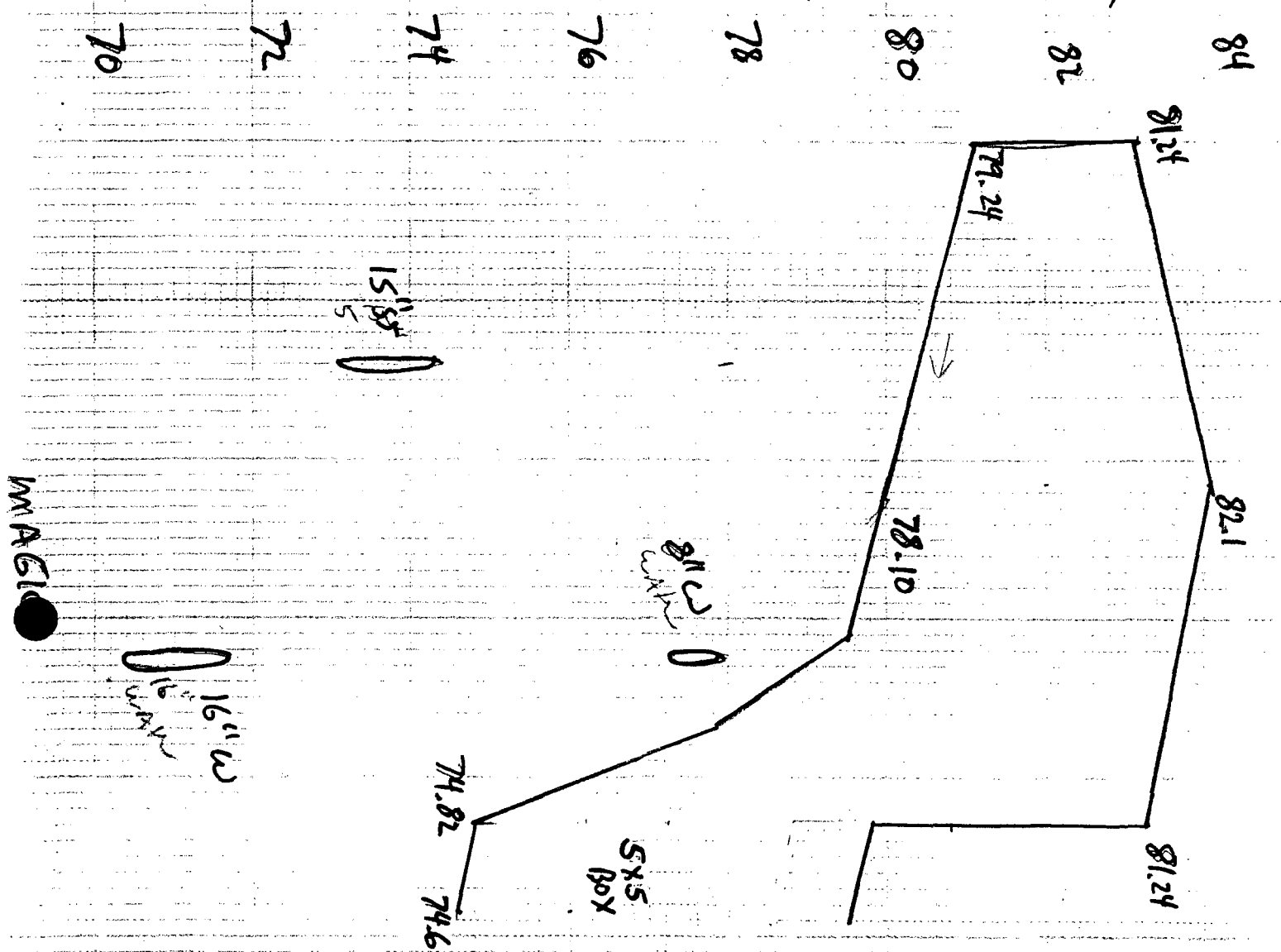
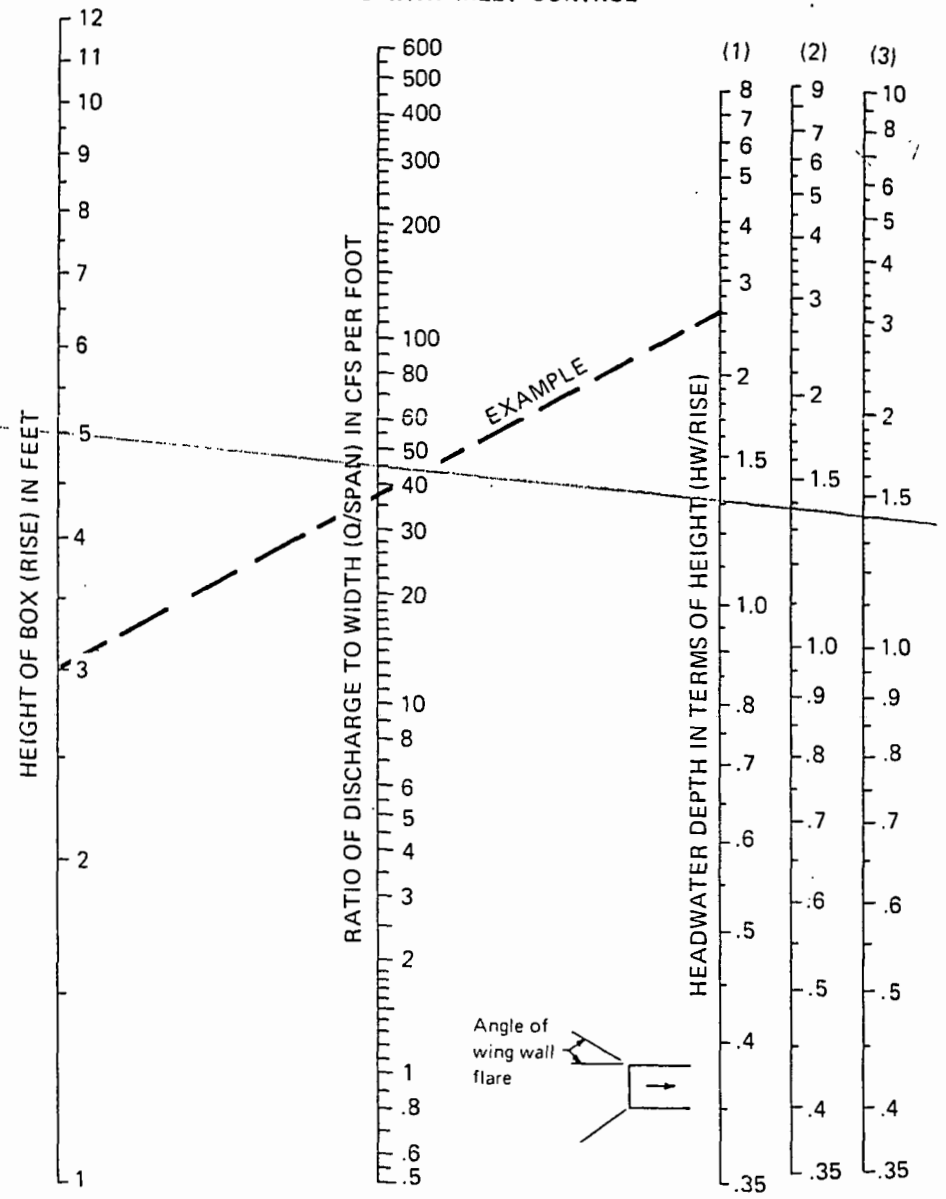


FIGURE 37

HEADWATER DEPTH FOR CONCRETE BOX CULVERTS WITH INLET CONTROL



EXAMPLE

6' x 3' Box Q = 225 cfs
Q/Span = 37.5 cfs/ft

Inlet	HW/Rise	HW ft
(1)	2.6	7.8

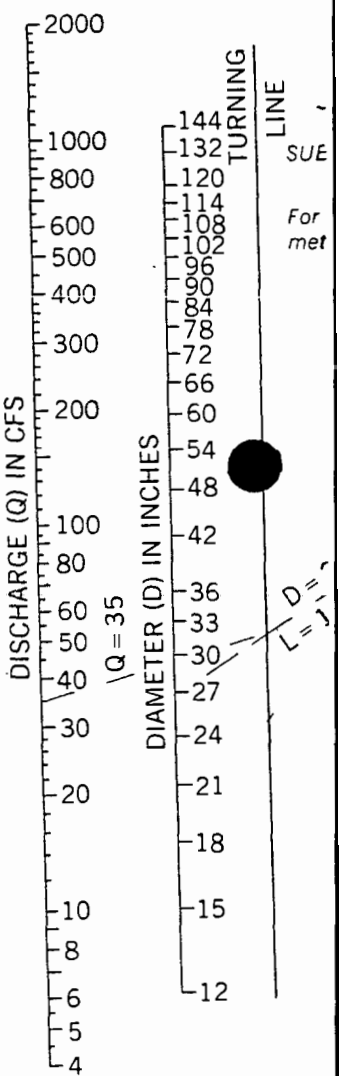
HW/Rise SCALE	WING WALL FLARE
(1)	30° to 75°
(2)	90° and 15°
(3)	0° (extensions of sides)

To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through rise and Q scales, or reverse as illustrated.

BUREAU OF PUBLIC ROADS · JAN 1963

FIGURE 38

HEAD FOR CIR CULVER



SUE

For met

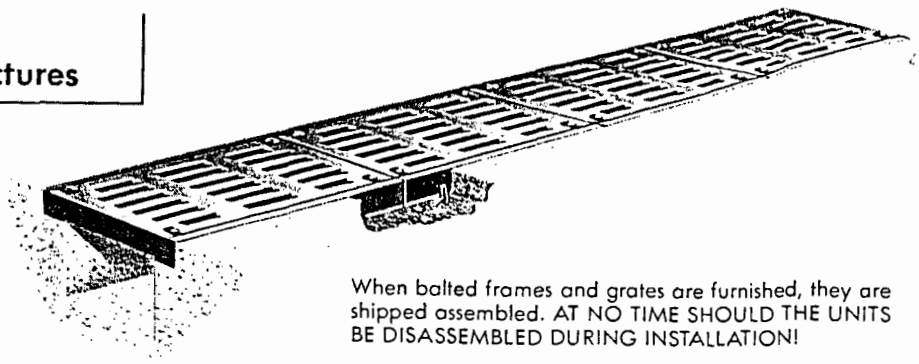
BUREAU OF PUBLIC ROADS

R-4999 Series Bolted Transverse Drainage Structures

Heavy Duty

Illustrating flat type surface showing Type X frame and Type C grate.

Standard frame and cover sections of this type are bolted and manufactured in 24" standard lengths.



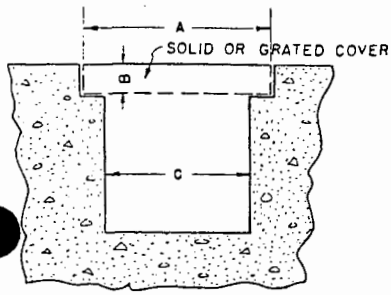
When bolted frames and grates are furnished, they are shipped assembled. AT NO TIME SHOULD THE UNITS BE DISASSEMBLED DURING INSTALLATION!

Read Carefully Before Ordering Specify:

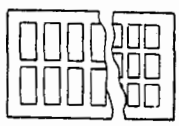
1. Complete catalog number.
2. Length of structure.
3. Type of cover.
4. Perma-Grip surface if required. (See page 229.)
5. End frame sections and number required per unit.
6. If trench drain grates are to be installed in bicycle traffic areas, please advise so that safety standards described on catalog page 89 can be applied.

Catalog No.	Dimensions in inches			Weight per lineal foot (without frame)					
	A	B	C	Type A	Type C	Type D	Type E	Type P	Frame**
R-4999-AX	8	1½	**6**	19	22	19	22	25	12
R-4999-BX	10	1½	**8**	24	27	29	27	31	12
R-4999-CX	12	1½	**10**	28	31	40	36	37	12
R-4999-DX	14	1½	**12**	33	35	52	47	45	12
R-4999-EX	17	1½	**15**	39	52	55	49	—	12
R-4999-FX	20	1½	**18**	54	67	70	70	—	12
R-4999-GX	23	1½	**21**	60	77	85	—	—	12
R-4999-HX	26	1½	**24**	71	100	85	—	—	12
R-4999-JX	30	2	**27**	100	120	100	—	—	17
R-4999-KX	33	2	**30**	110	140	150	—	—	17
R-4999-LX	36	2	**33**	120	130	185	—	—	17
R-4999-MX	39	2	**36**	130	200	180	—	—	17
R-4999-NX	45	2	**42**	150	245	210	—	—	17
R-4999-OX	51	2	**48**	190	—	215	—	—	17

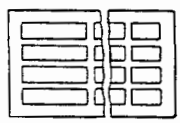
**Weight per foot — includes both sides.



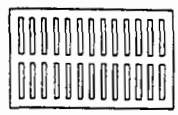
COVER TYPES



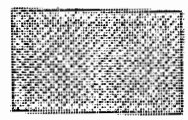
Grate Type A



Grate Type C



Grate Type P



Solid Checkered Type D

Solid Perforated Type E

Type P grates have ¼" slot widths and are especially applicable for areas of heavy pedestrian traffic.

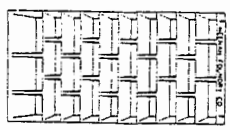
FRAME TYPE

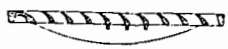
TYPE X

Catalog No.	Dimensions in inches			Grate Wt. per lineal ft.
	A	B	C	
R-4999-L3	14	1½	**12**	45*
R-4999-L6	24	2	**22**	88**
R-4999-L9	29¾	2½	**26¾**	115***

This series furnished standard with Type L grate shown at right.

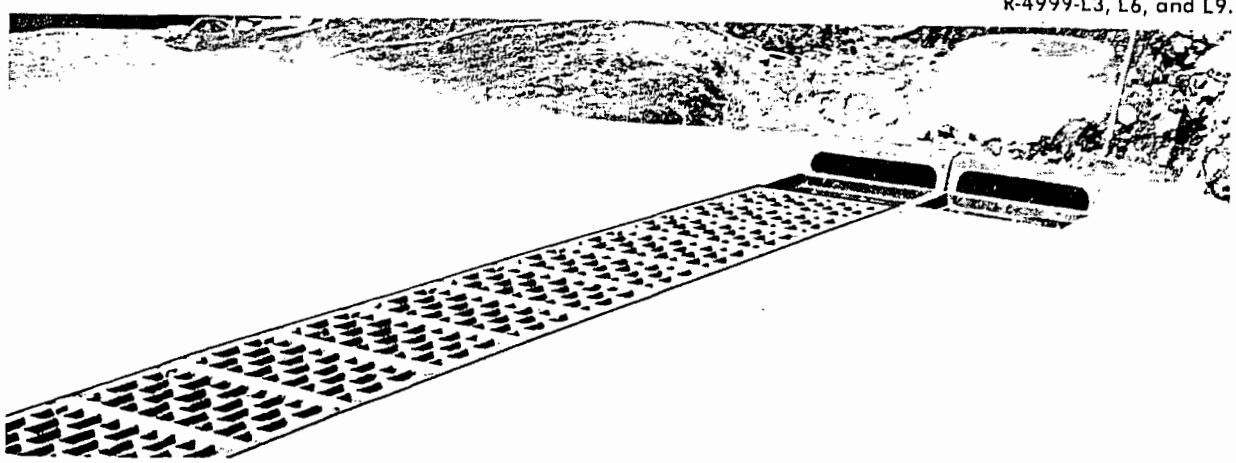
*Furnished in 2 foot increments only.
**Furnished in 1 or 2 foot increments only.
***Furnished in 1½ or 3 foot increments only.





Grate Type L

Available only on R-4999-L3, L6, and L9.



Illustrating R-4999 bolted trench series with Type L grate.

NEENAH FOUNDRY COMPANY

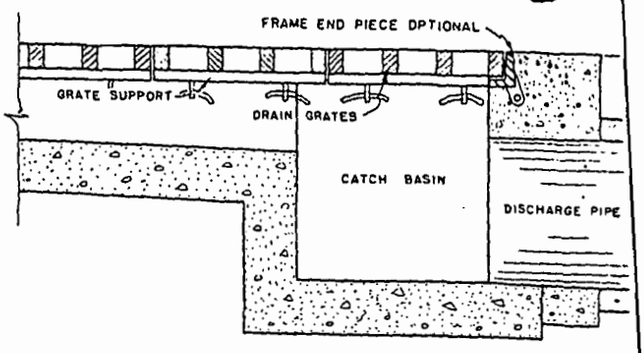
Construction Details for R-4999 Bolted Series Flat or Crowned

NEENA FOUNDRY COMP

VARIABLES:

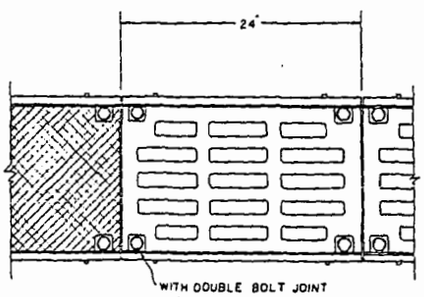
1. Overall length.
2. Cover type.
3. Curb box, catch basin inlet, or frame end piece.
4. Machined horizontal bearing surfaces. (Vertical machined bearing surfaces also available on special order.)

For perfect seating of cover in frame, specify machined horizontal bearing surfaces.



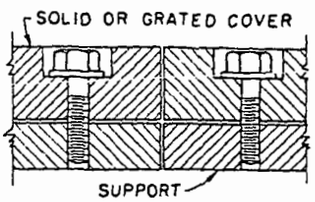
Showing method of construction when no box or inlet is used at end of assembly.

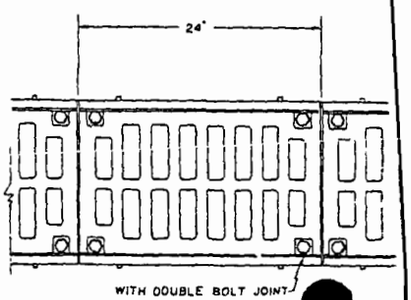
Special assistance is offered providing details shown *do not* cover your requirements. Shop drawings furnished on request.



Illustrating Type "D" Solid Lid with Type "C" Grate and Frame

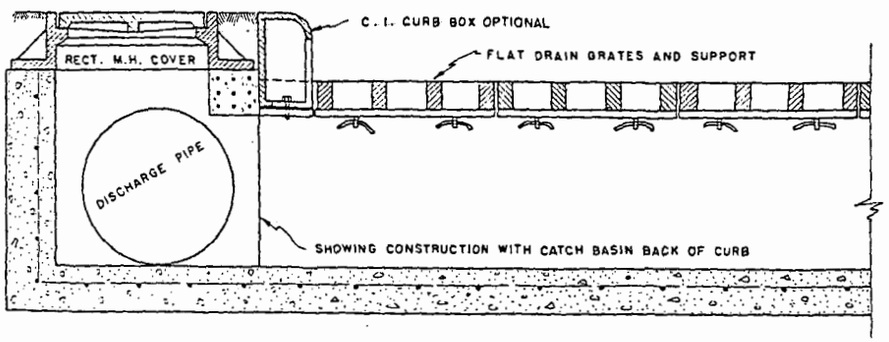
Cover Type Variable
(See page 234)

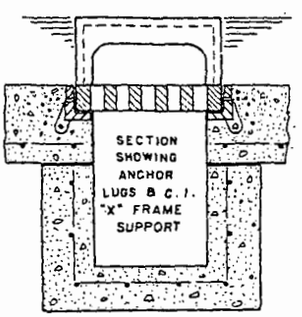




Illustrating Type "A" Grate with Frame

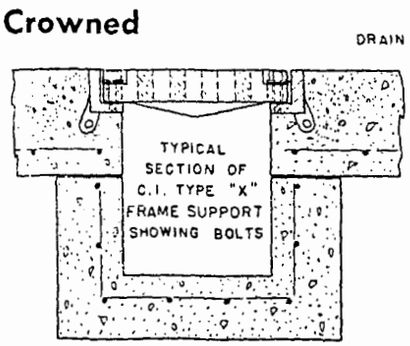
Flat

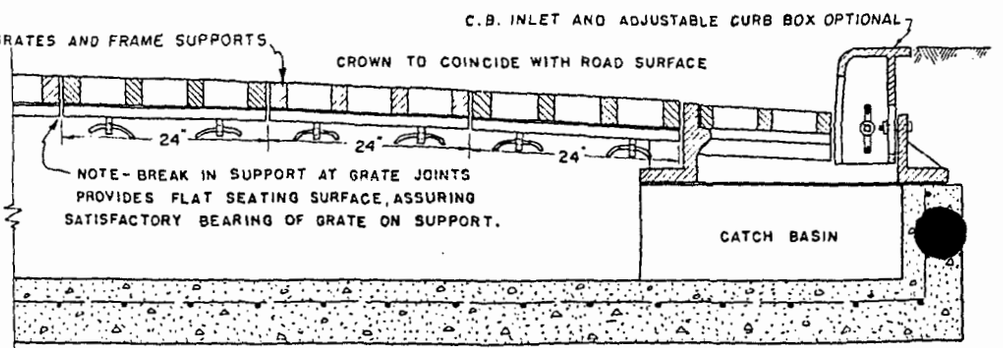




If *necessary*, complete curb inlet assemblies with adjustable curb boxes or fixed stationary boxes are available. Inlets or curb boxes need not be installed at both ends of the trench drain; they can be used in combination or not at all, depending on drainage conditions.

Crowned





Crowned type drainage structures will conform to any roadway crown. Frames and grates are separated at 2-foot intervals, allowing drain to conform to roadway crown.

Table
Rating Table for Rectangular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	TROUGHT
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Constant Data	
Mannings Coefficient	0.013
Channel Slope	0.020000 ft/ft
Bottom Width	2.23 ft

Input Data			
	Minimum	Maximum	Increment
Discharge	10.00	200.00	10.00 ft³/s

Rating Table

Discharge (ft³/s)	Depth (ft)
10.00	0.54
20.00	0.89
30.00	1.20
40.00	1.50
50.00	1.78
60.00	2.06
70.00	2.34
80.00	2.62
90.00	2.89
100.00	3.16

Table
Rating Table for Rectangular Channel

Rating Table	
Discharge (ft^3/s)	Depth (ft)
110.00	3.42
120.00	3.69
130.00	3.96
140.00	4.22
150.00	4.49
160.00	4.75
170.00	5.01
180.00	5.28
190.00	5.54
200.00	5.80

4 x 4 box culvert
Worksheet for Rectangular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	box culvert
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Bottom Width	4.00	ft
Discharge	300.00	ft^3/s

Results		
Depth	3.86	ft
Flow Area	15.44	ft^2
Wetted Perimeter	11.72	ft
Top Width	4.00	ft
Critical Depth	5.59	ft
Critical Slope	0.008215	ft/ft
Velocity	19.43	ft/s
Velocity Head	5.86	ft
Specific Energy	9.73	ft
Froude Number	1.74	
Flow is supercritical.		

Equestrian w/o median
Worksheet for Irregular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	Equestrian w/o median
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.005300	ft/ft

Elevation range: 99.39 ft to 100.38 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	100.00	0.017
5.50	99.89			
5.50	99.39			
7.00	99.51			
7.00	99.55			
50.00	100.38			
92.00	99.55			
92.00	99.51			
94.50	99.39			
94.50	99.89			
100.00	100.00			
Discharge	310.00	ft^3/s		

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	100.60	ft
Flow Area	65.55	ft^2
Wetted Perimeter	102.30	ft
Top Width	100.00	ft
Depth	1.21	ft
Critical Water Elev.	100.61	ft

Equestrian w/o median
Worksheet for Irregular Channel

Critical Slope	0.004966	ft/ft
Velocity	4.73	ft/s
Velocity Head	0.35	ft
Specific Energy	100.95	ft
Froude Number	1.03	
Full Flow Capacity	29.79	ft^3/s

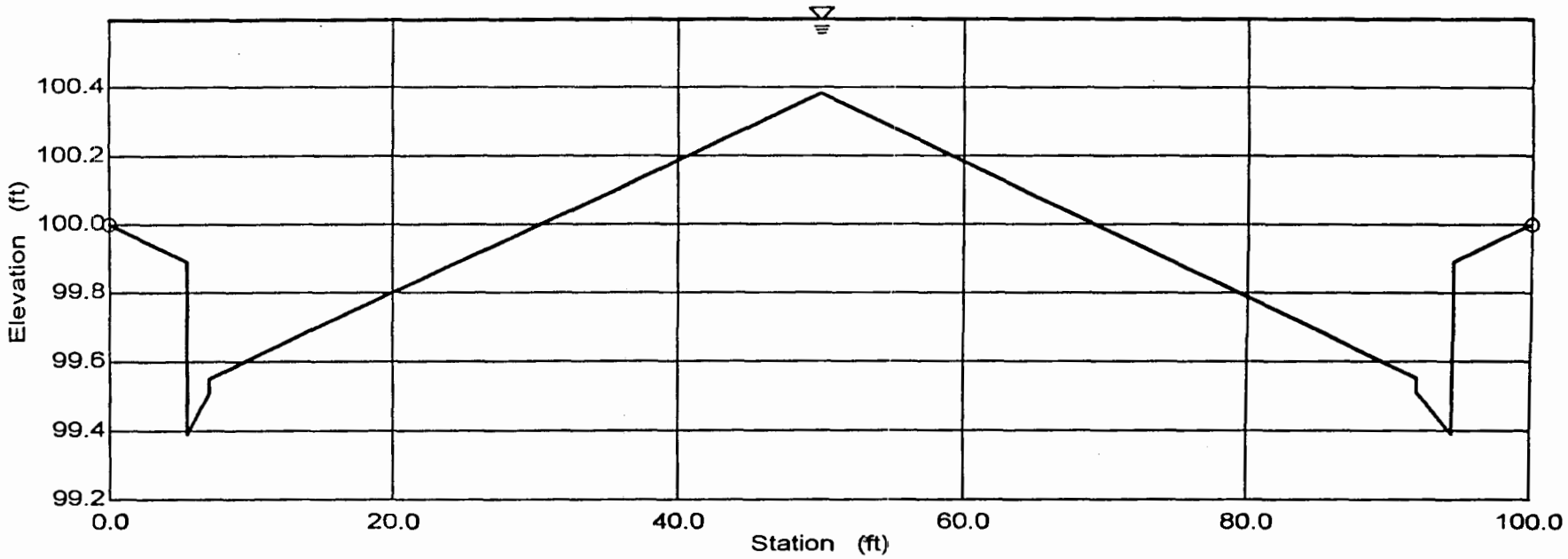
Flow is supercritical.

Water elevation exceeds lowest end station by 0.60 ft.

Equestrian w/o median
Cross Section for Irregular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	Equestrian w/o median
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.005300	ft/ft
Water Surface Elevation	100.60	ft
Discharge	310.00	ft^3/s



Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	EQUESTRIAN DR.
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.005300 ft/ft	
Elevation range: 99.39 ft to 100.93 ft.		

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	100.00	0.017
5.50	99.89			
5.50	99.39			
7.00	99.51			
7.00	99.55			
42.00	100.25			
42.92	100.29			
43.00	100.79			
50.00	100.93			
57.00	100.79			
57.08	100.29			
58.00	100.25			
92.00	99.55			
92.00	99.51			
94.50	99.39			
94.50	99.89			
100.00	100.00			

Discharge	310.00	ft^3/s

Results	
Wtd. Mannings Coefficient	0.017

Worksheet
Worksheet for Irregular Channel

Water Surface Elevation	100.61	ft
Flow Area	61.95	ft^2
Wetted Perimeter	88.83	ft
Top Width	85.94	ft
Depth	1.22	ft
Critical Water Elev.	100.63	ft
Critical Slope	0.004872	ft/ft
Velocity	5.00	ft/s
Velocity Head	0.39	ft
Specific Energy	101.00	ft
Froude Number	1.04	
Full Flow Capacity	28.88	ft^3/s

Flow is supercritical.

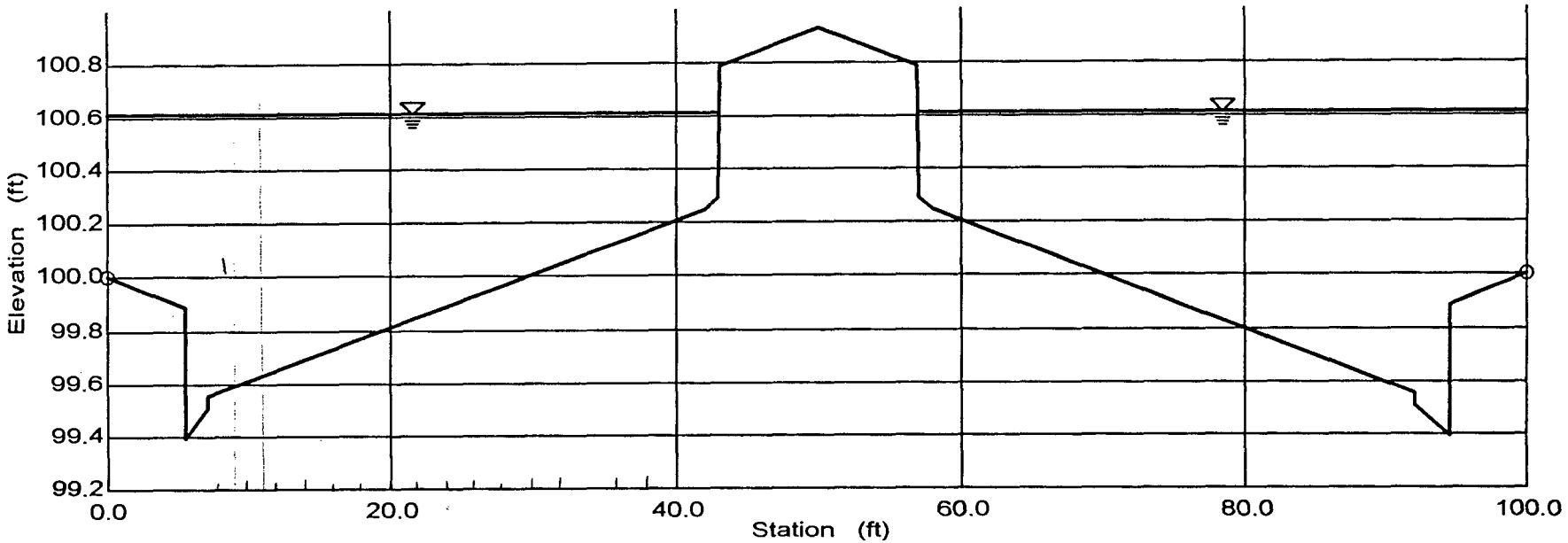
Flow is divided.

Water elevation exceeds lowest end station by 0.61 ft.

Cross Section EQUESTRIAN DR
Cross Section for Irregular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	EQUESTRIAN DR.
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.005300	ft/ft
Water Surface Elevation	100.61	ft
Discharge	310.00	ft^3/s



Magic w/o median
Worksheet for Irregular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	Magic Way w/o median
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.012000	ft/ft

Elevation range: 99.39 ft to 100.38 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	100.00	0.017
5.50	99.89			
5.50	99.39			
7.00	99.51			
7.00	99.55			
50.00	100.38			
92.00	99.55			
92.00	99.51			
94.50	99.39			
94.50	99.89			
100.00	100.00			

Discharge	100.00	ft^3/s

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	100.15	ft
Flow Area	23.29	ft^2
Wetted Perimeter	77.58	ft
Top Width	76.18	ft
Depth	0.76	ft
Critical Water Elev.	100.23	ft

Magic w/o median
Worksheet for Irregular Channel

Critical Slope	0.006111	ft/ft
Velocity	4.29	ft/s
Velocity Head	0.29	ft
Specific Energy	100.43	ft
Froude Number	1.37	
Full Flow Capacity	44.83	ft^3/s

Flow is supercritical.

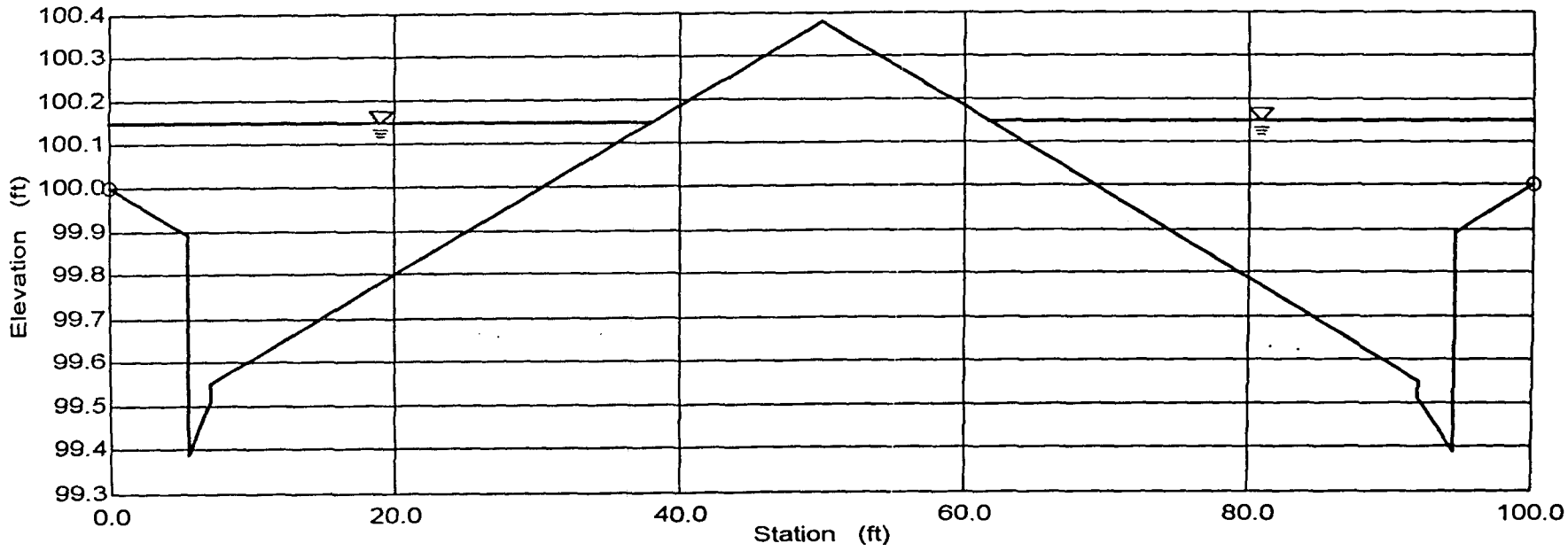
Flow is divided.

Water elevation exceeds lowest end station by 0.15 ft.

Magic w/o median
Cross Section for Irregular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	Magic Way w/o median
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.012000	ft/ft
Water Surface Elevation	100.15	ft
Discharge	100.00	ft^3/s



4 x 4 box culvert
Worksheet for Rectangular Channel

Project Description	
Project File	j:\1002001\project1.fm2
Worksheet	box culvert
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000	ft/ft
Bottom Width	4.00	ft
Discharge	300.00	ft^3/s

Results		
Depth	3.86	ft
Flow Area	15.44	ft^2
Wetted Perimeter	11.72	ft
Top Width	4.00	ft
Critical Depth	5.59	ft
Critical Slope	0.008215	ft/ft
Velocity	19.43	ft/s
Velocity Head	5.86	ft
Specific Energy	9.73	ft
Froude Number	1.74	
Flow is supercritical.		

The Magic Way inlet was designed to collect flows at the Magic Way & Equestrian intersections with ultimate flow conditions. The following calculations are used to define the flow collection in the interim conditions when major flows cross the Boulder Highway. The limiting factor is the entrance head loss in the 5' X 7' box culvert. The collection flow rates for the other existing catch basins are taken from the Equestrian Drive drainage study. Maximum collection due to Magic Way inlet is 385 CFS.

Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	EQUESTRIAN W/O MEIDAN
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.005300	ft/ft

Elevation range: 99.39 ft to 100.38 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	100.00	0.017
5.50	99.98			
5.50	99.39			
7.00	99.51			
7.00	99.55			
50.00	100.38			
92.00	99.55			
92.00	99.51			
94.50	99.39			
94.50	99.89			
100.00	100.00			

Discharge	220.00	ft^3/s

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	100.48	ft
Flow Area	53.33	ft^2
Wetted Perimeter	102.15	ft
Top Width	100.00	ft
Depth	1.09	ft
Critical Water Elev.	100.48	ft
Critical Slope	0.005347	ft/ft
Velocity	4.13	ft/s
Velocity Head	0.26	ft
Specific Energy	100.74	ft
Froude Number	1.00	
Full Flow Capacity	28.84	ft^3/s

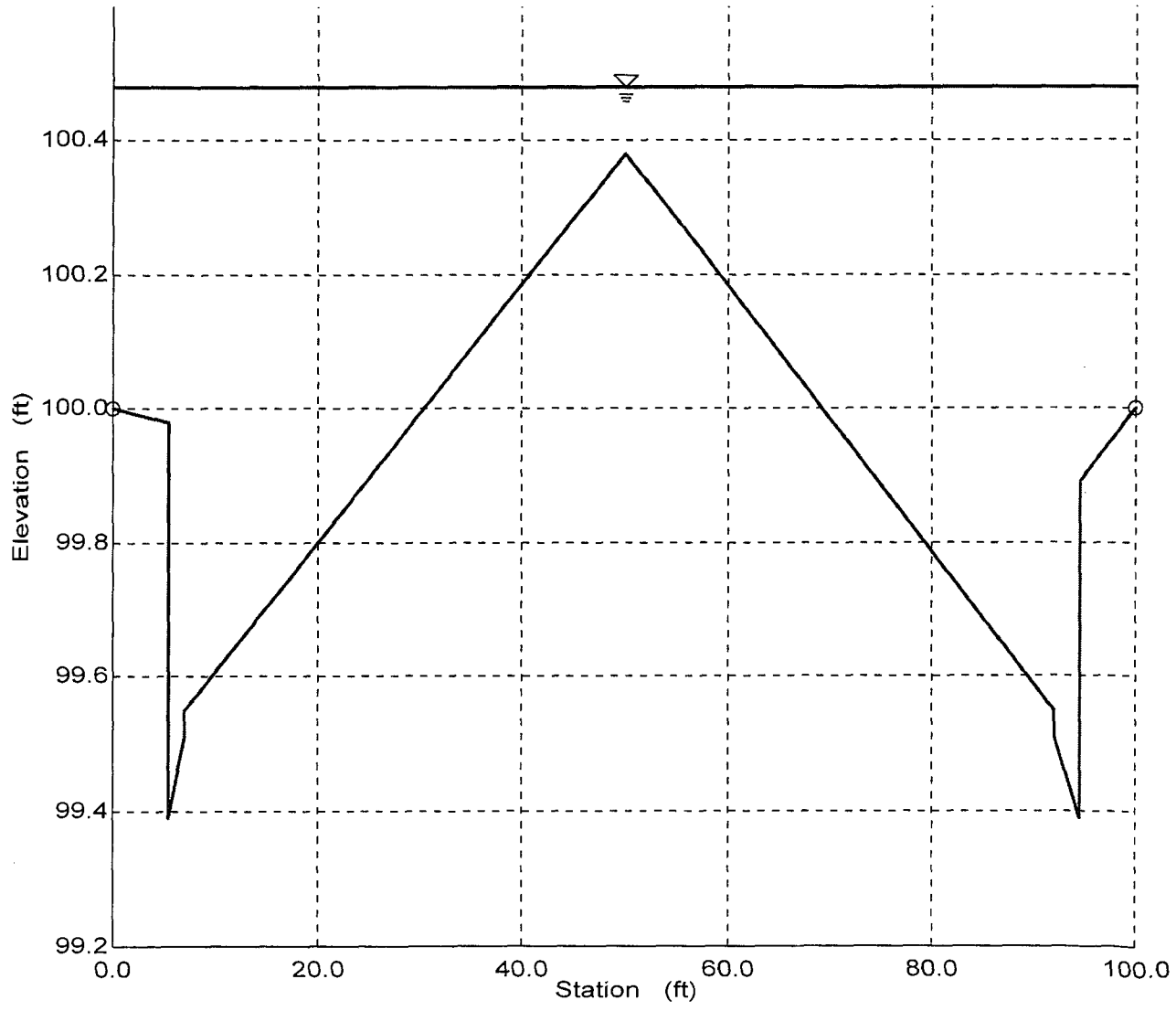
Flow is subcritical.

Water elevation exceeds lowest end station by 0.48 ft.

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	EQUESTRIAN W/O MEIDAN
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.005300	ft/ft
Water Surface Elevation	100.48	ft
Discharge	220.00	ft^3/s



Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	MAGIC WAY W/O MEIDAN
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.012000	ft/ft

Elevation range: 99.39 ft to 100.38 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	100.00	0.017
5.50	99.98			
5.50	99.39			
7.00	99.51			
7.00	99.55			
50.00	100.38			
92.00	99.55			
92.00	99.51			
94.50	99.39			
94.50	99.89			
100.00	100.00			

Discharge	957.00	ft^3/s

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	100.96	ft
Flow Area	101.20	ft^2
Wetted Perimeter	103.11	ft
Top Width	100.00	ft
Depth	1.57	ft
Critical Water Elev.	101.36	ft
Critical Slope	0.003946	ft/ft
Velocity	9.46	ft/s
Velocity Head	1.39	ft
Specific Energy	102.35	ft
Froude Number	1.66	
Full Flow Capacity	43.39	ft^3/s

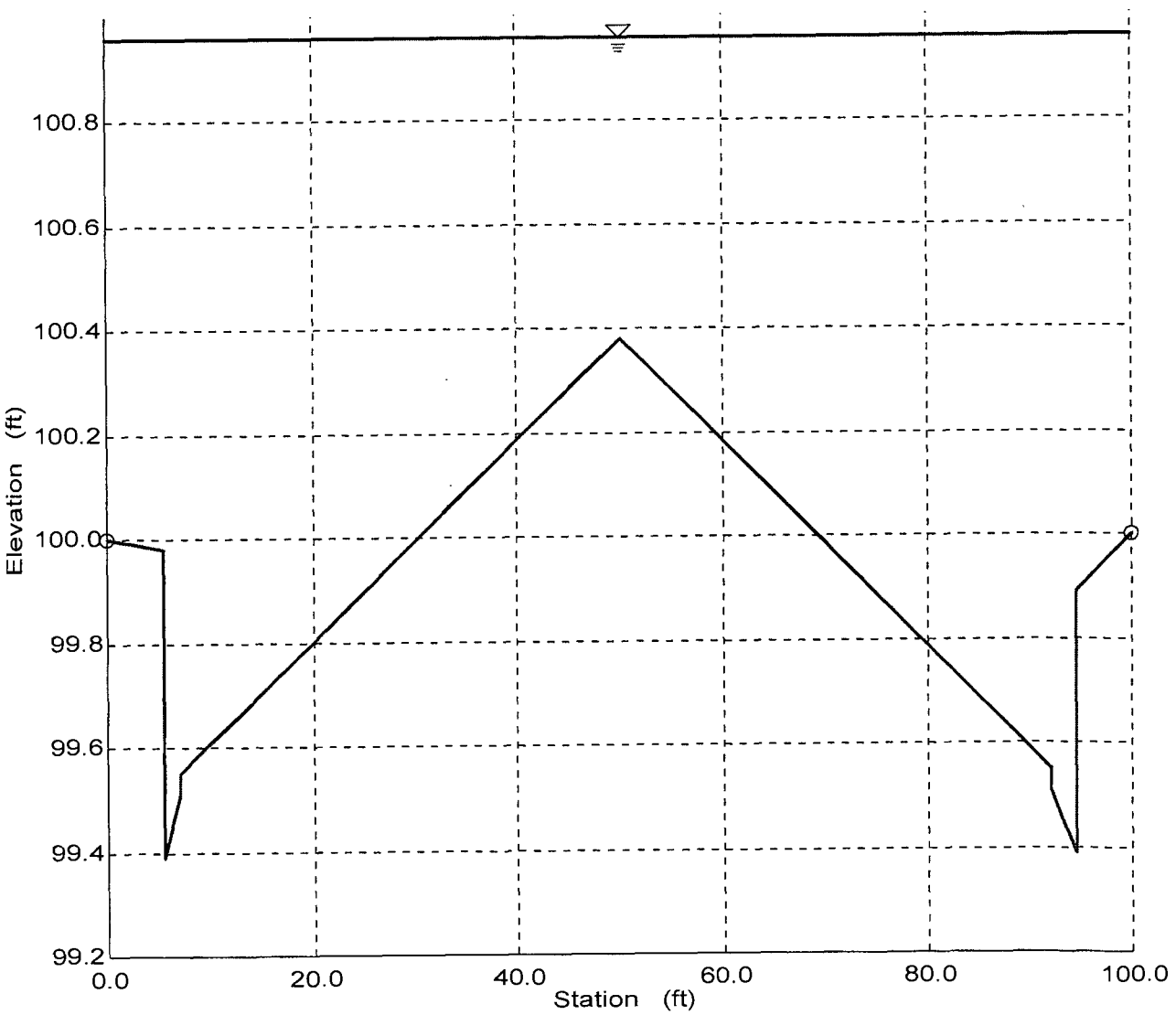
Flow is supercritical.

Water elevation exceeds lowest end station by 0.96 ft.

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	MAGIC WAY W/O MEIDAN
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.012000	ft/ft
Water Surface Elevation	100.96	ft
Discharge	957.00	ft^3/s

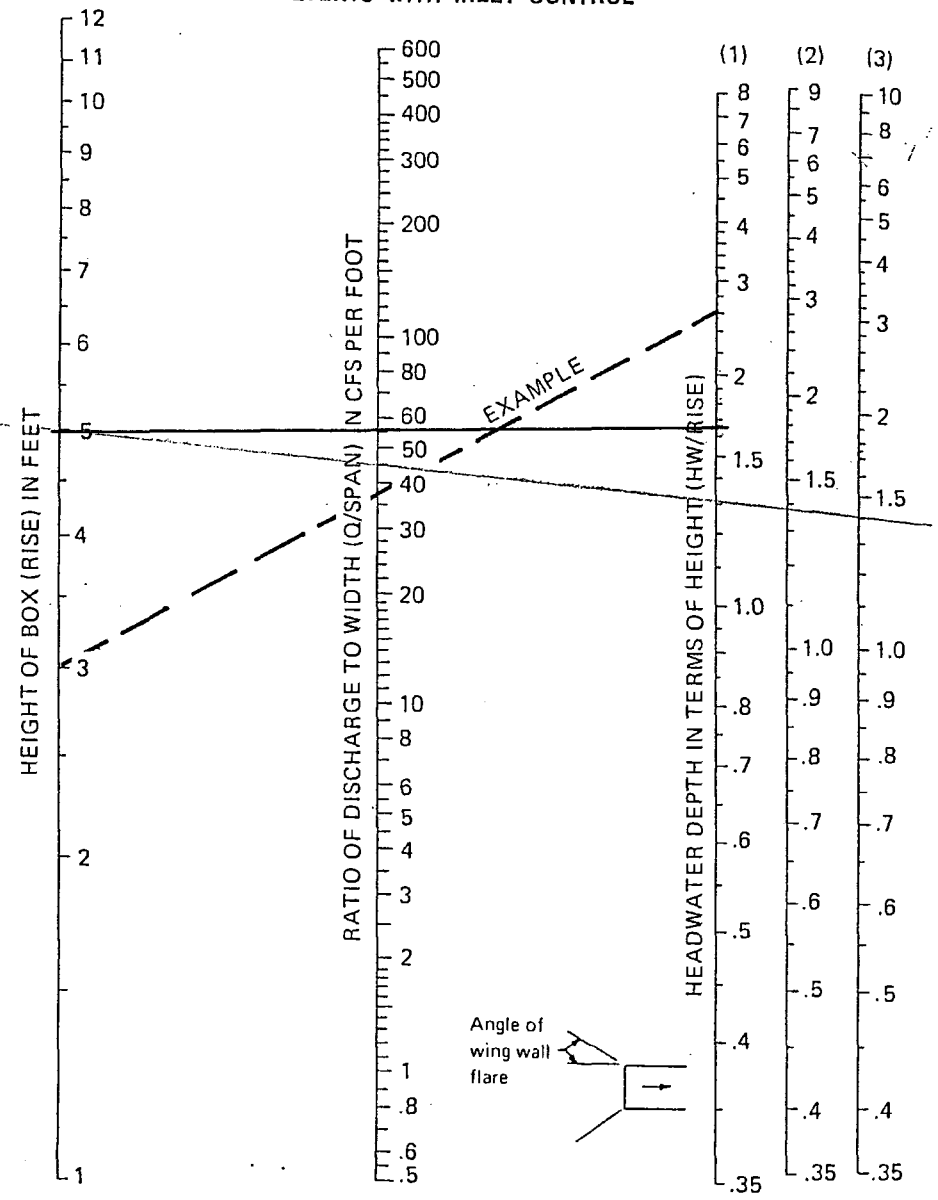


water sur	100.48		**EQUESTRIAN**											
OFFSET	0.000	1.000	2.688	4.375	6.063	7.750	9.438	11.125	12.813	14.500	16.188	17.875	19.563	21.250
	LIP GUT													
ELEV	99.550	99.570	99.604	99.638	99.671	99.705	99.739	99.773	99.806	99.840	99.874	99.908	99.941	99.975
DEPTH	0.930	0.910	0.876	0.843	0.809	0.775	0.741	0.708	0.674	0.640	0.606	0.573	0.539	0.505
Q		5.355	5.355	5.355	5.355	5.355	5.355	5.355	5.355	5.355	5.355	5.355	5.355	5.355
water sur	100.96		**MAGIC**											
OFFSET	0.000	1.000	2.688	4.375	6.063	7.750	9.438	11.125	12.813	14.500	16.188	17.875	19.563	21.250
	LIP GUT													
ELEV	99.550	99.570	99.604	99.638	99.671	99.705	99.739	99.773	99.806	99.840	99.874	99.908	99.941	99.975
DEPTH	1.410	1.390	1.356	1.322	1.289	1.255	1.221	1.188	1.154	1.120	1.086	1.052	1.019	0.985
Q		6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300

22.938	24.625	26.313	28.000	29.688	31.375	33.063	34.750	36.438	38.125	39.813	41.500		
100.009	100.043	100.076	100.110	100.144	100.178	100.211	100.245	100.279	100.313	100.346	100.380		
0.471	0.438	0.404	0.370	0.336	0.303	0.269	0.235	0.201	0.168	0.134	0.100		
4.851	4.286	3.749	3.242	2.764	2.317	1.903	1.521	1.175	0.865	0.595	0.366		97.246
22.938	24.625	26.313	28.000	29.688	31.375	33.063	34.750	36.438	38.125	39.813	41.500		
100.009	100.043	100.076	100.110	100.144	100.178	100.211	100.245	100.279	100.313	100.346	100.380		
0.951	0.917	0.884	0.850	0.816	0.782	0.749	0.715	0.681	0.647	0.614	0.580		
6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300	6.300		157.490

FIGURE 37

HEADWATER DEPTH FOR CONCRETE BOX CULVERTS WITH INLET CONTROL



EXAMPLE

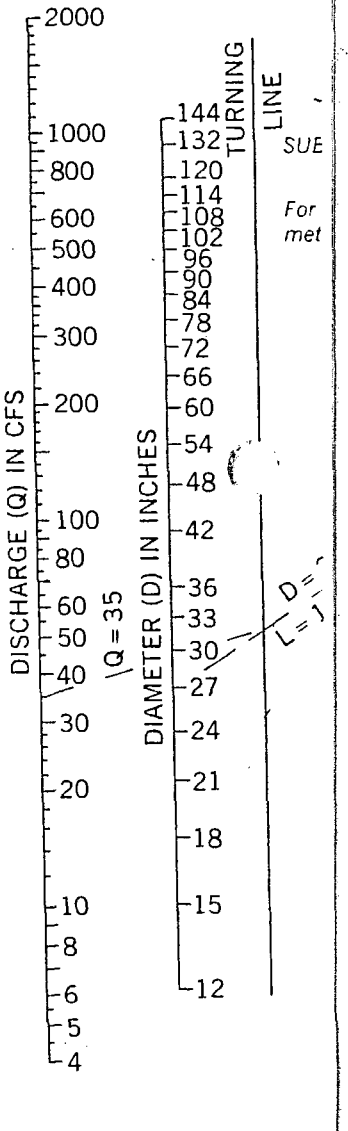
6' x 3' Box Q = 225 cfs
Q/Span = 37.5 cfs/ft
HW *HW*

HW / Rise	SCALE	WING WALL FLARE
	(1)	30° to 75°
	(2)	90° and 15°

To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through rise and Q scales, or reverse as illustrated.

FIGURE 38

HEAD FOR CIR
CULVER



SUE

For met

The flow not collected at the magic Way and Equestrian intersection flows north in Magic Way. Magic Way is a ½ improved 100 foot ROW road with full improvements on the west side. The flow (202-CFS) will be contained within the west side improvements. The existing improvements are as shown in the approved LOMR application for Heritage II 96-09-163R / 97-09-105P except the proposed channel noted to be on the east side of the roadway is not present. The sections provided shown the ½ ROW road and that the flows do not exceed the center line elevation nor the existing median.

MAGIC WAY NORTH OF EQUESTRIAN WEST SIDE
Worksheet for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	MAGIC WAY 1/2 ROW
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.020100	ft/ft

Elevation range: 99.39 ft to 100.91 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	100.00	0.00	50.00	0.017
5.50	99.98			
5.50	99.39			
7.00	99.51			
7.00	99.55			
48.00	100.37			
48.00	100.87			
50.00	100.91			

Discharge	202.00	ft^3/s

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	100.48	ft
Flow Area	25.36	ft^2
Wetted Perimeter	49.22	ft
Top Width	48.00	ft
Depth	1.09	ft
Critical Water Elev.	100.77	ft
Critical Slope	0.004727	ft/ft
Velocity	7.96	ft/s
Velocity Head	0.99	ft
Specific Energy	101.46	ft
Froude Number	1.93	
Full Flow Capacity	529.51	ft^3/s

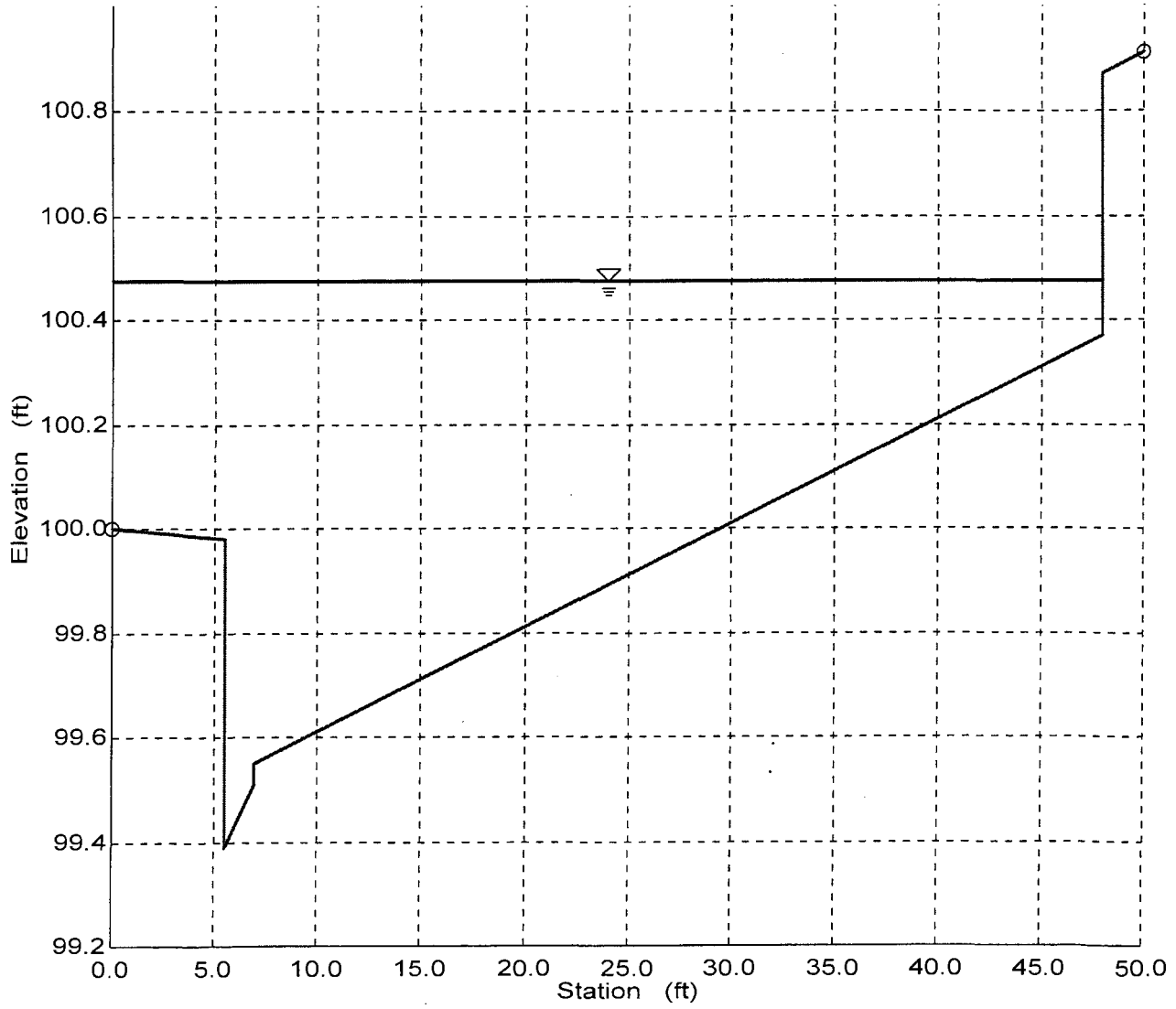
Flow is supercritical.

Water elevation exceeds lowest end station by 0.48 ft.

MAGIC WAY NORTH OF EQUESTRIAN
Cross Section for Irregular Channel

Project Description	
Project File	j:\1002005\equestin.fm2
Worksheet	MAGIC WAY 1/2 ROW
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.020100	ft/ft
Water Surface Elevation	100.48	ft
Discharge	202.00	ft^3/s



APPENDIX F

HEC-RAS CALCULATIONS

Sub-Critical Evaluation

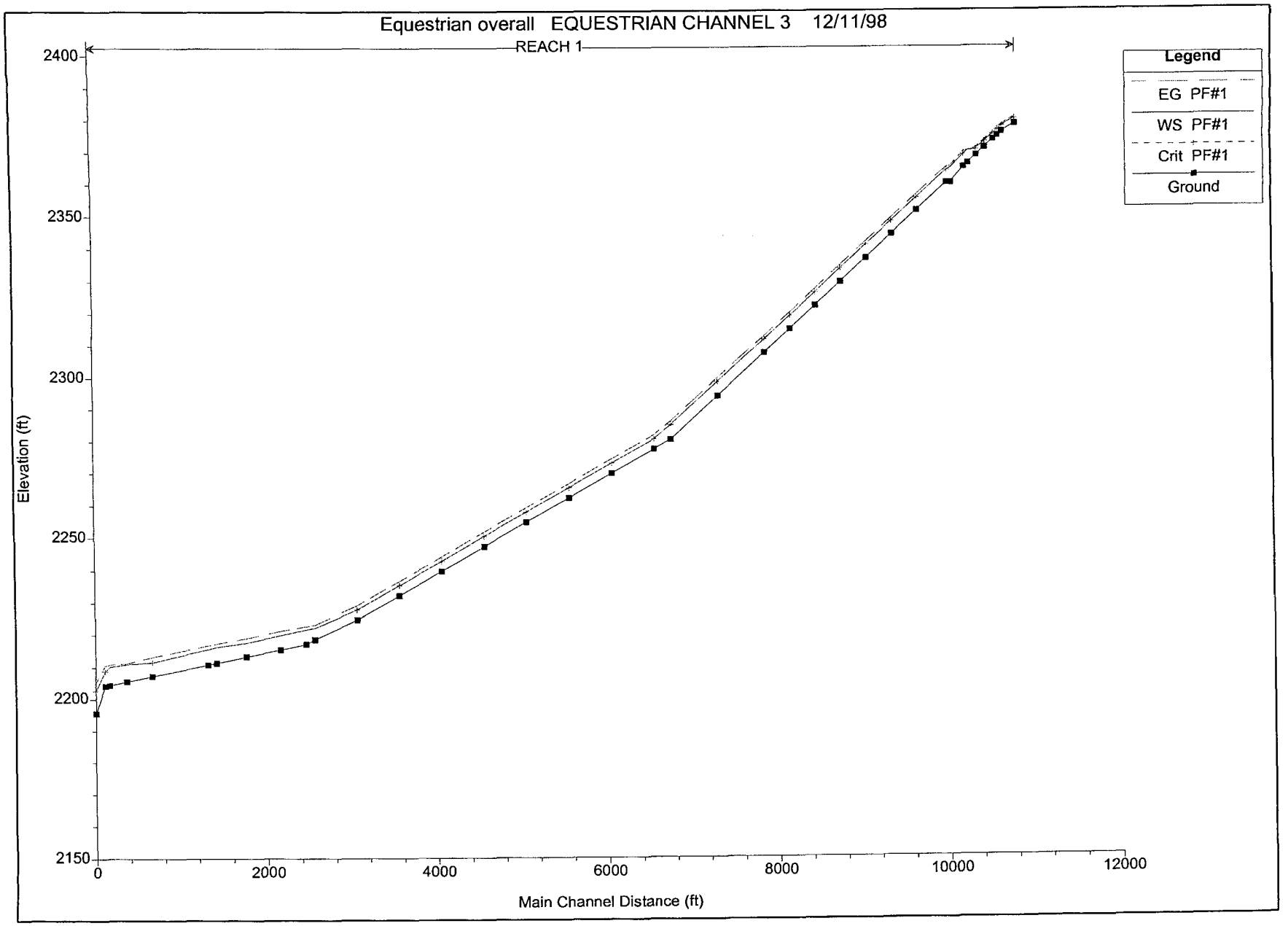
Of Non-Lined Channel

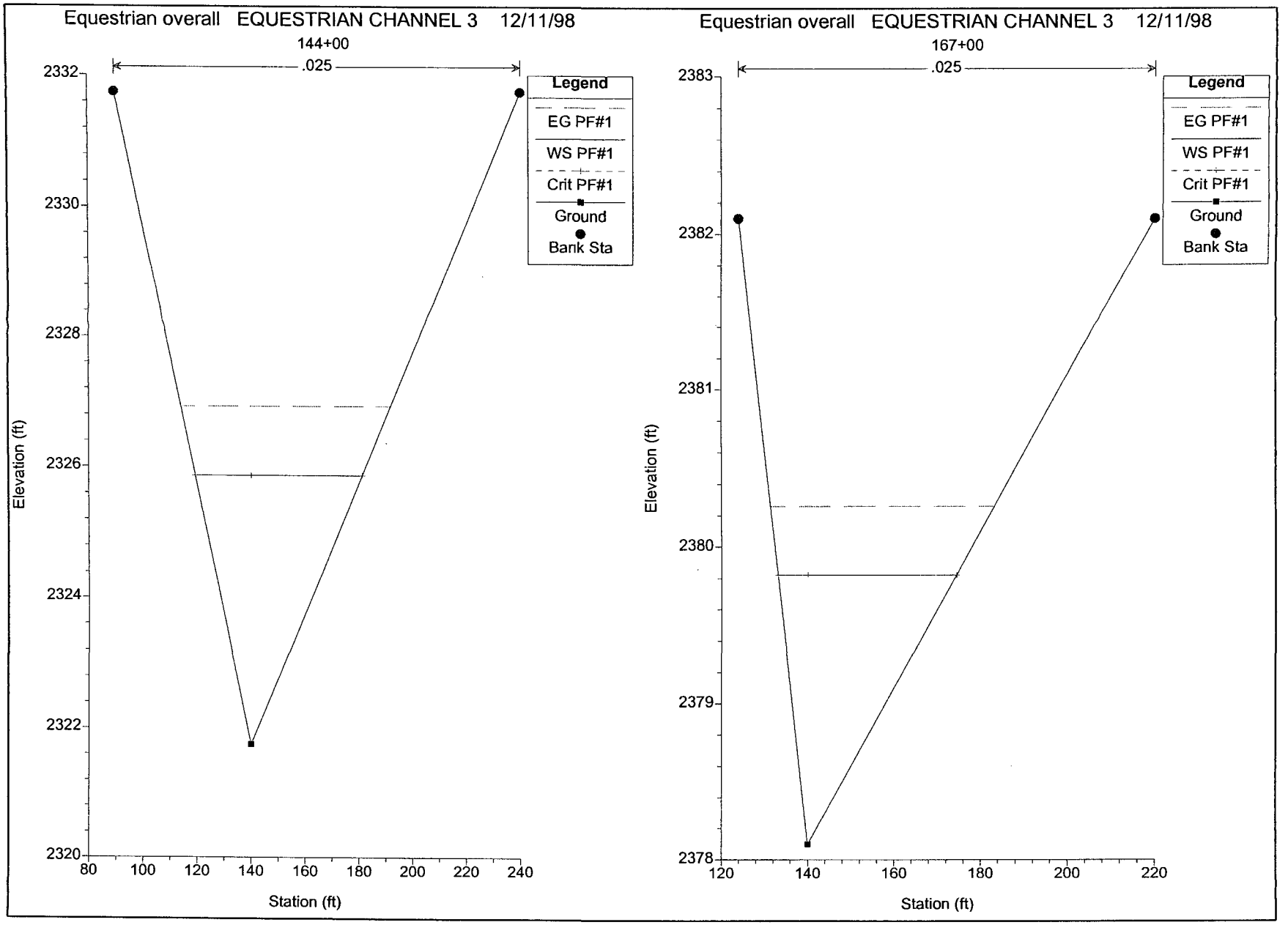
HEC-RAS Plan: EQOVERALL3 River: REACH 1 Reach: REACH 1

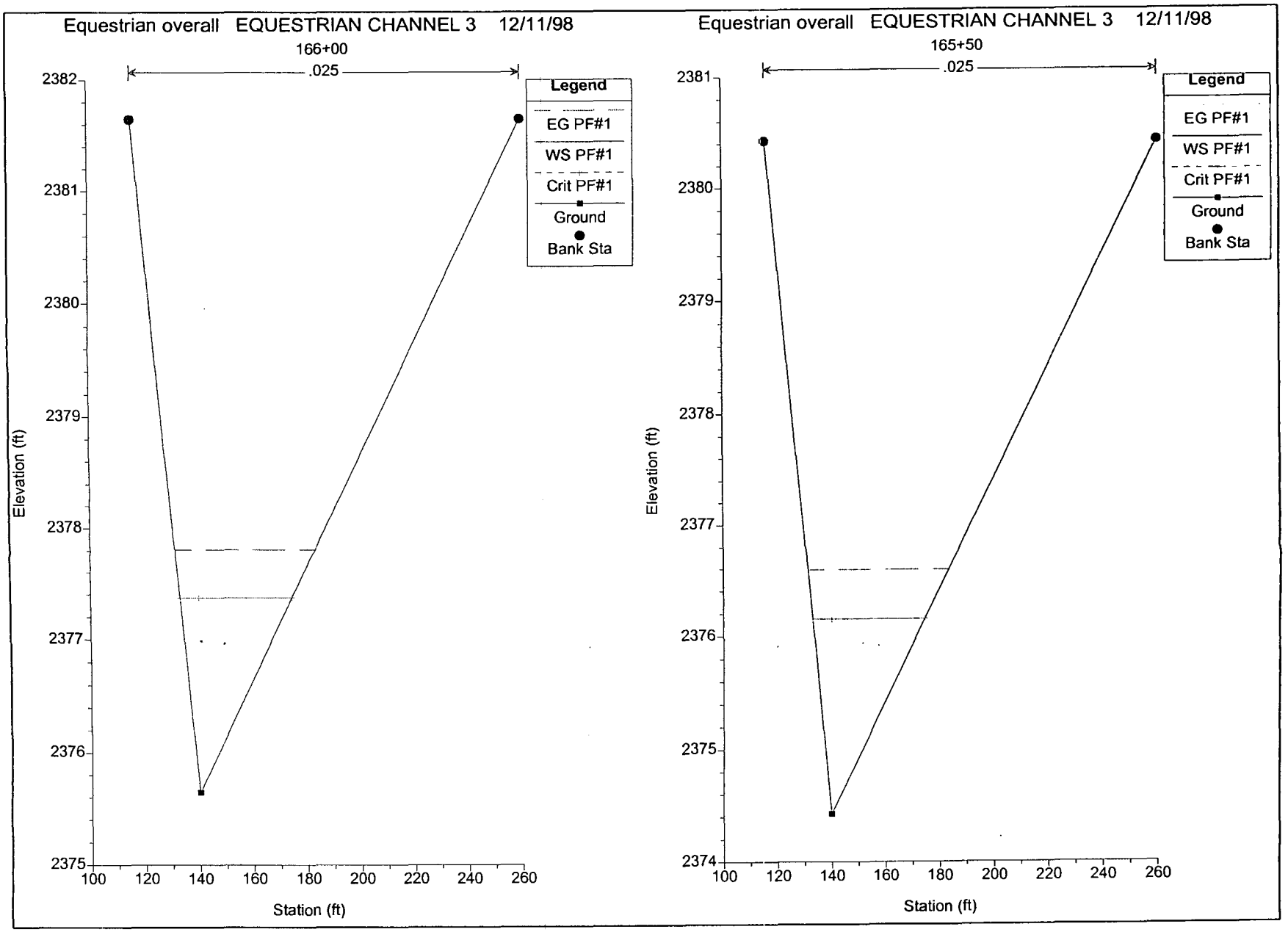
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
REACH 1	16700	189.00	2378.10	2379.82	2379.82	2380.26	0.009832	5.31	35.58	41.33	1.01
REACH 1	16600	189.00	2375.65	2377.37	2377.37	2377.81	0.009832	5.31	35.58	41.33	1.01
REACH 1	16550	189.00	2374.43	2376.15	2376.15	2376.59	0.009832	5.31	35.58	41.33	1.01
REACH 1	16500	189.00	2373.20	2374.92	2374.92	2375.36	0.009952	5.34	35.42	41.23	1.01
REACH 1	16400	189.00	2370.75	2372.44	2372.44	2372.88	0.009861	5.27	35.88	42.36	1.01
REACH 1	16300	189.00	2368.30	2369.99	2369.99	2370.43	0.009998	5.29	35.70	42.25	1.01
REACH 1	16200	189.00	2365.85	2369.69		2369.71	0.000125	1.02	184.45	96.03	0.13
REACH 1	16150	915.00	2364.63	2368.53	2368.53	2369.53	0.007533	8.00	114.31	58.56	1.01
REACH 1	16000	915.00	2359.73	2364.42		2364.90	0.002839	5.55	164.83	70.32	0.64
REACH 1	15950	915.00	2359.73	2363.64	2363.64	2364.63	0.007520	8.00	114.38	58.58	1.01
REACH 1	15600	915.00	2351.15	2355.05	2355.05	2356.05	0.007598	8.03	113.94	58.47	1.01
REACH 1	15300	915.00	2343.80	2347.72	2347.72	2348.70	0.007398	7.95	115.09	58.76	1.00
REACH 1	15000	1046.00	2336.45	2340.57	2340.57	2341.62	0.007402	8.22	127.21	61.78	1.01
REACH 1	14700	1046.00	2329.10	2333.22	2333.22	2334.27	0.007402	8.22	127.21	61.78	1.01
REACH 1	14400	1046.00	2321.75	2325.87	2325.87	2326.92	0.007414	8.23	127.13	61.76	1.01
REACH 1	14100	1046.00	2314.40	2318.52	2318.52	2319.57	0.007384	8.21	127.33	61.81	1.01
REACH 1	13800	1046.00	2307.05	2311.16	2311.16	2312.22	0.007438	8.24	126.98	61.72	1.01
REACH 1	13250	1315.00	2293.58	2298.10	2298.10	2299.24	0.007102	8.57	153.39	67.84	1.00
REACH 1	12700	1315.00	2280.10	2284.63	2284.63	2285.76	0.007051	8.55	153.81	67.93	1.00
REACH 1	12500	1315.00	2277.10	2280.25	2280.25	2281.53	0.006894	9.09	144.71	57.02	1.01
REACH 1	12000	1315.00	2269.60	2272.75	2272.75	2274.03	0.006894	9.09	144.71	57.02	1.01
REACH 1	11500	1315.00	2262.10	2265.25	2265.25	2266.53	0.006894	9.09	144.71	57.02	1.01
REACH 1	11000	1315.00	2254.60	2257.75	2257.75	2259.03	0.006894	9.09	144.71	57.02	1.01
REACH 1	10500	1315.00	2247.10	2250.25	2250.25	2251.53	0.006894	9.09	144.71	57.02	1.01
REACH 1	10000	1315.00	2239.60	2242.74	2242.74	2244.03	0.006923	9.10	144.50	56.99	1.01
REACH 1	9500	1315.00	2232.10	2235.26	2235.26	2236.54	0.006868	9.08	144.76	56.90	1.00
REACH 1	9000	1315.00	2224.60	2227.75	2227.75	2229.03	0.006896	9.09	144.69	57.02	1.01
REACH 1	8600	1315.00	2218.60	2222.12		2223.09	0.004575	7.89	166.71	59.66	0.83
REACH 1	8500	1315.00	2217.10	2221.61		2222.64	0.004225	8.14	161.63	51.60	0.81
REACH 1	8200	1438.00	2215.45	2219.89		2221.18	0.005414	9.12	157.63	51.06	0.91
REACH 1	7800	1438.00	2213.25	2217.65		2218.97	0.005596	9.23	155.76	50.80	0.93
REACH 1	7450	1494.00	2211.33	2216.29		2217.30	0.003741	8.06	185.34	54.72	0.77
REACH 1	7350	1494.00	2210.78	2215.58		2216.85	0.004748	9.04	165.23	48.81	0.87
REACH 1	6700	1494.00	2207.20	2211.63	2211.63	2213.22	0.006527	10.14	147.31	46.56	1.00
REACH 1	6400	1494.00	2205.55	2210.98		2211.33	0.001319	4.74	315.13	96.04	0.46
REACH 1	6200	1494.00	2204.43	2210.20		2210.95	0.002286	6.93	215.44	54.64	0.62

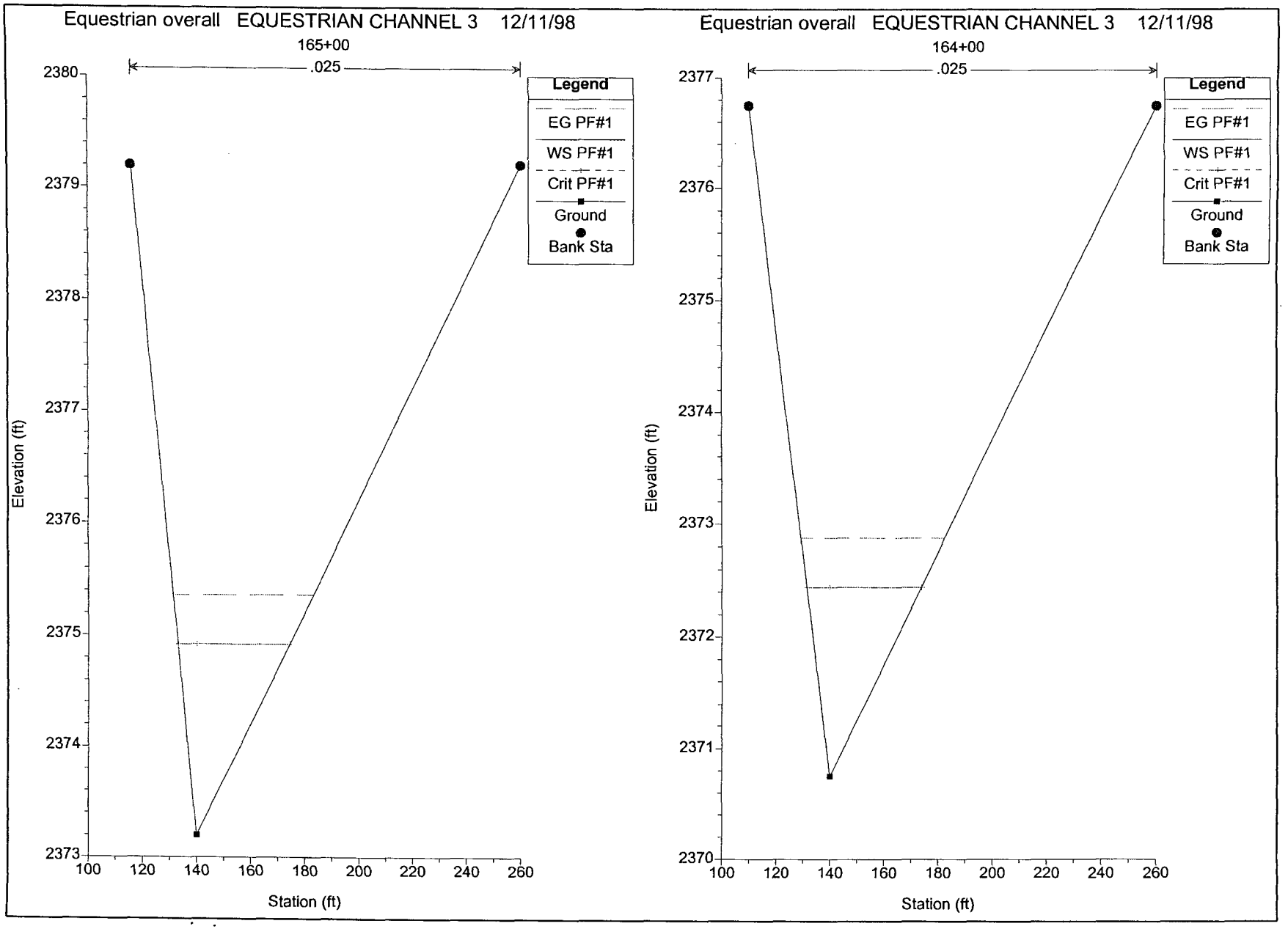
HEC-RAS Plan: EQOVERALL3 River: REACH 1 Reach: REACH 1 (Continued)

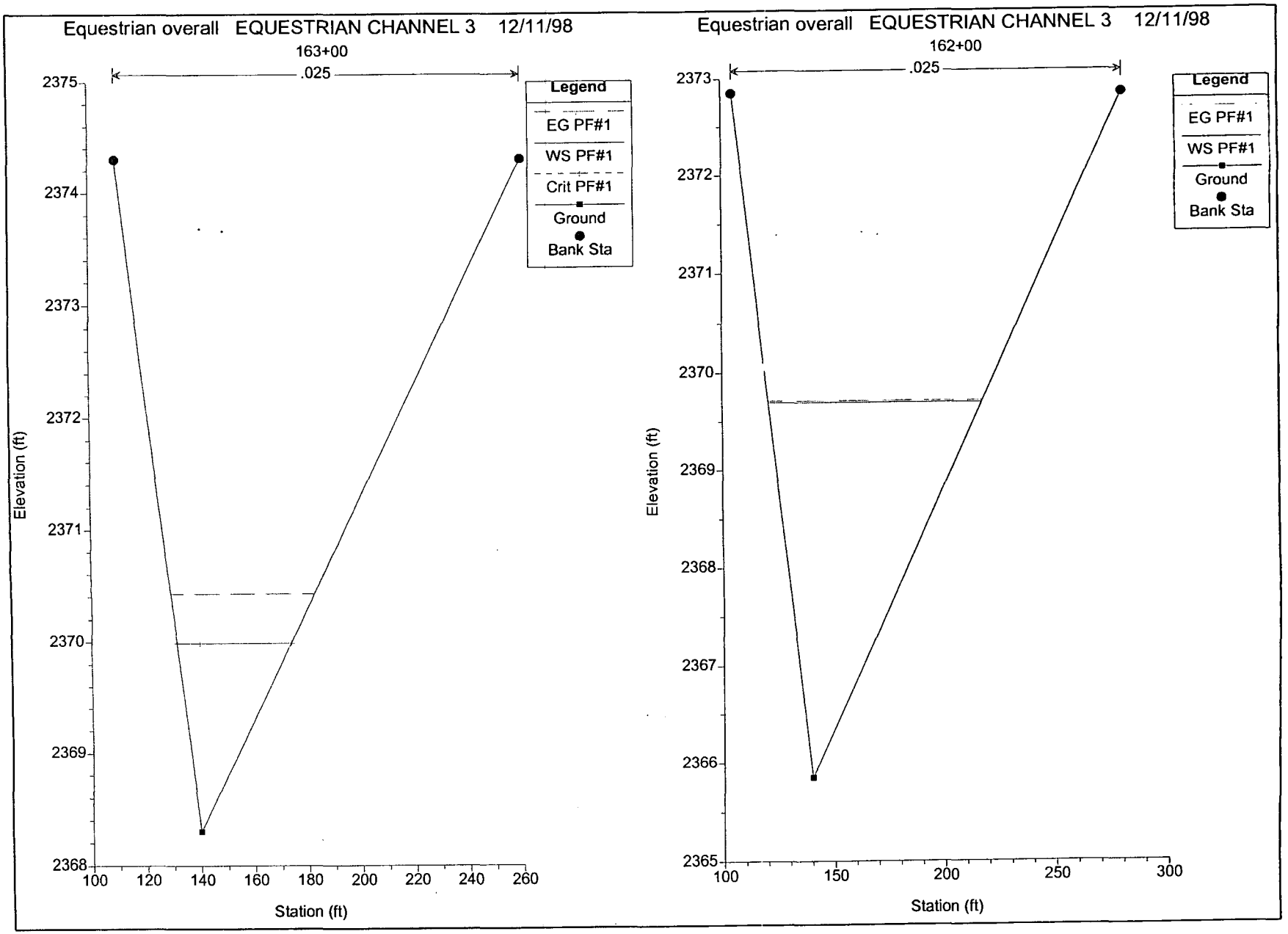
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
REACH 1	6150	1494.00	2204.15	2208.86	2208.86	2210.67	0.006494	10.78	138.62	38.85	1.01
REACH 1	6037	3058.00	2195.53	2202.59	2202.59	2205.09	0.002099	12.68	241.09	48.26	1.00

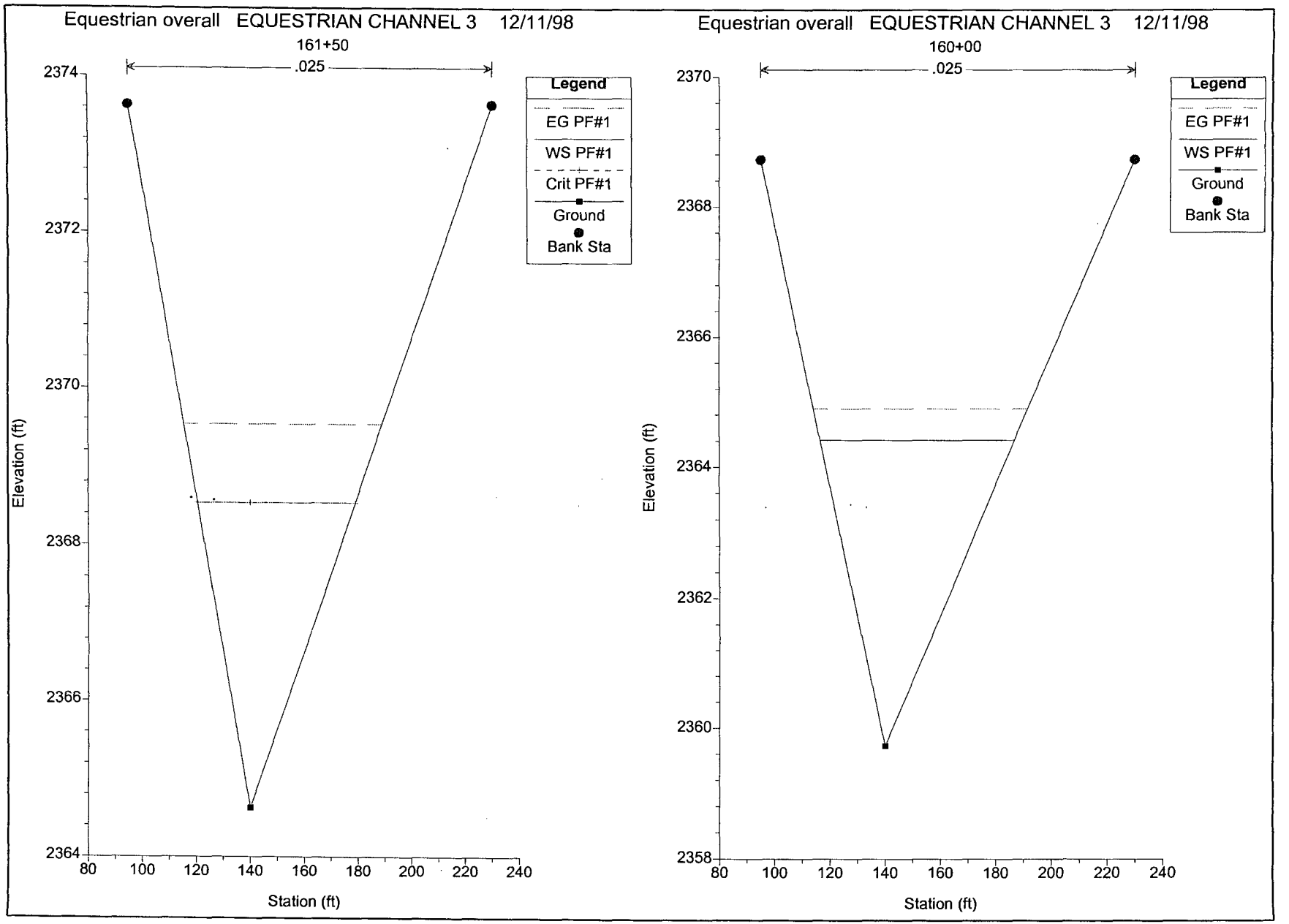

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
REACH 1
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Elevation (ft)
2400
2350
2300
2250
2200
2150
0
2000
4000
6000
8000
10000
12000
Main Channel Distance (ft)

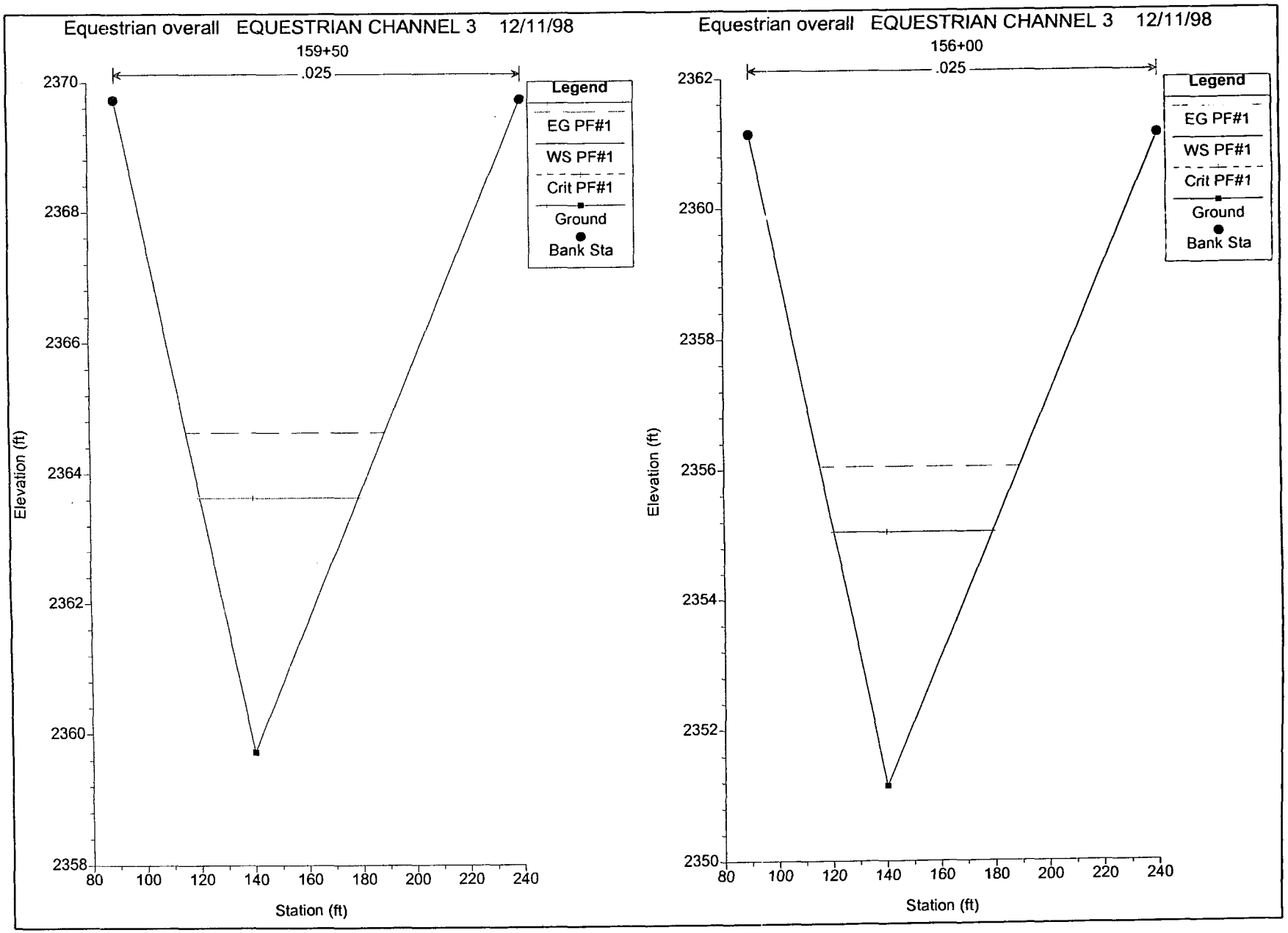

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
144+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2332
2330
2328
2326
2324
2322
2320
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
167+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2383
2382
2381
2380
2379
2378
120
140
160
180
200
220

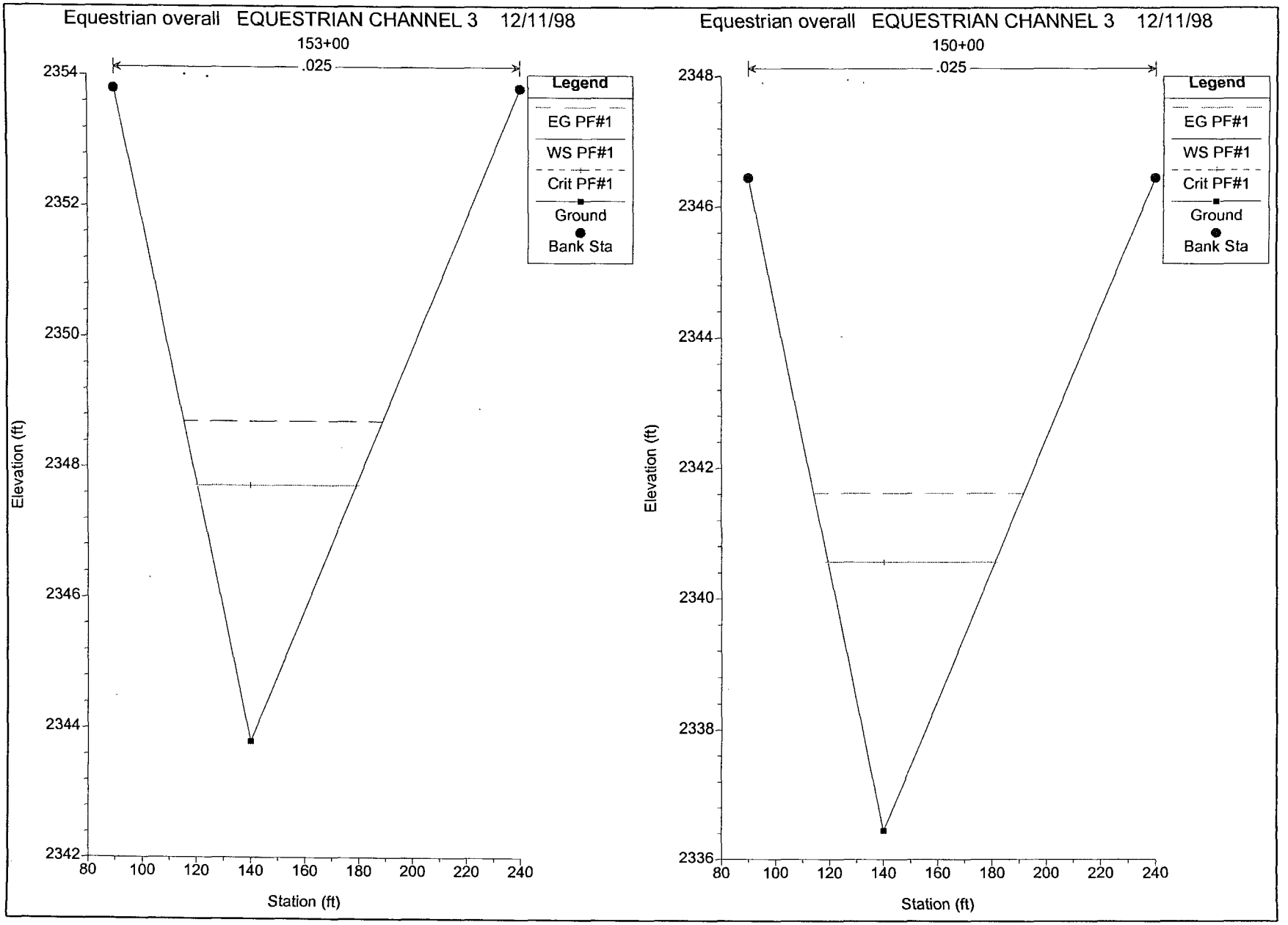

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
166+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2382
2381
2380
2379
2378
2377
2376
2375
100
120
140
160
180
200
220
240
260
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
165+50
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2381
2380
2379
2378
2377
2376
2375
2374
100
120
140
160
180
200
220
240
260

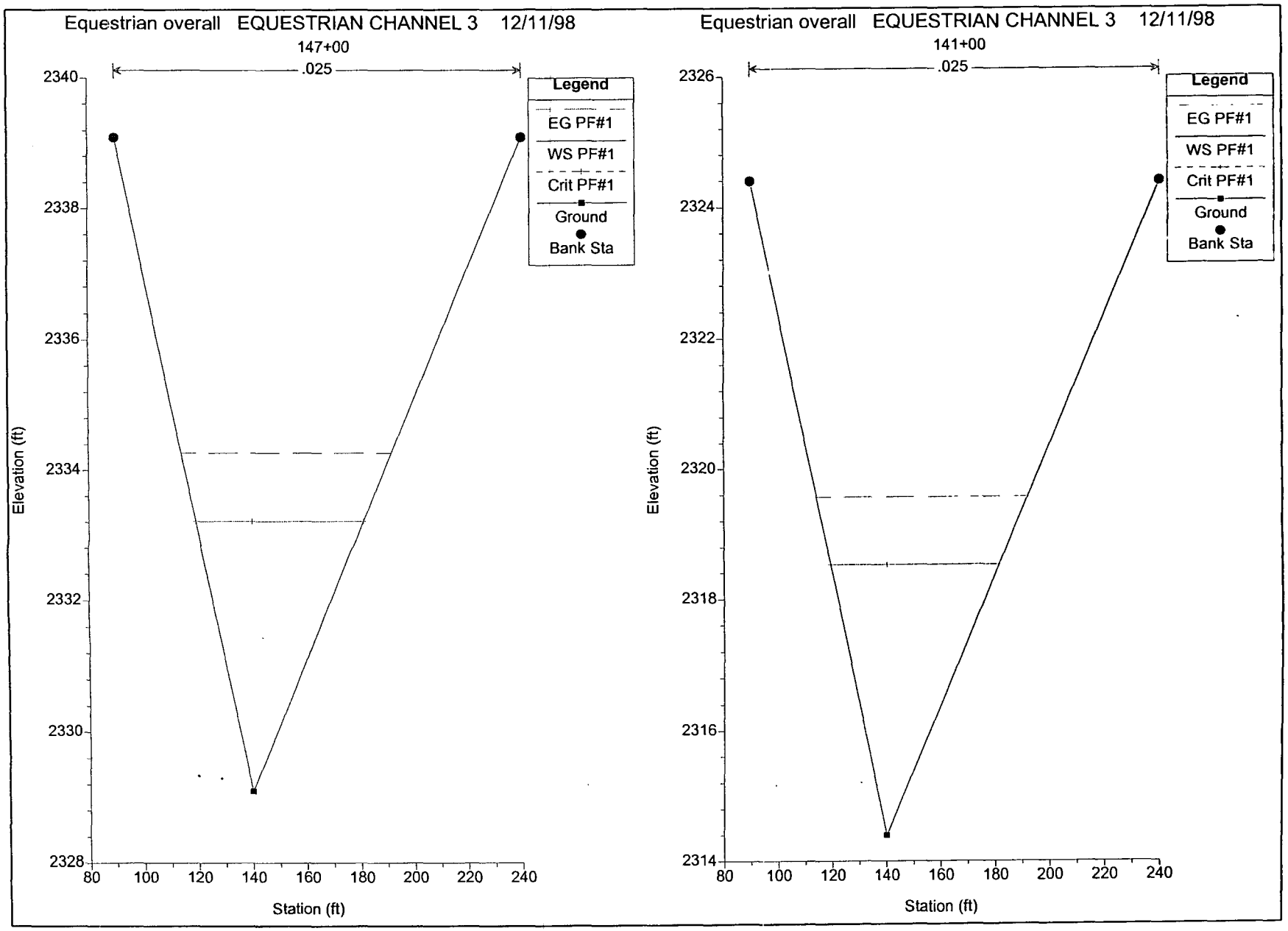

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
165+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2380
2379
2378
2377
2376
2375
2374
2373
100
120
140
160
180
200
220
240
260
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
164+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2377
2376
2375
2374
2373
2372
2371
2370
100
120
140
160
180
200
220
240
260

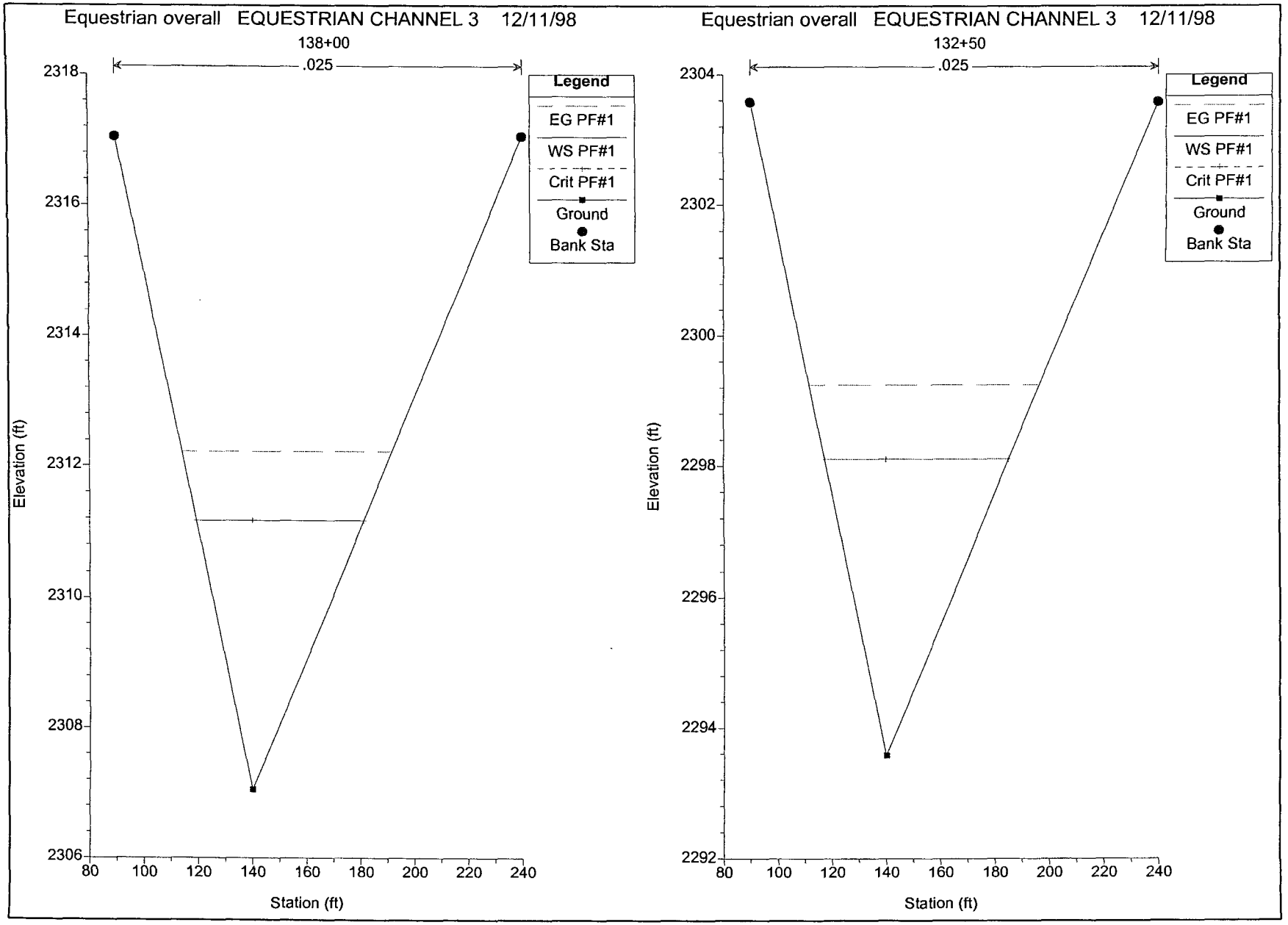

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
163+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2375
2374
2373
2372
2371
2370
2369
2368
100
120
140
160
180
200
220
240
260
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
162+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2373
2372
2371
2370
2369
2368
2367
2366
2365
100
150
200
250
300

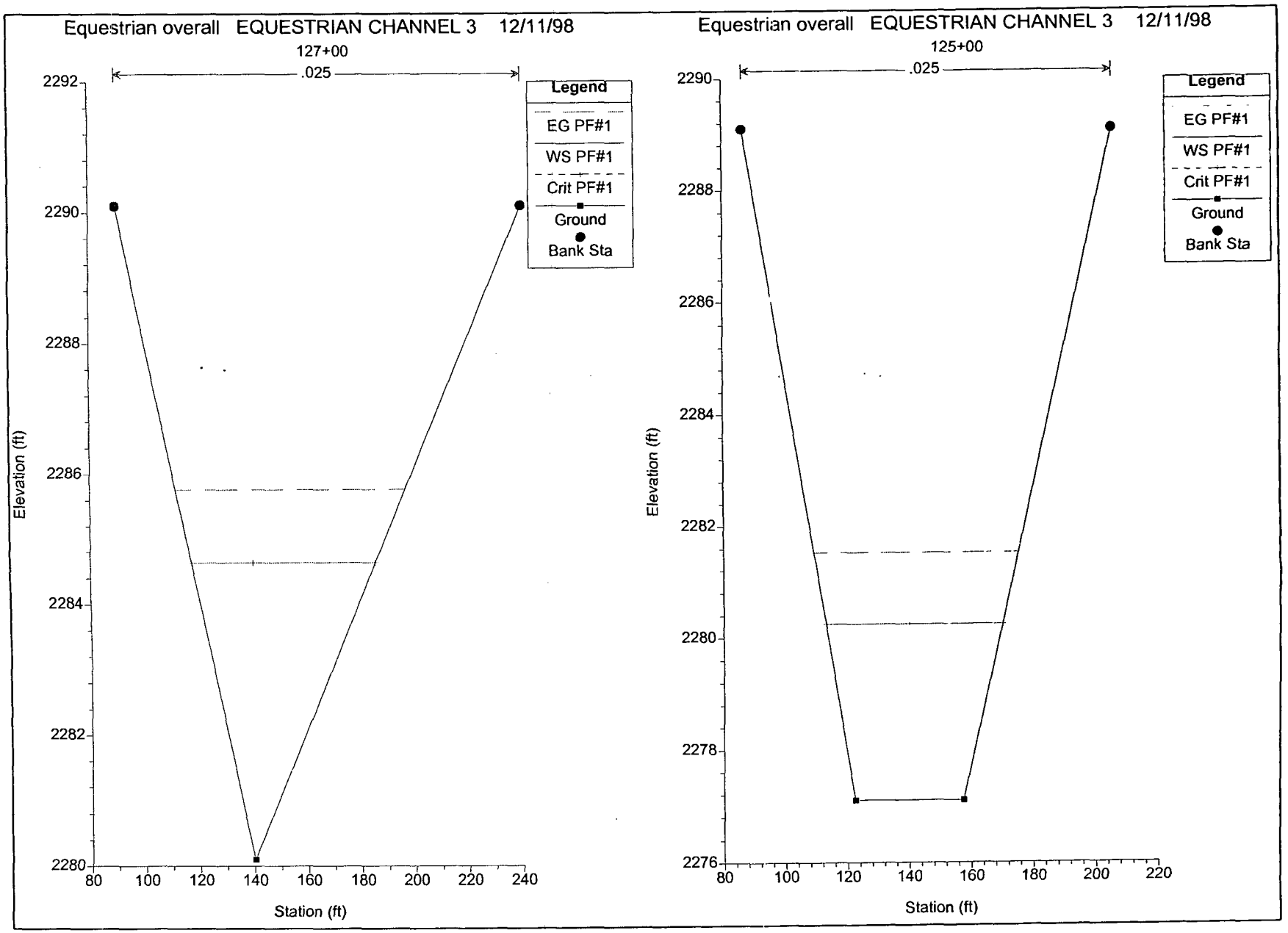

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
161+50
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2374
2372
2370
2368
2366
2364
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
160+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2370
2368
2366
2364
2362
2360
2358
80
100
120
140
160
180
200
220
240

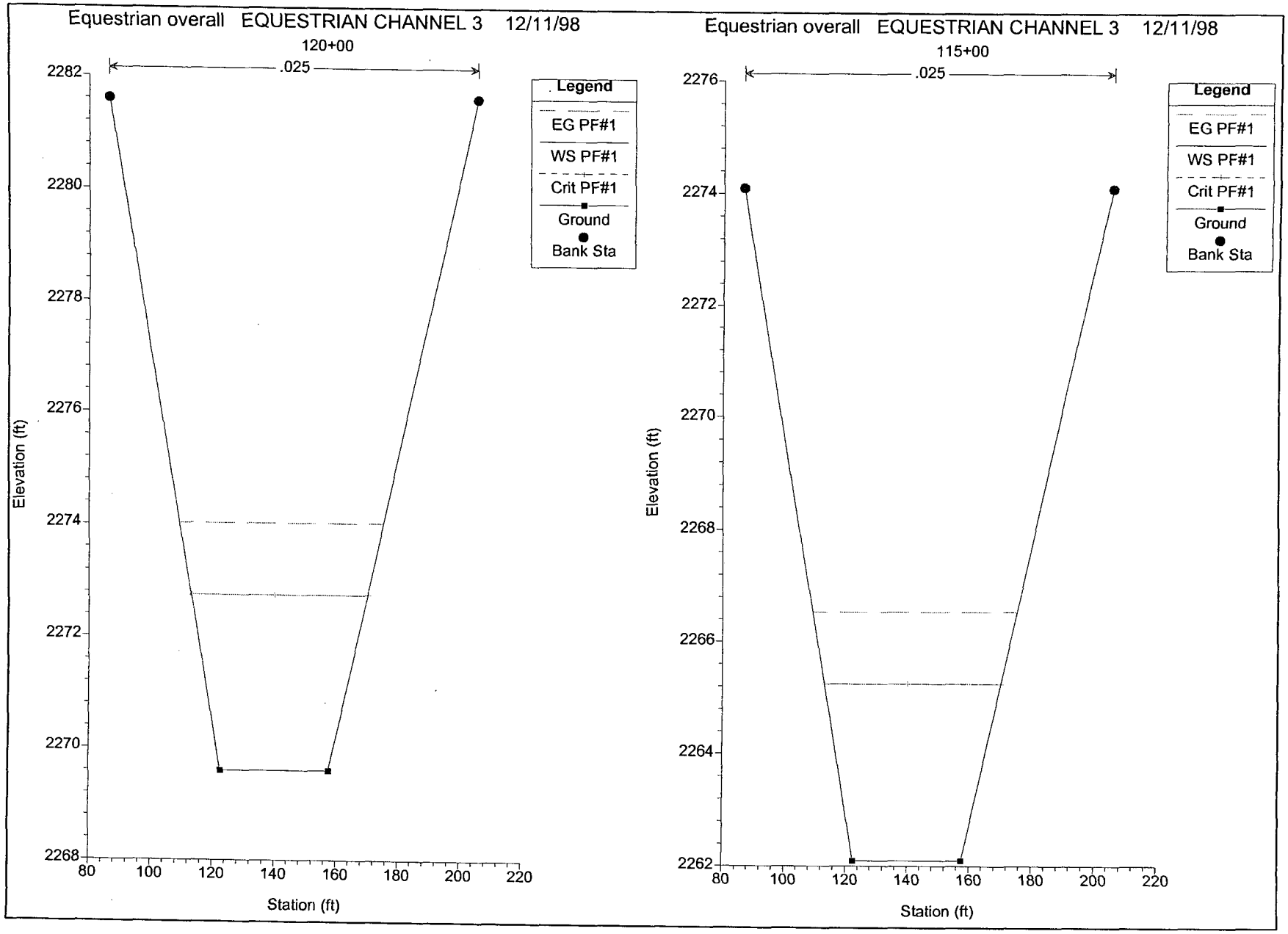

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
159+50
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2370
2368
2366
2364
2362
2360
2358
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
156+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2362
2360
2358
2356
2354
2352
2350
80
100
120
140
160
180
200
220
240

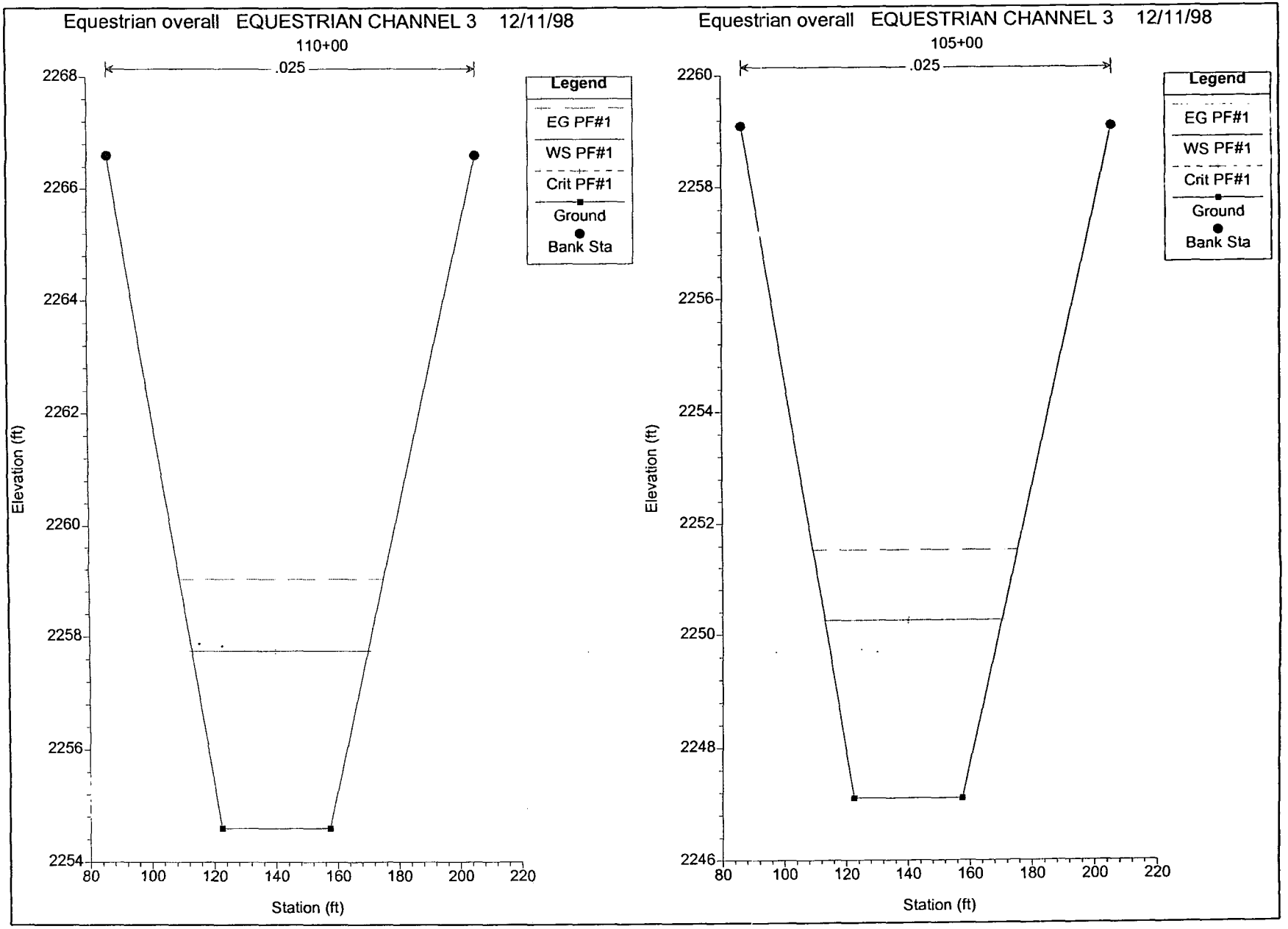

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
153+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2354
2352
2350
2348
2346
2344
2342
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
150+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2348
2346
2344
2342
2340
2338
2336
80
100
120
140
160
180
200
220
240

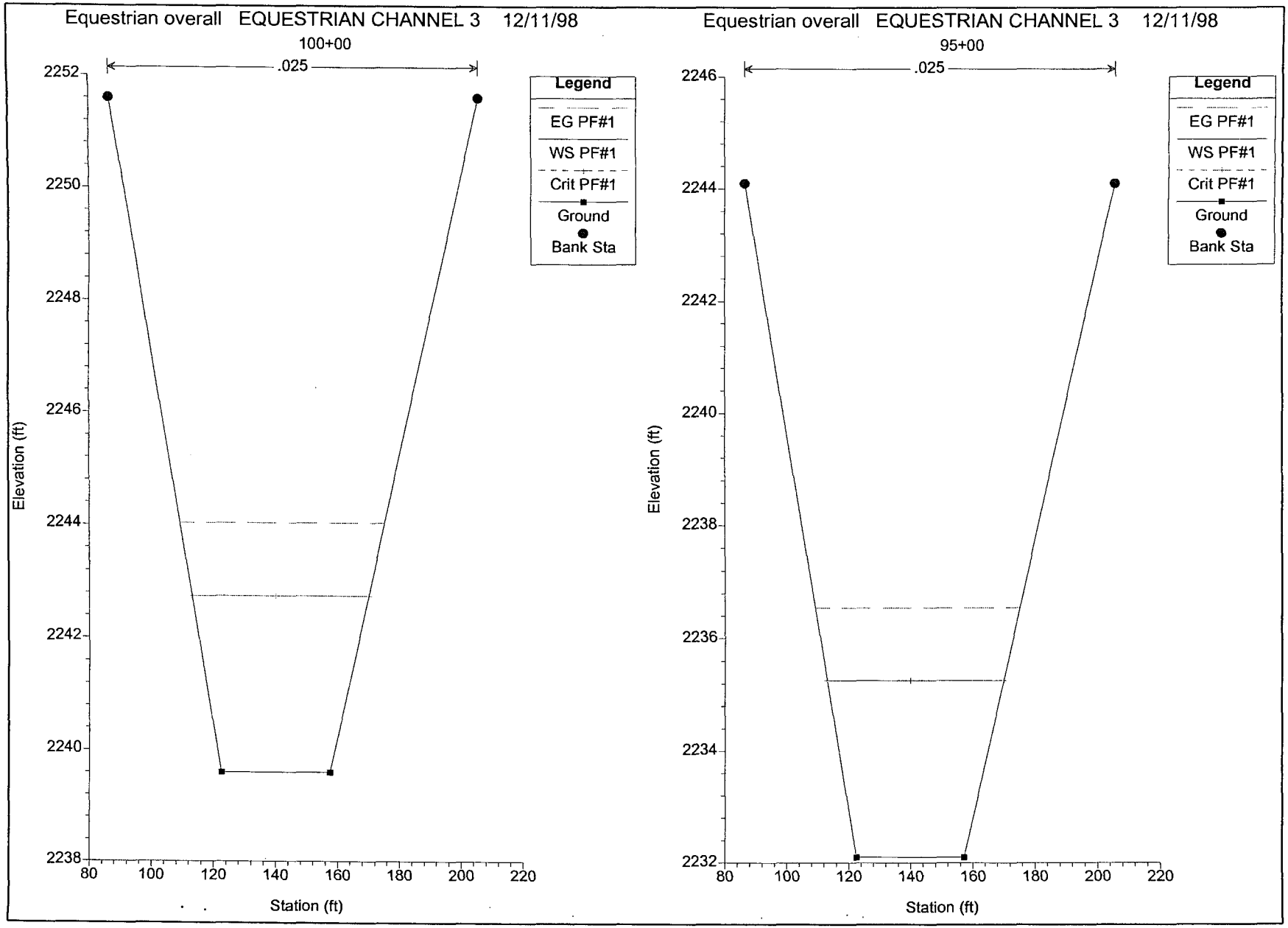

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
147+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2340
2338
2336
2334
2332
2330
2328
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
141+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2326
2324
2322
2320
2318
2316
2314
80
100
120
140
160
180
200
220
240

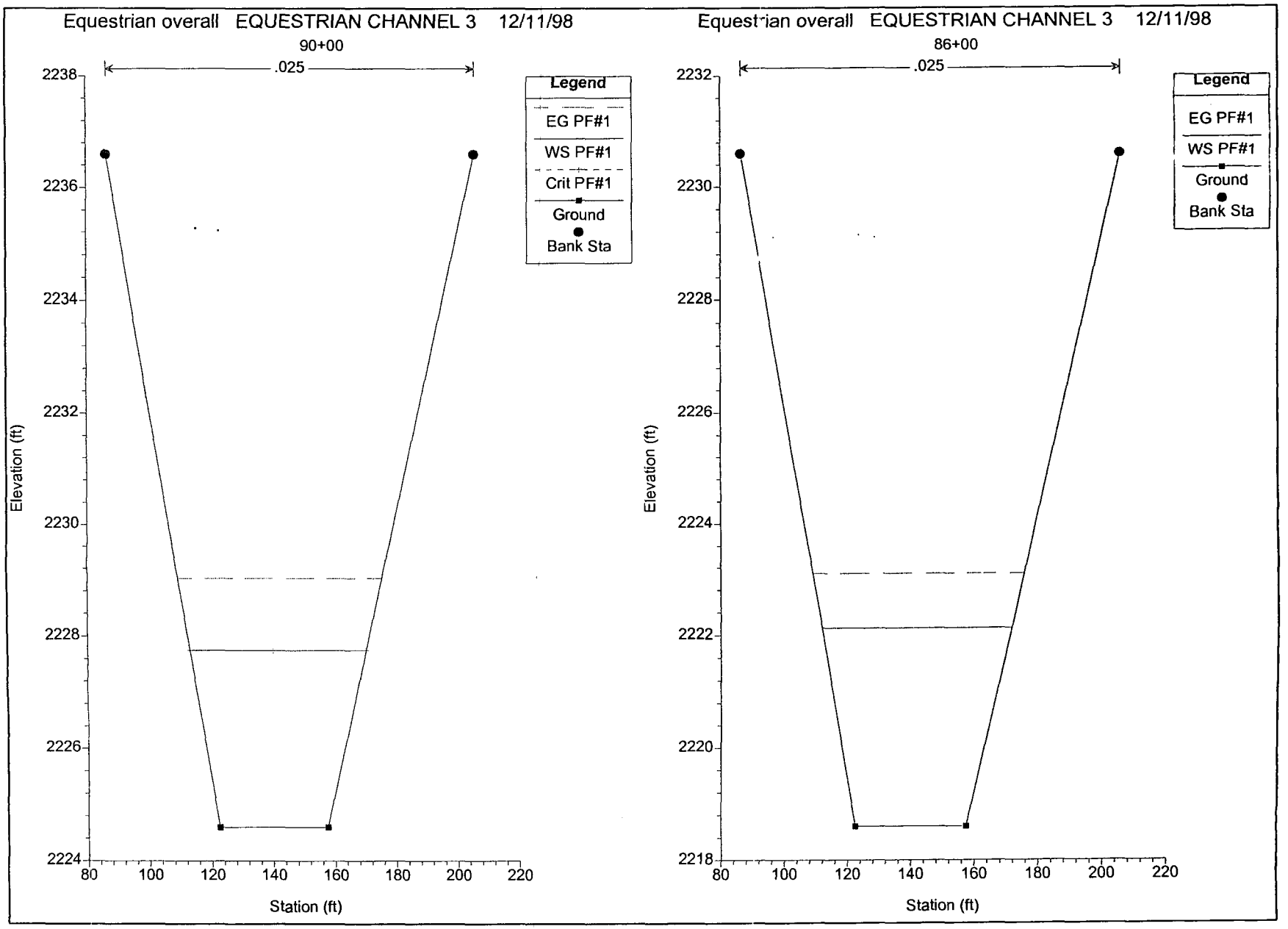

Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
138+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2318
2316
2314
2312
2310
2308
2306
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
132+50
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2304
2302
2300
2298
2296
2294
2292
80
100
120
140
160
180
200
220
240


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
127+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2292
2290
2288
2286
2284
2282
2280
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
125+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2290
2288
2286
2284
2282
2280
2278
2276
80
100
120
140
160
180
200
220


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
120+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
115+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
110+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
105+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
100+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2252
2250
2248
2246
2244
2242
2240
2238
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
95+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2246
2244
2242
2240
2238
2236
2234
2232
80
100
120
140
160
180
200
220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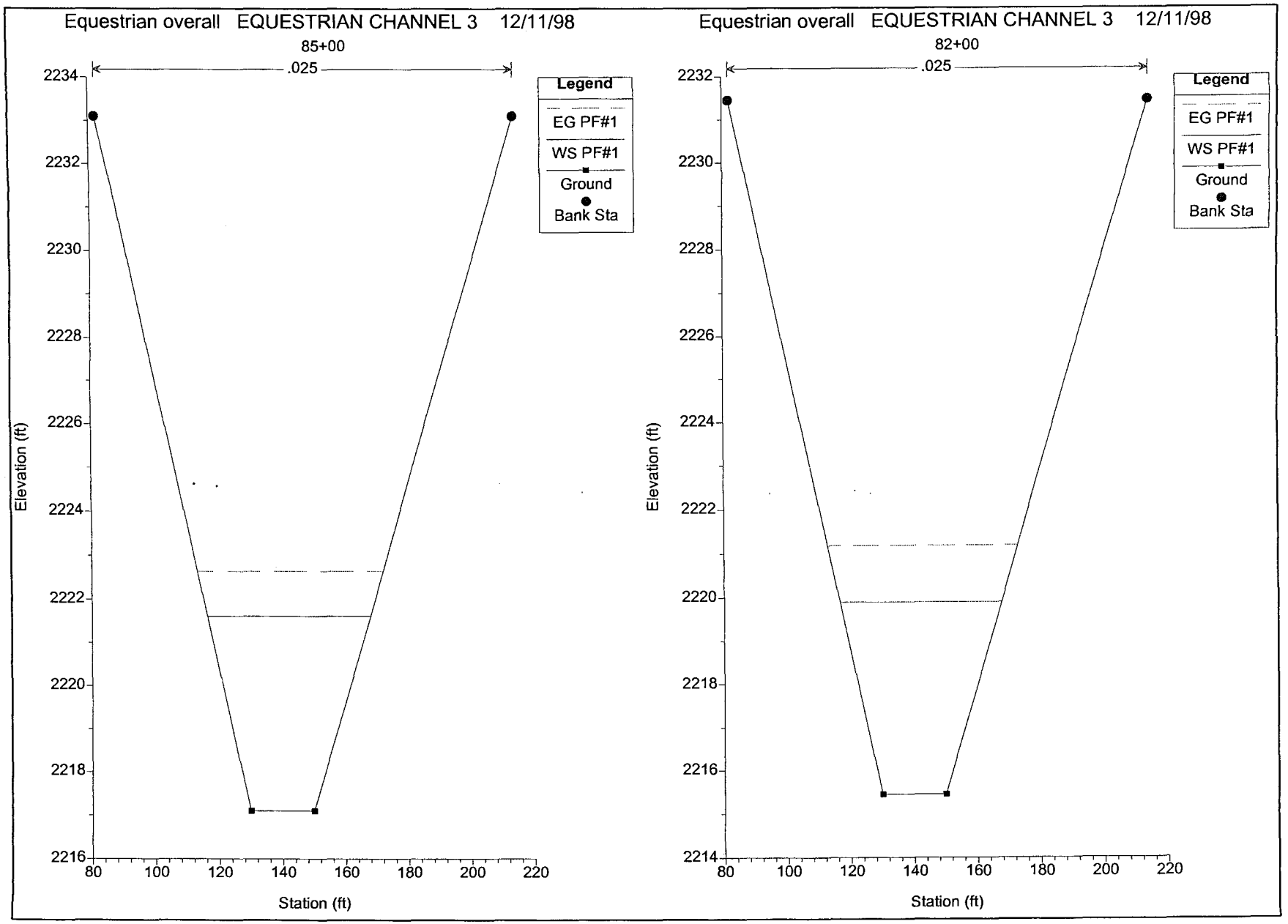
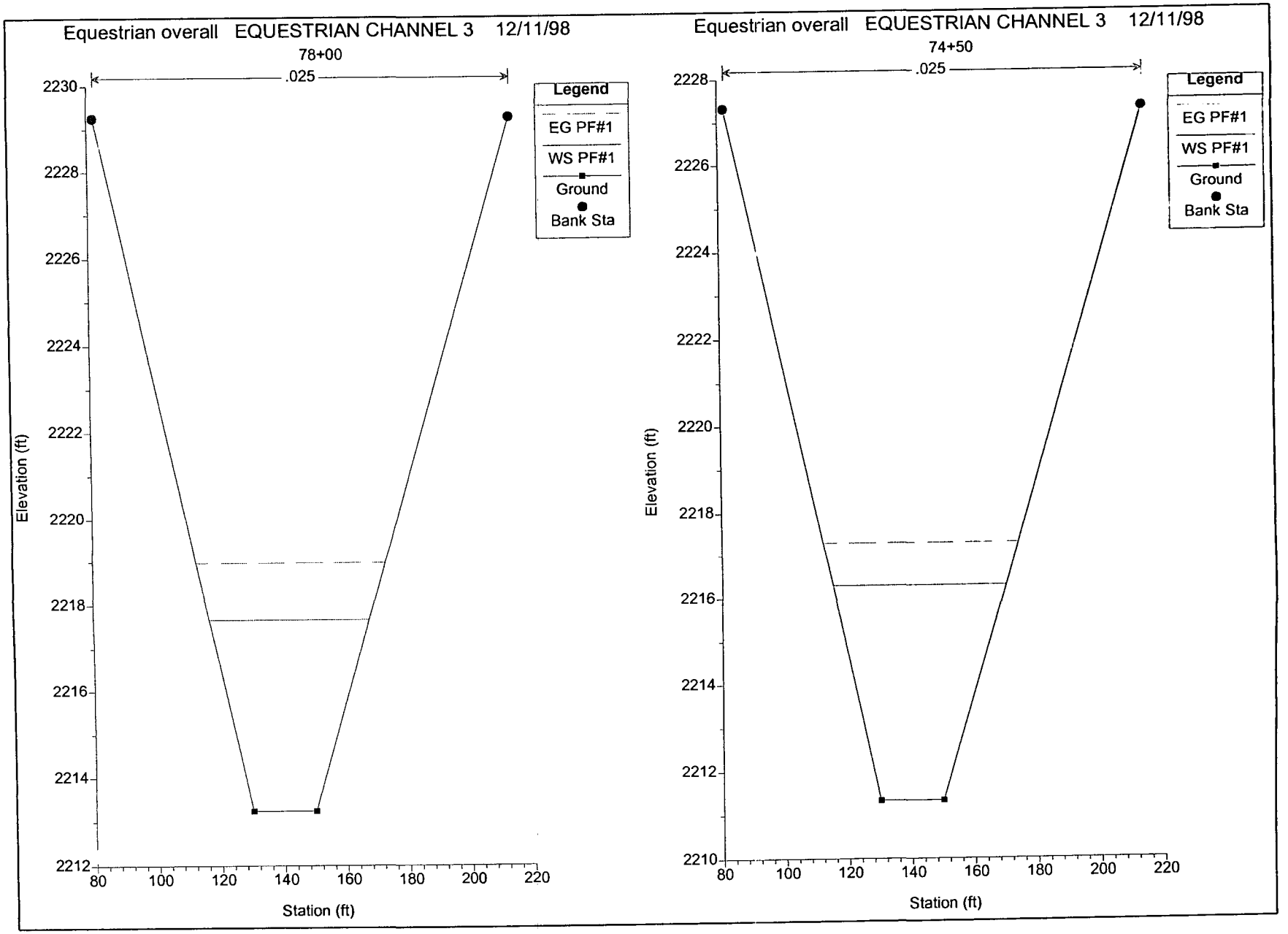
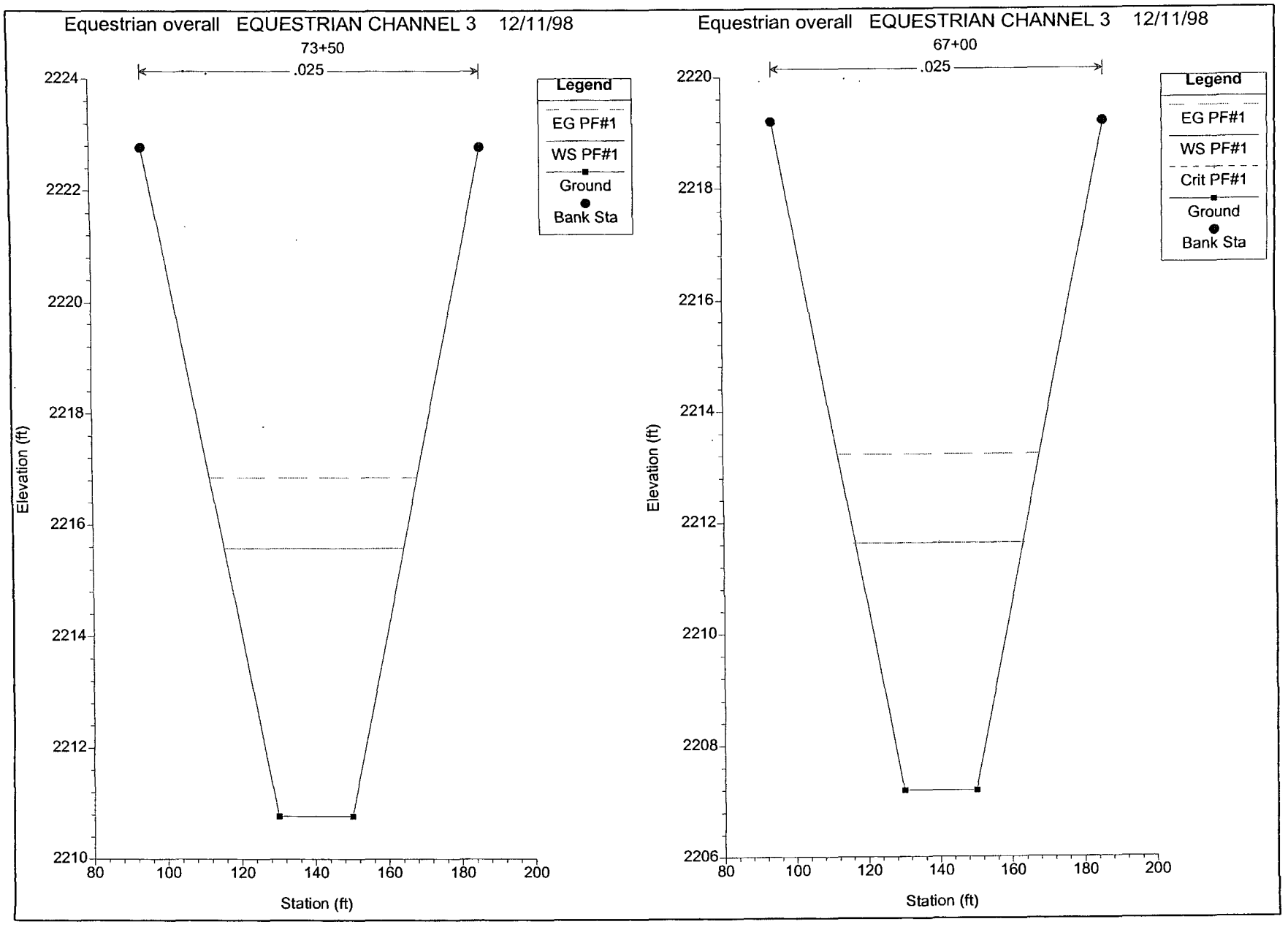
90+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
86+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
85+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2234
2232
2230
2228
2226
2224
2222
2220
2218
2216
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
82+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2232
2230
2228
2226
2224
2222
2220
2218
2216
2214
80
100
120
140
160
180
200
220


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
78+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2230
2228
2226
2224
2222
2220
2218
2216
2214
2212
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
74+50
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2228
2226
2224
2222
2220
2218
2216
2214
2212
2210
80
100
120
140
160
180
200
220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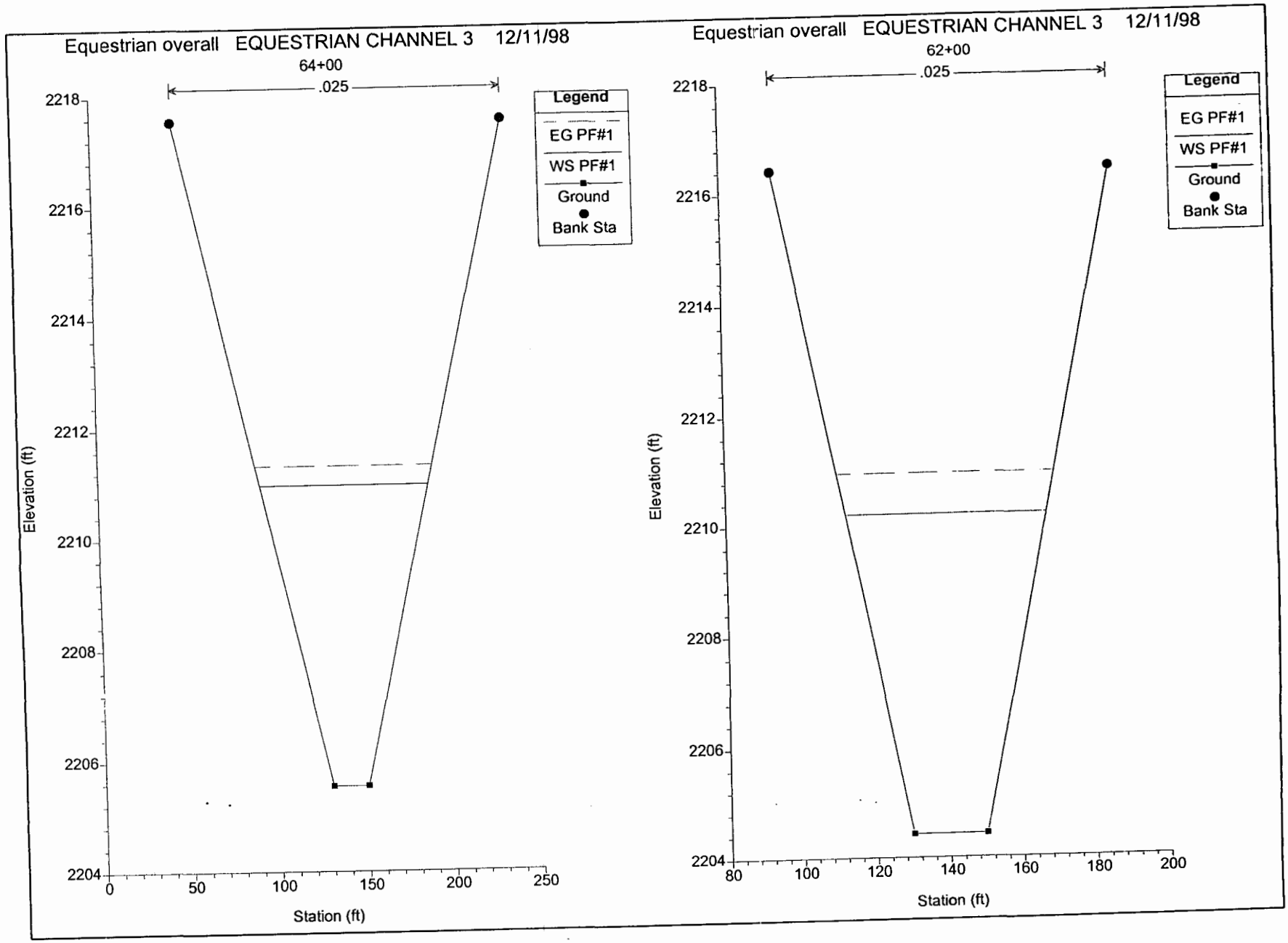
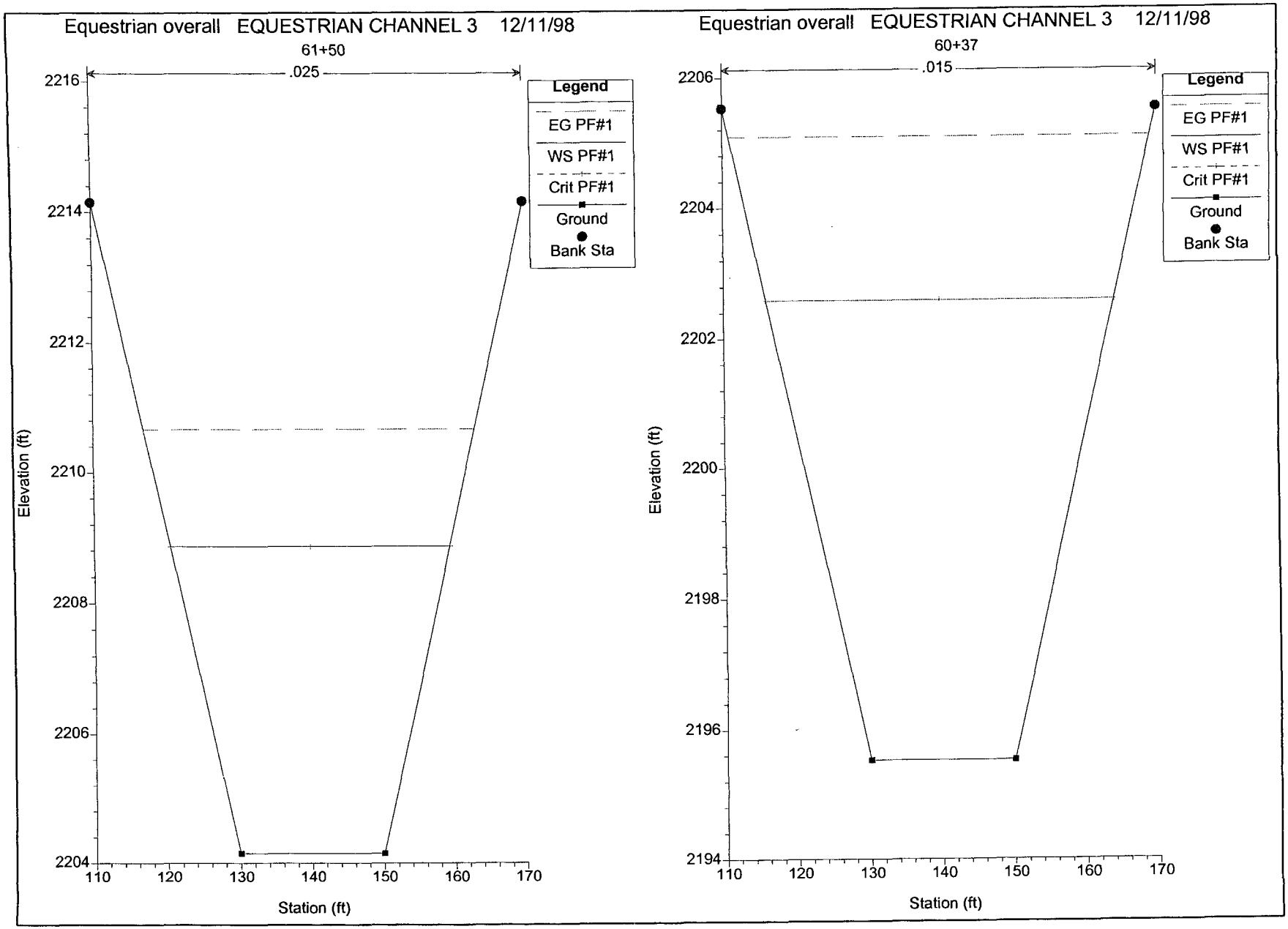
73+50
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2224
2222
2220
2218
2216
2214
2212
2210
80
100
120
140
160
180
200
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
67+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2220
2218
2216
2214
2212
2210
2208
2206
80
100
120
140
160
180
200


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
64+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2218
2216
2214
2212
2210
2208
2206
2204
0
50
100
150
200
250
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
62+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2218
2216
2214
2212
2210
2208
2206
2204
80
100
120
140
160
180
200


Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
61+50
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2216
2214
2212
2210
2208
2206
2204
110
120
130
140
150
160
170
Equestrian overall EQUESTRIAN CHANNEL 3 12/11/98
60+37
.015
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2206
2204
2202
2200
2198
2196
2194
110
120
130
140
150
160
170

HEC-RAS Version 2.1 October 1997
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
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PROJECT DATA
Project Title: Equestrian overall
Project File : eqcoall.prj
Run Date and Time: 12/11/98 2:09:30 PM

Project in English units

Project Description:
Overall HecRas evaluations

PLAN DATA

Plan Title: EQUESTRIAN CHANNEL 3
Plan File : j:\1002005\LOMR\eqcoall.p07

Geometry Title: EQUESTRAIN NON LINED
Geometry File : j:\1002005\LOMR\eqcoall.g03

Flow Title : ESQUESTRAIN CHANNEL 2 NEW
Flow File : j:\1002005\LOMR\eqcoall.f04

Plan Summary Information:
Number of: Cross Sections = 38 Mulitple Openings = 0

Culverts = 0 Inline Weirs = 0
Bridges = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01
Maximum number of interations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: ESQUESTRAIN CHANNEL 2 NEW
Flow File : j:\1002005\LOMR\eqcoall.f04

Flow Data (cfs)

River	Reach	RS	PF#1
REACH 1	REACH 1	16700	189
REACH 1	REACH 1	16150	915
REACH 1	REACH 1	15000	1046
REACH 1	REACH 1	13250	1315
REACH 1	REACH 1	8200	1438
REACH 1	REACH 1	7450	1494
REACH 1	REACH 1	6037	3058

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
REACH 1	REACH 1	PF#1	Known WS = 2379.99	Known WS = 2200.05

GEOMETRY DATA

Geometry Title: EQUESTRAIN NON LINED
Geometry File : j:\1002005\LOMR\eqcoall.g03

CROSS SECTION RIVER: REACH 1

REACH: REACH 1 RS: 16700

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
124	2382.1	140	2378.1	220	2382.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
124	.025	124	.025	220	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
124	220	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2379.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.025	
E.G. Elev (ft)	2380.26	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2379.82	Flow Area (sq ft)		35.58	
E.G. Slope (ft/ft)	0.009832	Area (sq ft)		35.58	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	41.33	Top Width (ft)		41.33	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	1906.1	Conv. (cfs)		1906.1	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		41.58	
Min Ch El (ft)	2378.10	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.79	
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)		35.81	
C & E Loss (ft)	0.00	Cum SA (acres)		14.38	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1

REACH: REACH 1 RS: 16600

INPUT
Description:
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
116	2381.65	140	2375.65	260	2381.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
116	.025	116	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116	260	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2377.37	Element			
Vel Head (ft)	0.44	Wt. n-Val.		0.025	
E.G. Elev (ft)	2377.81	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2377.37	Flow Area (sq ft)		35.58	
E.G. Slope (ft/ft)	0.009832	Area (sq ft)		35.58	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	41.33	Top Width (ft)		41.33	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	1906.1	Conv. (cfs)		1906.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		41.58	
Min Ch El (ft)	2375.65	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.79	
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)		35.69	
C & E Loss (ft)	0.00	Cum SA (acres)		14.24	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1

REACH: REACH 1 RS: 16550

INPUT
Description:
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
116	2380.43	140	2374.43	260	2380.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
116	.025	116	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116	260	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2376.15	Element			
Vel Head (ft)	0.44	Wt. n-Val.		0.025	
E.G. Elev (ft)	2376.59	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2376.15	Flow Area (sq ft)		35.58	
E.G. Slope (ft/ft)	0.009832	Area (sq ft)		35.58	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	41.33	Top Width (ft)		41.33	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	1906.1	Conv. (cfs)		1906.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		41.58	
Min Ch El (ft)	2374.43	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.79	
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)		35.65	
C & E Loss (ft)	0.00	Cum SA (acres)		14.19	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1

REACH: REACH 1 RS: 16500

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
116	2379.2	140	2373.2	260	2379.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
116	.025	116	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116	260	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2374.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.025	
E.G. Elev (ft)	2375.36	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2374.92	Flow Area (sq ft)		35.42	
E.G. Slope (ft/ft)	0.009952	Area (sq ft)		35.42	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	41.23	Top Width (ft)		41.23	
Vel Total (ft/s)	5.34	Avg. Vel. (ft/s)		5.34	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	1894.6	Conv. (cfs)		1894.6	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		41.49	
Min Ch El (ft)	2373.20	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.83	
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)		35.61	
C & E Loss (ft)	0.00	Cum SA (acres)		14.14	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1

REACH: REACH 1 RS: 16400

INPUT
Description:
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
110	2376.75	140	2370.75	260	2376.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.025	110	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	260	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2372.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.025	
E.G. Elev (ft)	2372.88	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2372.44	Flow Area (sq ft)		35.88	
E.G. Slope (ft/ft)	0.009861	Area (sq ft)		35.88	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	42.36	Top Width (ft)		42.36	
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)		5.27	
Max Chl Dpth (ft)	1.69	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	1903.3	Conv. (cfs)		1903.3	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		42.57	
Min Ch El (ft)	2370.75	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		2.73	
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)		35.52	
C & E Loss (ft)	0.00	Cum SA (acres)		14.05	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1

REACH: REACH 1 RS: 16300

INPUT
Description:
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
110	2374.3	140	2368.3	260	2374.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.025	110	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	260	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2369.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.025	
E.G. Elev (ft)	2370.43	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2369.99	Flow Area (sq ft)		35.70	
E.G. Slope (ft/ft)	0.009998	Area (sq ft)		35.70	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	42.25	Top Width (ft)		42.25	
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)		5.29	
Max Chl Dpth (ft)	1.69	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	1890.2	Conv. (cfs)		1890.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		42.46	
Min Ch El (ft)	2368.30	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		2.78	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		35.44	
C & E Loss (ft)	0.13	Cum SA (acres)		13.95	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is . . not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16200

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
105	2372.85	140	2365.85	280	2372.85

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
105	.025	105	.025	280	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
105	280	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2369.69	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.025	
E.G. Elev (ft)	2369.71	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		184.45	
E.G. Slope (ft/ft)	0.000125	Area (sq ft)		184.45	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	96.03	Top Width (ft)		96.03	
Vel Total (ft/s)	1.02	Avg. Vel. (ft/s)		1.02	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		1.92	
Conv. Total (cfs)	16883.3	Conv. (cfs)		16883.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		96.51	
Min Ch El (ft)	2365.85	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		35.19	
C & E Loss (ft)	0.10	Cum SA (acres)		13.79	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16150

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
95	2373.63	140	2364.63	230	2373.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
95	.025	95	.025	230	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95	230	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2368.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.025	
E.G. Elev (ft)	2369.53	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2368.53	Flow Area (sq ft)		114.31	
E.G. Slope (ft/ft)	0.007533	Area (sq ft)		114.31	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	58.56	Top Width (ft)		58.56	
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)		8.00	
Max Chl Dpth. (ft)	3.90	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	10542.5	Conv. (cfs)		10542.5	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		59.14	
Min Ch El (ft)	2364.63	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		7.28	
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)		35.02	
C & E Loss (ft)	0.15	Cum SA (acres)		13.70	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16000

INPUT
Description:
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
95	2368.73	140	2359.73	230	2368.73

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
95	.025	95	.025	230	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95	230	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2364.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.025	
E.G. Elev (ft)	2364.90	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		164.83	
E.G. Slope (ft/ft)	0.002839	Area (sq ft)		164.83	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	70.32	Top Width (ft)		70.32	
Vel Total (ft/s)	5.55	Avg. Vel. (ft/s)		5.55	
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)		2.34	
Conv. Total (cfs)	17173.8	Conv. (cfs)		17173.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		71.02	
Min Ch El (ft)	2359.73	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		2.28	
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		34.54	
C & E Loss (ft)	0.05	Cum SA (acres)		13.48	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15950

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2369.73	140	2359.73	240	2369.73

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	350	350	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2363.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.025	
E.G. Elev (ft)	2364.63	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2363.64	Flow Area (sq ft)		114.38	
E.G. Slope (ft/ft)	0.007520	Area (sq ft)		114.38	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	58.58	Top Width (ft)		58.58	
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)		8.00	
Max Chl Dpth (ft)	3.91	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	10551.3	Conv. (cfs)		10551.3	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		59.16	
Min Ch El (ft)	2359.73	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		7.26	
Frctn Loss (ft)	2.65	Cum Volume (acre-ft)		34.38	
C & E Loss (ft)	0.00	Cum SA (acres)		13.41	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15600

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2361.15	140	2351.15	240	2361.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2355.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.		0.025	
E.G. Elev (ft)	2356.05	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2355.05	Flow Area (sq ft)		113.94	
E.G. Slope (ft/ft)	0.007598	Area (sq ft)		113.94	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	58.47	Top Width (ft)		58.47	
Vel Total (ft/s)	8.03	Avg. Vel. (ft/s)		8.03	
Max Chl Dpth (ft)	3.90	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	10496.9	Conv. (cfs)		10496.9	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		59.05	
Min Ch El (ft)	2351.15	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)		7.35	
Frctn Loss (ft)	2.25	Cum Volume (acre-ft)		33.46	
C & E Loss (ft)	0.01	Cum SA (acres)		12.94	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15300

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2353.8	140	2343.8	240	2353.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2347.72	Element			
Vel Head (ft)	0.98	Wt. n-Val.		0.025	
E.G. Elev (ft)	2348.70	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2347.72	Flow Area (sq ft)		115.09	
E.G. Slope (ft/ft)	0.007398	Area (sq ft)		115.09	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	58.76	Top Width (ft)		58.76	
Vel Total (ft/s)	7.95	Avg. Vel. (ft/s)		7.95	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	10637.7	Conv. (cfs)		10637.7	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		59.34	
Min Ch El (ft)	2343.80	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)		7.12	
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)		32.67	
C & E Loss (ft)	0.01	Cum SA (acres)		12.53	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15000

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2346.45	140	2336.45	240	2346.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2340.57	Element			
Vel Head (ft)	1.05	Wt. n-Val.		0.025	
E.G. Elev (ft)	2341.62	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2340.57	Flow Area (sq ft)		127.21	
E.G. Slope (ft/ft)	0.007402	Area (sq ft)		127.21	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	61.78	Top Width (ft)		61.78	
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)		8.22	
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	12157.6	Conv. (cfs)		12157.6	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		62.39	
Min Ch El (ft)	2336.45	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)		7.75	
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)		31.84	
C & E Loss (ft)	0.00	Cum SA (acres)		12.12	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 14700

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2339.1	140	2329.1	240	2339.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2333.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.025	
E.G. Elev (ft)	2334.27	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2333.22	Flow Area (sq ft)		127.21	
E.G. Slope (ft/ft)	0.007402	Area (sq ft)		127.21	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	61.78	Top Width (ft)		61.78	
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)		8.22	
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	12157.6	Conv. (cfs)		12157.6	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		62.39	
Min Ch El (ft)	2329.10	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)		7.75	
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)		30.96	
C & E Loss (ft)	0.00	Cum SA (acres)		11.69	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 14400

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2331.75	140	2321.75	240	2331.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2325.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.025	
E.G. Elev (ft)	2326.92	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2325.87	Flow Area (sq ft)		127.13	
E.G. Slope (ft/ft)	0.007414	Area (sq ft)		127.13	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	61.76	Top Width (ft)		61.76	
Vel Total (ft/s)	8.23	Avg. Vel. (ft/s)		8.23	
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	12148.0	Conv. (cfs)		12148.0	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		62.37	
Min Ch El (ft)	2321.75	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)		7.76	
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)		30.09	
C & E Loss (ft)	0.00	Cum SA (acres)		11.27	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 14100

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2324.4	140	2314.4	240	2324.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2318.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.025	
E.G. Elev (ft)	2319.57	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2318.52	Flow Area (sq ft)		127.33	
E.G. Slope (ft/ft)	0.007384	Area (sq ft)		127.33	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	61.81	Top Width (ft)		61.81	
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)		8.21	
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	12173.0	Conv. (cfs)		12173.0	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		62.42	
Min Ch El (ft)	2314.40	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)		7.72	
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)		29.21	
C & E Loss (ft)	0.00	Cum SA (acres)		10.84	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 13800

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2317.05	140	2307.05	240	2317.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	550	550	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2311.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.025	
E.G. Elev (ft)	2312.22	Reach Len. (ft)	550.00	550.00	550.00
Crit W.S. (ft)	2311.16	Flow Area (sq ft)		126.98	
E.G. Slope (ft/ft)	0.007438	Area (sq ft)		126.98	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	61.72	Top Width (ft)		61.72	
Vel Total (ft/s)	8.24	Avg. Vel. (ft/s)		8.24	
Max Chl Dpth (ft)	4.11	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	12128.8	Conv. (cfs)		12128.8	
Length Wtd. (ft)	550.00	Wetted Per. (ft)		62.33	
Min Ch El (ft)	2307.05	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)		7.79	
Frctn Loss (ft)	3.99	Cum Volume (acre-ft)		28.33	
C & E Loss (ft)	0.01	Cum SA (acres)		10.42	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 13250

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2303.58	140	2293.58	240	2303.58

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	550	550	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2298.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.025	
E.G. Elev (ft)	2299.24	Reach Len. (ft)	550.00	550.00	550.00
Crit W.S. (ft)	2298.10	Flow Area (sq ft)		153.39	
E.G. Slope (ft/ft)	0.007102	Area (sq ft)		153.39	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	67.84	Top Width (ft)		67.84	
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57	
Max Chl Dpth (ft)	4.52	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	15604.0	Conv. (cfs)		15604.0	
Length Wtd. (ft)	550.00	Wetted Per. (ft)		68.51	
Min Ch El (ft)	2293.58	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)		8.51	
Frctn Loss (ft)	3.89	Cum Volume (acre-ft)		26.56	
C & E Loss (ft)	0.00	Cum SA (acres)		9.60	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 12700

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2290.1	140	2280.1	240	2290.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2284.63	Element			
Vel Head (ft)	1.14	Wt. n-Val.		0.025	
E.G. Elev (ft)	2285.76	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2284.63	Flow Area (sq ft)		153.81	
E.G. Slope (ft/ft)	0.007051	Area (sq ft)		153.81	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	67.93	Top Width (ft)		67.93	
Vel Total (ft/s)	8.55	Avg. Vel. (ft/s)		8.55	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	15660.2	Conv. (cfs)		15660.2	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		68.60	
Min Ch El (ft)	2280.10	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)		8.44	
Frctn Loss (ft)	1.39	Cum Volume (acre-ft)		24.62	
C & E Loss (ft)	0.01	Cum SA (acres)		8.74	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 12500

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2289.1	122.5	2277.1	157.5	2277.1	205.5	2289.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2280.25	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	2281.53	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2280.25	Flow Area (sq ft)		144.71	
E.G. Slope (ft/ft)	0.006894	Area (sq ft)		144.71	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	57.02	Top Width (ft)		57.02	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15837.5	Conv. (cfs)		15837.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.91	
Min Ch El (ft)	2277.10	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.77	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		23.94	
C & E Loss (ft)	0.00	Cum SA (acres)		8.46	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 12000

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2281.6	122.5	2269.6	157.5	2269.6	205.5	2281.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2272.75	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	2274.03	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2272.75	Flow Area (sq ft)		144.71	
E.G. Slope (ft/ft)	0.006894	Area (sq ft)		144.71	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	57.02	Top Width (ft)		57.02	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15837.5	Conv. (cfs)		15837.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.91	
Min Ch El (ft)	2269.60	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.77	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		22.28	
C & E Loss (ft)	0.00	Cum SA (acres)		7.80	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 11500

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2274.1	122.5	2262.1	157.5	2262.1	205.5	2274.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2265.25	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	2266.53	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2265.25	Flow Area (sq ft)		144.71	
E.G. Slope (ft/ft)	0.006894	Area (sq ft)		144.71	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	57.02	Top Width (ft)		57.02	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15837.5	Conv. (cfs)		15837.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.91	
Min Ch El (ft)	2262.10	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.77	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		20.62	
C & E Loss (ft)	0.00	Cum SA (acres)		7.15	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 11000

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2266.6	122.5	2254.6	157.5	2254.6	205.5	2266.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2257.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	2259.03	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2257.75	Flow Area (sq ft)		144.71	
E.G. Slope (ft/ft)	0.006894	Area (sq ft)		144.71	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	57.02	Top Width (ft)		57.02	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15837.5	Conv. (cfs)		15837.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.91	
Min Ch El (ft)	2254.60	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.77	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		18.96	
C & E Loss (ft)	0.00	Cum SA (acres)		6.49	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 10500

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2259.1	122.5	2247.1	157.5	2247.1	205.5	2259.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2250.25	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	2251.53	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2250.25	Flow Area (sq ft)		144.71	
E.G. Slope (ft/ft)	0.006894	Area (sq ft)		144.71	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	57.02	Top Width (ft)		57.02	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15837.5	Conv. (cfs)		15837.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.91	
Min Ch El (ft)	2247.10	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.77	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		17.29	
C & E Loss (ft)	0.00	Cum SA (acres)		5.84	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 10000

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2251.6	122.5	2239.6	157.5	2239.6	205.5	2251.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2242.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.		0.025	
E.G. Elev (ft)	2244.03	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2242.74	Flow Area (sq ft)		144.50	
E.G. Slope (ft/ft)	0.006923	Area (sq ft)		144.50	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	56.99	Top Width (ft)		56.99	
Vel Total (ft/s)	9.10	Avg. Vel. (ft/s)		9.10	
Max Chl Dpth (ft)	3.14	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15804.3	Conv. (cfs)		15804.3	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.89	
Min Ch El (ft)	2239.60	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.82	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		15.63	
C & E Loss (ft)	0.00	Cum SA (acres)		5.18	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 9500

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2244.1	122.5	2232.1	157.2	2232.1	205.5	2244.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2235.26	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	2236.54	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2235.26	Flow Area (sq ft)		144.76	
E.G. Slope (ft/ft)	0.006868	Area (sq ft)		144.76	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	56.90	Top Width (ft)		56.90	
Vel Total (ft/s)	9.08	Avg. Vel. (ft/s)		9.08	
Max Chl Dpth (ft)	3.16	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15867.8	Conv. (cfs)		15867.8	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.80	
Min Ch El (ft)	2232.10	Shear (lb/sq ft)		1.07	
Alpha	1.00	Stream Power (lb/ft s)		9.75	
Frctn Loss (ft)	3.44	Cum Volume (acre-ft)		13.97	
C & E Loss (ft)	0.00	Cum SA (acres)		4.53	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 9000

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2236.6	122.5	2224.6	157.5	2224.6	205.5	2236.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2227.75	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	2229.03	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2227.75	Flow Area (sq ft)		144.69	
E.G. Slope (ft/ft)	0.006896	Area (sq ft)		144.69	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	57.02	Top Width (ft)		57.02	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15835.3	Conv. (cfs)		15835.3	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		57.91	
Min Ch El (ft)	2224.60	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		9.78	
Frctn Loss (ft)	2.78	Cum Volume (acre-ft)		12.31	
C & E Loss (ft)	0.09	Cum SA (acres)		3.88	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 8600

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2230.6	122.5	2218.6	157.5	2218.6	205.5	2230.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2222.12	Element			
Vel Head (ft)	0.97	Wt. n-Val.		0.025	
E.G. Elev (ft)	2223.09	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)		166.71	
E.G. Slope (ft/ft)	0.004575	Area (sq ft)		166.71	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	59.66	Top Width (ft)		59.66	
Vel Total (ft/s)	7.89	Avg. Vel. (ft/s)		7.89	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	19441.3	Conv. (cfs)		19441.3	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		60.66	
Min Ch El (ft)	2218.60	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		6.19	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)		10.53	
C & E Loss (ft)	0.01	Cum SA (acres)		3.21	

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 8500

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2233.1	130	2217.1	150	2217.1	214	2233.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	302	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2221.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.025	
E.G. Elev (ft)	2222.64	Reach Len. (ft)	302.00	300.00	300.00
Crit W.S. (ft)		Flow Area (sq ft)		161.63	
E.G. Slope (ft/ft)	0.004225	Area (sq ft)		161.63	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	51.60	Top Width (ft)		51.60	
Vel Total (ft/s)	8.14	Avg. Vel. (ft/s)		8.14	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	20230.4	Conv. (cfs)		20230.4	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		52.89	
Min Ch El (ft)	2217.10	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)		6.56	
Frctn Loss (ft)	1.44	Cum Volume (acre-ft)		10.15	
C & E Loss (ft)	0.03	Cum SA (acres)		3.08	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 8200

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2231.45	130	2215.45	150	2215.45	214	2231.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	400	400	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2219.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.		0.025	
E.G. Elev (ft)	2221.18	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		157.63	
E.G. Slope (ft/ft)	0.005414	Area (sq ft)		157.63	
Q Total (cfs)	1438.00	Flow (cfs)		1438.00	

Top Width (ft)	51.06	Top Width (ft)	51.06
Vel Total (ft/s)	9.12	Avg. Vel. (ft/s)	9.12
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)	3.09
Conv. Total (cfs)	19543.4	Conv. (cfs)	19543.4
Length Wtd. (ft)	400.00	Wetted Per. (ft)	52.32
Min Ch El (ft)	2215.45	Shear (lb/sq ft)	1.02
Alpha	1.00	Stream Power (lb/ft s)	9.29
Frctn Loss (ft)	2.21	Cum Volume (acre-ft)	9.05
C & E Loss (ft)	0.00	Cum SA (acres)	2.73

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 7800

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2229.25	130	2213.25	150	2213.25	214	2229.25

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	350	350	350 .1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2217.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.025	
E.G. Elev (ft)	2218.97	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)		Flow Area (sq ft)		155.76	
E.G. Slope (ft/ft)	0.005596	Area (sq ft)		155.76	
Q Total (cfs)	1438.00	Flow (cfs)		1438.00	
Top Width (ft)	50.80	Top Width (ft)		50.80	
Vel Total (ft/s)	9.23	Avg. Vel. (ft/s)		9.23	
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	19222.8	Conv. (cfs)		19222.8	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		52.05	
Min Ch El (ft)	2213.25	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		9.65	
Frctn Loss (ft)	1.58	Cum Volume (acre-ft)		7.61	

C & E Loss (ft)	0.10	Cum SA (acres)	2.26

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 7450

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2227.33	130	2211.33	150	2211.33	214	2227.33

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	100	100	105	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

		Element	Left OB	Channel	Right OB
W.S. Elev (ft)	2216.29	Wt. n-Val.		0.025	
Vel Head (ft)	1.01	Reach Len. (ft)	100.00	100.00	105.00
E.G. Elev (ft)	2217.30	Flow Area (sq ft)		185.34	
Crit W.S. (ft)		Area (sq ft)		185.34	
E.G. Slope (ft/ft)	0.003741	Flow (cfs)		1494.00	
Q Total (cfs)	1494.00	Top Width (ft)		54.72	
Top Width (ft)	54.72	Avg. Vel. (ft/s)		8.06	
Vel Total (ft/s)	8.06	Hydr. Depth (ft)		3.39	
Max Chl Dpth (ft)	4.96	Conv. (cfs)		24424.9	
Conv. Total (cfs)	24424.9	Wetted Per. (ft)		56.14	
Length Wtd. (ft)	100.00	Shear (lb/sq ft)		0.77	
Min Ch El (ft)	2211.33	Stream Power (lb/ft s)		6.22	
Alpha	1.00	Cum Volume (acre-ft)		6.24	
Frctn Loss (ft)	0.42	Cum SA (acres)		1.83	
C & E Loss (ft)	0.03				

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 7350

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
94	2222.78	130	2210.78	150	2210.78	186	2222.78

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
94	.025	94	.025	186	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
94	186	650	650	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2215.58	Element			
Vel Head (ft)	1.27	Wt. n-Val.		0.025	
E.G. Elev (ft)	2216.85	Reach Len. (ft)	650.00	650.00	650.00
Crit W.S. (ft)		Flow Area (sq ft)		165.23	
E.G. Slope (ft/ft)	0.004748	Area (sq ft)		165.23	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	48.81	Top Width (ft)		48.81	
Vel Total (ft/s)	9.04	Avg. Vel. (ft/s)		9.04	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		3.38	
Conv. Total (cfs)	21680.8	Conv. (cfs)		21680.8	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		50.37	
Min Ch El (ft)	2210.78	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		8.79	
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)		5.84	
C & E Loss (ft)	0.03	Cum SA (acres)		1.72	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6700

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
94	2219.2	130	2207.2	150	2207.2	186	2219.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
94	.025	94	.025	186	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
94	186	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2211.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.025	
E.G. Elev (ft)	2213.22	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2211.63	Flow Area (sq ft)		147.31	
E.G. Slope (ft/ft)	0.006527	Area (sq ft)		147.31	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	46.56	Top Width (ft)		46.56	
Vel Total (ft/s)	10.14	Avg. Vel. (ft/s)		10.14	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	18492.1	Conv. (cfs)		18492.1	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		48.00	
Min Ch El (ft)	2207.20	Shear (lb/sq ft)		1.25	
Alpha	1.00	Stream Power (lb/ft s)		12.68	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		3.51	
C & E Loss (ft)	0.37	Cum SA (acres)		1.00	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6400

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
46	2217.55	130	2205.55	150	2205.55	234	2217.55

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
46	.025	46	.025	234	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
46	234	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2210.98	Element			
Vel Head (ft)	0.35	Wt. n-Val.		0.025	
E.G. Elev (ft)	2211.33	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)		Flow Area (sq ft)		315.13	
E.G. Slope (ft/ft)	0.001319	Area (sq ft)		315.13	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	96.04	Top Width (ft)		96.04	
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)		4.74	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	41138.6	Conv. (cfs)		41138.6	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		96.81	
Min Ch El (ft)	2205.55	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)		1.27	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		1.91	
C & E Loss (ft)	0.04	Cum SA (acres)		0.51	

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6200

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
94	2216.43	130	2204.43	150	2204.43	186	2216.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
94	.025	94	.025	186	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
94	186	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2210.20	Element			

Vel Head (ft)	0.75	Wt. n-Val.		0.025	
E.G. Elev (ft)	2210.95	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		215.44	
E.G. Slope (ft/ft)	0.002286	Area (sq ft)		215.44	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	54.64	Top Width (ft)		54.64	
Vel Total (ft/s)	6.93	Avg. Vel. (ft/s)		6.93	
Max Chl Dpth (ft)	5.77	Hydr. Depth (ft)		3.94	
Conv. Total (cfs)	31249.4	Conv. (cfs)		31249.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		56.51	
Min Ch El (ft)	2204.43	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		3.77	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.70	
C & E Loss (ft)	0.11	Cum SA (acres)		0.17	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6150

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2214.15	130	2204.15	150	2204.15	170	2214.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.025	110	.025	170	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	113	113	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2208.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.80	Wt. n-Val.		0.025	
E.G. Elev (ft)	2210.67	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2208.86	Flow Area (sq ft)		138.62	
E.G. Slope (ft/ft)	0.006494	Area (sq ft)		138.62	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	

Top Width (ft)	38.85	Top Width (ft)	38.85
Vel Total (ft/s)	10.78	Avg. Vel. (ft/s)	10.78
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)	3.57
Conv. Total (cfs)	18539.6	Conv. (cfs)	18539.6
Length Wtd. (ft)	113.00	Wetted Per. (ft)	41.07
Min Ch El (ft)	2204.15	Shear (lb/sq ft)	1.37
Alpha	1.00	Stream Power (lb/ft s)	14.75
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.49
C & E Loss (ft)	0.07	Cum SA (acres)	0.11

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6037

INPUT
Description: EARTHEN CHANNEL WITH RIP-RAP
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2205.53	130	2195.53	150	2195.53	170	2205.53

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	37	37	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2202.59	Element	Left OB	Channel	Right OB

Vel Head (ft)	2.50	Wt. n-Val.	0.015
E.G. Elev (ft)	2205.09	Reach Len. (ft)	
Crit W.S. (ft)	2202.59	Flow Area (sq ft)	241.09
E.G. Slope (ft/ft)	0.002099	Area (sq ft)	241.09
Q Total (cfs)	3058.00	Flow (cfs)	3058.00
Top Width (ft)	48.26	Top Width (ft)	48.26
Vel Total (ft/s)	12.68	Avg. Vel. (ft/s)	12.68
Max Chl Dpth (ft)	7.06	Hydr. Depth (ft)	5.00
Conv. Total (cfs)	66754.6	Conv. (cfs)	66754.6
Length Wtd. (ft)		Wetted Per. (ft)	51.59
Min Ch El (ft)	2195.53	Shear (lb/sq ft)	0.61
Alpha	1.00	Stream Power (lb/ft s)	7.77
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

Warning - User specified water surface is not possible for the specified flow regime. The program used critical depth as the starting water surface.

SUMMARY OF MANNING'S N VALUES

River:REACH 1

Reach	River Sta.	n1	n2	n3
REACH 1	16700	.025	.025	.025
REACH 1	16600	.025	.025	.025
REACH 1	16550	.025	.025	.025
REACH 1	16500	.025	.025	.025
REACH 1	16400	.025	.025	.025
REACH 1	16300	.025	.025	.025
REACH 1	16200	.025	.025	.025
REACH 1	16150	.025	.025	.025
REACH 1	16000	.025	.025	.025
REACH 1	15950	.025	.025	.025
REACH 1	15600	.025	.025	.025
REACH 1	15300	.025	.025	.025
REACH 1	15000	.025	.025	.025
REACH 1	14700	.025	.025	.025
REACH 1	14400	.025	.025	.025
REACH 1	14100	.025	.025	.025
REACH 1	13800	.025	.025	.025
REACH 1	13250	.025	.025	.025
REACH 1	12700	.025	.025	.025

REACH 1	12500	.025	.025	.025
REACH 1	12000	.025	.025	.025
REACH 1	11500	.025	.025	.025
REACH 1	11000	.025	.025	.025
REACH 1	10500	.025	.025	.025
REACH 1	10000	.025	.025	.025
REACH 1	9500	.025	.025	.025
REACH 1	9000	.025	.025	.025
REACH 1	8600	.025	.025	.025
REACH 1	8500	.025	.025	.025
REACH 1	8200	.025	.025	.025
REACH 1	7800	.025	.025	.025
REACH 1	7450	.025	.025	.025
REACH 1	7350	.025	.025	.025
REACH 1	6700	.025	.025	.025
REACH 1	6400	.025	.025	.025
REACH 1	6200	.025	.025	.025
REACH 1	6150	.025	.025	.025
REACH 1	6037	.015	.015	.015

SUMMARY OF REACH LENGTHS

River: REACH 1

Reach	River Sta.	Left	Channel	Right
REACH 1	16700	150	150	150
REACH 1	16600	50	50	50
REACH 1	16550	50	50	50
REACH 1	16500	100	100	100
REACH 1	16400	100	100	100
REACH 1	16300	100	100	100
REACH 1	16200	50	50	50
REACH 1	16150	150	150	150
REACH 1	16000	50	50	50
REACH 1	15950	350	350	350
REACH 1	15600	300	300	300
REACH 1	15300	300	300	300
REACH 1	15000	300	300	300
REACH 1	14700	300	300	300
REACH 1	14400	300	300	300
REACH 1	14100	300	300	300
REACH 1	13800	550	550	550

REACH 1	13250	550	550	550
REACH 1	12700	200	200	200
REACH 1	12500	500	500	500
REACH 1	12000	500	500	500
REACH 1	11500	500	500	500
REACH 1	11000	500	500	500
REACH 1	10500	500	500	500
REACH 1	10000	500	500	500
REACH 1	9500	500	500	500
REACH 1	9000	500	500	500
REACH 1	8600	100	100	100
REACH 1	8500	302	300	300
REACH 1	8200	400	400	400
REACH 1	7800	350	350	350
REACH 1	7450	100	100	105
REACH 1	7350	650	650	650
REACH 1	6700	300	300	300
REACH 1	6400	200	200	200
REACH 1	6200	50	50	50
REACH 1	6150	113	113	113
REACH 1	6037	37	37	37

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: REACH 1

Reach	River Sta.	Contr.	Expan.
REACH 1	16700	.1	.3
REACH 1	16600	.1	.3
REACH 1	16550	.1	.3
REACH 1	16500	.1	.3
REACH 1	16400	.1	.3
REACH 1	16300	.1	.3
REACH 1	16200	.1	.3
REACH 1	16150	.1	.3
REACH 1	16000	.1	.3
REACH 1	15950	.1	.3
REACH 1	15600	.1	.3
REACH 1	15300	.1	.3
REACH 1	15000	.1	.3
REACH 1	14700	.1	.3
REACH 1	14400	.1	.3

REACH 1	14100	.1	.3
REACH 1	13800	.1	.3
REACH 1	13250	.1	.3
REACH 1	12700	.1	.3
REACH 1	12500	.1	.3
REACH 1	12000	.1	.3
REACH 1	11500	.1	.3
REACH 1	11000	.1	.3
REACH 1	10500	.1	.3
REACH 1	10000	.1	.3
REACH 1	9500	.1	.3
REACH 1	9000	.1	.3
REACH 1	8600	.1	.3
REACH 1	8500	.1	.3
REACH 1	8200	.1	.3
REACH 1	7800	.1	.3
REACH 1	7450	.1	.3
REACH 1	7350	.1	.3
REACH 1	6700	.1	.3
REACH 1	6400	.1	.3
REACH 1	6200	.1	.3
REACH 1	6150	.1	.3
REACH 1	6037	.1	.3

APPENDIX F

HEC-RAS CALCULATIONS

Super-Critical Evaluation

Of Full Channel

HEC-RAS Plan: OVERALLM River: REACH 1 Reach: REACH 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
REACH 1	16700	189.00	2378.10	2379.82	2379.82	2380.26	0.009832	5.31	35.58	41.33	1.01
REACH 1	16600	189.00	2375.65	2377.09	2377.37	2377.98	0.025268	7.57	24.97	34.62	1.57
REACH 1	16550	189.00	2374.43	2375.88	2376.15	2376.75	0.024331	7.46	25.33	34.87	1.54
REACH 1	16500	189.00	2373.20	2374.64	2374.92	2375.53	0.025177	7.56	25.01	34.65	1.57
REACH 1	16400	189.00	2370.75	2372.17	2372.44	2373.05	0.025606	7.53	25.09	35.42	1.58
REACH 1	16300	189.00	2368.30	2369.73	2369.99	2370.58	0.024483	7.41	25.52	35.72	1.54
REACH 1	16200	189.00	2365.85	2369.69	2367.54	2369.71	0.000125	1.02	184.45	96.03	0.13
REACH 1	16150	915.00	2364.63	2368.53	2368.53	2369.53	0.007533	8.00	114.31	58.56	1.01
REACH 1	16000	915.00	2359.73	2362.42	2363.63	2366.82	0.054630	16.83	54.38	40.39	2.56
REACH 1	15950	915.00	2359.73	2363.24	2363.64	2364.77	0.013380	9.93	92.16	52.58	1.32
REACH 1	15600	915.00	2351.15	2354.05	2355.05	2357.31	0.036603	14.48	63.19	43.54	2.12
REACH 1	15300	915.00	2343.80	2347.06	2347.72	2349.11	0.019782	11.50	79.59	48.86	1.59
REACH 1	15000	1046.00	2336.45	2339.73	2340.57	2342.35	0.025090	13.00	80.49	49.14	1.79
REACH 1	14700	1046.00	2329.10	2332.39	2333.22	2334.97	0.024500	12.88	81.21	49.36	1.77
REACH 1	14400	1046.00	2321.75	2325.04	2325.87	2327.62	0.024500	12.88	81.21	49.36	1.77
REACH 1	14100	1046.00	2314.40	2317.69	2318.52	2320.27	0.024500	12.88	81.21	49.36	1.77
REACH 1	13800	1046.00	2307.05	2310.34	2311.16	2312.92	0.024510	12.88	81.19	49.35	1.77
REACH 1	13250	1315.00	2293.58	2297.21	2298.10	2299.95	0.022851	13.29	98.97	54.49	1.74
REACH 1	12700	1315.00	2280.10	2283.66	2284.63	2286.63	0.025408	13.83	95.11	53.42	1.83
REACH 1	12500	1315.00	2277.10	2279.44	2280.25	2282.06	0.019642	12.98	101.31	51.41	1.63
REACH 1	12000	1315.00	2269.60	2272.27	2272.75	2274.19	0.012432	11.12	118.28	53.67	1.32
REACH 1	11500	1315.00	2262.10	2264.54	2265.25	2266.92	0.017047	12.37	106.27	52.08	1.53
REACH 1	11000	1315.00	2254.60	2257.20	2257.75	2259.25	0.013712	11.49	114.41	53.17	1.38
REACH 1	10500	1315.00	2247.10	2249.59	2250.25	2251.85	0.015788	12.06	109.07	52.46	1.47
REACH 1	10000	1315.00	2239.60	2242.16	2242.74	2244.28	0.014383	11.68	112.57	52.92	1.41
REACH 1	9500	1315.00	2232.10	2234.62	2235.26	2236.84	0.015343	11.96	109.99	52.44	1.45
REACH 1	9000	1315.00	2224.60	2227.14	2227.75	2229.30	0.014825	11.80	111.42	52.77	1.43
REACH 1	8600	1315.00	2218.60	2222.12	2221.74	2223.09	0.004575	7.89	166.71	59.66	0.83
REACH 1	8500	1315.00	2217.10	2221.61		2222.64	0.004225	8.14	161.63	51.60	0.81
REACH 1	8200	1438.00	2215.45	2219.89		2221.18	0.005414	9.12	157.63	51.06	0.91
REACH 1	7800	1438.00	2213.25	2217.65		2218.97	0.005596	9.23	155.76	50.80	0.93
REACH 1	7450	1494.00	2211.33	2216.29		2217.30	0.003741	8.06	185.34	54.72	0.77
REACH 1	7350	1494.00	2210.78	2215.58		2216.85	0.004748	9.04	165.23	48.81	0.87
REACH 1	6700	1494.00	2207.20	2211.63	2211.63	2213.22	0.006527	10.14	147.31	46.56	1.00
REACH 1	6400	1494.00	2205.55	2210.98	2209.25	2211.33	0.001319	4.74	315.13	96.04	0.46
REACH 1	6200	1494.00	2204.43	2210.20		2210.95	0.002286	6.93	215.44	54.64	0.62

HEC-RAS Plan: OVERALLM River: REACH 1 Reach: REACH 1 (Continued)

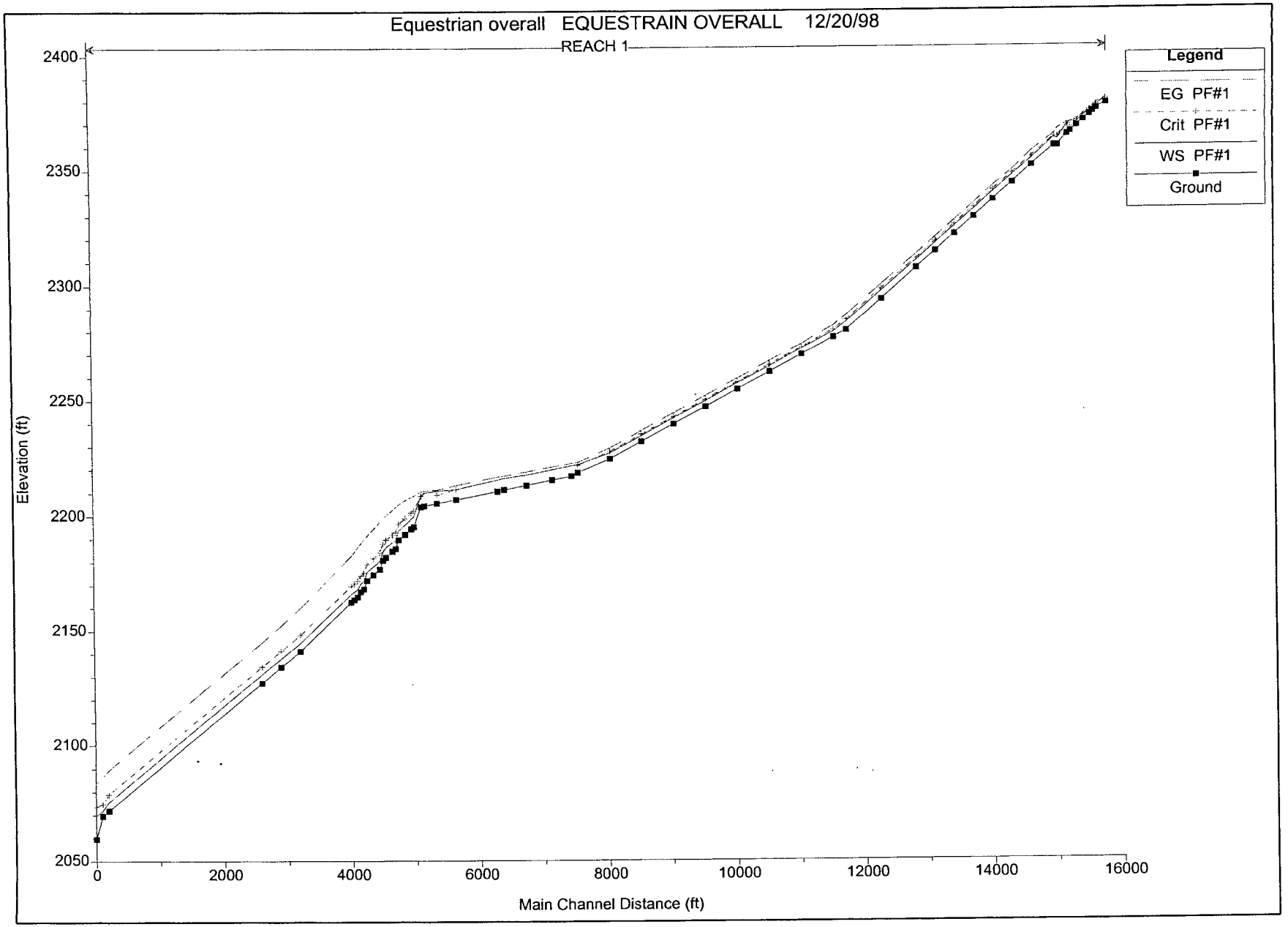
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
REACH 1	6150	1494.00	2204.15	2208.86	2208.86	2210.67	0.006494	10.78	138.62	38.85	1.01
REACH 1	6037	3058.00	2195.53	2199.95	2202.57	2208.88	0.012394	23.98	127.53	37.69	2.30
REACH 1	6000	3058.00	2194.61	2198.94	2201.65	2208.36	0.013355	24.62	124.20	37.33	2.38
REACH 1	5900	3058.00	2192.16	2196.32	2199.20	2206.80	0.015552	25.98	117.70	36.63	2.55
REACH 1	5800	3058.00	2189.71	2193.74	2196.75	2205.10	0.017443	27.05	113.04	36.12	2.69
REACH 1	5750	3058.00	2185.88	2189.57	2192.92	2203.83	0.024128	30.31	100.88	34.74	3.14
REACH 1	5700	3058.00	2184.86	2188.58	2191.90	2202.56	0.023439	30.01	101.91	34.86	3.09
REACH 1	5600	3058.00	2182.21	2186.39	2189.70	2200.25	0.023523	29.87	102.37	35.43	3.10
REACH 1	5550	3058.00	2180.98	2184.66	2188.02	2199.00	0.024315	30.40	100.61	34.71	3.15
REACH 1	5500	3058.00	2177.15	2180.60	2184.19	2197.41	0.030487	32.89	92.97	33.82	3.50
REACH 1	5400	3058.00	2174.70	2178.22	2181.74	2194.25	0.028504	32.13	95.17	34.08	3.39
REACH 1	5300	3058.00	2172.25	2175.82	2179.29	2191.32	0.027173	31.60	96.77	34.27	3.31
REACH 1	5250	3058.00	2168.42	2171.79	2175.46	2189.69	0.033384	33.95	90.08	33.48	3.65
REACH 1	5200	3058.00	2167.26	2170.68	2174.30	2187.86	0.031462	33.26	91.95	33.70	3.55
REACH 1	5100	3058.00	2164.95	2168.32	2171.99	2186.18	0.033280	33.91	90.17	33.49	3.64
REACH 1	5050	3058.00	2163.80	2167.23	2170.84	2184.36	0.031349	33.21	92.07	33.71	3.54
REACH 1	5000	3058.00	2162.64	2166.11	2169.68	2182.67	0.029858	32.65	93.65	33.90	3.46
REACH 1	4200	3058.00	2141.22	2144.82	2148.26	2159.96	0.026257	31.22	97.94	34.40	3.26
REACH 1	3900	3058.00	2134.30	2137.99	2141.34	2152.22	0.024024	30.27	101.03	34.76	3.13
REACH 1	3600	3058.00	2127.38	2131.10	2134.44	2145.02	0.023294	29.94	102.13	34.89	3.08
REACH 1	1200	3058.00	2072.00	2075.74	2079.06	2089.50	0.022899	29.76	102.74	34.96	3.06
REACH 1	1100	3058.00	2069.69	2071.94	2074.84	2086.41	0.037640	30.52	100.20	49.01	3.76
REACH 1	1000	3058.00	2059.69	2069.83	2073.64	2083.55	0.019482	29.72	102.89	20.00	2.31

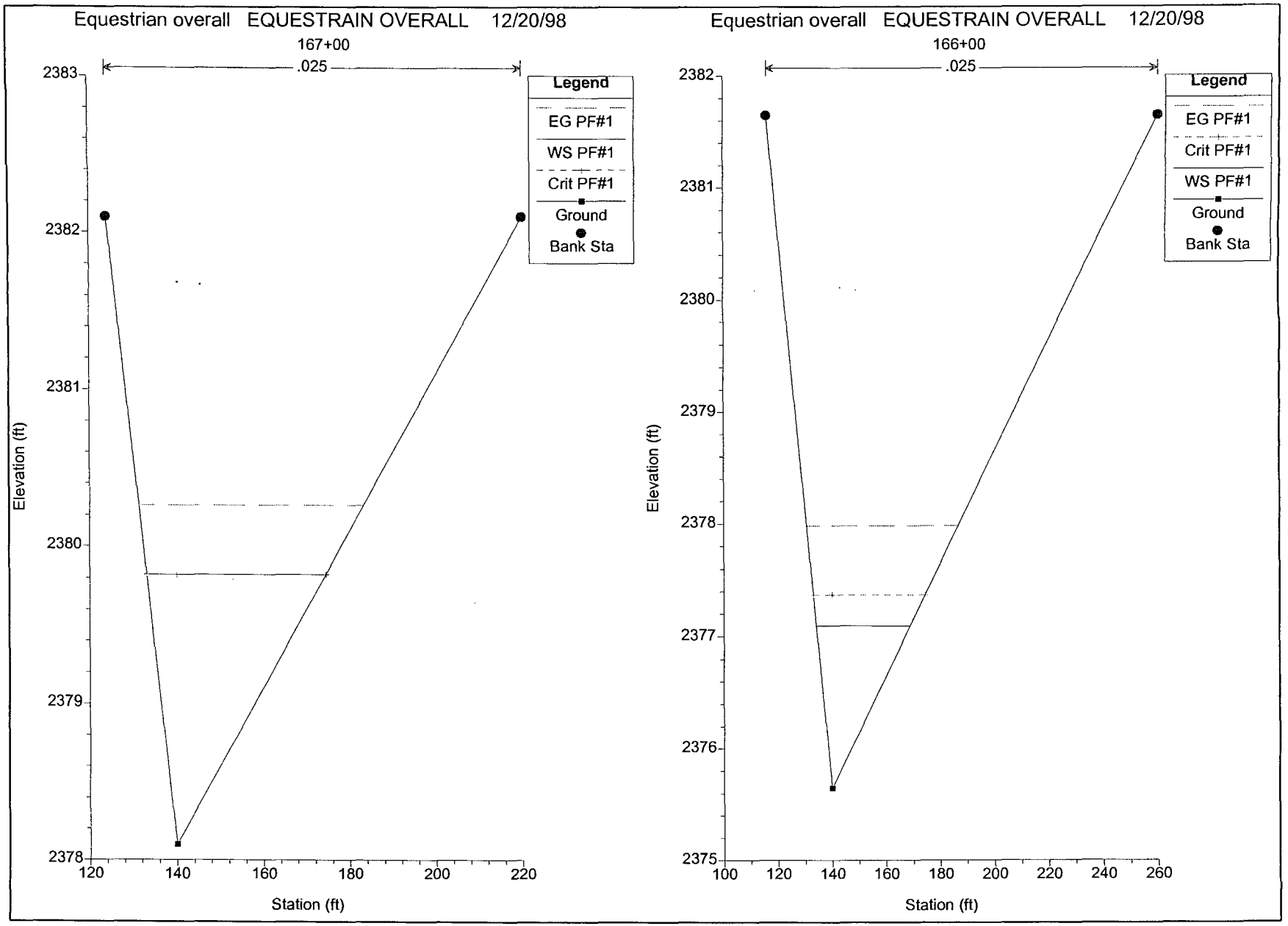
HEC-RAS Plan: OVERALLM River: REACH 1 Reach: REACH 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Max Chl Dpth	Top Width	LOB Elev	ROB Elev
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
REACH 1	16700	189.00	2378.10	2379.82	2379.82	2380.26	5.31	1.72	41.33	2382.10	2382.10
REACH 1	16600	189.00	2375.65	2377.09	2377.37	2377.98	7.57	1.44	34.62	2381.65	2381.65
REACH 1	16550	189.00	2374.43	2375.88	2376.15	2376.75	7.46	1.45	34.87	2380.43	2380.43
REACH 1	16500	189.00	2373.20	2374.64	2374.92	2375.53	7.56	1.44	34.65	2379.20	2379.20
REACH 1	16400	189.00	2370.75	2372.17	2372.44	2373.05	7.53	1.42	35.42	2376.75	2376.75
REACH 1	16300	189.00	2368.30	2369.73	2369.99	2370.58	7.41	1.43	35.72	2374.30	2374.30
REACH 1	16200	189.00	2365.85	2369.69	2367.54	2369.71	1.02	3.84	96.03	2372.85	2372.85
REACH 1	16150	915.00	2364.63	2368.53	2368.53	2369.53	8.00	3.90	58.56	2373.63	2373.63
REACH 1	16000	915.00	2359.73	2362.42	2363.63	2366.82	16.83	2.69	40.39	2368.73	2368.73
REACH 1	15950	915.00	2359.73	2363.24	2363.64	2364.77	9.93	3.51	52.58	2369.73	2369.73
REACH 1	15600	915.00	2351.15	2354.05	2355.05	2357.31	14.48	2.90	43.54	2361.15	2361.15
REACH 1	15300	915.00	2343.80	2347.06	2347.72	2349.11	11.50	3.26	48.86	2353.80	2353.80
REACH 1	15000	1046.00	2336.45	2339.73	2340.57	2342.35	13.00	3.28	49.14	2346.45	2346.45
REACH 1	14700	1046.00	2329.10	2332.39	2333.22	2334.97	12.88	3.29	49.36	2339.10	2339.10
REACH 1	14400	1046.00	2321.75	2325.04	2325.87	2327.62	12.88	3.29	49.36	2331.75	2331.75
REACH 1	14100	1046.00	2314.40	2317.69	2318.52	2320.27	12.88	3.29	49.36	2324.40	2324.40
REACH 1	13800	1046.00	2307.05	2310.34	2311.16	2312.92	12.88	3.29	49.35	2317.05	2317.05
REACH 1	13250	1315.00	2293.58	2297.21	2298.10	2299.95	13.29	3.63	54.49	2303.58	2303.58
REACH 1	12700	1315.00	2280.10	2283.66	2284.63	2286.63	13.83	3.56	53.42	2290.10	2290.10
REACH 1	12500	1315.00	2277.10	2279.44	2280.25	2282.06	12.98	2.34	51.41	2289.10	2289.10
REACH 1	12000	1315.00	2269.60	2272.27	2272.75	2274.19	11.12	2.67	53.67	2281.60	2281.60
REACH 1	11500	1315.00	2262.10	2264.54	2265.25	2266.92	12.37	2.44	52.08	2274.10	2274.10
REACH 1	11000	1315.00	2254.60	2257.20	2257.75	2259.25	11.49	2.60	53.17	2266.60	2266.60
REACH 1	10500	1315.00	2247.10	2249.59	2250.25	2251.85	12.06	2.49	52.46	2259.10	2259.10
REACH 1	10000	1315.00	2239.60	2242.16	2242.74	2244.28	11.68	2.56	52.92	2251.60	2251.60
REACH 1	9500	1315.00	2232.10	2234.62	2235.26	2236.84	11.96	2.52	52.44	2244.10	2244.10
REACH 1	9000	1315.00	2224.60	2227.14	2227.75	2229.30	11.80	2.54	52.77	2236.60	2236.60
REACH 1	8600	1315.00	2218.60	2222.12	2221.74	2223.09	7.89	3.52	59.66	2230.60	2230.60
REACH 1	8500	1315.00	2217.10	2221.61		2222.64	8.14	4.51	51.60	2233.10	2233.10
REACH 1	8200	1438.00	2215.45	2219.89		2221.18	9.12	4.44	51.06	2231.45	2231.45
REACH 1	7800	1438.00	2213.25	2217.65		2218.97	9.23	4.40	50.80	2229.25	2229.25
REACH 1	7450	1494.00	2211.33	2216.29		2217.30	8.06	4.96	54.72	2227.33	2227.33
REACH 1	7350	1494.00	2210.78	2215.58		2216.85	9.04	4.80	48.81	2222.78	2222.78
REACH 1	6700	1494.00	2207.20	2211.63	2211.63	2213.22	10.14	4.43	46.56	2219.20	2219.20
REACH 1	6400	1494.00	2205.55	2210.98	2209.25	2211.33	4.74	5.43	96.04	2217.55	2217.55
REACH 1	6200	1494.00	2204.43	2210.20		2210.95	6.93	5.77	54.64	2216.43	2216.43

HEC-RAS Plan: OVERALLM River: REACH 1 Reach: REACH 1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Max Chl Dpth	Top Width	LOB Elev	ROB Elev
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)
REACH 1	6150	1494.00	2204.15	2208.86	2208.86	2210.67	10.78	4.71	38.85	2214.15	2214.15
REACH 1	6037	3058.00	2195.53	2199.95	2202.57	2208.88	23.98	4.42	37.69	2205.53	2205.53
REACH 1	6000	3058.00	2194.61	2198.94	2201.65	2208.36	24.62	4.33	37.33	2204.61	2204.61
REACH 1	5900	3058.00	2192.16	2196.32	2199.20	2206.80	25.98	4.16	36.63	2202.16	2202.16
REACH 1	5800	3058.00	2189.71	2193.74	2196.75	2205.10	27.05	4.03	36.12	2199.71	2199.71
REACH 1	5750	3058.00	2185.88	2189.57	2192.92	2203.83	30.31	3.69	34.74	2195.88	2195.88
REACH 1	5700	3058.00	2184.86	2188.58	2191.90	2202.56	30.01	3.72	34.86	2194.86	2194.86
REACH 1	5600	3058.00	2182.21	2186.39	2189.70	2200.25	29.87	4.18	35.43	2192.21	2192.21
REACH 1	5550	3058.00	2180.98	2184.66	2188.02	2199.00	30.40	3.68	34.71	2190.98	2190.98
REACH 1	5500	3058.00	2177.15	2180.60	2184.19	2197.41	32.89	3.45	33.82	2187.15	2187.15
REACH 1	5400	3058.00	2174.70	2178.22	2181.74	2194.25	32.13	3.52	34.08	2184.70	2184.70
REACH 1	5300	3058.00	2172.25	2175.82	2179.29	2191.32	31.60	3.57	34.27	2182.25	2182.25
REACH 1	5250	3058.00	2168.42	2171.79	2175.46	2189.69	33.95	3.37	33.48	2178.42	2178.42
REACH 1	5200	3058.00	2167.26	2170.68	2174.30	2187.86	33.26	3.42	33.70	2177.26	2177.26
REACH 1	5100	3058.00	2164.95	2168.32	2171.99	2186.18	33.91	3.37	33.49	2174.95	2174.95
REACH 1	5050	3058.00	2163.80	2167.23	2170.84	2184.36	33.21	3.43	33.71	2173.80	2173.80
REACH 1	5000	3058.00	2162.64	2166.11	2169.68	2182.67	32.65	3.47	33.90	2172.64	2172.64
REACH 1	4200	3058.00	2141.22	2144.82	2148.26	2159.96	31.22	3.60	34.40	2151.22	2151.22
REACH 1	3900	3058.00	2134.30	2137.99	2141.34	2152.22	30.27	3.69	34.76	2144.30	2144.30
REACH 1	3600	3058.00	2127.38	2131.10	2134.44	2145.02	29.94	3.72	34.89	2137.38	2137.38
REACH 1	1200	3058.00	2072.00	2075.74	2079.06	2089.50	29.76	3.74	34.96	2082.00	2082.00
REACH 1	1100	3058.00	2069.69	2071.94	2074.84	2086.41	30.52	2.25	49.01	2079.69	2079.69
REACH 1	1000	3058.00	2059.69	2069.83	2073.64	2083.55	29.72	10.14	20.00	2069.69	2069.69


Equestrian overall EQUESTRAIN OVERALL 12/20/98
REACH 1
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Elevation (ft)
2400
2350
2300
2250
2200
2150
2100
2050
0
2000
4000
6000
8000
10000
12000
14000
16000
Main Channel Distance (ft)


Equestrian overall EQUESTRAIN OVERALL 12/20/98
167+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2383
2382
2381
2380
2379
2378
120
140
160
180
200
220
Equestrian overall EQUESTRAIN OVERALL 12/20/98
166+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2382
2381
2380
2379
2378
2377
2376
2375
100
120
140
160
180
200
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240
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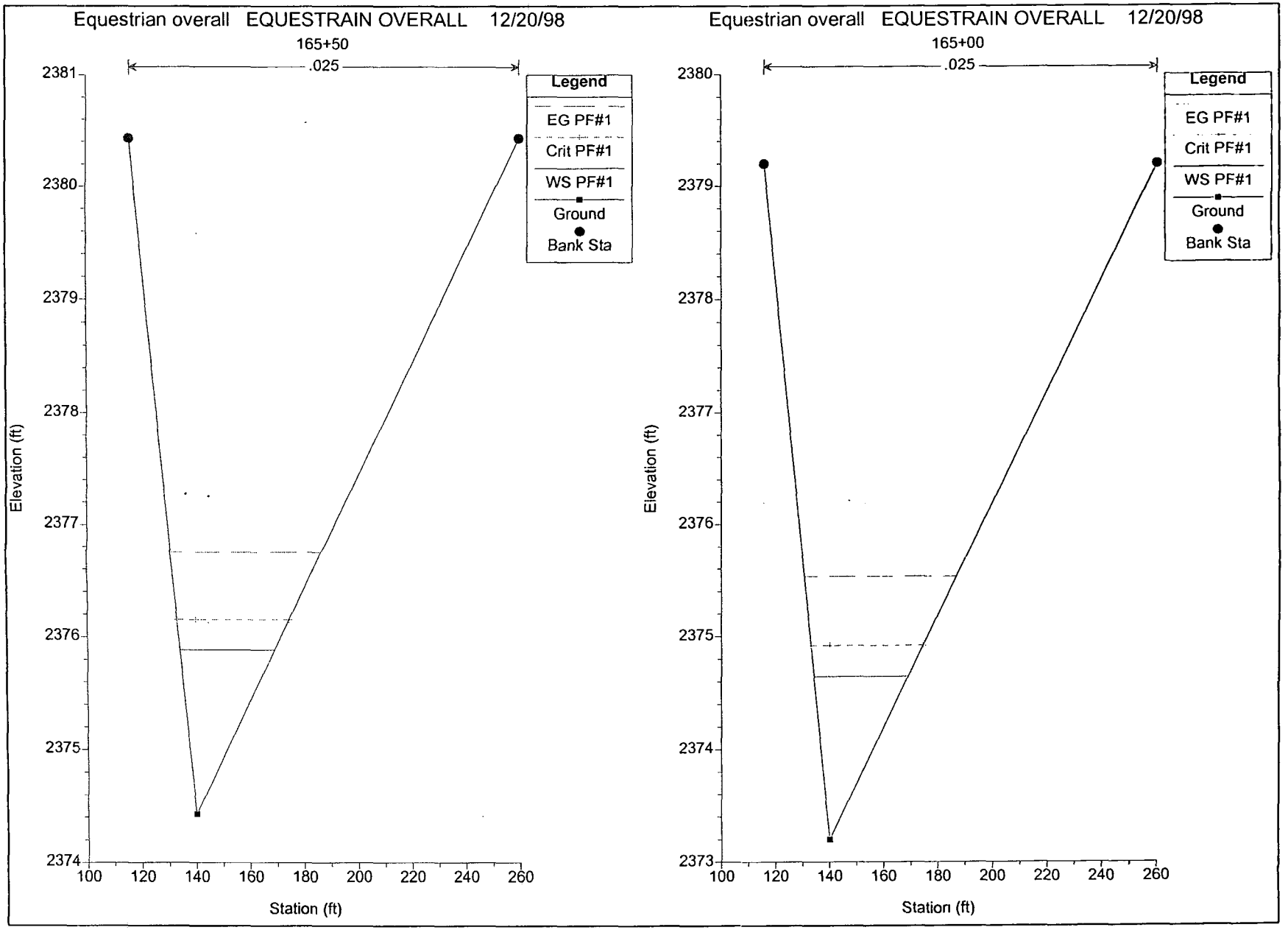
Equestrian overall EQUESTRAIN OVERALL 12/20/98
165+50
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2381
2380
2379
2378
2377
2376
2375
2374
100
120
140
160
180
200
220
240
260
Equestrian overall EQUESTRAIN OVERALL 12/20/98
165+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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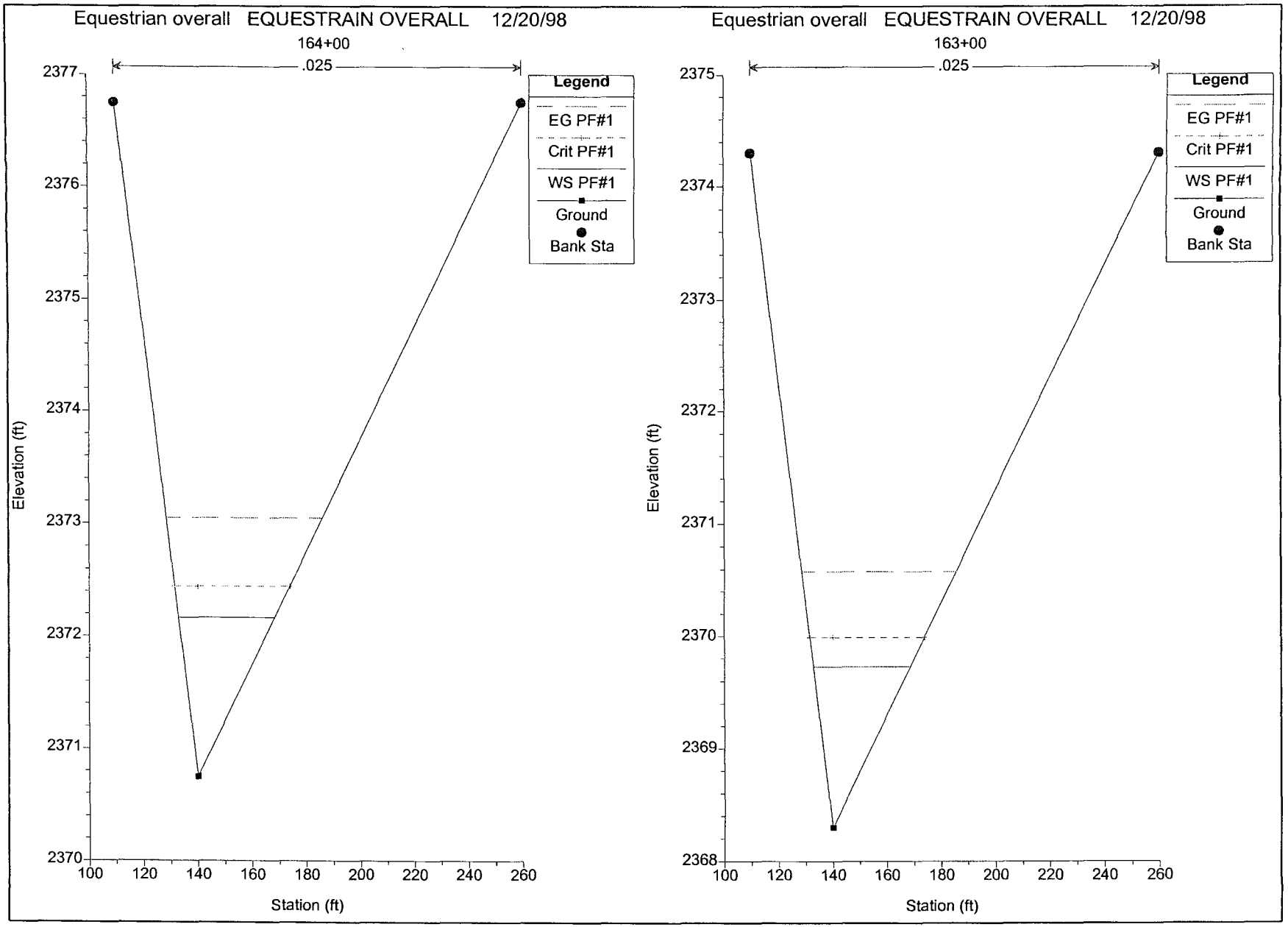
2379
2378
2377
2376
2375
2374
2373
100
120
140
160
180
200
220
240
260


Equestrian overall EQUESTRAIN OVERALL 12/20/98
164+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2377
2376
2375
2374
2373
2372
2371
2370
100
120
140
160
180
200
220
240
260
Equestrian overall EQUESTRAIN OVERALL 12/20/98
163+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2374
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120
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240
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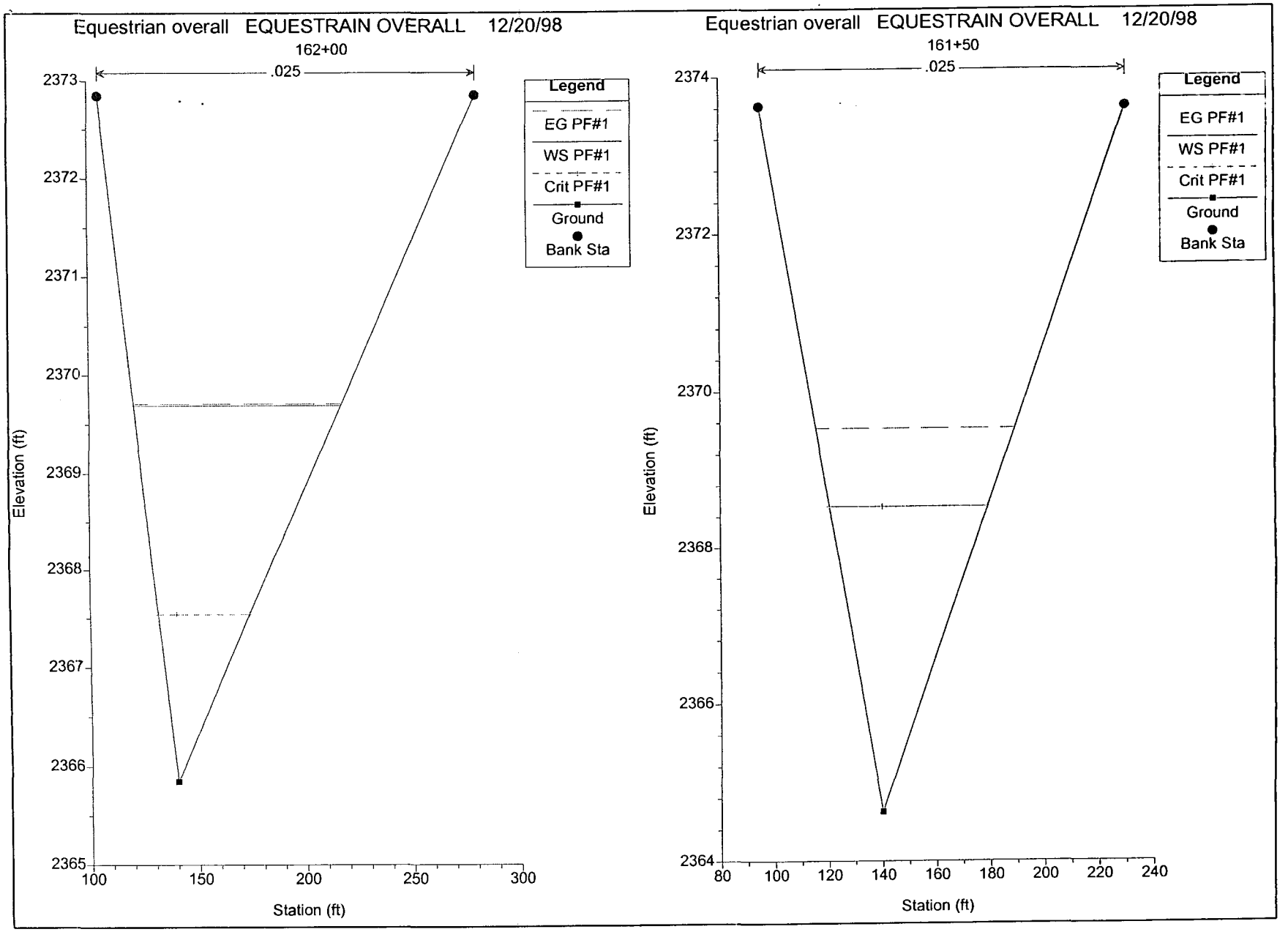
Equestrian overall EQUESTRAIN OVERALL 12/20/98
162+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2373
2372
2371
2370
2369
2368
2367
2366
2365
100
150
200
250
300
Equestrian overall EQUESTRAIN OVERALL 12/20/98
161+50
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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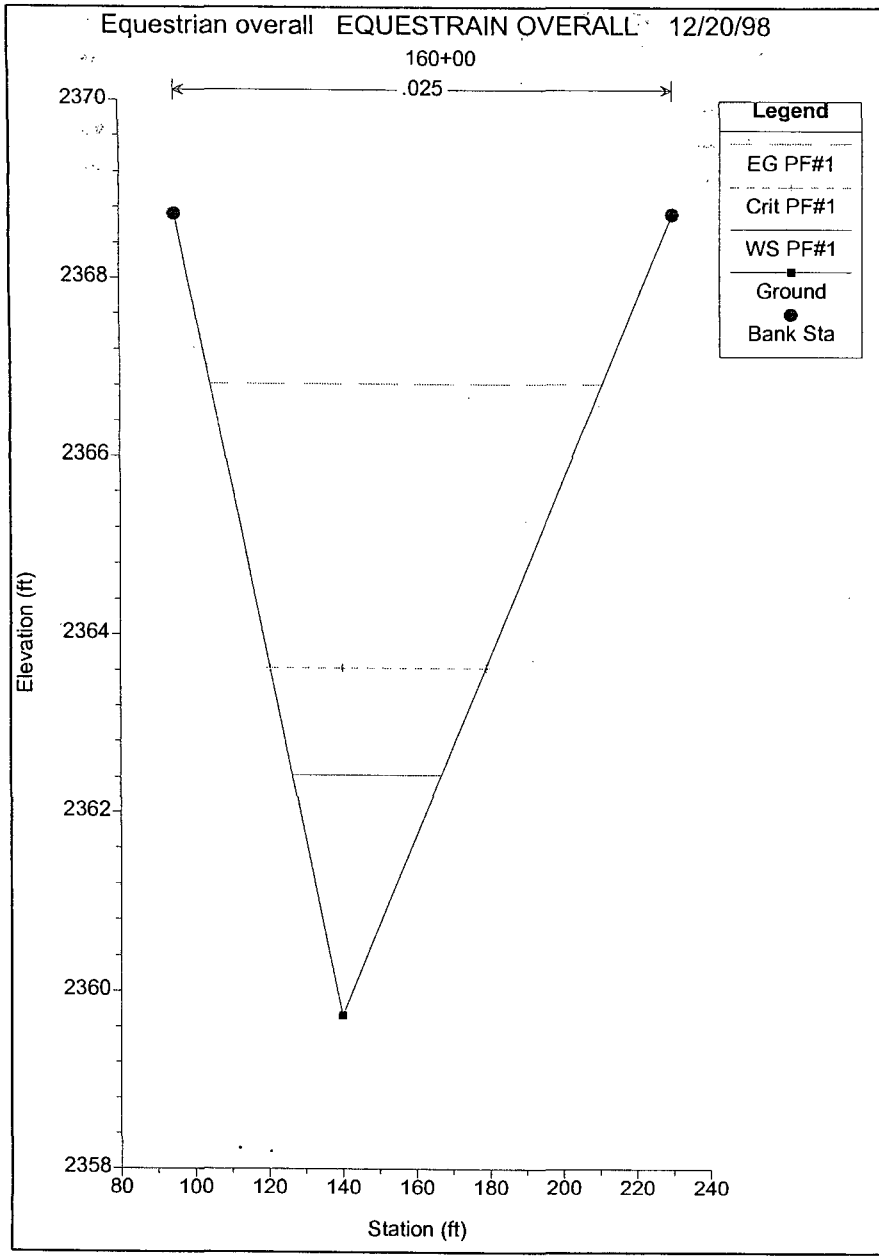
2372
2370
2368
2366
2364
80
100
120
140
160
180
200
220
240


Equestrian overall EQUESTRAIN OVERALL 12/20/98
160+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2368
2366
2364
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2360
2358
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100
120
140
160
180
200
220
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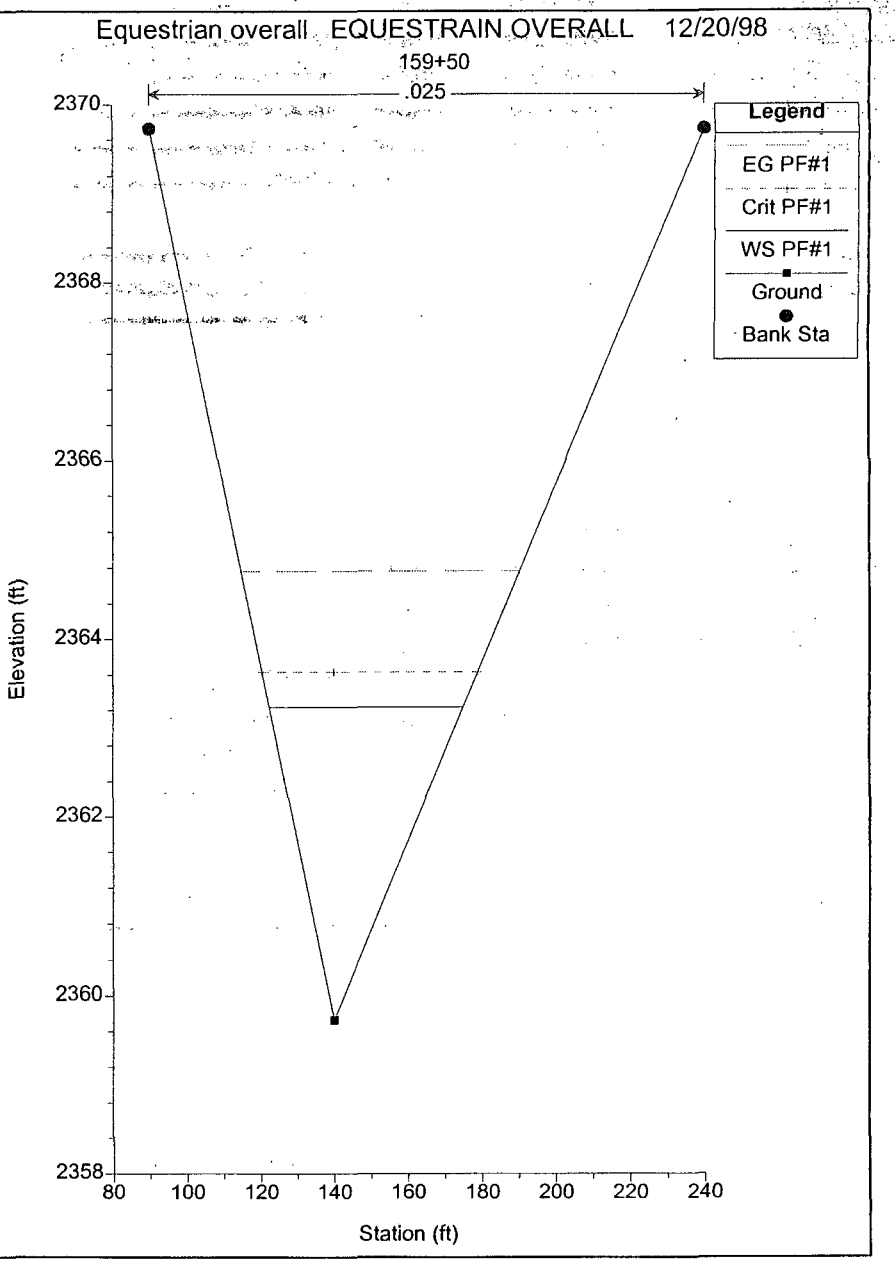
Equestrian overall EQUESTRAIN OVERALL 12/20/98
159+50
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2364
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2358
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100
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220
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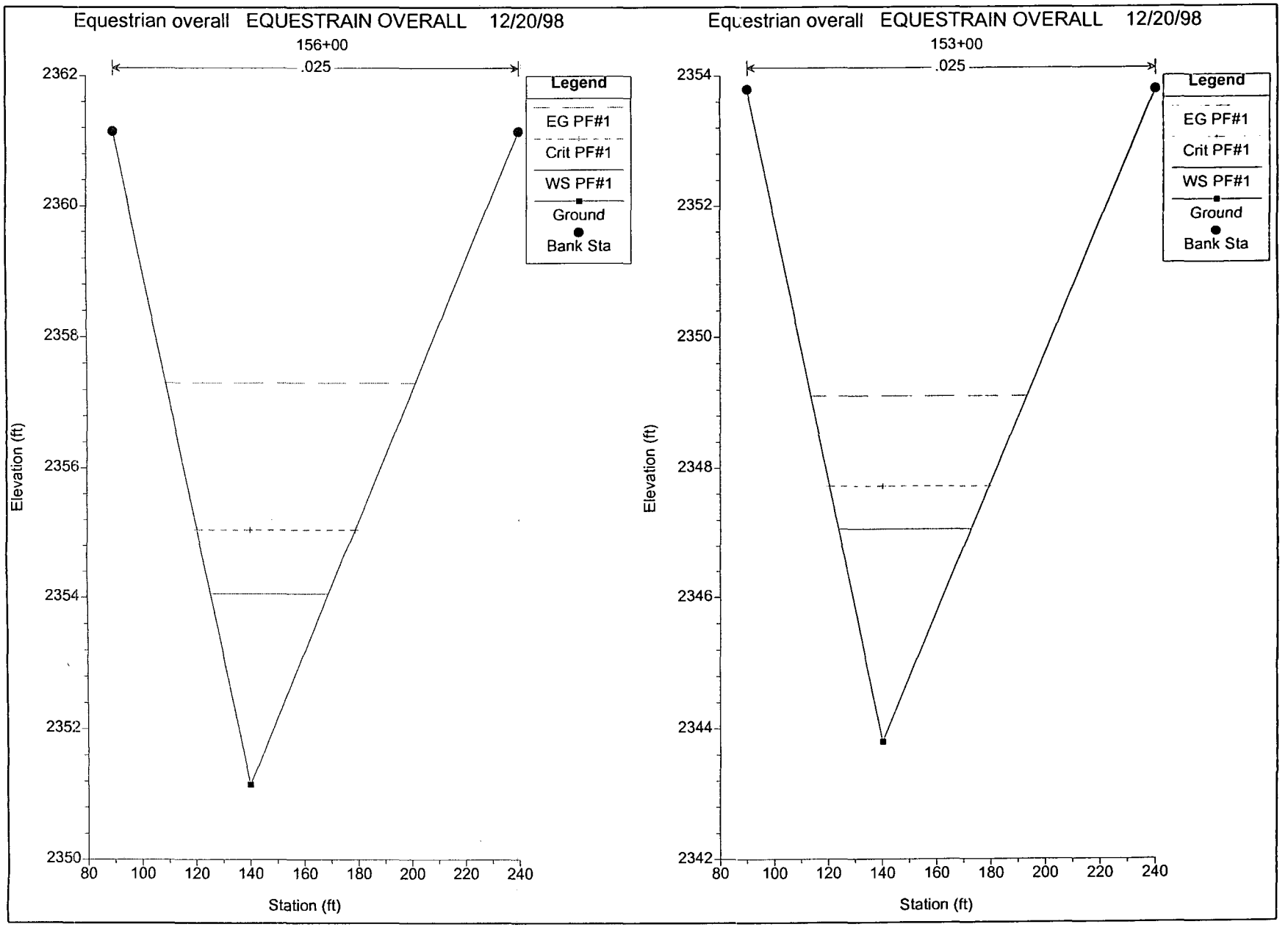
Equestrian overall EQUESTRAIN OVERALL 12/20/98
156+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2362
2360
2358
2356
2354
2352
2350
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRAIN OVERALL 12/20/98
153+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2354
2352
2350
2348
2346
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2342
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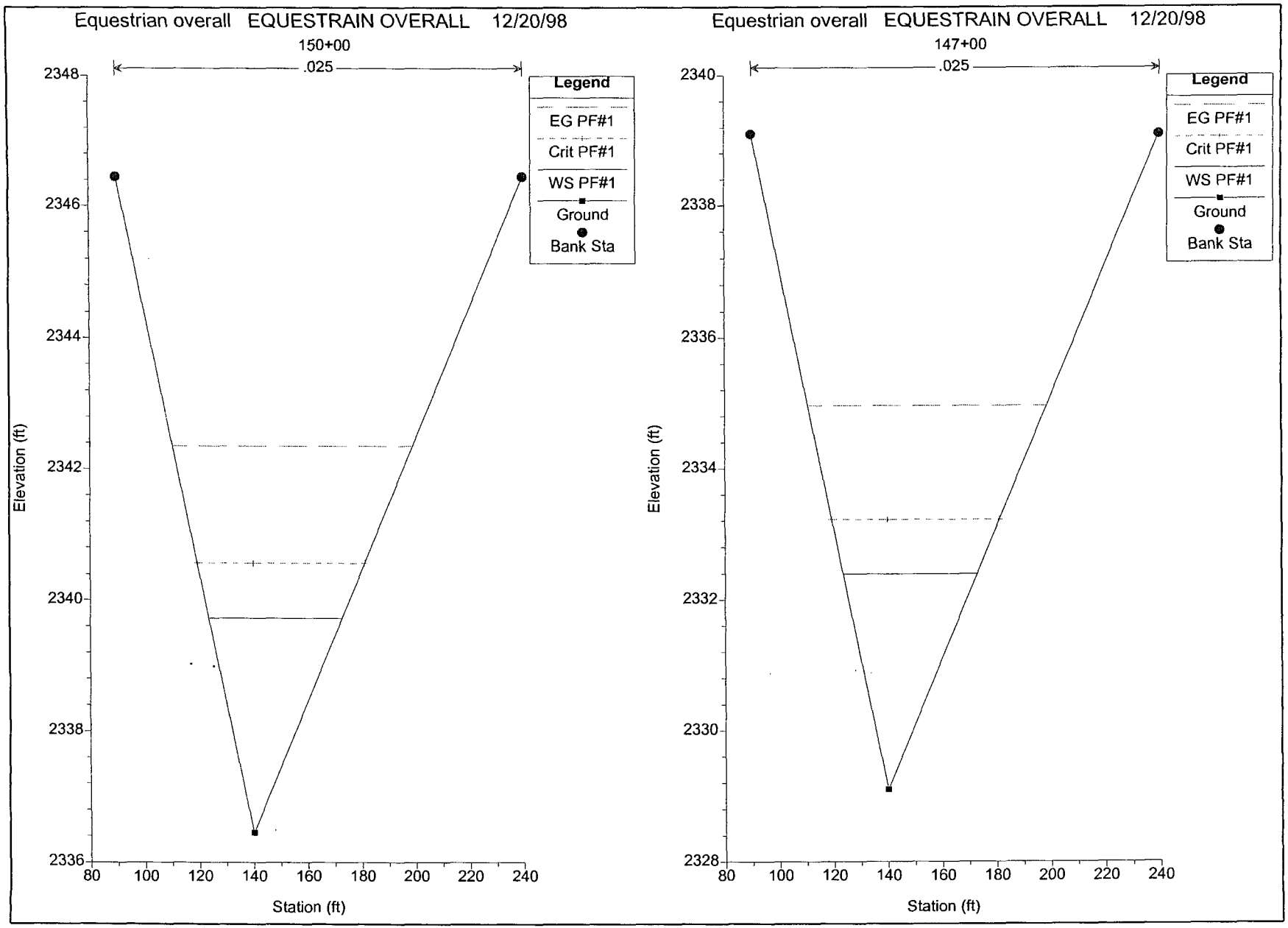
100
120
140
160
180
200
220
240


Equestrian overall EQUESTRAIN OVERALL 12/20/98
150+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2348
2346
2344
2342
2340
2338
2336
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRAIN OVERALL 12/20/98
147+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2336
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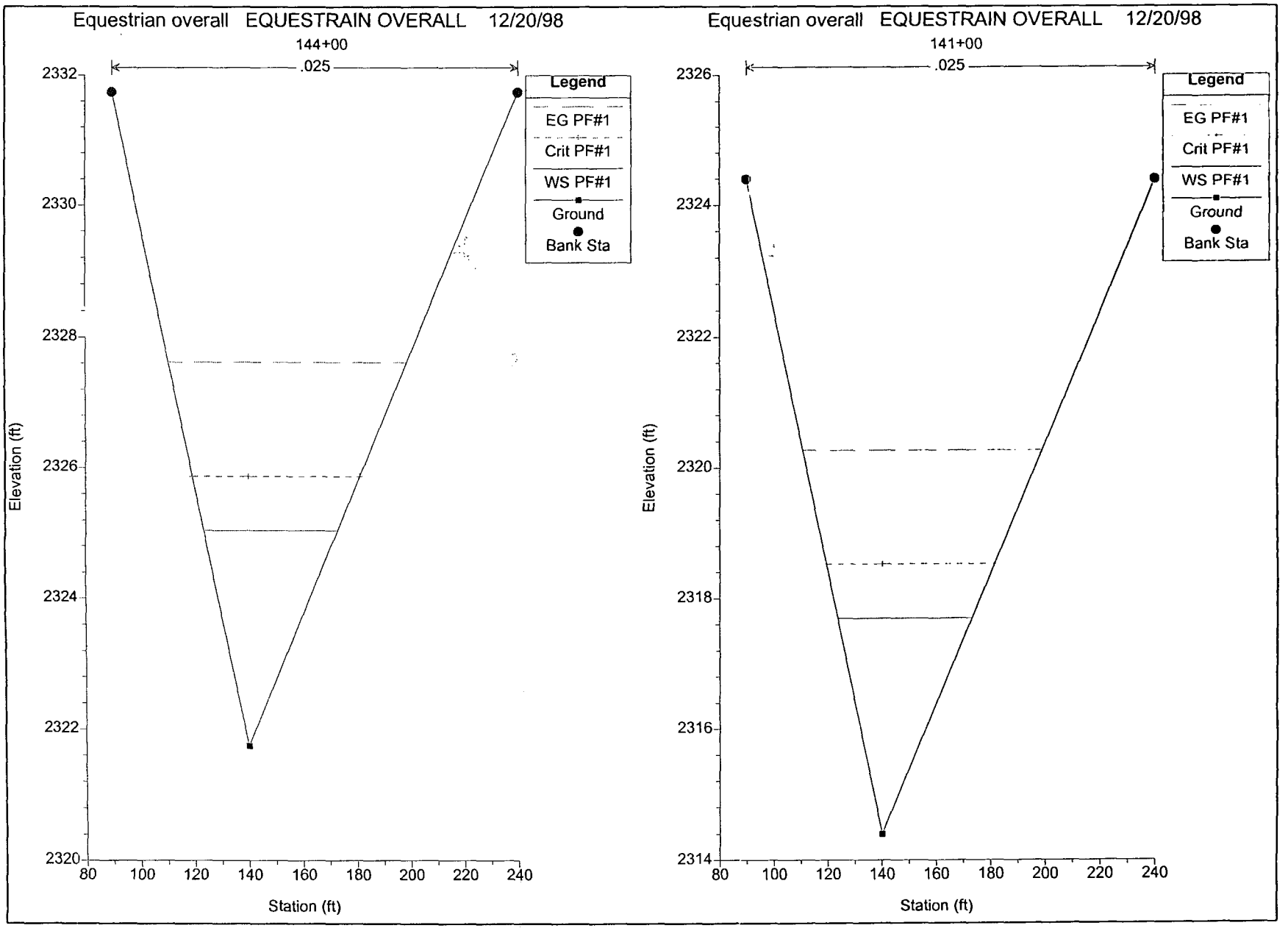
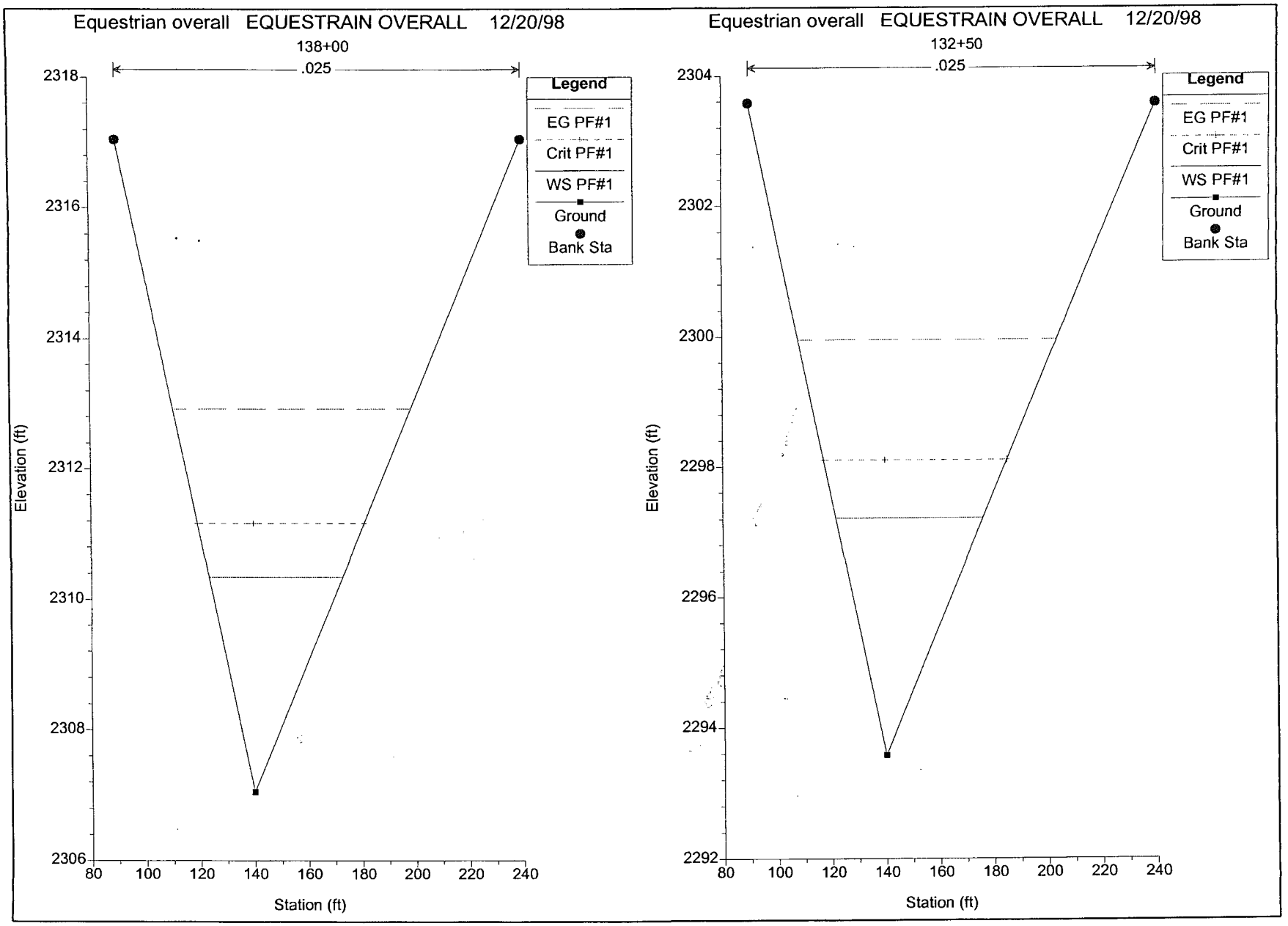
200
220
240


Equestrian overall EQUESTRAIN OVERALL 12/20/98
144+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2332
2330
2328
2326
2324
2322
2320
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRAIN OVERALL 12/20/98
141+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2326
2324
2322
2320
2318
2316
2314
80
100
120
140
160
180
200
220
240


Equestrian overall EQUESTRAIN OVERALL 12/20/98
138+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2318
2316
2314
2312
2310
2308
2306
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRAIN OVERALL 12/20/98
132+50
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2304
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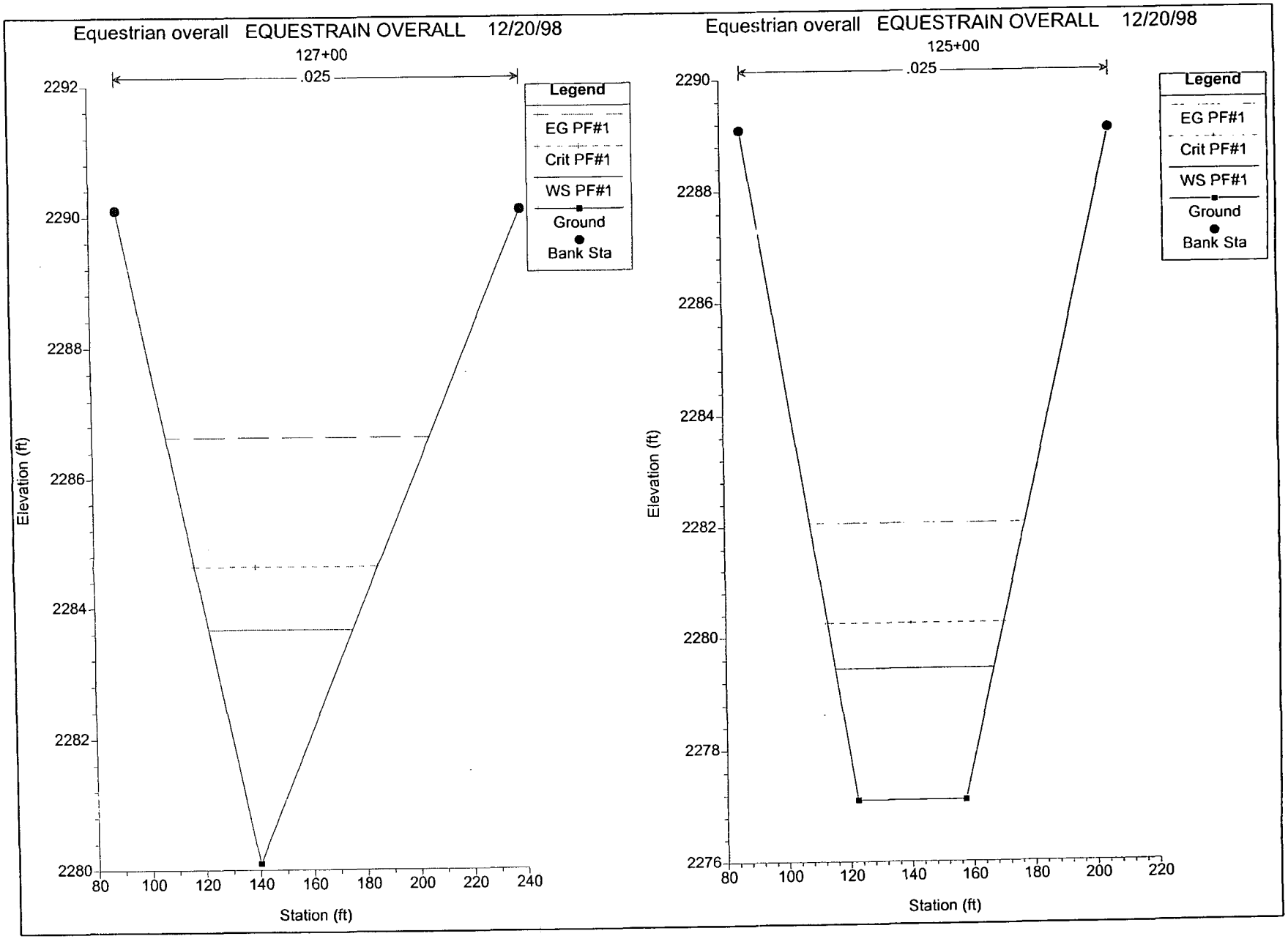
Equestrian overall EQUESTRAIN OVERALL 12/20/98
127+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2292
2290
2288
2286
2284
2282
2280
80
100
120
140
160
180
200
220
240
Equestrian overall EQUESTRAIN OVERALL 12/20/98
125+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2290
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2286
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200
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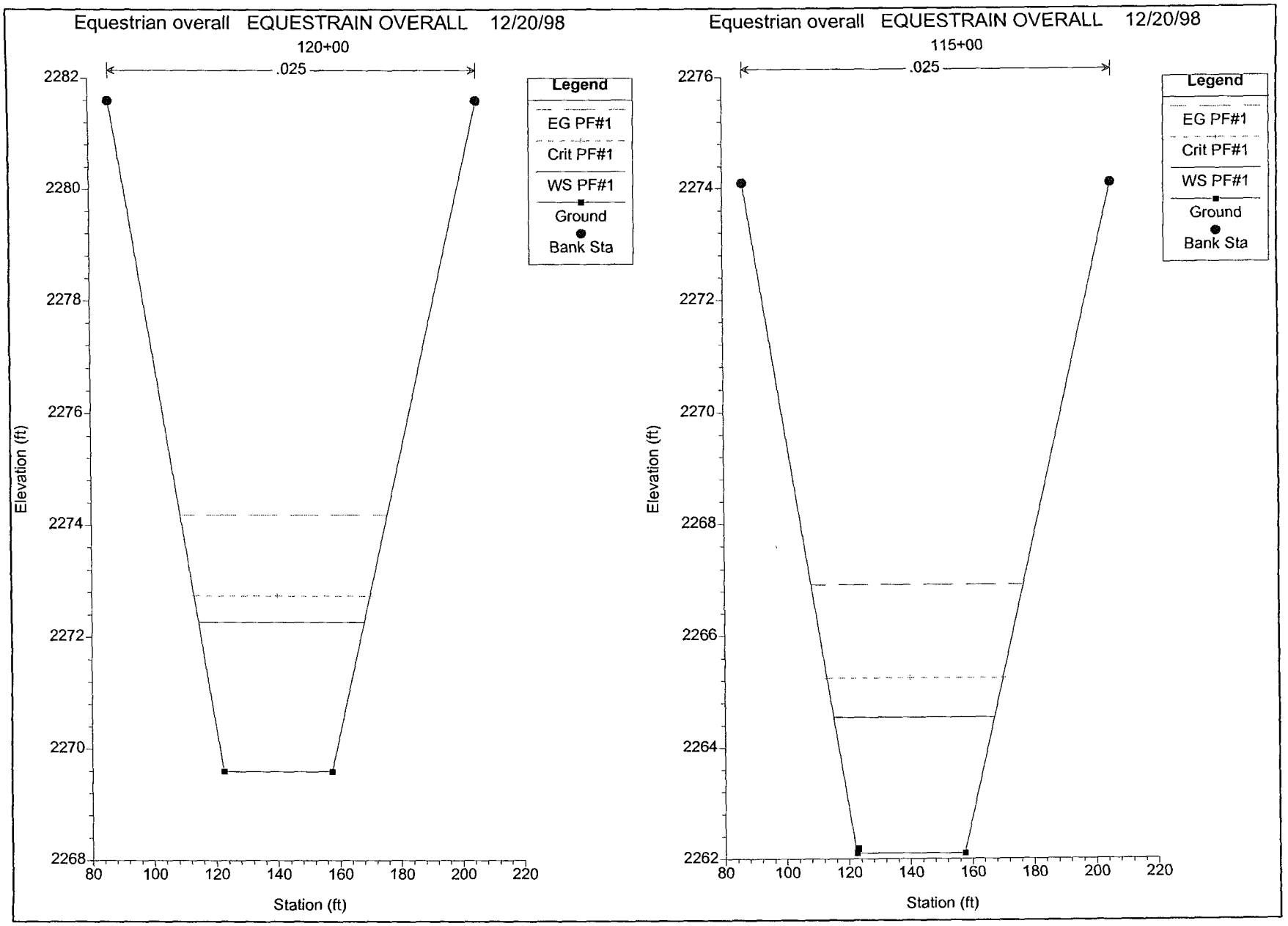
Equestrian overall EQUESTRAIN OVERALL 12/20/98
120+00
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Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2282
2280
2278
2276
2274
2272
2270
2268
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRAIN OVERALL 12/20/98
115+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2272
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2266
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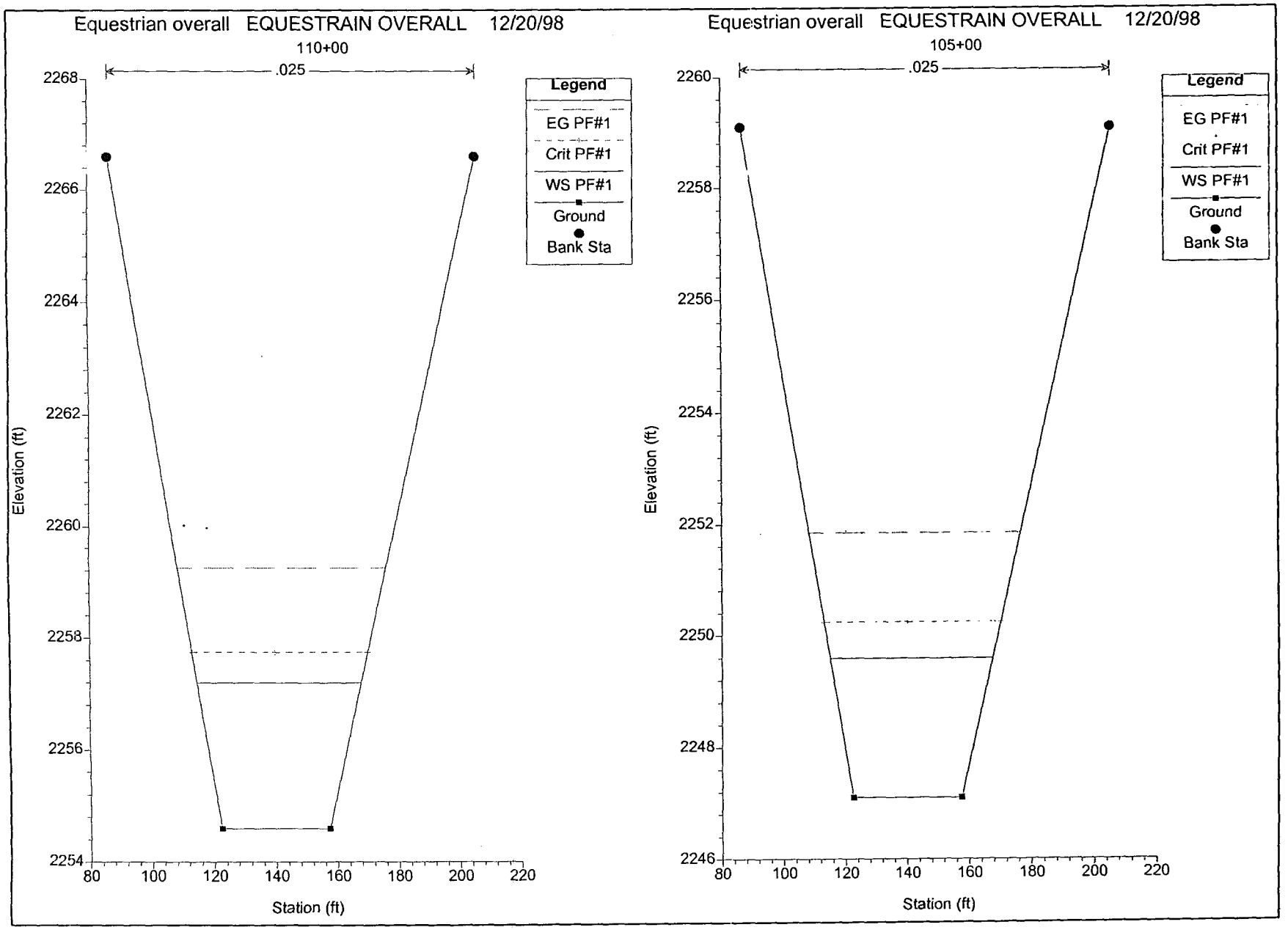
Equestrian overall EQUESTRAIN OVERALL 12/20/98
110+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2268
2266
2264
2262
2260
2258
2256
2254
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRAIN OVERALL 12/20/98
105+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2256
2254
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2248
2246
80
100
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200
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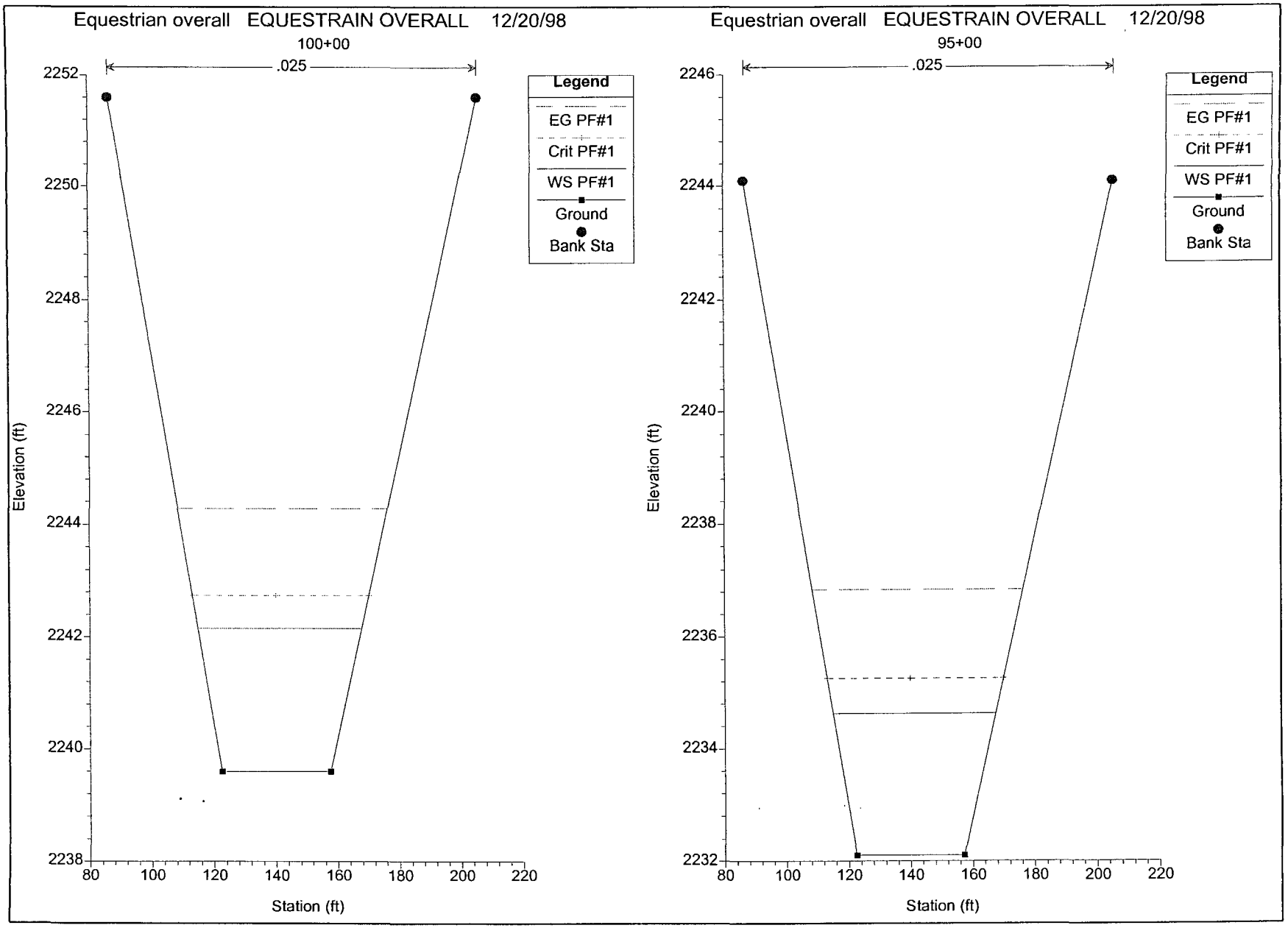
Equestrian overall EQUESTRAIN OVERALL 12/20/98
100+00
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EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2252
2250
2248
2246
2244
2242
2240
2238
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRAIN OVERALL 12/20/98
95+00
.025
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2242
2240
2238
2236
2234
2232
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200
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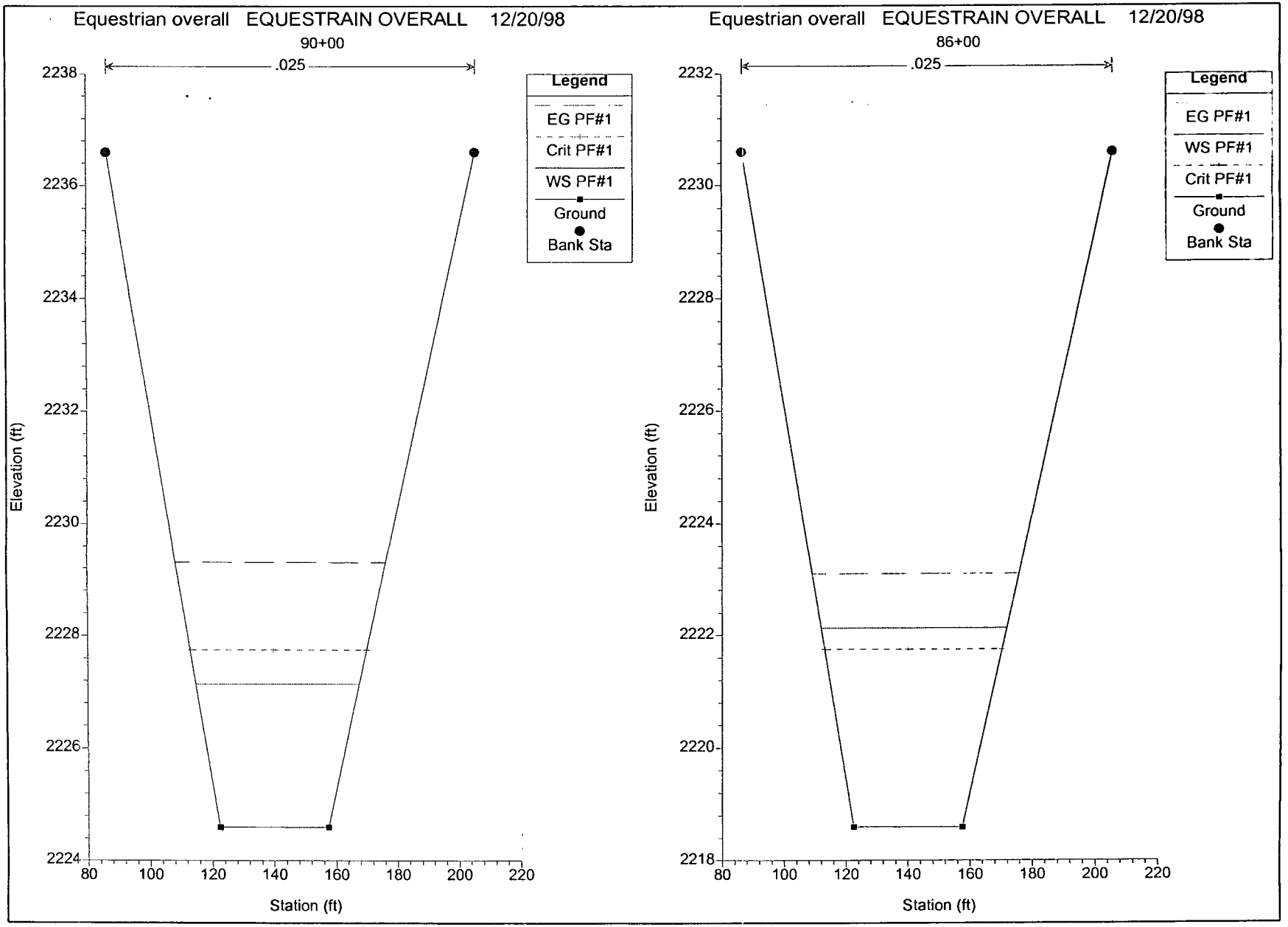
Equestrian overall EQUESTRAIN OVERALL 12/20/98
90+00
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EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2238
2236
2234
2232
2230
2228
2226
2224
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRAIN OVERALL 12/20/98
86+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2224
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2220
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200
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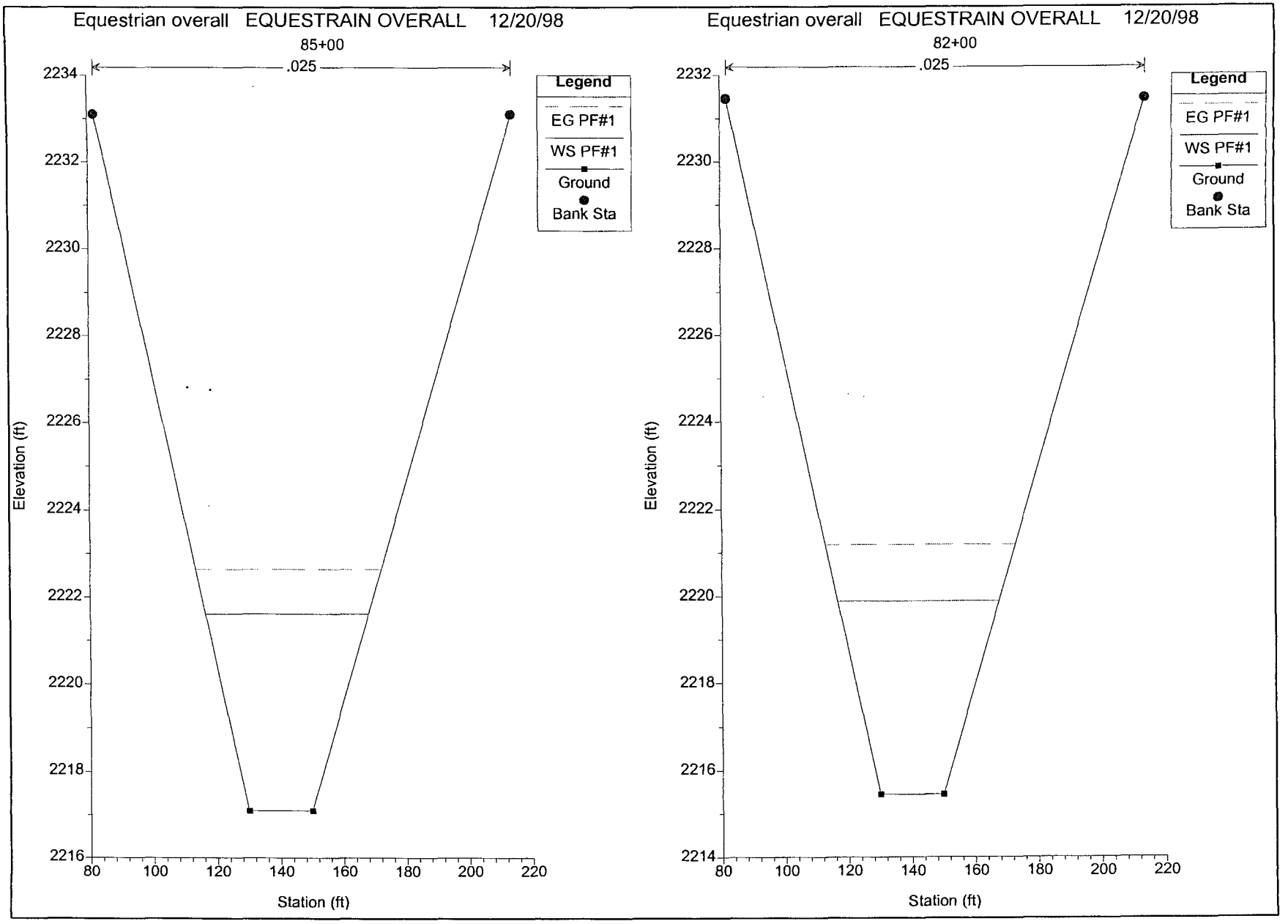
Equestrian overall EQUESTRAIN OVERALL 12/20/98
85+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2234
2232
2230
2228
2226
2224
2222
2220
2218
2216
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRAIN OVERALL 12/20/98
82+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2232
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200
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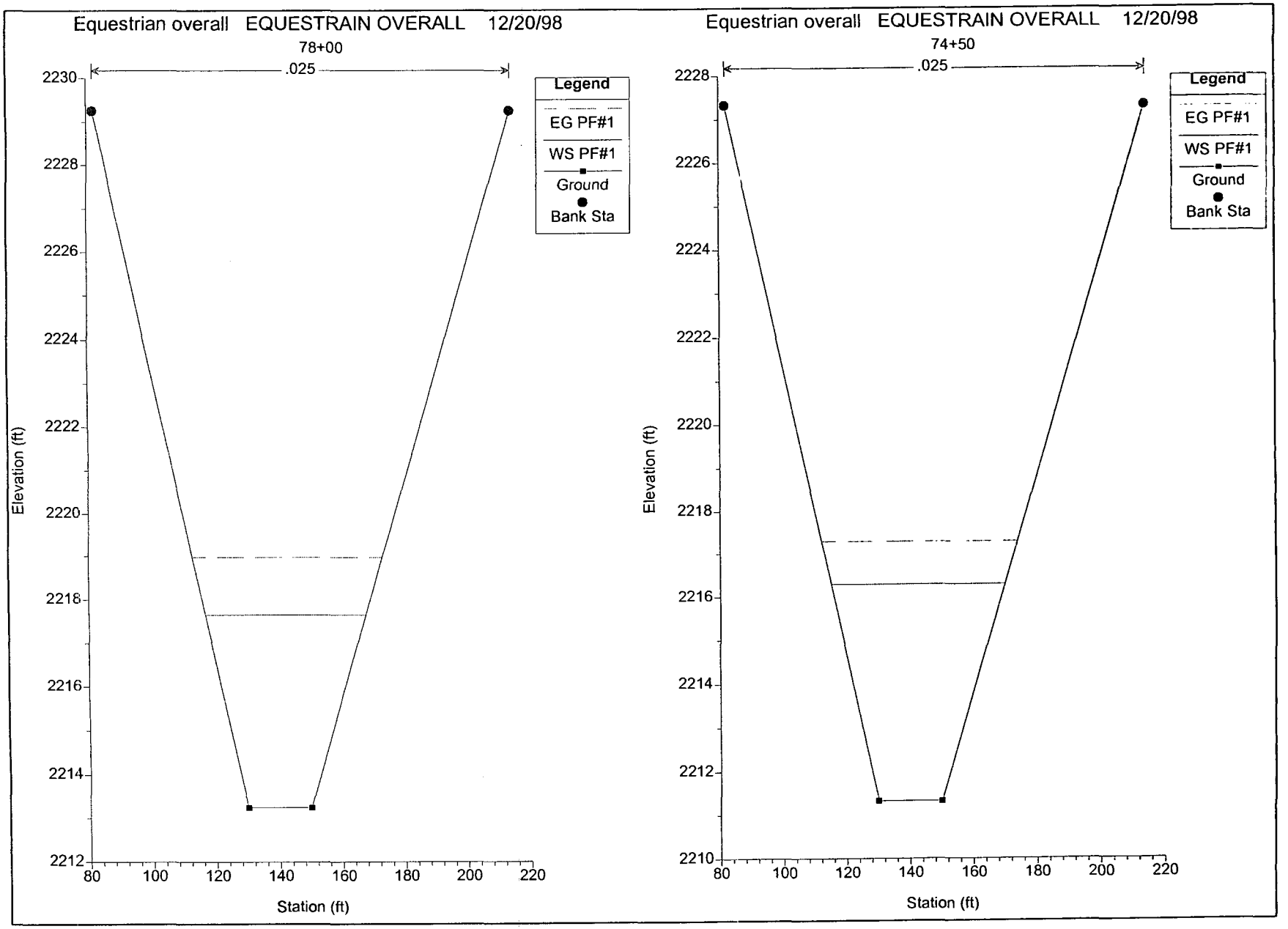
Equestrian overall EQUESTRAIN OVERALL 12/20/98
78+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2230
2228
2226
2224
2222
2220
2218
2216
2214
2212
80
100
120
140
160
180
200
220
Equestrian overall EQUESTRAIN OVERALL 12/20/98
74+50
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2228
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2220
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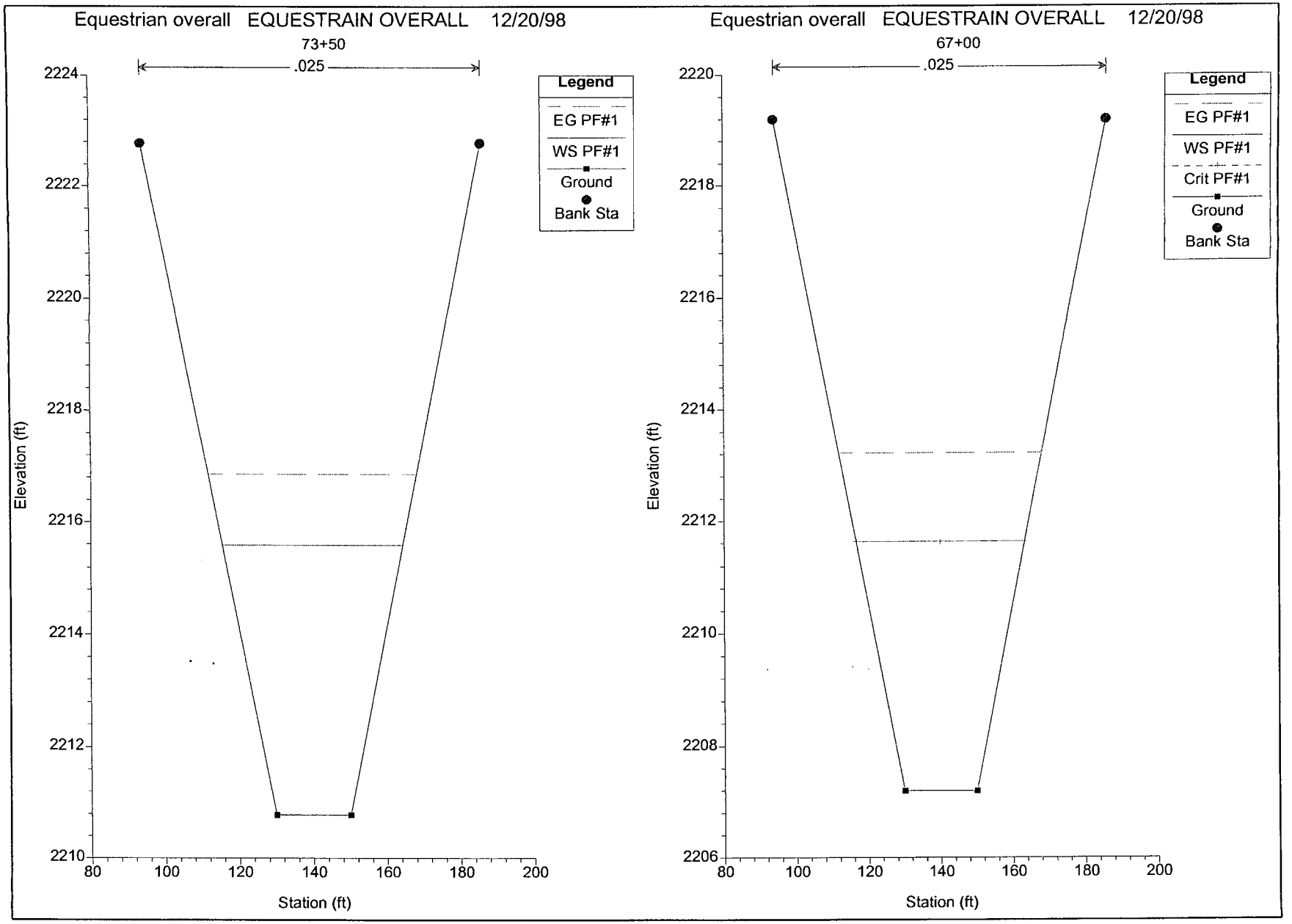
Equestrian overall EQUESTRAIN OVERALL 12/20/98
73+50
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2224
2222
2220
2218
2216
2214
2212
2210
80
100
120
140
160
180
200
Equestrian overall EQUESTRAIN OVERALL 12/20/98
67+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2212
2210
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2206
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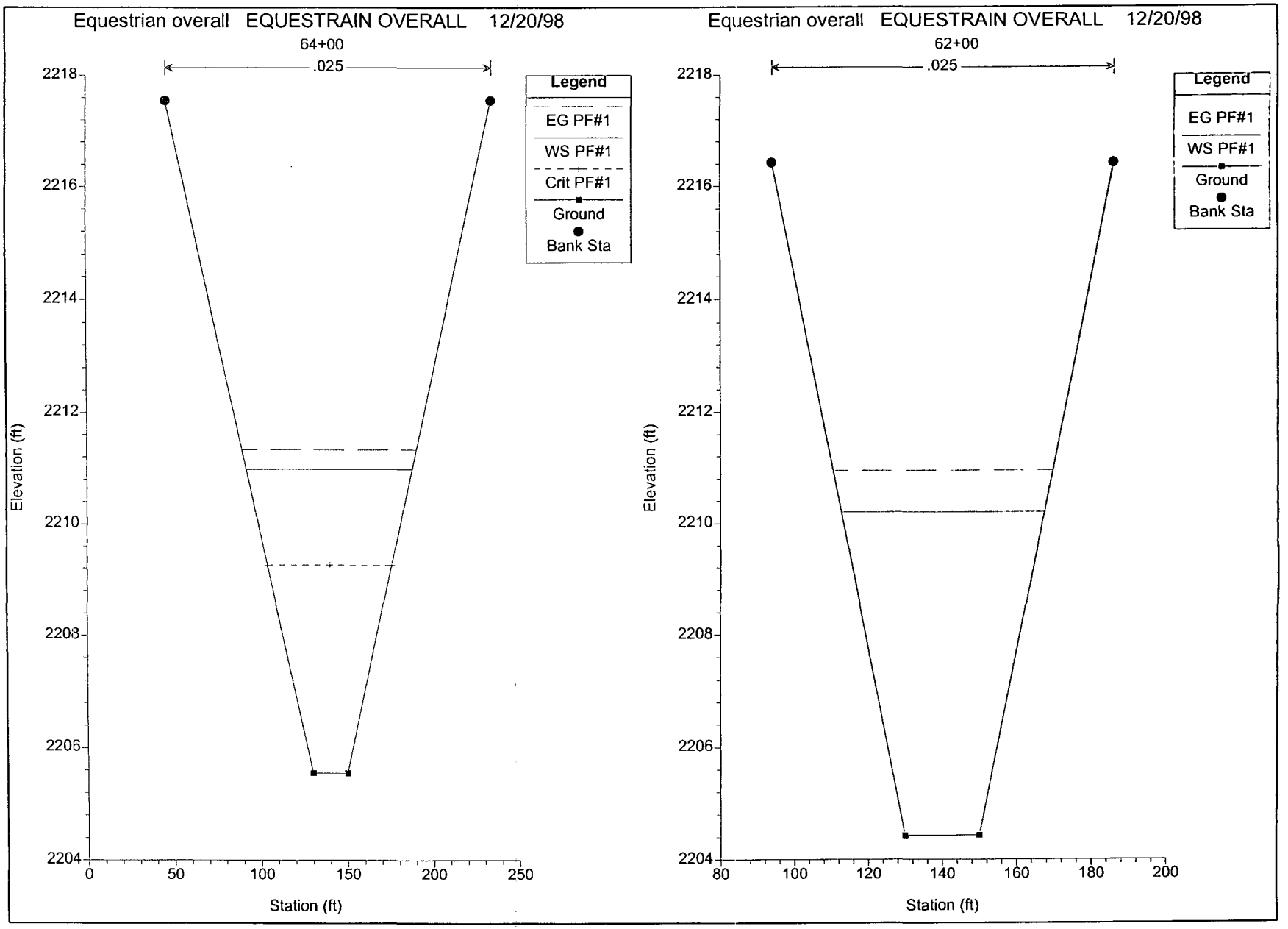
180
200


Equestrian overall EQUESTRAIN OVERALL 12/20/98
64+00
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2218
2216
2214
2212
2210
2208
2206
2204
0
50
100
150
200
250
Equestrian overall EQUESTRAIN OVERALL 12/20/98
62+00
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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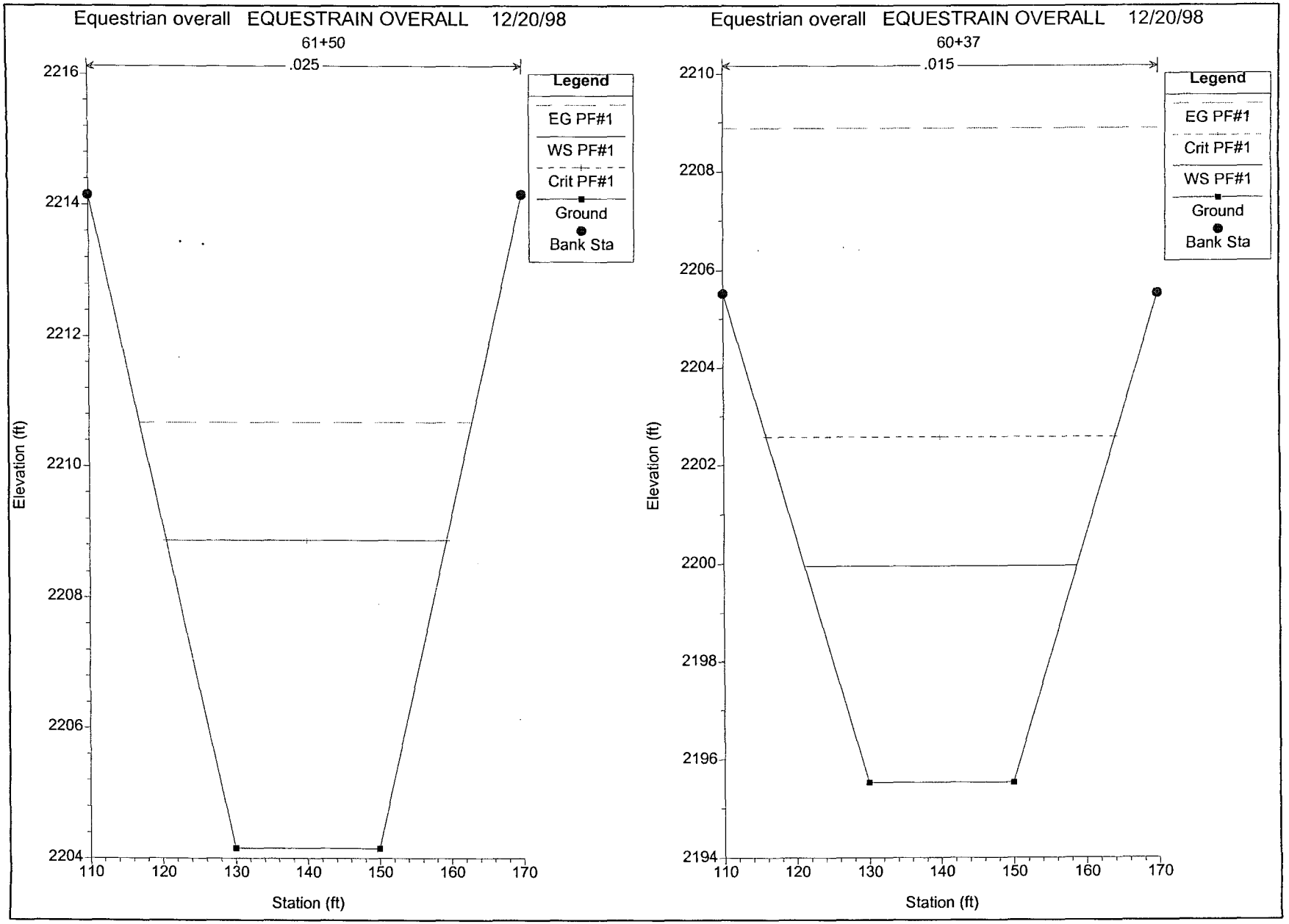
Equestrian overall EQUESTRAIN OVERALL 12/20/98
61+50
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Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2216
2214
2212
2210
2208
2206
2204
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
60+37
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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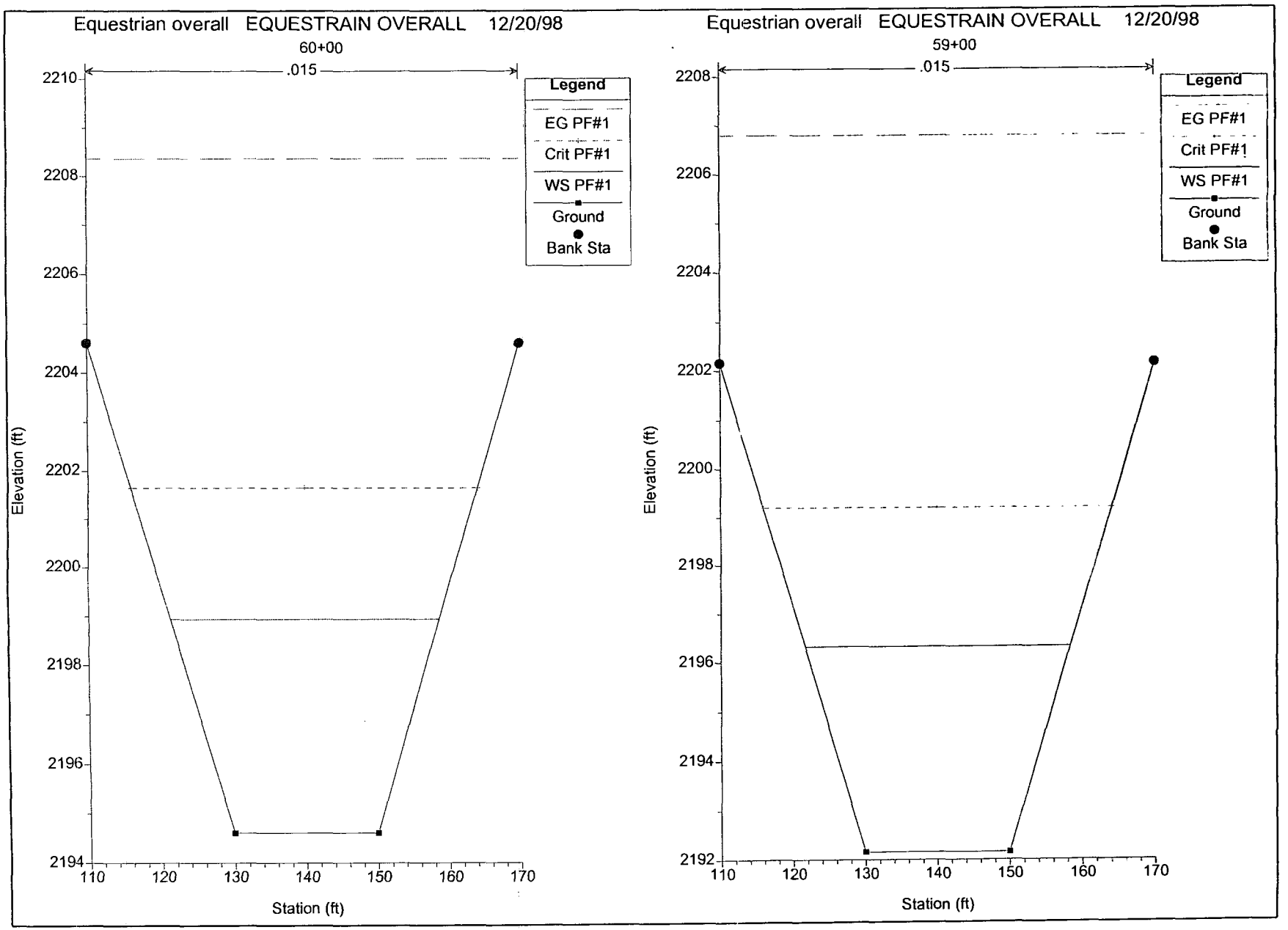
Equestrian overall EQUESTRAIN OVERALL 12/20/98
60+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2210
2208
2206
2204
2202
2200
2198
2196
2194
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
59+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2202
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160
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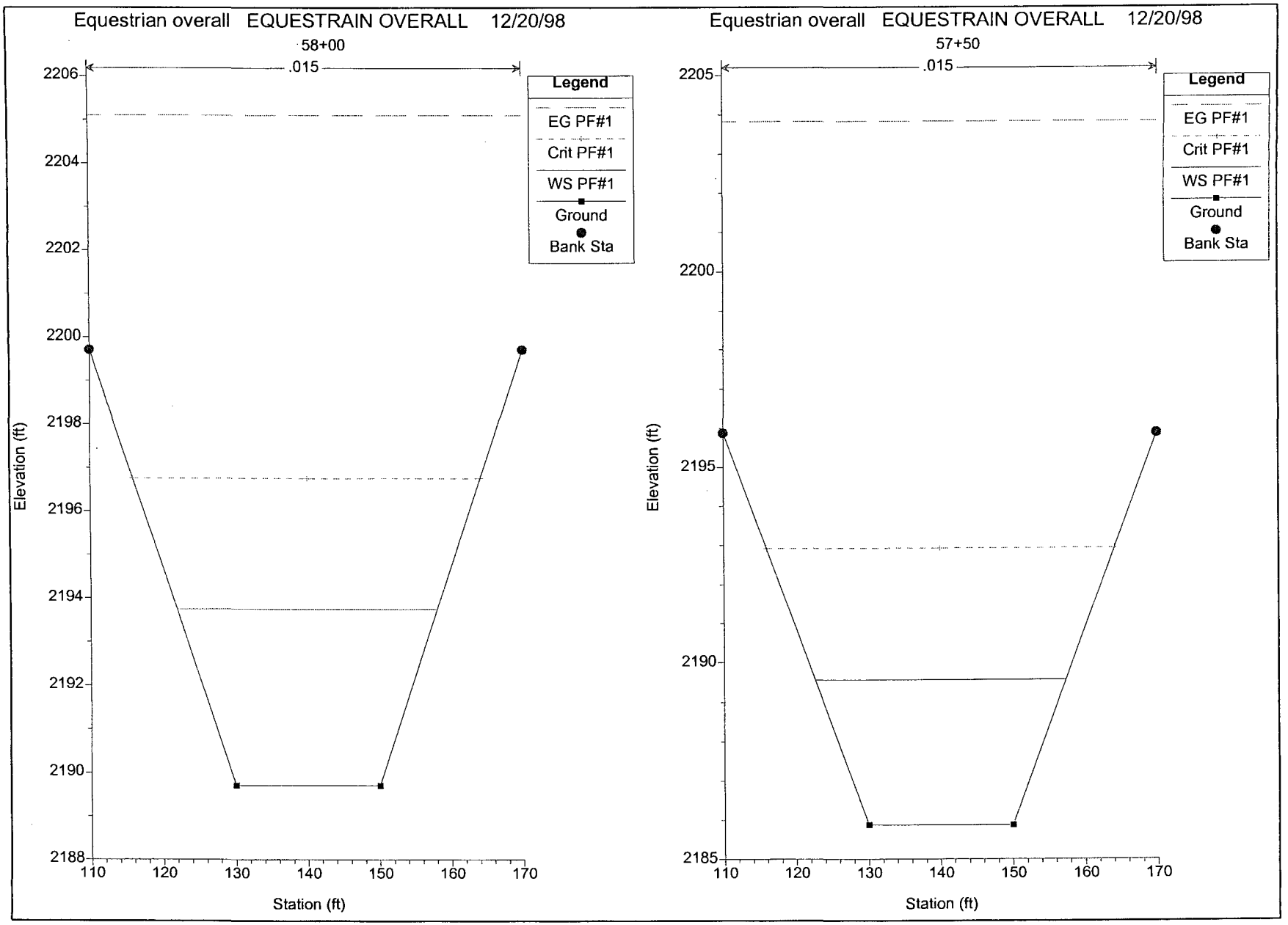
Equestrian overall EQUESTRAIN OVERALL 12/20/98
58+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2206
2204
2202
2200
2198
2196
2194
2192
2190
2188
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
57+50
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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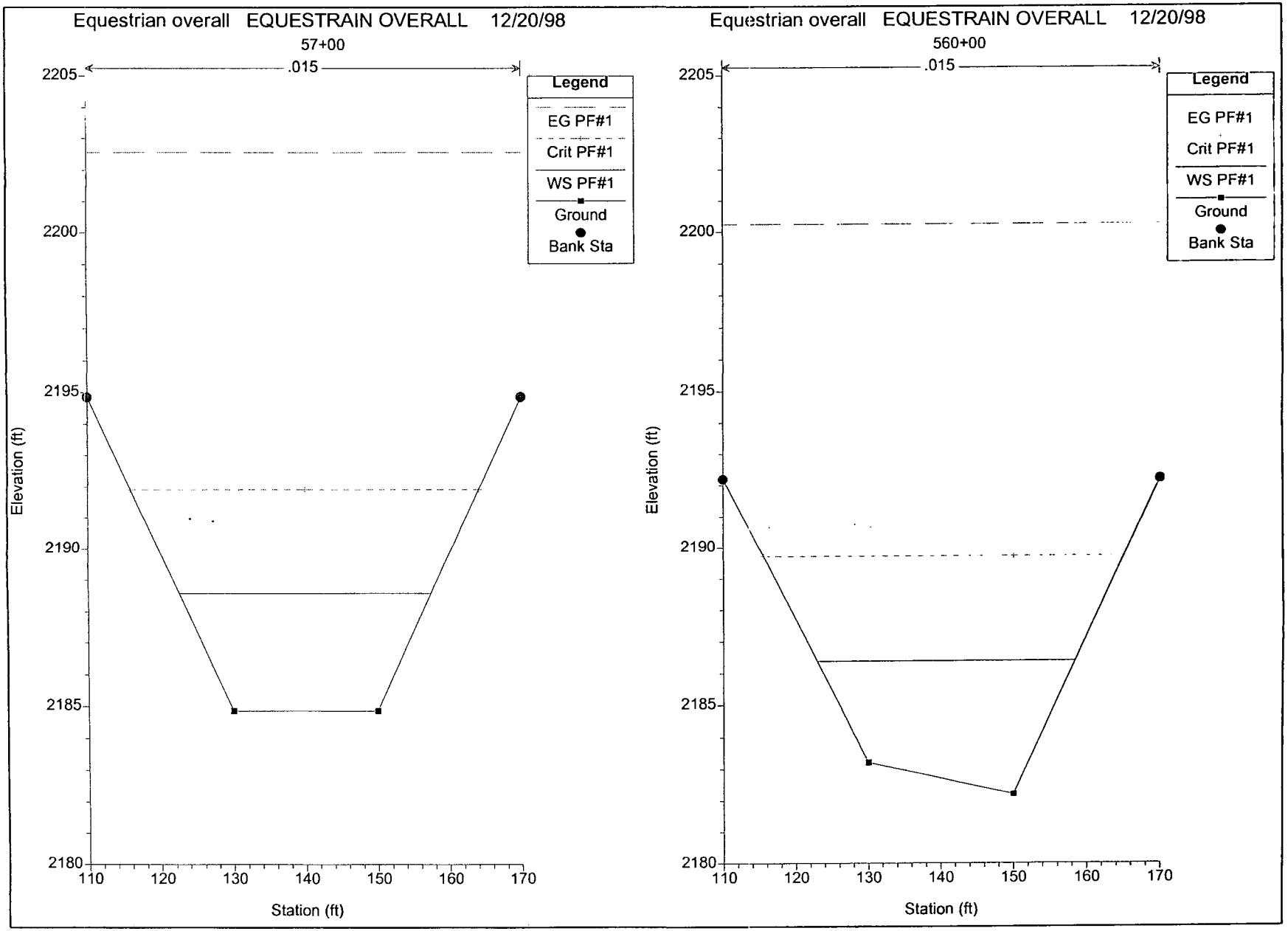
Equestrian overall EQUESTRAIN OVERALL 12/20/98
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Legend
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Crit PF#1
WS PF#1
Ground
Bank Sta
2205
2200
2195
2190
2185
2180
Elevation (ft)
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120
130
140
150
160
170
Station (ft)
Equestrian overall EQUESTRAIN OVERALL 12/20/98
560+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
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Elevation (ft)
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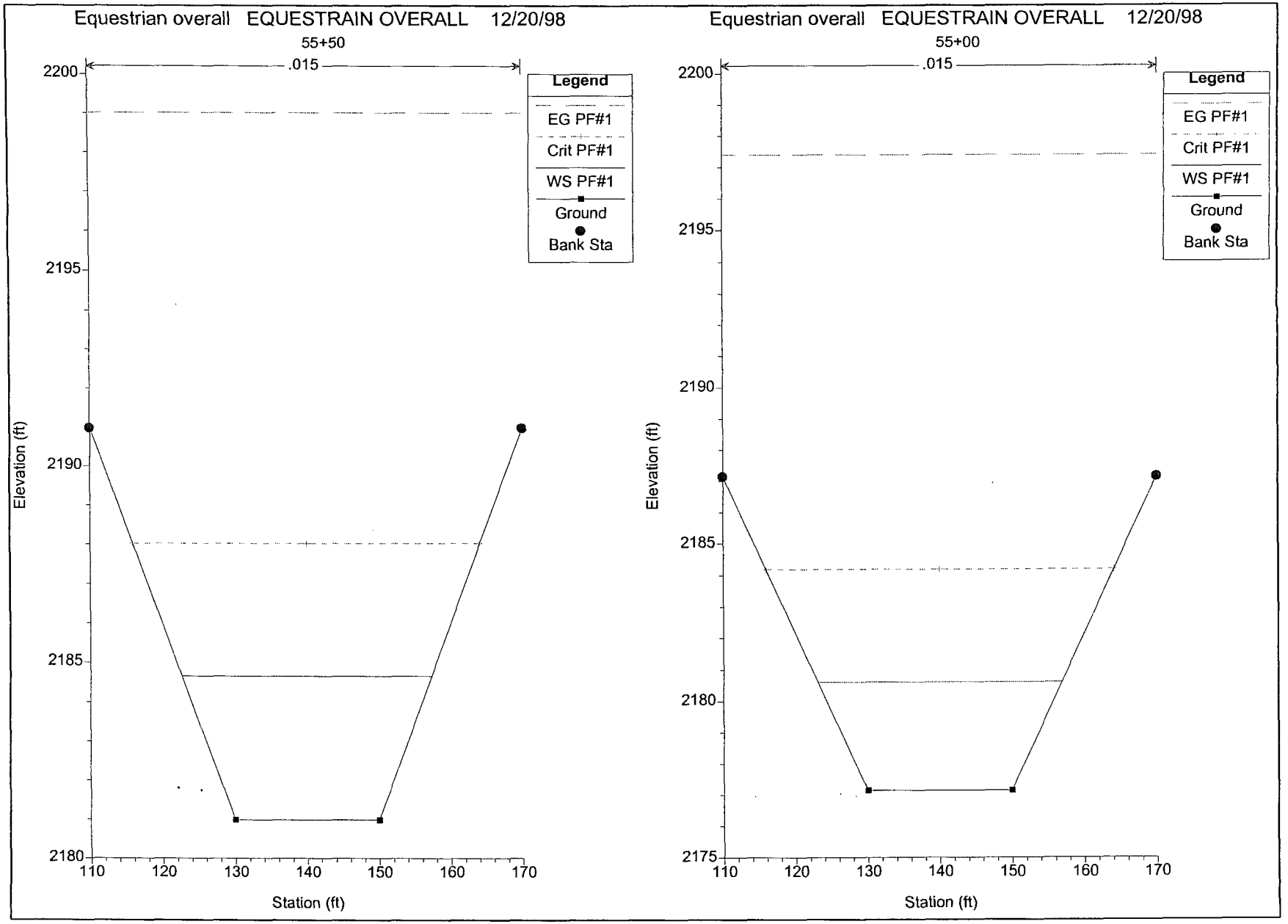
Station (ft)


Equestrian overall EQUESTRAIN OVERALL 12/20/98
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.015
Legend
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Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2200
2195
2190
2185
2180
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
55+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2200
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2190
2185
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2175
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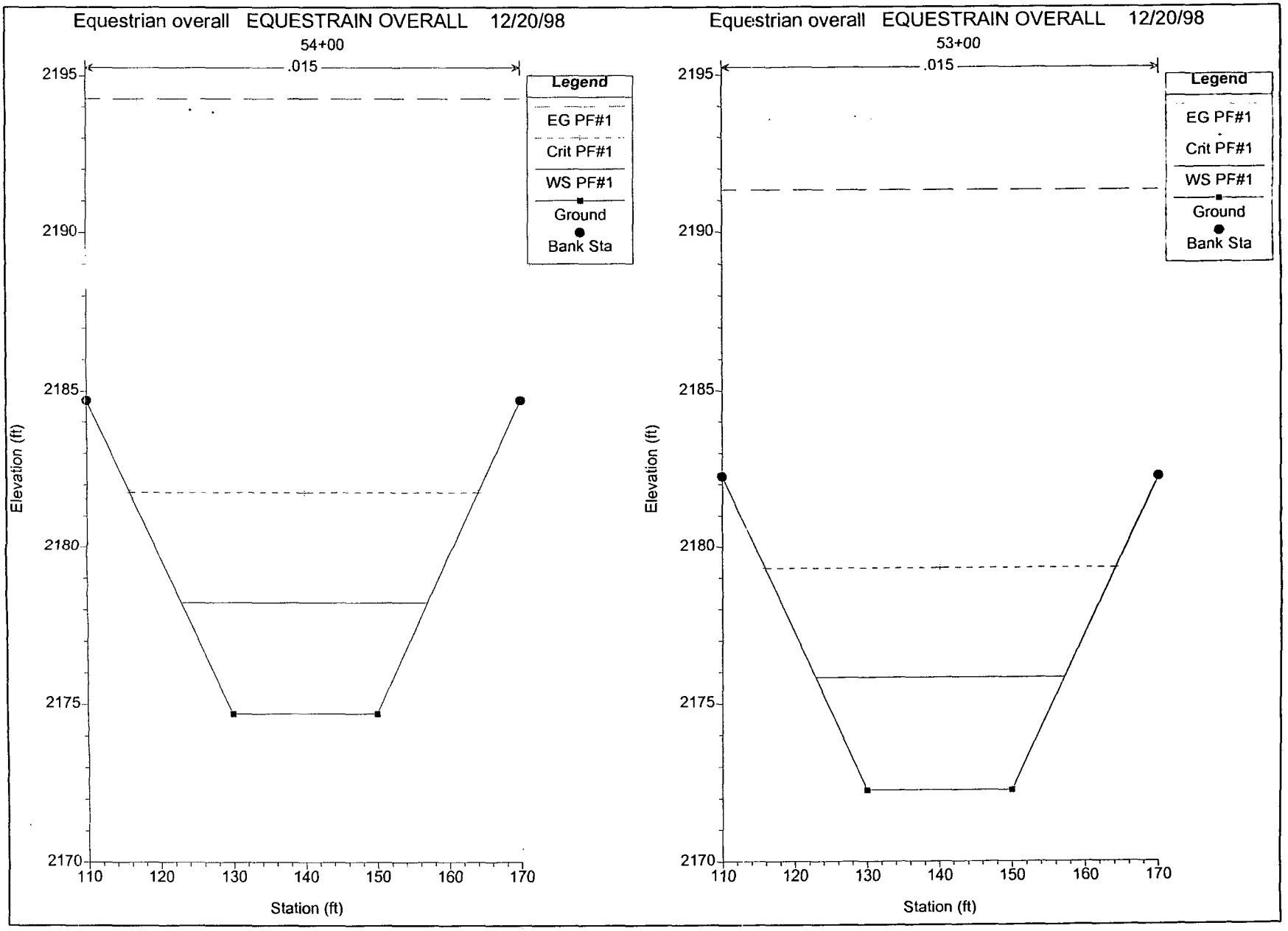
Equestrian overall EQUESTRAIN OVERALL 12/20/98
54+00
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Legend
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Crit PF#1
WS PF#1
Ground
Bank Sta
2195
2190
2185
2180
2175
2170
Elevation (ft)
110
120
130
140
150
160
170
Station (ft)
Equestrian overall EQUESTRAIN OVERALL 12/20/98
53+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
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2175
2170
Elevation (ft)
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120
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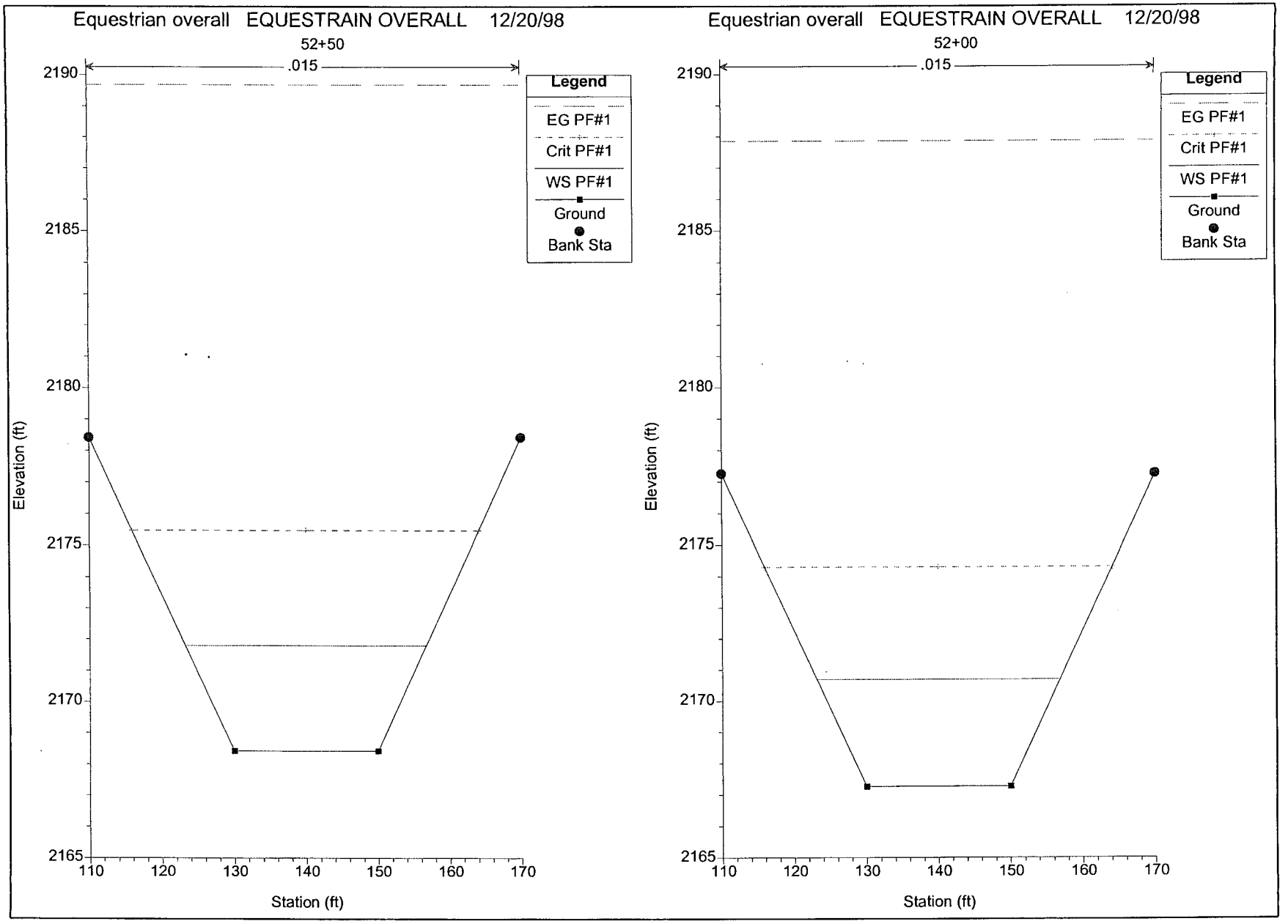
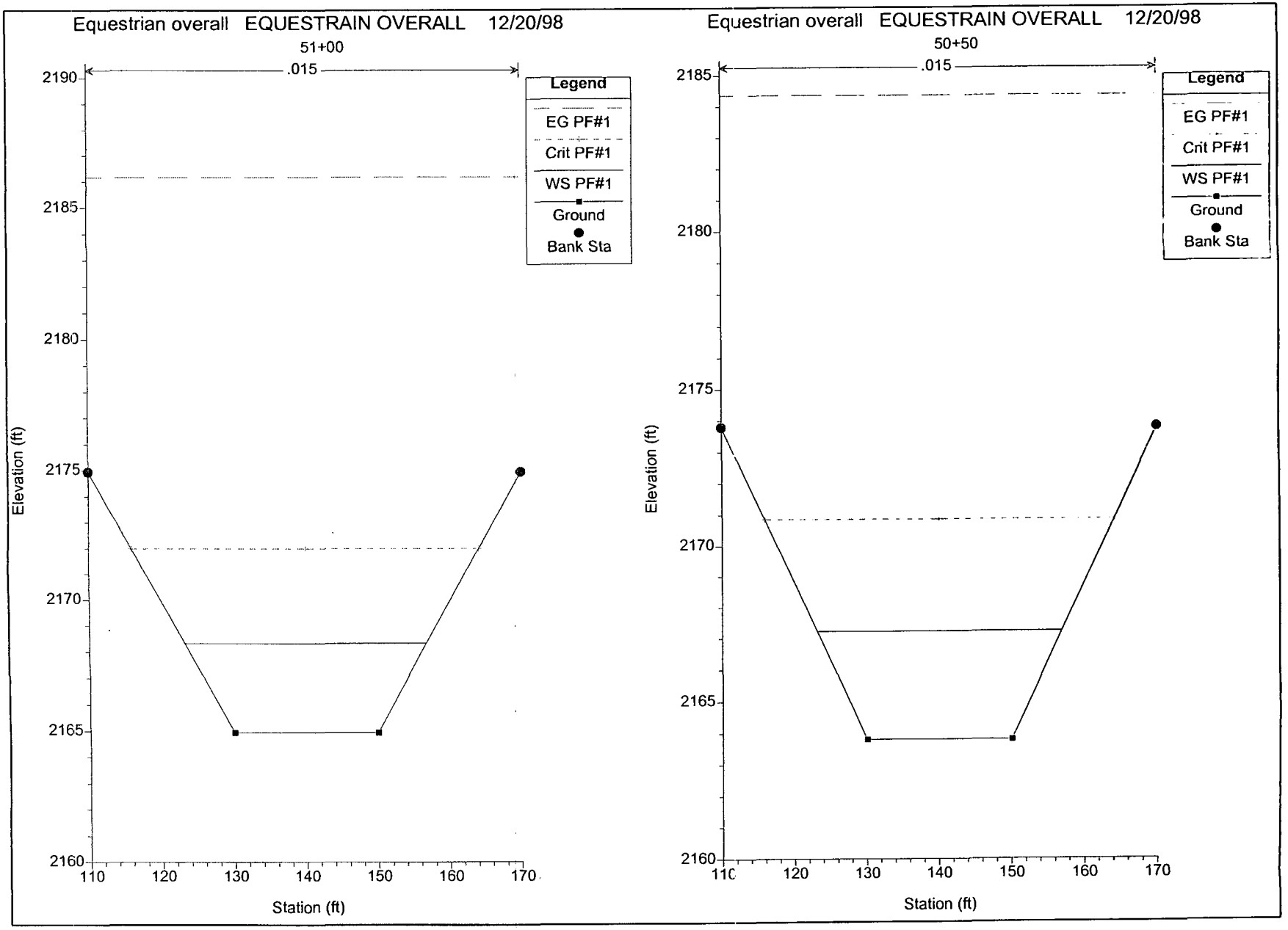
170
Station (ft)


Equestrian overall EQUESTRAIN OVERALL 12/20/98
52+50
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2190
2185
2180
2175
2170
2165
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
52+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)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51+00
.015
Legend
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WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2190
2185
2180
2175
2170
2165
2160
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
50+50
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2175
2170
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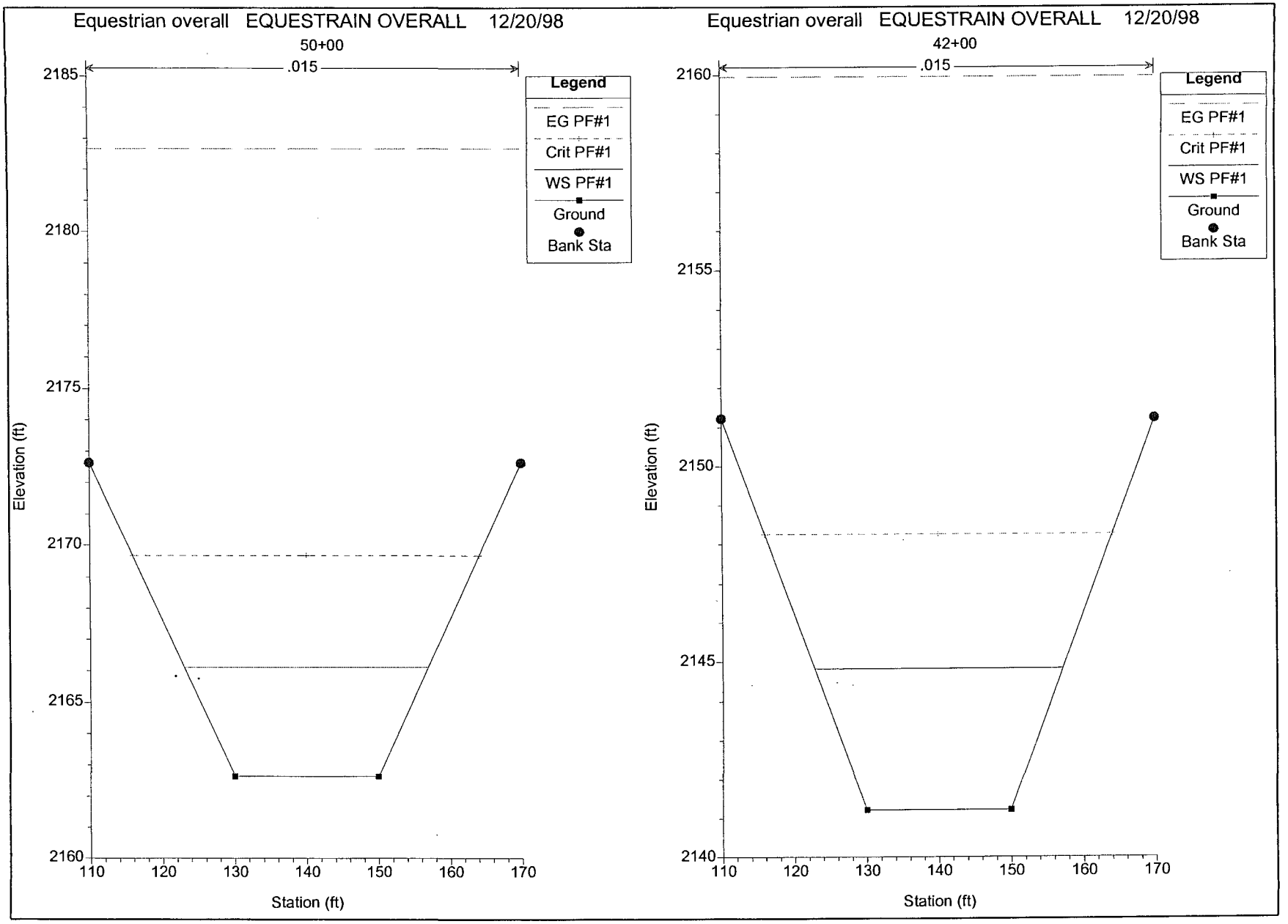
Equestrian overall EQUESTRAIN OVERALL 12/20/98
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Legend
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Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2185
2180
2175
2170
2165
2160
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
42+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
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Station (ft)
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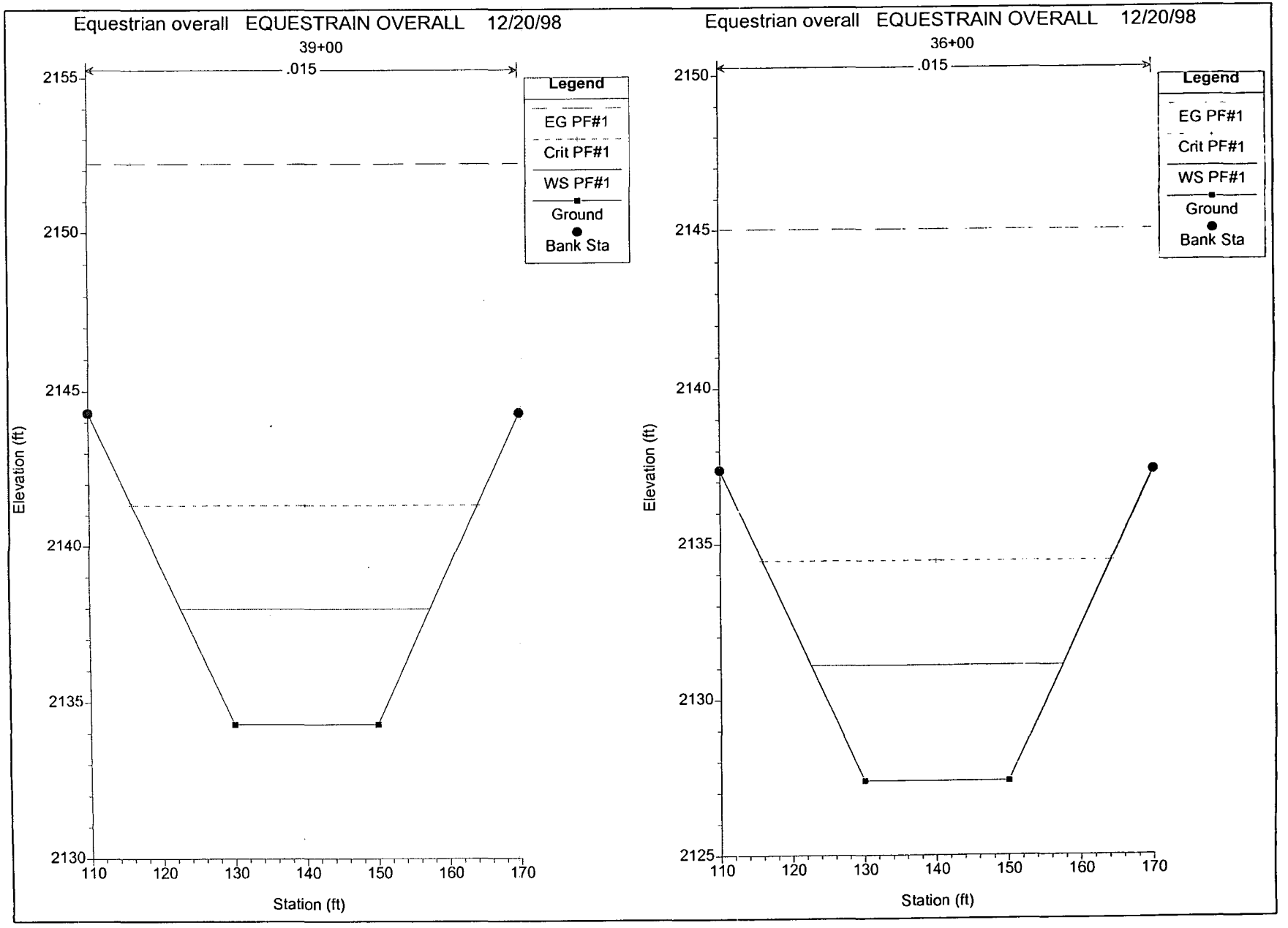
Equestrian overall EQUESTRAIN OVERALL 12/20/98
39+00
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Legend
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Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2155
2150
2145
2140
2135
2130
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
36+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
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Station (ft)
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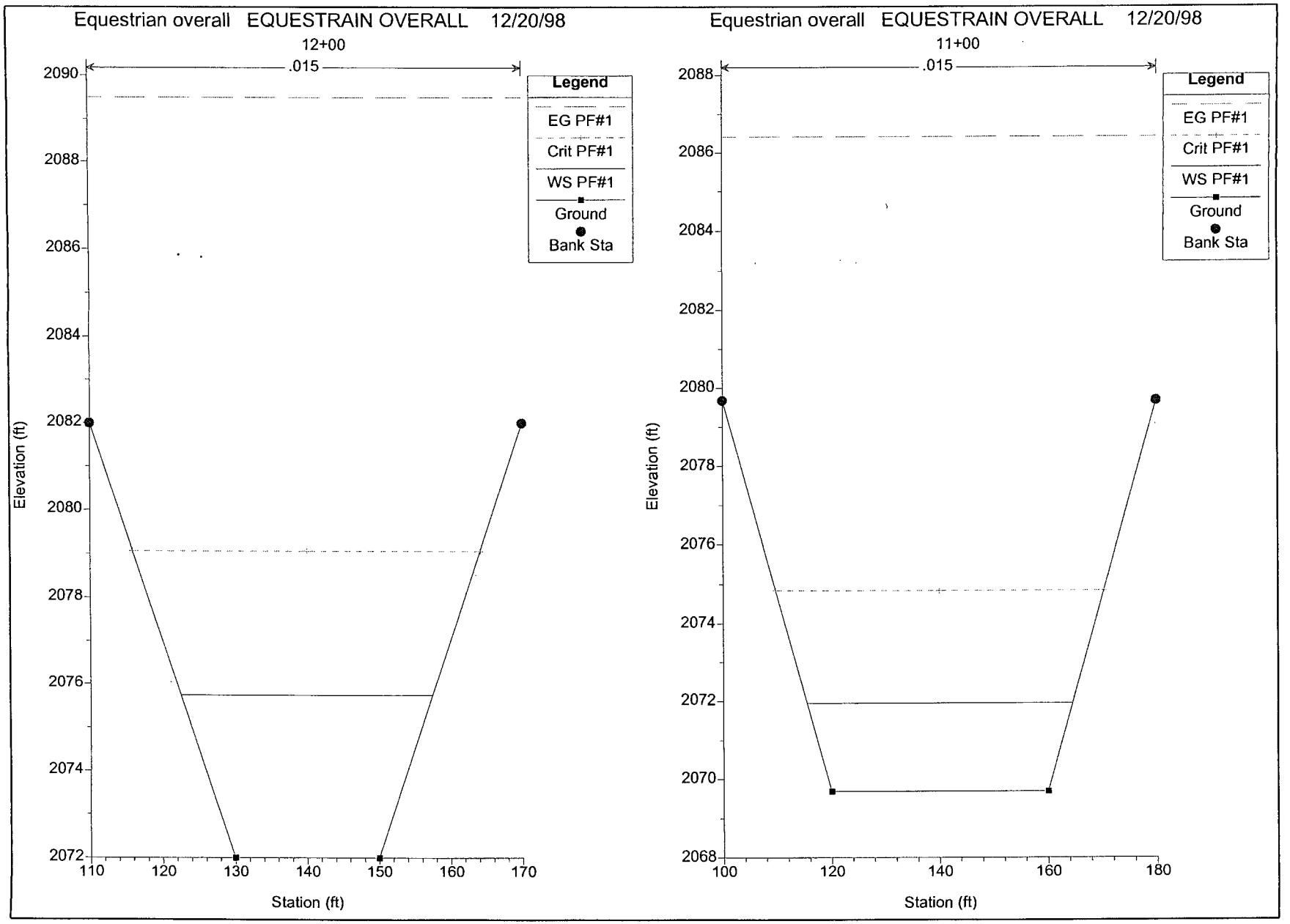
Equestrian overall EQUESTRAIN OVERALL 12/20/98
12+00
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Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2090
2088
2086
2084
2082
2080
2078
2076
2074
2072
110
120
130
140
150
160
170
Equestrian overall EQUESTRAIN OVERALL 12/20/98
11+00
.015
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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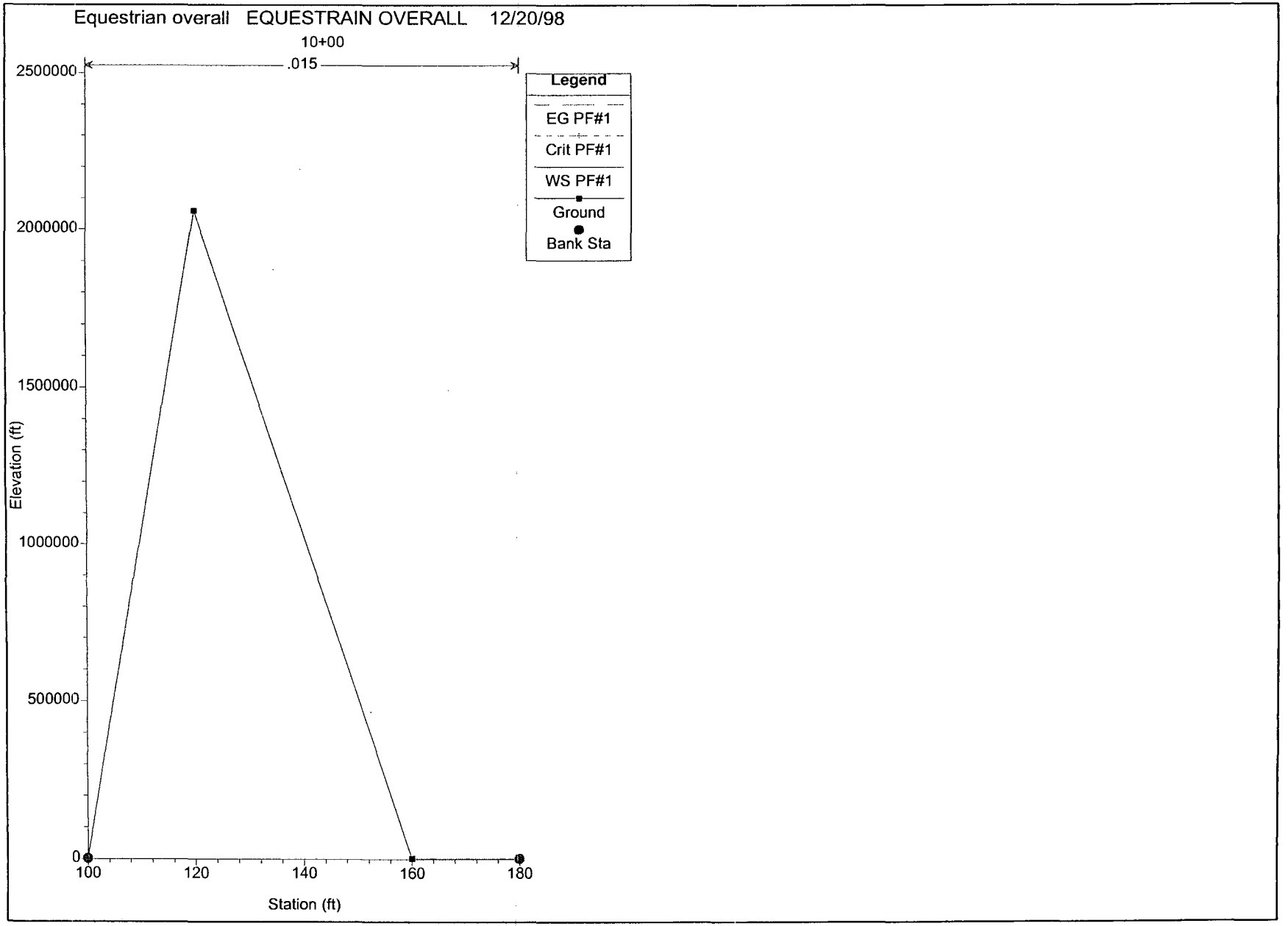
Equestrian overall EQUESTRAIN OVERALL 12/20/98
10+00
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Legend
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Ground
Bank Sta
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1500000
1000000
500000
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Elevation (ft)
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120
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160
180
Station (ft)

HEC-RAS Version 2.1 October 1997
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Equestrian overall
Project File : eqcoall.prj
Run Date and Time: 12/20/98 3:13:58 PM

Project in English units

Project Description:
Overall HecRas evaluations

FLOW DATA

Flow Title: ESQUESTRAIN CHANNEL 2
Flow File : j:\1002005\lomr\eqcoall.f01

Flow Data (cfs)

River	Reach	RS	PF#1
REACH 1	REACH 1	16700	189
REACH 1	REACH 1	16150	915
REACH 1	REACH 1	15000	1046
REACH 1	REACH 1	13250	1315
REACH 1	REACH 1	8200	1438
REACH 1	REACH 1	7450	1494
REACH 1	REACH 1	6037	3058

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
REACH 1	REACH 1	PF#1	Critical	Critical

GEOMETRY DATA

Geometry Title: EQUESTRAIN OVERALL
Geometry File : j:\1002005\lomr\eqcoall.g02

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16700

INPUT
Description: 167+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
124	2382.1	140	2378.1	220	2382.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
124	.025	124	.025	220	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
124	220	150	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2379.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.025	
E.G. Elev (ft)	2380.26	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2379.82	Flow Area (sq ft)		35.58	
E.G. Slope (ft/ft)	0.009832	Area (sq ft)		35.58	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	41.33	Top Width (ft)		41.33	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	1906.1	Conv. (cfs)		1906.1	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		41.58	
Min Ch El (ft)	2378.10	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.79	
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)		40.24	
C & E Loss (ft)	0.00	Cum SA (acres)		16.88	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16600

INPUT
Description: 166+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev

116	2381.65	140	2375.65	260	2381.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
116	.025	116	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116	260	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2377.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.025	
E.G. Elev (ft)	2377.98	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2377.37	Flow Area (sq ft)		24.97	
E.G. Slope (ft/ft)	0.025268	Area (sq ft)		24.97	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	34.62	Top Width (ft)		34.62	
Vel Total (ft/s)	7.57	Avg. Vel. (ft/s)		7.57	
Max Chl Dpth (ft)	1.44	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	1189.0	Conv. (cfs)		1189.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		34.84	
Min Ch El (ft)	2375.65	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)		8.56	
Frctn Loss (ft)	2.24	Cum Volume (acre-ft)		40.14	
C & E Loss (ft)	0.04	Cum SA (acres)		16.75	

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16550

INPUT
Description: 165+50
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
116	2380.43	140	2374.43	260	2380.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
116	.025	116	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116	260	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2375.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.025	
E.G. Elev (ft)	2376.75	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2376.15	Flow Area (sq ft)		25.33	
E.G. Slope (ft/ft)	0.024331	Area (sq ft)		25.33	
Q Total (cfs)	189.00	Flow (cfs)		189.00	

Top Width (ft)	34.87	Top Width (ft)	34.87
Vel Total (ft/s)	7.46	Avg. Vel. (ft/s)	7.46
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)	0.73
Conv. Total (cfs)	1211.7	Conv. (cfs)	1211.7
Length Wtd. (ft)	50.00	Wetted Per. (ft)	35.08
Min Ch El (ft)	2374.43	Shear (lb/sq ft)	1.10
Alpha	1.00	Stream Power (lb/ft s)	8.18
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)	40.11
C & E Loss (ft)	0.01	Cum SA (acres)	16.71

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16500

INPUT
Description: 165+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
116	2379.2	140	2373.2	260	2379.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
116	.025	116	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116	260	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2374.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.025	
E.G. Elev (ft)	2375.53	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2374.92	Flow Area (sq ft)		25.01	
E.G. Slope (ft/ft)	0.025177	Area (sq ft)		25.01	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	34.65	Top Width (ft)		34.65	
Vel Total (ft/s)	7.56	Avg. Vel. (ft/s)		7.56	
Max Chl Dpth (ft)	1.44	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	1191.1	Conv. (cfs)		1191.1	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		34.86	
Min Ch El (ft)	2373.20	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)		8.52	
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)		40.08	
C & E Loss (ft)	0.00	Cum SA (acres)		16.67	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16400

INPUT
Description: 164+00

Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
11[redacted]	2376.75	140	2370.75	260	2376.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.025	110	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	260	100	100	100 .1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2372.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0.025	
E.G. Elev (ft)	2373.05	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2372.44	Flow Area (sq ft)		25.09	
E.G. Slope (ft/ft)	0.025606	Area (sq ft)		25.09	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	35.42	Top Width (ft)		35.42	
Vel Total (ft/s)	7.53	Avg. Vel. (ft/s)		7.53	
Max Chl Dpth (ft)	1.42	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	1181.1	Conv. (cfs)		1181.1	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		35.59	
Min Ch El (ft)	2370.75	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)		8.49	
Frctn Loss (ft)	2.50	Cum Volume (acre-ft)		40.02	
C & E Loss (ft)	0.01	Cum SA (acres)		16.59	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16300

INPUT
Description: 163+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
110	2374.3	140	2368.3	260	2374.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.025	110	.025	260	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	260	100	100	100 .1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2369.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.025	
E.G. Elev (ft)	2370.58	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2369.99	Flow Area (sq ft)		25.52	
E.G. Slope (ft/ft)	0.024483	Area (sq ft)		25.52	
Q Total (cfs)	189.00	Flow (cfs)		189.00	

Top Width (ft)	35.72	Top Width (ft)	35.72
Vel Total (ft/s)	7.41	Avg. Vel. (ft/s)	7.41
Max Chl Dpth (ft)	1.43	Hydr. Depth (ft)	0.71
Conv. Total (cfs)	1207.9	Conv. (cfs)	1207.9
Length Wtd. (ft)	100.00	Wetted Per. (ft)	35.89
Min Ch El (ft)	2368.30	Shear (lb/sq ft)	1.09
Alpha	1.00	Stream Power (lb/ft s)	8.05
Frctn Loss (ft)	2.47	Cum Volume (acre-ft)	39.96
C & E Loss (ft)	0.01	Cum SA (acres)	16.51

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16200

INPUT
Description: 162+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
105	2372.85	140	2365.85	280	2372.85

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
105	.025	105	.025	280	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
105	280	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2369.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.025	
E.G. Elev (ft)	2369.71	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2367.54	Flow Area (sq ft)		184.45	
E.G. Slope (ft/ft)	0.000125	Area (sq ft)		184.45	
Q Total (cfs)	189.00	Flow (cfs)		189.00	
Top Width (ft)	96.03	Top Width (ft)		96.03	
Vel Total (ft/s)	1.02	Avg. Vel. (ft/s)		1.02	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		1.92	
Conv. Total (cfs)	16883.3	Conv. (cfs)		16883.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		96.51	
Min Ch El (ft)	2365.85	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)		0.02	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		39.72	
C & E Loss (ft)	0.10	Cum SA (acres)		16.36	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note - Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16150

INPUT
Description: 161+50
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
95	2373.63	140	2364.63	230	2373.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
95	.025	95	.025	230	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95	230	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2368.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.025	
E.G. Elev (ft)	2369.53	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2368.53	Flow Area (sq ft)		114.31	
E.G. Slope (ft/ft)	0.007533	Area (sq ft)		114.31	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	58.56	Top Width (ft)		58.56	
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)		8.00	
Max Chl Dpth (ft)	3.90	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	10542.5	Conv. (cfs)		10542.5	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		59.14	
Min Ch El (ft)	2364.63	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		7.28	
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)		39.55	
C & E Loss (ft)	0.15	Cum SA (acres)		16.27	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 16000

INPUT
Description: 160+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
95	2368.73	140	2359.73	230	2368.73

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
95	.025	95	.025	230	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95	230	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2362.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.40	Wt. n-Val.		0.025	
E.G. Elev (ft)	2366.82	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2363.63	Flow Area (sq ft)		54.38	
E.G. Slope (ft/ft)	0.054630	Area (sq ft)		54.38	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	40.39	Top Width (ft)		40.39	
Vel Total (ft/s)	16.83	Avg. Vel. (ft/s)		16.83	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	3914.8	Conv. (cfs)		3914.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		40.79	
Min Ch El (ft)	2359.73	Shear (lb/sq ft)		4.55	
Alpha	1.00	Stream Power (lb/ft s)		76.50	
Frctn Loss (ft)	2.38	Cum Volume (acre-ft)		39.26	
C & E Loss (ft)	0.34	Cum SA (acres)		16.10	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note - Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15950

INPUT
Description: 159+50
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2369.73	140	2359.73	240	2369.73

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	350	350	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2363.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.		0.025	
E.G. Elev (ft)	2364.77	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2363.64	Flow Area (sq ft)		92.16	
E.G. Slope (ft/ft)	0.013380	Area (sq ft)		92.16	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	52.58	Top Width (ft)		52.58	
Vel Total (ft/s)	9.93	Avg. Vel. (ft/s)		9.93	

Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)	1.75
Conv. Total (cfs)	7910.3	Conv. (cfs)	7910.3
Length Wtd. (ft)	350.00	Wetted Per. (ft)	53.10
Min Ch El (ft)	2359.73	Shear (lb/sq ft)	1.45
Alpha	1.00	Stream Power (lb/ft s)	14.39
Frctn Loss (ft)	1.20	Cum Volume (acre-ft)	39.18
C & E Loss (ft)	0.86	Cum SA (acres)	16.05

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15600

INPUT
Description: 156+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2361.15	140	2351.15	240	2361.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2354.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.26	Wt. n-Val.		0.025	
E.G. Elev (ft)	2357.31	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2355.05	Flow Area (sq ft)		63.19	
E.G. Slope (ft/ft)	0.036603	Area (sq ft)		63.19	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	43.54	Top Width (ft)		43.54	
Vel Total (ft/s)	14.48	Avg. Vel. (ft/s)		14.48	
Max Chl Dpth (ft)	2.90	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	4782.6	Conv. (cfs)		4782.6	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		43.97	
Min Ch El (ft)	2351.15	Shear (lb/sq ft)		3.28	
Alpha	1.00	Stream Power (lb/ft s)		47.55	
Frctn Loss (ft)	7.28	Cum Volume (acre-ft)		38.55	
C & E Loss (ft)	0.17	Cum SA (acres)		15.66	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15300

INPUT
Description: 153+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2353.8	140	2343.8	240	2353.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT . Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2347.06	Element			
Vel Head (ft)	2.05	Wt. n-Val.		0.025	
E.G. Elev (ft)	2349.11	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2347.72	Flow Area (sq ft)		79.59	
E.G. Slope (ft/ft)	0.019782	Area (sq ft)		79.59	
Q Total (cfs)	915.00	Flow (cfs)		915.00	
Top Width (ft)	48.86	Top Width (ft)		48.86	
Vel Total (ft/s)	11.50	Avg. Vel. (ft/s)		11.50	
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)		1.63	
Conv. Total (cfs)	6505.6	Conv. (cfs)		6505.6	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		49.35	
Min Ch El (ft)	2343.80	Shear (lb/sq ft)		1.99	
Alpha	1.00	Stream Power (lb/ft s)		22.90	
Frctn Loss (ft)	7.85	Cum Volume (acre-ft)		38.06	
C & E Loss (ft)	0.36	Cum SA (acres)		15.34	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 15000

INPUT
Description: 150+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2346.45	140	2336.45	240	2346.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2339.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.62	Wt. n-Val.		0.025	
E.G. Elev (ft)	2342.35	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2340.57	Flow Area (sq ft)		80.49	
E.G. Slope (ft/ft)	0.025090	Area (sq ft)		80.49	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	49.14	Top Width (ft)		49.14	
Vel Total (ft/s)	13.00	Avg. Vel. (ft/s)		13.00	
Max Chl Dpth (ft)	3.28	Hydr. Depth (ft)		1.64	
Conv. Total (cfs)	6603.5	Conv. (cfs)		6603.5	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		49.63	
Min Ch El (ft)	2336.45	Shear (lb/sq ft)		2.54	
Alpha	1.00	Stream Power (lb/ft s)		33.02	
Frctn Loss (ft)	6.71	Cum Volume (acre-ft)		37.51	
C & E Loss (ft)	0.06	Cum SA (acres)		15.00	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 14700

INPUT
Description: 147+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2339.1	140	2329.1	240	2339.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2332.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.		0.025	
E.G. Elev (ft)	2334.97	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2333.22	Flow Area (sq ft)		81.21	
E.G. Slope (ft/ft)	0.024500	Area (sq ft)		81.21	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	49.36	Top Width (ft)		49.36	
Vel Total (ft/s)	12.88	Avg. Vel. (ft/s)		12.88	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	6682.6	Conv. (cfs)		6682.6	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		49.85	
Min Ch El (ft)	2329.10	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)		32.10	
Frctn Loss (ft)	7.39	Cum Volume (acre-ft)		36.95	
C & E Loss (ft)	0.02	Cum SA (acres)		14.66	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 14400

INPUT
Description: 144+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2331.75	140	2321.75	240	2331.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2325.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.		0.025	
E.G. Elev (ft)	2327.62	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2325.87	Flow Area (sq ft)		81.21	
E.G. Slope (ft/ft)	0.024500	Area (sq ft)		81.21	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	49.36	Top Width (ft)		49.36	
Vel Total (ft/s)	12.88	Avg. Vel. (ft/s)		12.88	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	6682.6	Conv. (cfs)		6682.6	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		49.85	
Min Ch El (ft)	2321.75	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)		32.10	
Frctn Loss (ft)	7.35	Cum Volume (acre-ft)		36.39	
C & E Loss (ft)	0.00	Cum SA (acres)		14.32	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 14100

INPUT
Description: 141+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2324.4	140	2314.4	240	2324.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

90	240		300	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2317.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.		0.025	
E.G. Elev (ft)	2320.27	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2318.52	Flow Area (sq ft)		81.21	
E.G. Slope (ft/ft)	0.024500	Area (sq ft)		81.21	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	49.36	Top Width (ft)		49.36	
Vel Total (ft/s)	12.88	Avg. Vel. (ft/s)		12.88	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	6682.6	Conv. (cfs)		6682.6	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		49.85	
Min Ch El (ft)	2314.40	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)		32.10	
Frctn Loss (ft)	7.35	Cum Volume (acre-ft)		35.83	
C & E Loss (ft)	0.00	Cum SA (acres)		13.99	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 13800

INPUT
Description: 138+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2317.05	140	2307.05	240	2317.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	550	550	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2310.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.		0.025	
E.G. Elev (ft)	2312.92	Reach Len. (ft)	550.00	550.00	550.00
Crit W.S. (ft)	2311.16	Flow Area (sq ft)		81.19	
E.G. Slope (ft/ft)	0.024510	Area (sq ft)		81.19	
Q Total (cfs)	1046.00	Flow (cfs)		1046.00	
Top Width (ft)	49.35	Top Width (ft)		49.35	
Vel Total (ft/s)	12.88	Avg. Vel. (ft/s)		12.88	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	6681.3	Conv. (cfs)		6681.3	
Length Wtd. (ft)	550.00	Wetted Per. (ft)		49.84	
Min Ch El (ft)	2307.05	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)		32.11	
Frctn Loss (ft)	7.35	Cum Volume (acre-ft)		35.27	
C & E Loss (ft)	0.00	Cum SA (acres)		13.65	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 13250

INPUT
Description: 132+50
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2303.58	140	2293.58	240	2303.58

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	240	550	550	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2297.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.74	Wt. n-Val.		0.025	
E.G. Elev (ft)	2299.95	Reach Len. (ft)	550.00	550.00	550.00
Crit W.S. (ft)	2298.10	Flow Area (sq ft)		98.97	
E.G. Slope (ft/ft)	0.022851	Area (sq ft)		98.97	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	54.49	Top Width (ft)		54.49	
Vel Total (ft/s)	13.29	Avg. Vel. (ft/s)		13.29	
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)		1.82	
Conv. Total (cfs)	8699.1	Conv. (cfs)		8699.1	
Length Wtd. (ft)	550.00	Wetted Per. (ft)		55.03	
Min Ch El (ft)	2293.58	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)		34.09	
Frctn Loss (ft)	12.95	Cum Volume (acre-ft)		34.14	
C & E Loss (ft)	0.02	Cum SA (acres)		12.99	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 12700

INPUT
Description: 127+00
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
90	2290.1	140	2280.1	240	2290.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
90	.025	90	.025	240	.025

Bank St[redacted] Left Right Lengths: Left Channel Right [redacted]Coeff Contr. Expan.

90	240	200	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2283.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.97	Wt. n-Val.		0.025	
E.G. Elev (ft)	2286.63	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2284.63	Flow Area (sq ft)		95.11	
E.G. Slope (ft/ft)	0.025408	Area (sq ft)		95.11	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	53.42	Top Width (ft)		53.42	
Vel Total (ft/s)	13.83	Avg. Vel. (ft/s)		13.83	
Max Chl Dpth (ft)	3.56	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	8249.7	Conv. (cfs)		8249.7	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		53.95	
Min Ch El (ft)	2280.10	Shear (lb/sq ft)		2.80	
Alpha	1.00	Stream Power (lb/ft s)		38.67	
Frctn Loss (ft)	13.29	Cum Volume (acre-ft)		32.91	
C & E Loss (ft)	0.02	Cum SA (acres)		12.31	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 12500

INPUT
Description: 125+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2289.1	122.5	2277.1	157.5	2277.1	205.5	2289.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2279.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.62	Wt. n-Val.		0.025	
E.G. Elev (ft)	2282.06	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2280.25	Flow Area (sq ft)		101.31	
E.G. Slope (ft/ft)	0.019642	Area (sq ft)		101.31	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	51.41	Top Width (ft)		51.41	
Vel Total (ft/s)	12.98	Avg. Vel. (ft/s)		12.98	
Max Chl Dpth (ft)	2.34	Hydr. Depth (ft)		1.97	
Conv. Total (cfs)	9382.8	Conv. (cfs)		9382.8	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		52.08	
Min Ch El (ft)	2277.10	Shear (lb/sq ft)		2.39	
Alpha	1.00	Stream Power (lb/ft s)		30.96	
Frctn Loss (ft)	4.46	Cum Volume (acre-ft)		32.46	
C & E Loss (ft)	0.10	Cum SA (acres)		12.07	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 12000

INPUT
Description: 120+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2281.6	122.5	2269.6	157.5	2269.6	205.5	2281.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2272.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.025	
E.G. Elev (ft)	2274.19	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2272.75	Flow Area (sq ft)		118.28	
E.G. Slope (ft/ft)	0.012432	Area (sq ft)		118.28	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	53.67	Top Width (ft)		53.67	
Vel Total (ft/s)	11.12	Avg. Vel. (ft/s)		11.12	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	11793.6	Conv. (cfs)		11793.6	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		54.44	
Min Ch El (ft)	2269.60	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)		18.75	
Frctn Loss (ft)	7.67	Cum Volume (acre-ft)		31.20	
C & E Loss (ft)	0.21	Cum SA (acres)		11.46	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 11500

INPUT
Description: 115+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2274.1	122.5	2262.1	157.5	2262.1	205.5	2274.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2264.54	Element			
Vel Head (ft)	2.38	Wt. n-Val.		0.025	
E.G. Elev (ft)	2266.92	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2265.25	Flow Area (sq ft)		106.27	
E.G. Slope (ft/ft)	0.017047	Area (sq ft)		106.27	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	52.08	Top Width (ft)		52.08	
Vel Total (ft/s)	12.37	Avg. Vel. (ft/s)		12.37	
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	10071.7	Conv. (cfs)		10071.7	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		52.78	
Min Ch El (ft)	2262.10	Shear (lb/sq ft)		2.14	
Alpha	1.00	Stream Power (lb/ft s)		26.51	
Frctn Loss (ft)	7.23	Cum Volume (acre-ft)		29.91	
C & E Loss (ft)	0.05	Cum SA (acres)		10.86	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 11000

INPUT
Description: 110+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2266.6	122.5	2254.6	157.5	2254.6	205.5	2266.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2257.20	Element			
Vel Head (ft)	2.05	Wt. n-Val.		0.025	
E.G. Elev (ft)	2259.25	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2257.75	Flow Area (sq ft)		114.41	
E.G. Slope (ft/ft)	0.013712	Area (sq ft)		114.41	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	53.17	Top Width (ft)		53.17	
Vel Total (ft/s)	11.49	Avg. Vel. (ft/s)		11.49	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.15	
Conv. Total (cfs)	11229.7	Conv. (cfs)		11229.7	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		53.91	
Min Ch El (ft)	2254.60	Shear (lb/sq ft)		1.82	
Alpha	1.00	Stream Power (lb/ft s)		20.88	

Frctn Loss (ft)	7.58	Cum Volume (acre-ft)	28.65
C & E Loss (ft)	0.10	Cum SA (acres)	10.25

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 10500

INPUT
Description: 105+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2259.1	122.5	2247.1	157.5	2247.1	205.5	2259.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2249.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.26	Wt. n-Val.		0.025	
E.G. Elev (ft)	2251.85	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2250.25	Flow Area (sq ft)		109.07	
E.G. Slope (ft/ft)	0.015788	Area (sq ft)		109.07	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	52.46	Top Width (ft)		52.46	
Vel Total (ft/s)	12.06	Avg. Vel. (ft/s)		12.06	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		2.08	
Conv. Total (cfs)	10465.6	Conv. (cfs)		10465.6	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		53.17	
Min Ch El (ft)	2247.10	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)		24.38	
Frctn Loss (ft)	7.37	Cum Volume (acre-ft)		27.36	
C & E Loss (ft)	0.02	Cum SA (acres)		9.65	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 10000

INPUT
Description: 100+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2251.6	122.5	2239.6	157.5	2239.6	205.5	2251.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank S	Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
	86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2242.16	Element			
Vel Head (ft)	2.12	Wt. n-Val.		0.025	
E.G. Elev (ft)	2244.28	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2242.74	Flow Area (sq ft)		112.57	
E.G. Slope (ft/ft)	0.014383	Area (sq ft)		112.57	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	52.92	Top Width (ft)		52.92	
Vel Total (ft/s)	11.68	Avg. Vel. (ft/s)		11.68	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	10964.8	Conv. (cfs)		10964.8	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		53.65	
Min Ch El (ft)	2239.60	Shear (lb/sq ft)		1.88	
Alpha	1.00	Stream Power (lb/ft s)		22.01	
Frctn Loss (ft)	7.53	Cum Volume (acre-ft)		26.09	
C & E Loss (ft)	0.04	Cum SA (acres)		9.04	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 9500

INPUT
Description: 95+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2244.1	122.5	2232.1	157.2	2232.1	205.5	2244.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2234.62	Element			
Vel Head (ft)	2.22	Wt. n-Val.		0.025	
E.G. Elev (ft)	2236.84	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2235.26	Flow Area (sq ft)		109.99	
E.G. Slope (ft/ft)	0.015343	Area (sq ft)		109.99	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	52.44	Top Width (ft)		52.44	
Vel Total (ft/s)	11.96	Avg. Vel. (ft/s)		11.96	
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)		2.10	
Conv. Total (cfs)	10616.4	Conv. (cfs)		10616.4	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		53.15	
Min Ch El (ft)	2232.10	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)		23.70	

Frctn Loss (ft)	7.43	Cum Volume (acre-ft)	24.81
C & E Loss (ft)	0.01	Cum SA (acres)	8.44

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 9000

INPUT
Description: 90+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2236.6	122.5	2224.6	157.5	2224.6	205.5	2236.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.5	205.5	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2227.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.16	Wt. n-Val.		0.025	
E.G. Elev (ft)	2229.30	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2227.75	Flow Area (sq ft)		111.42	
E.G. Slope (ft/ft)	0.014825	Area (sq ft)		111.42	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	52.77	Top Width (ft)		52.77	
Vel Total (ft/s)	11.80	Avg. Vel. (ft/s)		11.80	
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	10800.2	Conv. (cfs)		10800.2	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		53.50	
Min Ch El (ft)	2224.60	Shear (lb/sq ft)		1.93	
Alpha	1.00	Stream Power (lb/ft s)		22.75	
Frctn Loss (ft)	7.53	Cum Volume (acre-ft)		23.54	
C & E Loss (ft)	0.02	Cum SA (acres)		7.83	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 8600

INPUT
Description: 86+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.5	2230.6	122.5	2218.6	157.5	2218.6	205.5	2230.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
86.5	.025	86.5	.025	205.5	.025

Bank S	Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
	86.5	205.5	100	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2222.12	Element			
Vel Head (ft)	0.97	Wt. n-Val.		0.025	
E.G. Elev (ft)	2223.09	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2221.74	Flow Area (sq ft)		166.71	
E.G. Slope (ft/ft)	0.004575	Area (sq ft)		166.71	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	59.66	Top Width (ft)		59.66	
Vel Total (ft/s)	7.89	Avg. Vel. (ft/s)		7.89	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	19441.3	Conv. (cfs)		19441.3	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		60.66	
Min Ch El (ft)	2218.60	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		6.19	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)		21.95	
C & E Loss (ft)	0.01	Cum SA (acres)		7.19	

Note - Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 8500

INPUT
Description: 85+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2233.1	130	2217.1	150	2217.1	214	2233.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	302	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2221.61	Element			
Vel Head (ft)	1.03	Wt. n-Val.		0.025	
E.G. Elev (ft)	2222.64	Reach Len. (ft)	302.00	300.00	300.00
Crit W.S. (ft)		Flow Area (sq ft)		161.63	
E.G. Slope (ft/ft)	0.004225	Area (sq ft)		161.63	
Q Total (cfs)	1315.00	Flow (cfs)		1315.00	
Top Width (ft)	51.60	Top Width (ft)		51.60	
Vel Total (ft/s)	8.14	Avg. Vel. (ft/s)		8.14	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	20230.4	Conv. (cfs)		20230.4	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		52.89	
Min Ch El (ft)	2217.10	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)		6.56	
Frctn Loss (ft)	1.44	Cum Volume (acre-ft)		21.57	

C & E Loss (ft)	0.03	Cum SA (acres)	7.06

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 8200

INPUT
Description: 82+00

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2231.45	130	2215.45	150	2215.45	214	2231.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	400	400	400 .1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2219.89	Element			
Vel Head (ft)	1.29	Wt. n-Val.		0.025	
E.G. Elev (ft)	2221.18	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		157.63	
E.G. Slope (ft/ft)	0.005414	Area (sq ft)		157.63	
Q Total (cfs)	1438.00	Flow (cfs)		1438.00	
Top Width (ft)	51.06	Top Width (ft)		51.06	
Vel Total (ft/s)	9.12	Avg. Vel. (ft/s)		9.12	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		3.09	
Conv. Total (cfs)	19543.4	Conv. (cfs)		19543.4	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		52.32	
Min Ch El (ft)	2215.45	Shear (lb/sq ft)		1.02	
Alpha	1.00	Stream Power (lb/ft s)		9.29	
Frctn Loss (ft)	2.21	Cum Volume (acre-ft)		20.47	
C & E Loss (ft)	0.00	Cum SA (acres)		6.71	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 7800

INPUT
Description: 78+00

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2229.25	130	2213.25	150	2213.25	214	2229.25

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	350	350	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2217.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.025	
E.G. Elev (ft)	2218.97	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)		Flow Area (sq ft)		155.76	
E.G. Slope (ft/ft)	0.005596	Area (sq ft)		155.76	
Q Total (cfs)	1438.00	Flow (cfs)		1438.00	
Top Width (ft)	50.80	Top Width (ft)		50.80	
Vel Total (ft/s)	9.23	Avg. Vel. (ft/s)		9.23	
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	19222.8	Conv. (cfs)		19222.8	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		52.05	
Min Ch El (ft)	2213.25	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		9.65	
Frctn Loss (ft)	1.58	Cum Volume (acre-ft)		19.03	
C & E Loss (ft)	0.10	Cum SA (acres)		6.24	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 7450

INPUT
Description: 74+50
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82	2227.33	130	2211.33	150	2211.33	214	2227.33

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
82	.025	82	.025	214	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82	214	100	105	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2216.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.025	
E.G. Elev (ft)	2217.30	Reach Len. (ft)	100.00	100.00	105.00
Crit W.S. (ft)		Flow Area (sq ft)		185.34	
E.G. Slope (ft/ft)	0.003741	Area (sq ft)		185.34	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	54.72	Top Width (ft)		54.72	
Vel Total (ft/s)	8.06	Avg. Vel. (ft/s)		8.06	
Max Chl Dpth (ft)	4.96	Hydr. Depth (ft)		3.39	
Conv. Total (cfs)	24424.9	Conv. (cfs)		24424.9	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		56.14	
Min Ch El (ft)	2211.33	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)		6.22	
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		17.66	

C & E Loss (ft)	0.03	Cum SA (acres)	5.82

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 7350

INPUT
Description: 73+50
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
94	2222.78	130	2210.78	150	2210.78	186	2222.78

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
94	.025	94	.025	186	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
94	186	650	650	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2215.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.27	Wt. n-Val.		0.025	
E.G. Elev (ft)	2216.85	Reach Len. (ft)	650.00	650.00	650.00
Crit W.S. (ft)		Flow Area (sq ft)		165.23	
E.G. Slope (ft/ft)	0.004748	Area (sq ft)		165.23	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	48.81	Top Width (ft)		48.81	
Vel Total (ft/s)	9.04	Avg. Vel. (ft/s)		9.04	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		3.38	
Conv. Total (cfs)	21680.8	Conv. (cfs)		21680.8	
Length Wtd. (ft)	650.00	Wetted Per. (ft)		50.37	
Min Ch El (ft)	2210.78	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		8.79	
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)		17.26	
C & E Loss (ft)	0.03	Cum SA (acres)		5.70	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6700

INPUT
Description: 67+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
94	2219.2	130	2207.2	150	2207.2	186	2219.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
94	.025	94	.025	186	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
94	186	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2211.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.025	
E.G. Elev (ft)	2213.22	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2211.63	Flow Area (sq ft)		147.31	
E.G. Slope (ft/ft)	0.006527	Area (sq ft)		147.31	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	46.56	Top Width (ft)		46.56	
Vel Total (ft/s)	10.14	Avg. Vel. (ft/s)		10.14	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	18492.1	Conv. (cfs)		18492.1	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		48.00	
Min Ch El (ft)	2207.20	Shear (lb/sq ft)		1.25	
Alpha	1.00	Stream Power (lb/ft s)		12.68	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		14.93	
C & E Loss (ft)	0.37	Cum SA (acres)		4.99	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6400

INPUT
Description: 64+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
46	2217.55	130	2205.55	150	2205.55	234	2217.55

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
46	.025	46	.025	234	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
46	234	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2210.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.025	
E.G. Elev (ft)	2211.33	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2209.25	Flow Area (sq ft)		315.13	
E.G. Slope (ft/ft)	0.001319	Area (sq ft)		315.13	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	96.04	Top Width (ft)		96.04	
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)		4.74	

Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)	3.28
Conv. Total (cfs)	41138.6	Conv. (cfs)	41138.6
Length Wtd. (ft)	200.00	Wetted Per. (ft)	96.81
Min Ch El (ft)	2205.55	Shear (lb/sq ft)	0.27
Alpha	1.00	Stream Power (lb/ft s)	1.27
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	13.33
C & E Loss (ft)	0.04	Cum SA (acres)	4.49

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6200

INPUT
Description: 62+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
94	2216.43	130	2204.43	150	2204.43	186	2216.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
94	.025	94	.025	186	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
94	186	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2210.20	Element	Left CB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.		0.025	
E.G. Elev (ft)	2210.95	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		215.44	
E.G. Slope (ft/ft)	0.002286	Area (sq ft)		215.44	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	54.64	Top Width (ft)		54.64	
Vel Total (ft/s)	6.93	Avg. Vel. (ft/s)		6.93	
Max Chl Dpth (ft)	5.77	Hydr. Depth (ft)		3.94	
Conv. Total (cfs)	31249.4	Conv. (cfs)		31249.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		56.51	
Min Ch El (ft)	2204.43	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		3.77	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		12.12	
C & E Loss (ft)	0.11	Cum SA (acres)		4.15	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6150

INPUT
Description: 61+50
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
11[redacted]	2214.15	130	2204.15	150	2204.15	170	[redacted].15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.025	110	.025	170	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	113	113	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2208.86	Element			
Vel Head (ft)	1.80	Wt. n-Val.		0.025	
E.G. Elev (ft)	2210.67	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2208.86	Flow Area (sq ft)		138.62	
E.G. Slope (ft/ft)	0.006494	Area (sq ft)		138.62	
Q Total (cfs)	1494.00	Flow (cfs)		1494.00	
Top Width (ft)	38.85	Top Width (ft)		38.85	
Vel Total (ft/s)	10.78	Avg. Vel. (ft/s)		10.78	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		3.57	
Conv. Total (cfs)	18539.6	Conv. (cfs)		18539.6	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		41.07	
Min Ch El (ft)	2204.15	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)		14.75	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		11.91	
C & E Loss (ft)	0.07	Cum SA (acres)		4.09	

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6037

INPUT
Description: 60+37
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2205.53	130	2195.53	150	2195.53	170	2205.53

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	37	37	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2199.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.93	Wt. n-Val.		0.015	
E.G. Elev (ft)	2208.88	Reach Len. (ft)	37.00	37.00	37.00
Crit W.S. (ft)	2202.57	Flow Area (sq ft)		127.53	
E.G. Slope (ft/ft)	0.012394	Area (sq ft)		127.53	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	37.69	Top Width (ft)		37.69	
Vel Total (ft/s)	23.98	Avg. Vel. (ft/s)		23.98	
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)		3.38	
Conv. Total (cfs)	27468.6	Conv. (cfs)		27468.6	
Length Wtd. (ft)	37.00	Wetted Per. (ft)		39.77	
Min Ch El (ft)	2195.53	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		59.49	
Frctn Loss (ft)	1.10	Cum Volume (acre-ft)		11.57	
C & E Loss (ft)	0.71	Cum SA (acres)		4.00	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note - Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 6000

INPUT
Description: 60+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2204.61	130	2194.61	150	2194.61	170	2204.61

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	100	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2198.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.41	Wt. n-Val.		0.015	
E.G. Elev (ft)	2208.36	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2201.65	Flow Area (sq ft)		124.20	
E.G. Slope (ft/ft)	0.013355	Area (sq ft)		124.20	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	37.33	Top Width (ft)		37.33	
Vel Total (ft/s)	24.62	Avg. Vel. (ft/s)		24.62	
Max Chl Dpth (ft)	4.33	Hydr. Depth (ft)		3.33	
Conv. Total (cfs)	26461.8	Conv. (cfs)		26461.8	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		39.38	
Min Ch El (ft)	2194.61	Shear (lb/sq ft)		2.63	
Alpha	1.00	Stream Power (lb/ft s)		64.75	
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)		11.46	

C & E Loss (ft)	0.05	Cum SA (acres)	3.96

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5900

INPUT
Description: 59+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2202.16	130	2192.16	150	2192.16	170	2202.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2196.32	Element			
Vel Head (ft)	10.48	Wt. n-Val.		0.015	
E.G. Elev (ft)	2206.80	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2199.20	Flow Area (sq ft)		117.70	
E.G. Slope (ft/ft)	0.015552	Area (sq ft)		117.70	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	36.63	Top Width (ft)		36.63	
Vel Total (ft/s)	25.98	Avg. Vel. (ft/s)		25.98	
Max Chl Dpth (ft)	4.16	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	24521.5	Conv. (cfs)		24521.5	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		38.59	
Min Ch El (ft)	2192.16	Shear (lb/sq ft)		2.96	
Alpha	1.00	Stream Power (lb/ft s)		76.94	
Frctn Loss (ft)	1.44	Cum Volume (acre-ft)		11.18	
C & E Loss (ft)	0.11	Cum SA (acres)		3.88	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5800

INPUT
Description: 58+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2199.71	130	2189.71	150	2189.71	170	2199.71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.

110	170		50	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2193.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.36	Wt. n-Val.		0.015	
E.G. Elev (ft)	2205.10	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2196.75	Flow Area (sq ft)		113.04	
E.G. Slope (ft/ft)	0.017443	Area (sq ft)		113.04	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	36.12	Top Width (ft)		36.12	
Vel Total (ft/s)	27.05	Avg. Vel. (ft/s)		27.05	
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	23154.1	Conv. (cfs)		23154.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		38.02	
Min Ch El (ft)	2189.71	Shear (lb/sq ft)		3.24	
Alpha	1.00	Stream Power (lb/ft s)		87.59	
Frctn Loss (ft)	1.64	Cum Volume (acre-ft)		10.92	
C & E Loss (ft)	0.09	Cum SA (acres)		3.80	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5750

INPUT
Description: 57+50
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2195.88	130	2185.88	150	2185.88	170	2195.88

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2189.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.27	Wt. n-Val.		0.015	
E.G. Elev (ft)	2203.83	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2192.92	Flow Area (sq ft)		100.88	
E.G. Slope (ft/ft)	0.024128	Area (sq ft)		100.88	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.74	Top Width (ft)		34.74	
Vel Total (ft/s)	30.31	Avg. Vel. (ft/s)		30.31	
Max Chl Dpth (ft)	3.69	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	19686.7	Conv. (cfs)		19686.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		36.48	
Min Ch El (ft)	2185.88	Shear (lb/sq ft)		4.17	
Alpha	1.00	Stream Power (lb/ft		126.26	

Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	10.80
C & E Loss (ft)	0.29	Cum SA (acres)	3.75

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5700

INPUT
Description: 57+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2194.86	130	2184.86	150	2184.86	170	2194.86

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2188.58	Element			
Vel Head (ft)	13.98	Wt. n-Val.		0.015	
E.G. Elev (ft)	2202.56	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2191.90	Flow Area (sq ft)		101.91	
E.G. Slope (ft/ft)	0.023439	Area (sq ft)		101.91	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.86	Top Width (ft)		34.86	
Vel Total (ft/s)	30.01	Avg. Vel. (ft/s)		30.01	
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)		2.92	
Conv. Total (cfs)	19974.0	Conv. (cfs)		19974.0	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		36.61	
Min Ch El (ft)	2184.86	Shear (lb/sq ft)		4.07	
Alpha	1.00	Stream Power (lb/ft s)		122.21	
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)		10.68	
C & E Loss (ft)	0.09	Cum SA (acres)		3.71	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5600

INPUT
Description: 560+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2192.21	130	2183.21	150	2182.21	170	2192.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2186.39	Element			
Vel Head (ft)	13.86	Wt. n-Val.		0.015	
E.G. Elev (ft)	2200.25	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2189.70	Flow Area (sq ft)		102.37	
E.G. Slope (ft/ft)	0.023523	Area (sq ft)		102.37	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	35.43	Top Width (ft)		35.43	
Vel Total (ft/s)	29.87	Avg. Vel. (ft/s)		29.87	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		2.89	
Conv. Total (cfs)	19938.6	Conv. (cfs)		19938.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		37.13	
Min Ch El (ft)	2182.21	Shear (lb/sq ft)		4.05	
Alpha	1.00	Stream Power (lb/ft s)		120.95	
Frctn Loss (ft)	2.34	Cum Volume (acre-ft)		10.45	
C & E Loss (ft)	0.07	Cum SA (acres)		3.63	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5550

INPUT
Description: 55+50
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2190.98	130	2180.98	150	2180.98	170	2190.98

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2184.66	Element			
Vel Head (ft)	14.35	Wt. n-Val.		0.015	
E.G. Elev (ft)	2199.00	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2188.02	Flow Area (sq ft)		100.61	
E.G. Slope (ft/ft)	0.024315	Area (sq ft)		100.61	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.71	Top Width (ft)		34.71	
Vel Total (ft/s)	30.40	Avg. Vel. (ft/s)		30.40	
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	19611.1	Conv. (cfs)		19611.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		36.45	

Min Ch El (ft)	2180.98	Shear (lb/sq ft)	4.19
Alph	1.00	Stream Power (lb/ft	127.36
Frct oss (ft)	1.20	Cum Volume (acre-ft)	10.33
C & E Loss (ft)	0.05	Cum SA (acres)	3.59

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5500

INPUT
Description: 55+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2187.15	130	2177.15	150	2177.15	170	2187.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2180.60	Element			
Vel Head (ft)	16.80	Wt. n-Val.		0.015	
E.G. Elev (ft)	2197.41	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2184.19	Flow Area (sq ft)		92.97	
E.G. Slope (ft/ft)	0.030487	Area (sq ft)		92.97	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	33.82	Top Width (ft)		33.82	
Vel Total (ft/s)	32.89	Avg. Vel. (ft/s)		32.89	
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	17513.8	Conv. (cfs)		17513.8	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		35.45	
Min Ch El (ft)	2177.15	Shear (lb/sq ft)		4.99	
Alpha	1.00	Stream Power (lb/ft s)		164.18	
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)		10.22	
C & E Loss (ft)	0.25	Cum SA (acres)		3.55	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5400

INPUT
Description: 54+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2184.7	130	2174.7	150	2174.7	170	2184.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	100	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2178.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.03	Wt. n-Val.		0.015	
E.G. Elev (ft)	2194.25	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2181.74	Flow Area (sq ft)		95.17	
E.G. Slope (ft/ft)	0.028504	Area (sq ft)		95.17	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.08	Top Width (ft)		34.08	
Vel Total (ft/s)	32.13	Avg. Vel. (ft/s)		32.13	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	18112.7	Conv. (cfs)		18112.7	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		35.74	
Min Ch El (ft)	2174.70	Shear (lb/sq ft)		4.74	
Alpha	1.00	Stream Power (lb/ft s)		152.26	
Frctn Loss (ft)	2.94	Cum Volume (acre-ft)		10.00	
C & E Loss (ft)	0.24	Cum SA (acres)		3.48	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5300

INPUT
Description: 53+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2182.25	130	2172.25	150	2172.25	170	2182.25

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2175.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	15.50	Wt. n-Val.		0.015	
E.G. Elev (ft)	2191.32	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2179.29	Flow Area (sq ft)		96.77	
E.G. Slope (ft/ft)	0.027173	Area (sq ft)		96.77	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.27	Top Width (ft)		34.27	

Vel Total (ft/s)	31.60	Avg. Vel. (ft/s)	31.60
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)	2.82
Conv. Total (cfs)	18551.2	Conv. (cfs)	18551.2
Length Wtd. (ft)	50.00	Wetted Per. (ft)	35.95
Min Ch El (ft)	2172.25	Shear (lb/sq ft)	4.57
Alpha	1.00	Stream Power (lb/ft s)	144.30
Frctn Loss (ft)	2.78	Cum Volume (acre-ft)	9.78
C & E Loss (ft)	0.16	Cum SA (acres)	3.40

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5250

INPUT
Description: 52+50
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2178.42	130	2168.42	150	2168.42	170	2178.42

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2171.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	17.90	Wt. n-Val.		0.015	
E.G. Elev (ft)	2189.69	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2175.46	Flow Area (sq ft)		90.08	
E.G. Slope (ft/ft)	0.033384	Area (sq ft)		90.08	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	33.48	Top Width (ft)		33.48	
Vel Total (ft/s)	33.95	Avg. Vel. (ft/s)		33.95	
Max Chl Dpth (ft)	3.37	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	16736.6	Conv. (cfs)		16736.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		35.07	
Min Ch El (ft)	2168.42	Shear (lb/sq ft)		5.35	
Alpha	1.00	Stream Power (lb/ft s)		181.75	
Frctn Loss (ft)	1.50	Cum Volume (acre-ft)		9.67	
C & E Loss (ft)	0.23	Cum SA (acres)		3.36	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5200

INPUT
Description: 52+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2177.26	130	2167.26	150	2167.26	170	2177.26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2170.68	Element			
Vel Head (ft)	17.17	Wt. n-Val.		0.015	
E.G. Elev (ft)	2187.86	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2174.30	Flow Area (sq ft)		91.95	
E.G. Slope (ft/ft)	0.031462	Area (sq ft)		91.95	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	33.70	Top Width (ft)		33.70	
Vel Total (ft/s)	33.26	Avg. Vel. (ft/s)		33.26	
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)		2.73	
Conv. Total (cfs)	17240.3	Conv. (cfs)		17240.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		35.32	
Min Ch El (ft)	2167.26	Shear (lb/sq ft)		5.11	
Alpha	1.00	Stream Power (lb/ft s)		170.08	
Frctn Loss (ft)	1.62	Cum Volume (acre-ft)		9.57	
C & E Loss (ft)	0.22	Cum SA (acres)		3.32	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5100

INPUT
Description: 51+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2174.95	130	2164.95	150	2164.95	170	2174.95

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2168.32	Element			

Vel Head (ft)	17.86	Wt. n-Val.		0.015	
E.G. Elev (ft)	2186.18	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2171.99	Flow Area (sq ft)		90.17	
E.G. Slope (ft/ft)	0.033280	Area (sq ft)		90.17	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	33.49	Top Width (ft)		33.49	
Vel Total (ft/s)	33.91	Avg. Vel. (ft/s)		33.91	
Max Chl Dpth (ft)	3.37	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	16762.8	Conv. (cfs)		16762.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		35.08	
Min Ch El (ft)	2164.95	Shear (lb/sq ft)		5.34	
Alpha	1.00	Stream Power (lb/ft s)		181.12	
Frctn Loss (ft)	1.62	Cum Volume (acre-ft)		9.46	
C & E Loss (ft)	0.07	Cum SA (acres)		3.28	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5050

INPUT
Description: 50+50
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2173.8	130	2163.8	150	2163.8	170	2173.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2167.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	17.13	Wt. n-Val.		0.015	
E.G. Elev (ft)	2184.36	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2170.84	Flow Area (sq ft)		92.07	
E.G. Slope (ft/ft)	0.031349	Area (sq ft)		92.07	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	33.71	Top Width (ft)		33.71	
Vel Total (ft/s)	33.21	Avg. Vel. (ft/s)		33.21	
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)		2.73	
Conv. Total (cfs)	17271.3	Conv. (cfs)		17271.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		35.33	
Min Ch El (ft)	2163.80	Shear (lb/sq ft)		5.10	
Alpha	1.00	Stream Power (lb/ft s)		169.39	
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)		9.36	
C & E Loss (ft)	0.22	Cum SA (acres)		3.24	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need

for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 5000

INPUT
Description: 50+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2172.64	130	2162.64	150	2162.64	170	2172.64

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	800	800	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2166.11	Element			
Vel Head (ft)	16.56	Wt. n-Val.		0.015	
E.G. Elev (ft)	2182.67	Reach Len. (ft)	800.00	800.00	800.00
Crit W.S. (ft)	2169.68	Flow Area (sq ft)		93.65	
E.G. Slope (ft/ft)	0.029858	Area (sq ft)		93.65	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	33.90	Top Width (ft)		33.90	
Vel Total (ft/s)	32.65	Avg. Vel. (ft/s)		32.65	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)		2.76	
Conv. Total (cfs)	17697.4	Conv. (cfs)		17697.4	
Length Wtd. (ft)	800.00	Wetted Per. (ft)		35.54	
Min Ch El (ft)	2162.64	Shear (lb/sq ft)		4.91	
Alpha	1.00	Stream Power (lb/ft s)		160.39	
Frctn Loss (ft)	1.53	Cum Volume (acre-ft)		9.25	
C & E Loss (ft)	0.18	Cum SA (acres)		3.20	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 4200

INPUT
Description: 42+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2151.22	130	2141.22	150	2141.22	170	2151.22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2144.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	15.14	Wt. n-Val.		0.015	
E.G. Elev (ft)	2159.96	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2148.26	Flow Area (sq ft)		97.94	
E.G. Slope (ft/ft)	0.026257	Area (sq ft)		97.94	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.40	Top Width (ft)		34.40	
Vel Total (ft/s)	31.22	Avg. Vel. (ft/s)		31.22	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	18871.9	Conv. (cfs)		18871.9	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		36.10	
Min Ch El (ft)	2141.22	Shear (lb/sq ft)		4.45	
Alpha	1.00	Stream Power (lb/ft s)		138.85	
Frctn Loss (ft)	22.32	Cum Volume (acre-ft)		7.49	
C & E Loss (ft)	0.44	Cum SA (acres)		2.58	

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 3900

INPUT
Description: 39+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2144.3	130	2134.3	150	2134.3	170	2144.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2137.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.23	Wt. n-Val.		0.015	
E.G. Elev (ft)	2152.22	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2141.34	Flow Area (sq ft)		101.03	
E.G. Slope (ft/ft)	0.024024	Area (sq ft)		101.03	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.76	Top Width (ft)		34.76	
Vel Total (ft/s)	30.27	Avg. Vel. (ft/s)		30.27	
Max Chl Dpth (ft)	3.69	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	19729.3	Conv. (cfs)		19729.3	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		36.50	
Min Ch El (ft)	2134.30	Shear (lb/sq ft)		4.15	

Alpha	1.00	Stream Power (lb/ft s)	125.65
Frctn Loss (ft)	7.51	Cum Volume (acre-ft)	6.81
C & E Loss (ft)	0.29	Cum SA (acres)	2.34

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 3600

INPUT
Description: 36+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2137.38	130	2127.38	150	2127.38	170	2137.38

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
110	.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	2400	2400	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2131.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.92	Wt. n-Val.		0.015	
E.G. Elev (ft)	2145.02	Reach Len. (ft)	2400.00	2400.00	2400.00
Crit W.S. (ft)	2134.44	Flow Area (sq ft)		102.13	
E.G. Slope (ft/ft)	0.023294	Area (sq ft)		102.13	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.89	Top Width (ft)		34.89	
Vel Total (ft/s)	29.94	Avg. Vel. (ft/s)		29.94	
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)		2.93	
Conv. Total (cfs)	20036.0	Conv. (cfs)		20036.0	
Length Wtd. (ft)	2400.00	Wetted Per. (ft)		36.64	
Min Ch El (ft)	2127.38	Shear (lb/sq ft)		4.05	
Alpha	1.00	Stream Power (lb/ft s)		121.37	
Frctn Loss (ft)	7.10	Cum Volume (acre-ft)		6.11	
C & E Loss (ft)	0.09	Cum SA (acres)		2.10	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 1200

INPUT
Description: 12+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
110	2082	130	2072	150	2072	170	2082

Manning's n Values num= 3

n Val	Sta	n Val	Sta	n Val
.015	110	.015	170	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	170	100	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2075.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.76	Wt. n-Val.		0.015	
E.G. Elev (ft)	2089.50	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2079.06	Flow Area (sq ft)		102.74	
E.G. Slope (ft/ft)	0.022899	Area (sq ft)		102.74	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	34.96	Top Width (ft)		34.96	
Vel Total (ft/s)	29.76	Avg. Vel. (ft/s)		29.76	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		2.94	
Conv. Total (cfs)	20208.3	Conv. (cfs)		20208.3	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		36.72	
Min Ch El (ft)	2072.00	Shear (lb/sq ft)		4.00	
Alpha	1.00	Stream Power (lb/ft s)		119.05	
Frctn Loss (ft)	55.47	Cum Volume (acre-ft)		0.47	
C & E Loss (ft)	0.05	Cum SA (acres)		0.18	

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 1100

INPUT
Description: 11+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2079.69	120	2069.69	160	2069.69	180	2079.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.015	100	.015	180	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
100	180	100	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2071.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.46	Wt. n-Val.		0.015	
E.G. Elev (ft)	2086.41	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2074.84	Flow Area (sq ft)		100.20	
E.G. Slope (ft/ft)	0.037640	Area (sq ft)		100.20	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	49.01	Top Width (ft)		49.01	
Vel Total (ft/s)	30.52	Avg. Vel. (ft/s)		30.52	
Max Chl Dpth (ft)	2.25	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	15762.1	Conv. (cfs)		15762.1	

Length Wtd. (ft)	100.00	Wetted Per. (ft)	50.07
Min Ch El (ft)	2069.69	Shear (lb/sq ft)	4.70
Alpha	1.00	Stream Power (lb/ft s)	143.52
Frctn Loss (ft)	2.91	Cum Volume (acre-ft)	0.23
C & E Loss (ft)	0.08	Cum SA (acres)	0.08

Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: REACH 1
REACH: REACH 1 RS: 1000

INPUT
Description: 10+00
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2069.69	120	2059059	160	2059.69	180	2069.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.015	100	.015	180	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
100	180	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2069.83	Element			
Vel Head (ft)	13.72	Wt. n-Val.		0.015	
E.G. Elev (ft)	2083.55	Reach Len. (ft)			
Crit W.S. (ft)	2073.64	Flow Area (sq ft)		102.89	
E.G. Slope (ft/ft)	0.019482	Area (sq ft)		102.89	
Q Total (cfs)	3058.00	Flow (cfs)		3058.00	
Top Width (ft)	20.00	Top Width (ft)		20.00	
Vel Total (ft/s)	29.72	Avg. Vel. (ft/s)		29.72	
Max Chl Dpth (ft)	10.14	Hydr. Depth (ft)		5.14	
Conv. Total (cfs)	21908.7	Conv. (cfs)		21908.7	
Length Wtd. (ft)		Wetted Per. (ft)		32.65	
Min Ch El (ft)	2059.69	Shear (lb/sq ft)		3.83	
Alpha	1.00	Stream Power (lb/ft s)		113.92	
Frctn Loss (ft)	2.63	Cum Volume (acre-ft)			
C & E Loss (ft)	0.23	Cum SA (acres)			

Warning - Divided flow computed for this cross-section.
Warning - The cross-section end points had to be extended vertically for the computed water surface.
Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area

Top Width (ft)	Froude # Chl	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)
REACH 1	16700	189.00	2378.10	2379.82	2379.82	2380.26	0.009832	5.31	35.58
41.33	1.01								
REACH 1	16600	189.00	2375.65	2377.09	2377.37	2377.98	0.025268	7.57	24.97
34.62	1.57								
REACH 1	16550	189.00	2374.43	2375.88	2376.15	2376.75	0.024331	7.46	25.33
34.87	1.54								
REACH 1	16500	189.00	2373.20	2374.64	2374.92	2375.53	0.025177	7.56	25.01
34.65	1.57								
REACH 1	16400	189.00	2370.75	2372.17	2372.44	2373.05	0.025606	7.53	25.09
35.42	1.58								
REACH 1	16300	189.00	2368.30	2369.73	2369.99	2370.58	0.024483	7.41	25.52
35.72	1.54								
REACH 1	16200	189.00	2365.85	2369.69	2367.54	2369.71	0.000125	1.02	184.45
96.03	0.13								
REACH 1	16150	915.00	2364.63	2368.53	2368.53	2369.53	0.007533	8.00	114.31
58.56	1.01								
REACH 1	16000	915.00	2359.73	2362.42	2363.63	2366.82	0.054630	16.83	54.38
40.39	2.56								
REACH 1	15950	915.00	2359.73	2363.24	2363.64	2364.77	0.013380	9.93	92.16
52.58	1.32								
REACH 1	15600	915.00	2351.15	2354.05	2355.05	2357.31	0.036603	14.48	63.19
43.54	2.12								
REACH 1	15300	915.00	2343.80	2347.06	2347.72	2349.11	0.019782	11.50	79.59
48.86	1.59								
REACH 1	15000	1046.00	2336.45	2339.73	2340.57	2342.35	0.025090	13.00	80.49
49.14	1.79								
REACH 1	14700	1046.00	2329.10	2332.39	2333.22	2334.97	0.024500	12.88	81.21
49.36	1.77								
REACH 1	14400	1046.00	2321.75	2325.04	2325.87	2327.62	0.024500	12.88	81.21
49.36	1.77								
REACH 1	14100	1046.00	2314.40	2317.69	2318.52	2320.27	0.024500	12.88	81.21
49.36	1.77								
REACH 1	13800	1046.00	2307.05	2310.34	2311.16	2312.92	0.024510	12.88	81.19
49.35	1.77								
REACH 1	13250	1315.00	2293.58	2297.21	2298.10	2299.95	0.022851	13.29	98.97
54.49	1.74								
REACH 1	12700	1315.00	2280.10	2283.66	2284.63	2286.63	0.025408	13.83	95.11
53.42	1.83								
REACH 1	12500	1315.00	2277.10	2279.44	2280.25	2282.06	0.019642	12.98	101.31
51.41	1.63								
REACH 1	12000	1315.00	2269.60	2272.27	2272.75	2274.19	0.012432	11.12	118.28
53.67	1.32								
REACH 1	11500	1315.00	2262.10	2264.54	2265.25	2266.92	0.017047	12.37	106.27
52.08	1.53								
REACH 1	11000	1315.00	2254.60	2257.20	2257.75	2259.25	0.013712	11.49	114.41
53.17	1.38								
REACH 1	10500	1315.00	2247.10	2249.59	2250.25	2251.85	0.015788	12.06	109.07
52.46	1.47								
REACH 1	10000	1315.00	2239.60	2242.16	2242.74	2244.28	0.014383	11.68	112.57
52.92	1.41								
REACH 1	9500	1315.00	2232.10	2234.62	2235.26	2236.84	0.015343	11.96	109.99
52.44	1.45								
REACH 1	9000	1315.00	2224.60	2227.14	2227.75	2229.30	0.014825	11.80	111.42

52.77	1.43									
REACH 1	8600	1315.00	2218.60	2222.12	2221.74	2223.09	0.004575	7.89	166.71
59.66	0.83									
REACH 1	8500	1315.00	2217.10	2221.61		2222.64	0.004225	8.14	161.63
51.60	0.81									
REACH 1	8200	1438.00	2215.45	2219.89		2221.18	0.005414	9.12	157.63
51.06	0.91									
REACH 1	7800	1438.00	2213.25	2217.65		2218.97	0.005596	9.23	155.76
50.80	0.93									
REACH 1	7450	1494.00	2211.33	2216.29		2217.30	0.003741	8.06	185.34
54.72	0.77									
REACH 1	7350	1494.00	2210.78	2215.58		2216.85	0.004748	9.04	165.23
48.81	0.87									
REACH 1	6700	1494.00	2207.20	2211.63	2211.63	2213.22	0.006527	10.14	147.31
46.56	1.00									
REACH 1	6400	1494.00	2205.55	2210.98	2209.25	2211.33	0.001319	4.74	315.13
96.04	0.46									
REACH 1	6200	1494.00	2204.43	2210.20		2210.95	0.002286	6.93	215.44
54.64	0.62									
REACH 1	6150	1494.00	2204.15	2208.86	2208.86	2210.67	0.006494	10.78	138.62
38.85	1.01									
REACH 1	6037	3058.00	2195.53	2199.95	2202.57	2208.88	0.012394	23.98	127.53
37.69	2.30									
REACH 1	6000	3058.00	2194.61	2198.94	2201.65	2208.36	0.013355	24.62	124.20
37.33	2.38									
REACH 1	5900	3058.00	2192.16	2196.32	2199.20	2206.80	0.015552	25.98	117.70
36.63	2.55									
REACH 1	5800	3058.00	2189.71	2193.74	2196.75	2205.10	0.017443	27.05	113.04
36.12	2.69									
REACH 1	5750	3058.00	2185.88	2189.57	2192.92	2203.83	0.024128	30.31	100.88
34.74	3.14									
REACH 1	5700	3058.00	2184.86	2188.58	2191.90	2202.56	0.023439	30.01	101.91
34.86	3.09									
REACH 1	5600	3058.00	2182.21	2186.39	2189.70	2200.25	0.023523	29.87	102.37
35.43	3.10									
REACH 1	5550	3058.00	2180.98	2184.66	2188.02	2199.00	0.024315	30.40	100.61
34.71	3.15									
REACH 1	5500	3058.00	2177.15	2180.60	2184.19	2197.41	0.030487	32.89	92.97
33.82	3.50									
REACH 1	5400	3058.00	2174.70	2178.22	2181.74	2194.25	0.028504	32.13	95.17
34.08	3.39									
REACH 1	5300	3058.00	2172.25	2175.82	2179.29	2191.32	0.027173	31.60	96.77
34.27	3.31									
REACH 1	5250	3058.00	2168.42	2171.79	2175.46	2189.69	0.033384	33.95	90.08
33.48	3.65									
REACH 1	5200	3058.00	2167.26	2170.68	2174.30	2187.86	0.031462	33.26	91.95
33.70	3.55									
REACH 1	5100	3058.00	2164.95	2168.32	2171.99	2186.18	0.033280	33.91	90.17
33.49	3.64									
REACH 1	5050	3058.00	2163.80	2167.23	2170.84	2184.36	0.031349	33.21	92.07
33.71	3.54									
REACH 1	5000	3058.00	2162.64	2166.11	2169.68	2182.67	0.029858	32.65	93.65
33.90	3.46									
REACH 1	4200	3058.00	2141.22	2144.82	2148.26	2159.96	0.026257	31.22	[illegible]7.94
34.40	3.26									
REACH 1	3900	3058.00	2134.30	2137.9[illegible]	2141.34	2152.22	0.024024	30.27	101.02
34.76	3.13									

	3.08	3058.00	2127.38	1.10	2134.44	2145.02	0.023294	29.94	102.13
REACH 1	1200								
34.9	3.06	3058.00	2072.00	2075.74	2079.06	2089.50	0.022899	29.76	102.74
REACH 1	1100								
49.01	3.76	3058.00	2069.69	2071.94	2074.84	2086.41	0.037640	30.52	100.20
REACH 1	1000								
20.00	2.31	3058.00	2059.69	2069.83	2073.64	2083.55	0.019482	29.72	102.89

Profile Output Table - Standard Table 2

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right
Top Width (ft)		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)
REACH 1	16700								
41.33		2380.26	2379.82	0.44	1.47	0.00		189.00	
REACH 1	16600								
34.62		2377.98	2377.09	0.89	2.24	0.04		189.00	
REACH 1	16550								
34.87		2376.75	2375.88	0.86	1.23	0.01		189.00	
REACH 1	16500								
34.65		2375.53	2374.64	0.89	1.23	0.00		189.00	
REACH 1	16400								
35.42		2373.05	2372.17	0.88	2.50	0.01		189.00	
REACH 1	16300								
35.72		2370.58	2369.73	0.85	2.47	0.01		189.00	
REACH 1	16200								
96.03		2369.71	2369.69	0.02	0.08	0.10		189.00	
REACH 1	16150								
58.56		2369.53	2368.53	0.99	0.65	0.15		915.00	
REACH 1	16000								
40.39		2366.82	2362.42	4.40	2.38	0.34		915.00	
REACH 1	15950								
52.58		2364.77	2363.24	1.53	1.20	0.86		915.00	
REACH 1	15600								
43.54		2357.31	2354.05	3.26	7.28	0.17		915.00	
REACH 1	15300								
48.86		2349.11	2347.06	2.05	7.85	0.36		915.00	
REACH 1	15000								
49.14		2342.35	2339.73	2.62	6.71	0.06		1046.00	
REACH 1	14700								
9.36		2334.97	2332.39	2.58	7.39	0.02		1046.00	
REACH 1	14400								
9.36		2327.62	2325.04	2.58	7.35	0.00		1046.00	
REACH 1	14100								
9.35		2320.27	2317.69	2.58	7.35	0.00		1046.00	
REACH 1	13800								
.49		2312.92	2310.34	2.58	7.35	0.00		1046.00	
REACH 1	13250								
.42		2299.95	2297.21	2.74	12.95	0.02		1315.00	
REACH 1	12700								
.41		2286.63	2283.66	2.97	13.29	0.02		1315.00	
	12500	2282.06	2279.44	2.62	4.46	0.10		1315.00	

53.67	12000	2274.19	2272.27	1.92	7.67	0.21	1315.00
REACH 1 52.08	11500	2266.92	2264.54	2.38	7.23	0.05	1315.00
REACH 1 53.17	11000	2259.25	2257.20	2.05	7.58	0.10	1315.00
REACH 1 52.46	10500	2251.85	2249.59	2.26	7.37	0.02	1315.00
REACH 1 52.92	10000	2244.28	2242.16	2.12	7.53	0.04	1315.00
REACH 1 52.44	9500	2236.84	2234.62	2.22	7.43	0.01	1315.00
REACH 1 52.77	9000	2229.30	2227.14	2.16	7.53	0.02	1315.00
REACH 1 59.66	8600	2223.09	2222.12	0.97	0.44	0.01	1315.00
REACH 1 51.60	8500	2222.64	2221.61	1.03	1.44	0.03	1315.00
REACH 1 51.06	8200	2221.18	2219.89	1.29	2.21	0.00	1438.00
REACH 1 50.80	7800	2218.97	2217.65	1.32	1.58	0.10	1438.00
REACH 1 54.72	7450	2217.30	2216.29	1.01	0.42	0.03	1494.00
REACH 1 48.81	7350	2216.85	2215.58	1.27	3.60	0.03	1494.00
REACH 1 46.56	6700	2213.22	2211.63	1.60	0.75	0.37	1494.00
REACH 1 96.04	6400	2211.33	2210.98	0.35	0.34	0.04	1494.00
REACH 1 54.64	6200	2210.95	2210.20	0.75	0.18	0.11	1494.00
REACH 1 38.85	6150	2210.67	2208.86	1.80	0.33	0.07	1494.00
REACH 1 37.69	6037	2208.88	2199.95	8.93	1.10	0.71	3058.00
REACH 1 37.33	6000	2208.36	2198.94	9.41	0.48	0.05	3058.00
REACH 1 36.63	5900	2206.80	2196.32	10.48	1.44	0.11	3058.00
REACH 1 36.12	5800	2205.10	2193.74	11.36	1.64	0.09	3058.00
REACH 1 34.74	5750	2203.83	2189.57	14.27	1.02	0.29	3058.00
REACH 1 34.86	5700	2202.56	2188.58	13.98	1.19	0.09	3058.00
REACH 1 35.43	5600	2200.25	2186.39	13.86	2.34	0.07	3058.00
REACH 1 35.71	5550	2199.00	2184.66	14.35	1.20	0.05	3058.00
REACH 1 35.82	5500	2197.41	2180.60	16.80	1.36	0.25	3058.00
REACH 1 36.08	5400	2194.25	2178.22	16.03	2.94	0.24	3058.00
REACH 1 36.27	5300	2191.32	2175.82	15.50	2.78	0.16	3058.00
REACH 1	5250	2189.69	2171.79	17.90	1.50		

33.70	5200	2187.86	2170.68	17.17	1.62	0.22	3058.00
RE[redacted] 1 33.45	5100	2186.18	2168.32	17.86	1.62	0.07	3058.00
REACH 1 33.71	5050	2184.36	2167.23	17.13	1.61	0.22	3058.00
REACH 1 33.90	5000	2182.67	2166.11	16.56	1.53	0.18	3058.00
REACH 1 34.40	4200	2159.96	2144.82	15.14	22.32	0.44	3058.00
REACH 1 34.76	3900	2152.22	2137.99	14.23	7.51	0.29	3058.00
REACH 1 34.89	3600	2145.02	2131.10	13.92	7.10	0.09	3058.00
REACH 1 34.96	1200	2089.50	2075.74	13.76	55.47	0.05	3058.00
REACH 1 49.01	1100	2086.41	2071.94	14.46	2.91	0.08	3058.00
REACH 1 20.00	1000	2083.55	2069.83	13.72	2.63	0.23	3058.00

APPENDIX F

HEC-RAS CALCULATIONS

Sub-Critical Evaluation

Of Discharge Channel

HEC-RAS Plan: BASINOTS River: Equestrian Outfa Reach: 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Max Chl Dpth	Top Width	Sta W.S. Lft	Sta W.S. Rgt	LOB Elev	ROB Elev
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1	33.2	247.00	2047.00	2049.85	2049.01	2050.09	0.001908	3.95	2.85	32.23	116.46	148.69	2052.00	2052.00
1	32.1	247.00	2047.00	2049.03	2049.03	2049.69	0.008446	6.54	2.03	28.13	118.92	147.05	2052.00	2052.00
1	31.1	247.00	2044.00	2045.66	2045.66	2046.39	0.008276	6.84	1.66	24.41	149.09	173.49	2048.00	2048.00
1	30.1	247.00	2040.00	2043.00	2043.00	2044.09	0.008784	8.39	3.00	13.64	144.75	158.39	2044.00	2045.00
1	29.1	247.00	2040.00	2041.14	2041.14	2041.60	0.009454	5.44	1.14	49.59	126.83	176.42	2044.00	2044.00
1	28.1	247.00	2036.00	2038.35	2038.35	2038.96	0.009408	6.25	2.35	33.88	227.77	261.65	2040.00	2040.00
1	27.1	247.00	2034.50	2037.06	2037.06	2037.59	0.009769	5.84	2.56	40.81	285.94	326.75	2040.00	2040.00
1	26.1	247.00	2032.00	2033.79	2033.79	2034.48	0.008667	6.65	1.79	27.45	316.76	344.21	2036.00	2036.00
1	25.1	247.00	2031.50	2032.97	2032.97	2033.40	0.010056	5.26	1.47	56.36	220.70	277.06	2035.00	2035.00
1	24.1	247.00	2029.50	2031.25	2031.25	2031.61	0.010720	4.80	1.75	74.47	289.59	364.06	2032.00	2032.00
1	23.1	247.00	2028.00	2028.87	2028.85	2029.16	0.009956	4.30	0.87	93.15	195.43	288.58	2030.00	2032.00
1	22.1	247.00	2026.50	2027.35	2027.33	2027.54	0.010782	3.50	0.85	165.18	245.40	410.58	2028.00	2028.00
1	21.1	247.00	2025.50	2025.90	2025.90	2026.07	0.012990	3.33	0.40	214.73	172.90	387.63	2026.00	2026.50
1	20.1	247.00	2024.00	2024.78		2024.81	0.000813	1.35	0.78	259.13	158.01	417.14	2028.00	2026.50
1	19.1	247.00	2024.00	2024.29	2024.29	2024.44	0.013826	3.04	0.29	282.55	111.91	394.46	2027.00	2025.50
1	17.1	247.00	2020.00	2021.37		2021.43	0.001088	2.02	1.37	117.02	183.36	300.38	2024.00	2024.00
1	16.1	247.00	2020.00	2020.67	2020.67	2020.96	0.011049	4.33	0.67	98.72	179.08	277.80	2021.82	2021.50
1	15.1	247.00	2019.00	2019.98	2019.98	2020.25	0.011443	4.18	0.98	110.79	74.13	184.92	2020.00	2020.00
1	14.1	247.00	2016.00	2016.88	2016.88	2017.13	0.011813	4.03	0.88	124.59	197.74	322.32	2017.00	2018.50
1	13.1	247.00	2013.50	2014.03	2014.03	2014.21	0.012960	3.49	0.53	191.20	325.90	523.75	2014.00	2016.00
1	12.1	247.00	2010.50	2011.21	2011.21	2011.42	0.012103	3.73	0.71	163.23	394.90	558.13	2012.00	2011.00
1	11.1	247.00	2007.00	2007.62	2007.62	2007.86	0.011756	3.95	0.62	130.05	352.89	482.94	2008.00	2008.00
1	10.1	247.00	2000.00	2001.73		2002.01	0.004573	4.20	1.73	54.76	364.56	419.32	2004.00	2003.00
1	9.1	247.00	1998.00	2000.56	2000.56	2000.85	0.007363	5.28	2.56	100.69	194.20	325.00	2000.00	2000.00
1	8.1	247.00	1994.00	1995.59	1995.36	1995.78	0.004784	3.48	1.59	91.11	188.70	279.81	1996.00	1996.00
1	7.1	247.00	1993.50	1994.65	1994.65	1994.93	0.011603	4.24	1.15	107.91	210.77	318.69	1995.50	1996.00
1	6.1	247.00	1988.00	1989.51	1989.51	1989.90	0.010023	5.04	1.51	62.67	197.17	259.83	1991.00	1991.50
1	5.1	247.00	1986.00	1986.10	1986.10	1986.31	0.012057	0.87	0.60	165.06	176.81	508.44	1987.00	1988.00
1	4.1	247.00	1982.00	1982.77	1982.77	1983.03	0.011403	4.09	0.77	116.79	350.29	467.08	1983.50	1984.00
1	3.1	247.00	1979.00	1979.81	1979.81	1979.95	0.015324	2.84	1.31	306.42	388.58	695.00	1980.00	1979.75
1	2.1	247.00	1976.25	1977.31		1977.36	0.001269	1.72	1.06	208.63	268.37	477.00	1976.50	1977.00
1	1.1	247.00	1976.00	1976.70	1976.70	1977.01	0.010009	4.68	0.70	88.00	0.00	88.00	1976.00	1976.00

HEC-RAS Plan: BASINOTS River: Equestrian Outfa Reach: 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	33.2	247.00	2047.00	2049.85	2049.01	2050.09	0.001908	3.95	62.46	32.23	0.50
1	32.1	247.00	2047.00	2049.03	2049.03	2049.69	0.008446	6.54	37.75	28.13	1.00
1	31.1	247.00	2044.00	2045.66	2045.66	2046.39	0.008276	6.84	36.09	24.41	0.99
1	30.1	247.00	2040.00	2043.00	2043.00	2044.09	0.008784	8.39	29.43	13.64	1.01
1	29.1	247.00	2040.00	2041.14	2041.14	2041.60	0.009454	5.44	45.41	49.59	1.00
1	28.1	247.00	2036.00	2038.35	2038.35	2038.96	0.009408	6.25	39.53	33.88	1.02
1	27.1	247.00	2034.50	2037.06	2037.06	2037.59	0.009769	5.84	42.29	40.81	1.01
1	26.1	247.00	2032.00	2033.79	2033.79	2034.48	0.008667	6.65	37.16	27.45	1.01
1	25.1	247.00	2031.50	2032.97	2032.97	2033.40	0.010056	5.26	46.99	56.36	1.01
1	24.1	247.00	2029.50	2031.25	2031.25	2031.61	0.010720	4.80	51.43	74.47	1.02
1	23.1	247.00	2028.00	2028.87	2028.85	2029.16	0.009956	4.30	57.48	93.15	0.96
1	22.1	247.00	2026.50	2027.35	2027.33	2027.54	0.010782	3.50	70.56	165.18	0.94
1	21.1	247.00	2025.50	2025.90	2025.90	2026.07	0.012990	3.33	74.11	214.73	1.00
1	20.1	247.00	2024.00	2024.78		2024.81	0.000813	1.35	183.51	259.13	0.28
1	19.1	247.00	2024.00	2024.29	2024.29	2024.44	0.013826	3.04	81.18	282.55	1.00
1	17.1	247.00	2020.00	2021.37		2021.43	0.001088	2.02	122.37	117.02	0.35
1	16.1	247.00	2020.00	2020.67	2020.67	2020.96	0.011049	4.33	57.02	98.72	1.00
1	15.1	247.00	2019.00	2019.98	2019.98	2020.25	0.011443	4.18	59.10	110.79	1.01
1	14.1	247.00	2016.00	2016.88	2016.88	2017.13	0.011813	4.03	61.33	124.59	1.01
1	13.1	247.00	2013.50	2014.03	2014.03	2014.21	0.012960	3.49	70.73	191.20	1.01
1	12.1	247.00	2010.50	2011.21	2011.21	2011.42	0.012103	3.73	66.92	163.23	1.00
1	11.1	247.00	2007.00	2007.62	2007.62	2007.86	0.011756	3.95	62.48	130.05	1.00
1	10.1	247.00	2000.00	2001.73		2002.01	0.004573	4.20	58.76	54.76	0.72
1	9.1	247.00	1998.00	2000.56	2000.56	2000.85	0.007363	5.28	62.34	100.69	0.89
1	8.1	247.00	1994.00	1995.59	1995.36	1995.78	0.004784	3.48	71.01	91.11	0.69
1	7.1	247.00	1993.50	1994.65	1994.65	1994.93	0.011603	4.24	58.22	107.91	1.02
1	6.1	247.00	1988.00	1989.51	1989.51	1989.90	0.010023	5.04	48.97	62.67	1.01
1	5.1	247.00	1986.00	1986.10	1986.10	1986.31	0.012057	0.87	67.61	165.06	0.70
1	4.1	247.00	1982.00	1982.77	1982.77	1983.03	0.011403	4.09	60.41	116.79	1.00
1	3.1	247.00	1979.00	1979.81	1979.81	1979.95	0.015324	2.84	81.41	306.42	1.02
1	2.1	247.00	1976.25	1977.31		1977.36	0.001269	1.72	146.93	208.63	0.35
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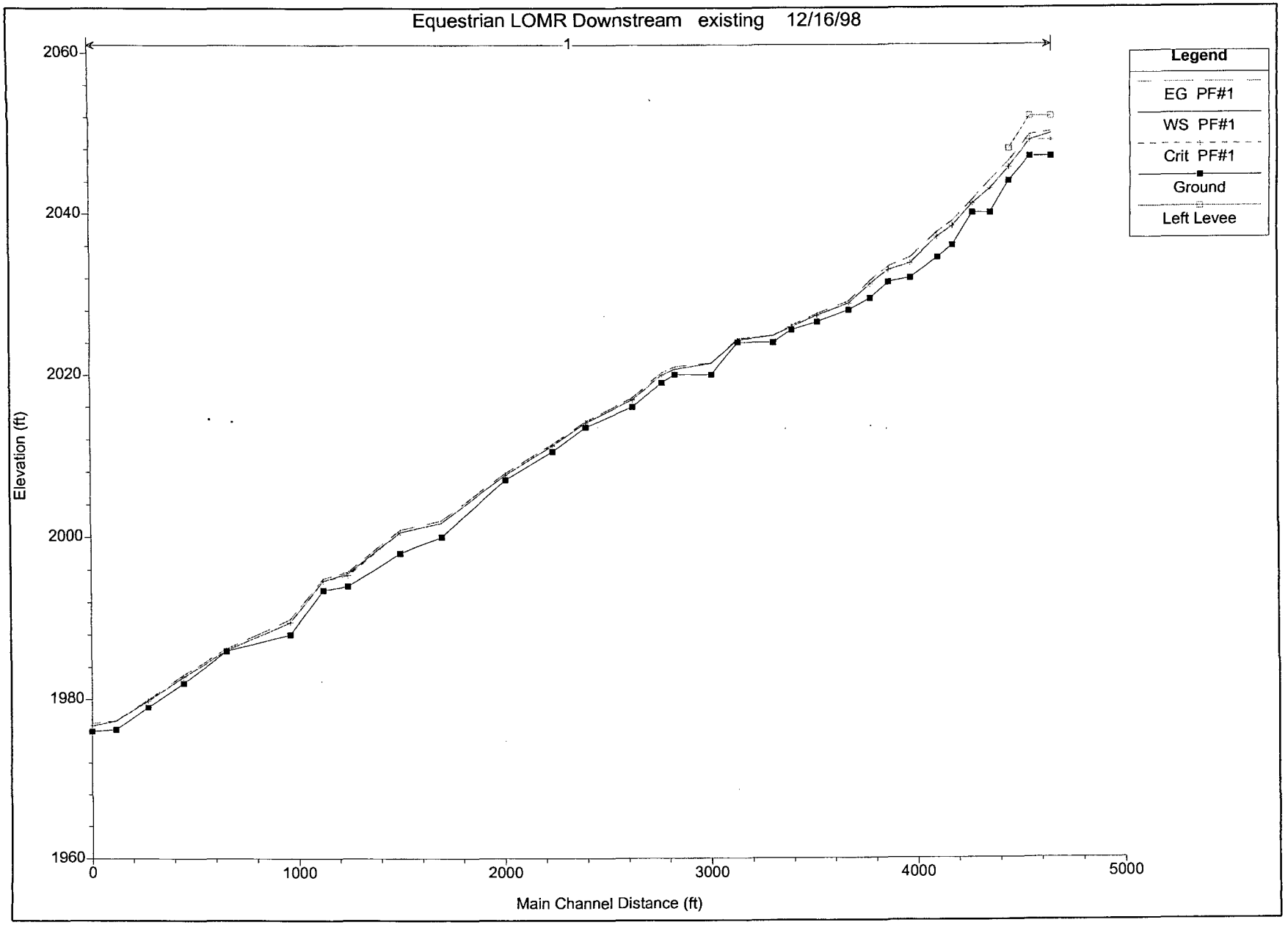
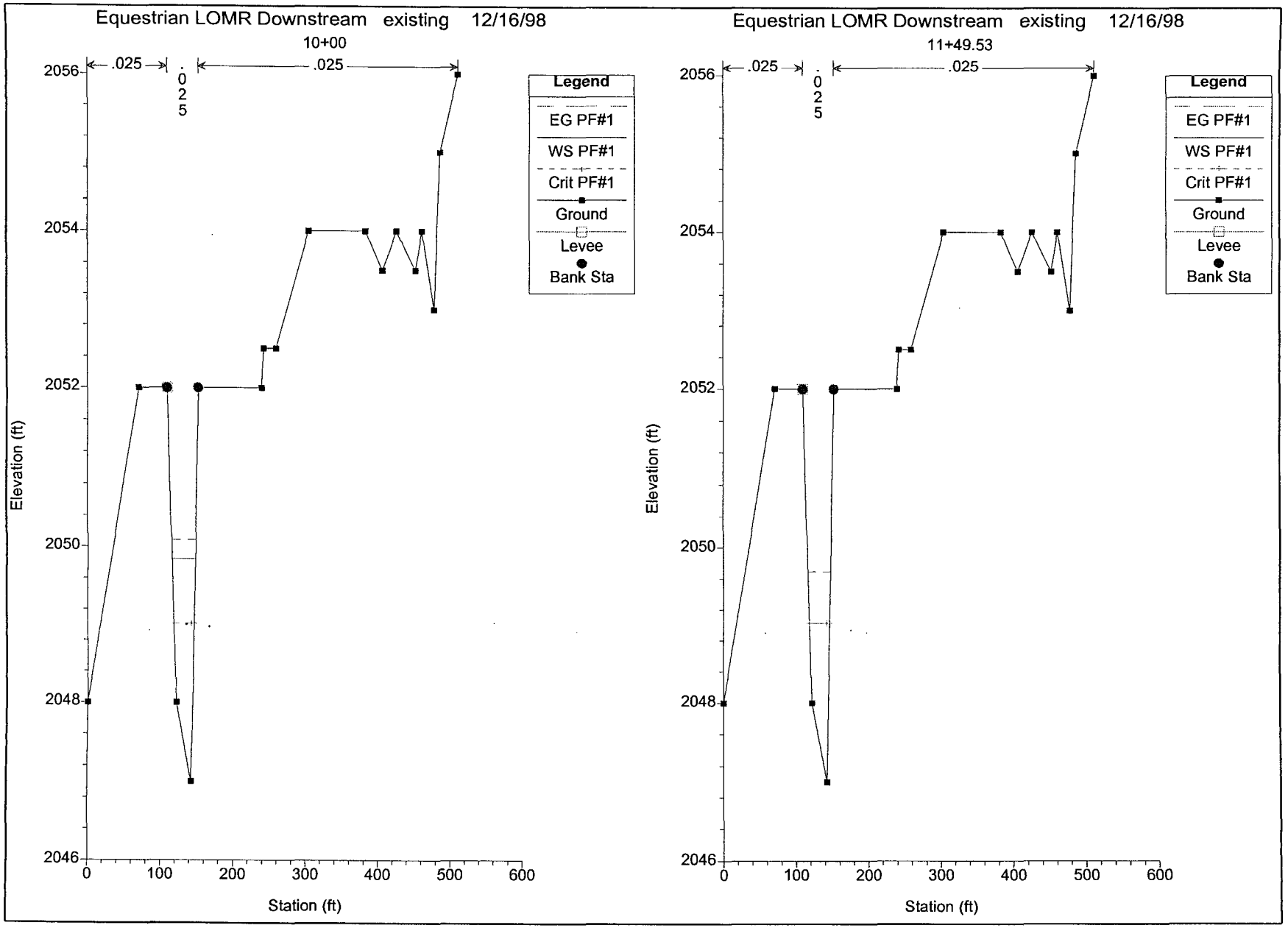

Equestrian LOMR Downstream existing 12/16/98
1
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Left Levee
2060
2040
2020
2000
1980
1960
Elevation (ft)
0
1000
2000
3000
4000
5000
Main Channel Distance (ft)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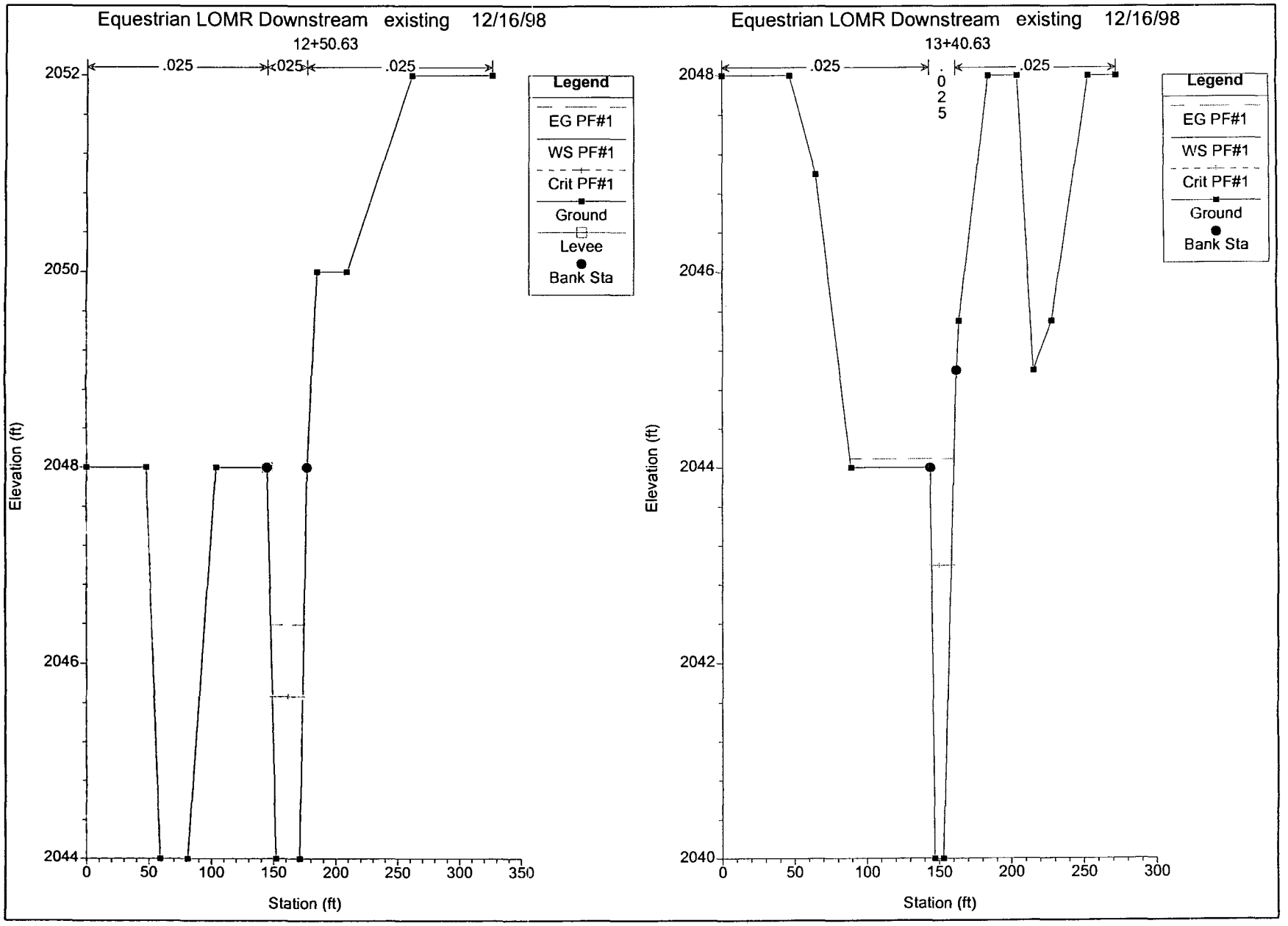
10+00
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
2056
2054
2052
2050
2048
2046
0
100
200
300
400
500
600
Equestrian LOMR Downstream existing 12/16/98
11+49.53
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)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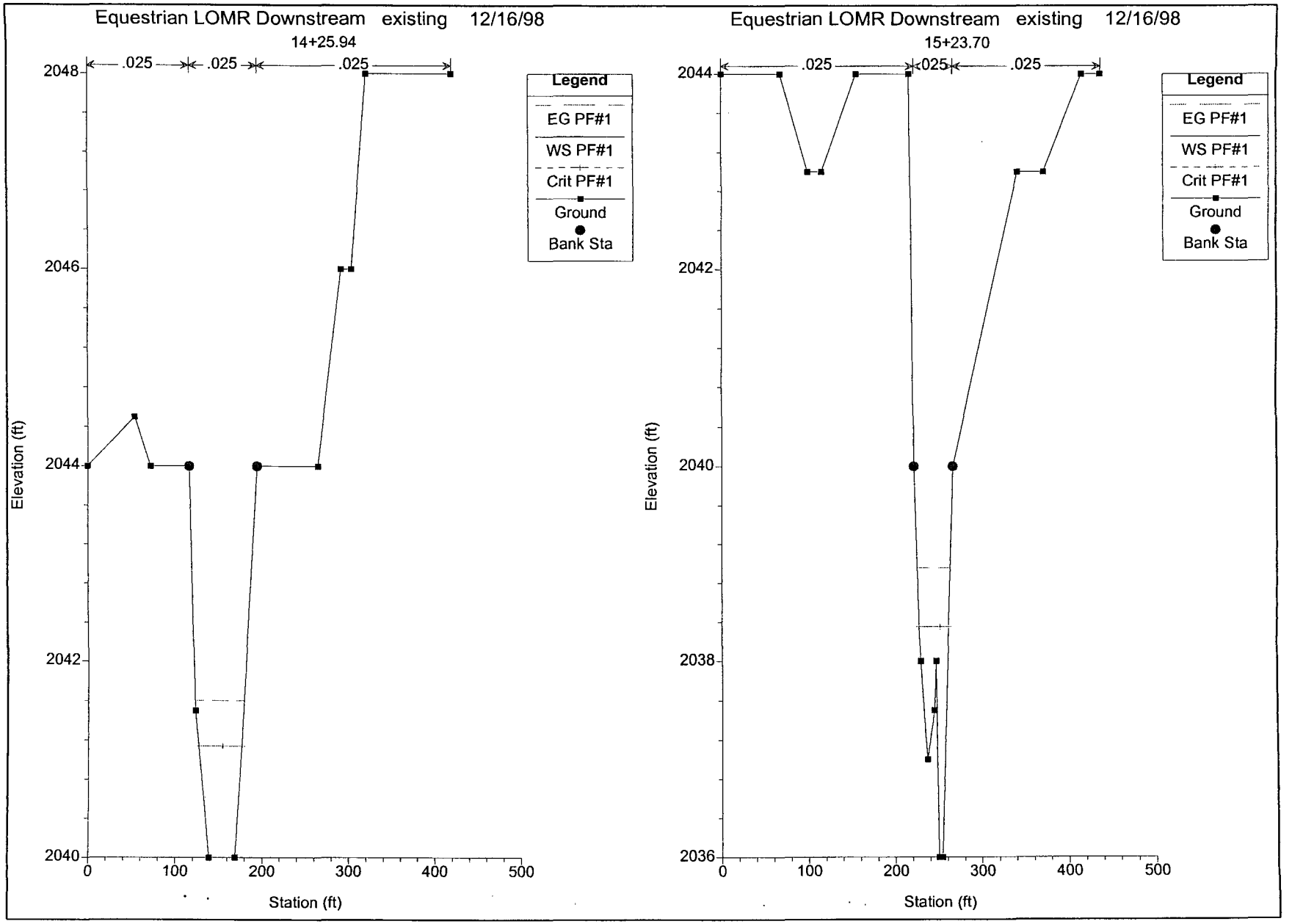
12+50.63
.025
.025
.025
2052
2050
2048
2046
2044
Elevation (ft)
0
50
100
150
200
250
300
350
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Equestrian LOMR Downstream existing 12/16/98
13+40.63
.025
.025
2048
2046
2044
2042
2040
Elevation (ft)
0
50
100
150
200
250
300
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


Equestrian LOMR Downstream existing 12/16/98
14+25.94
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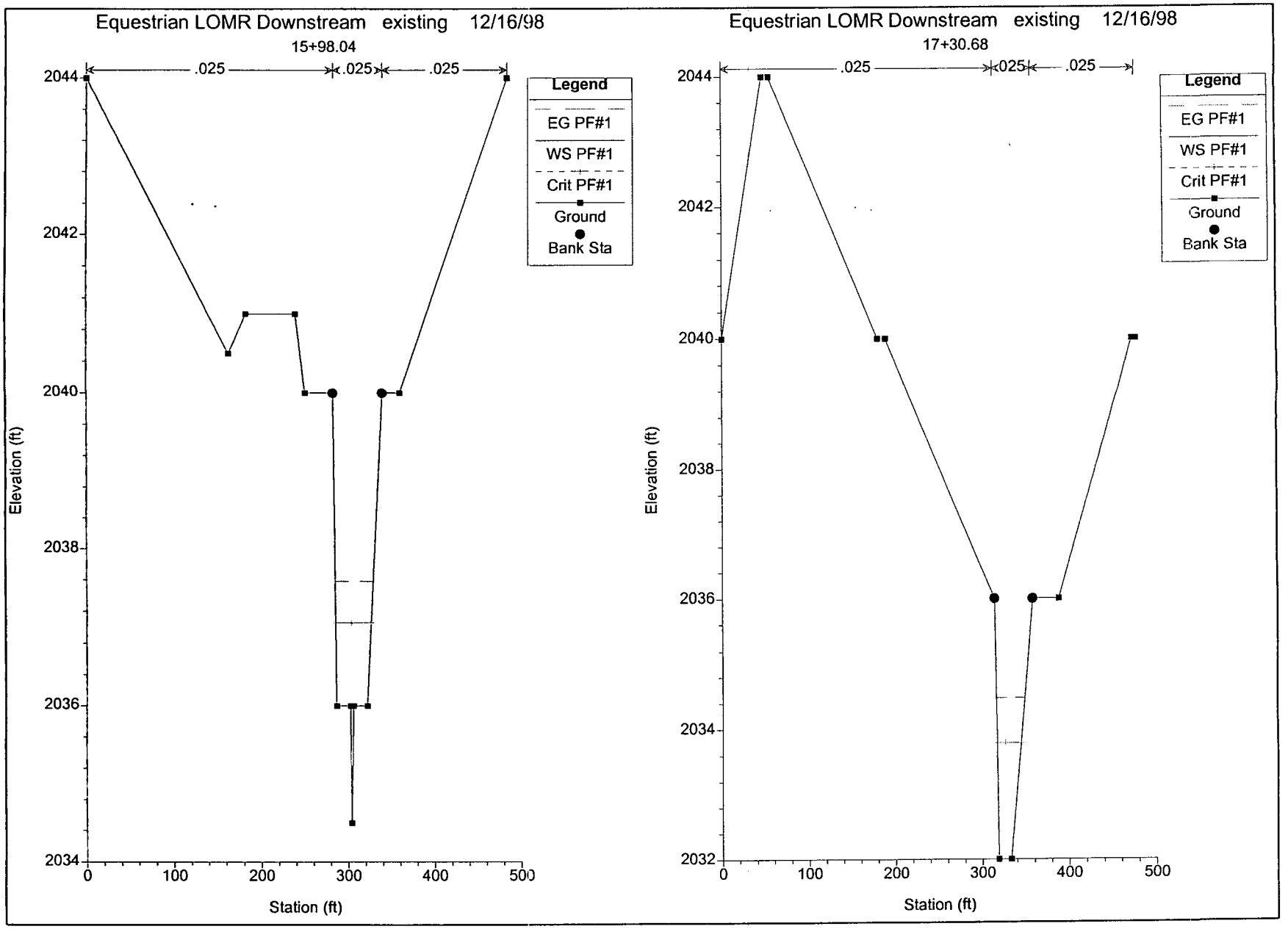
.025
.025
2048
2046
2044
2042
2040
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Equestrian LOMR Downstream existing 12/16/98
15+23.70
.025
025
.025
2044
2042
2040
2038
2036
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta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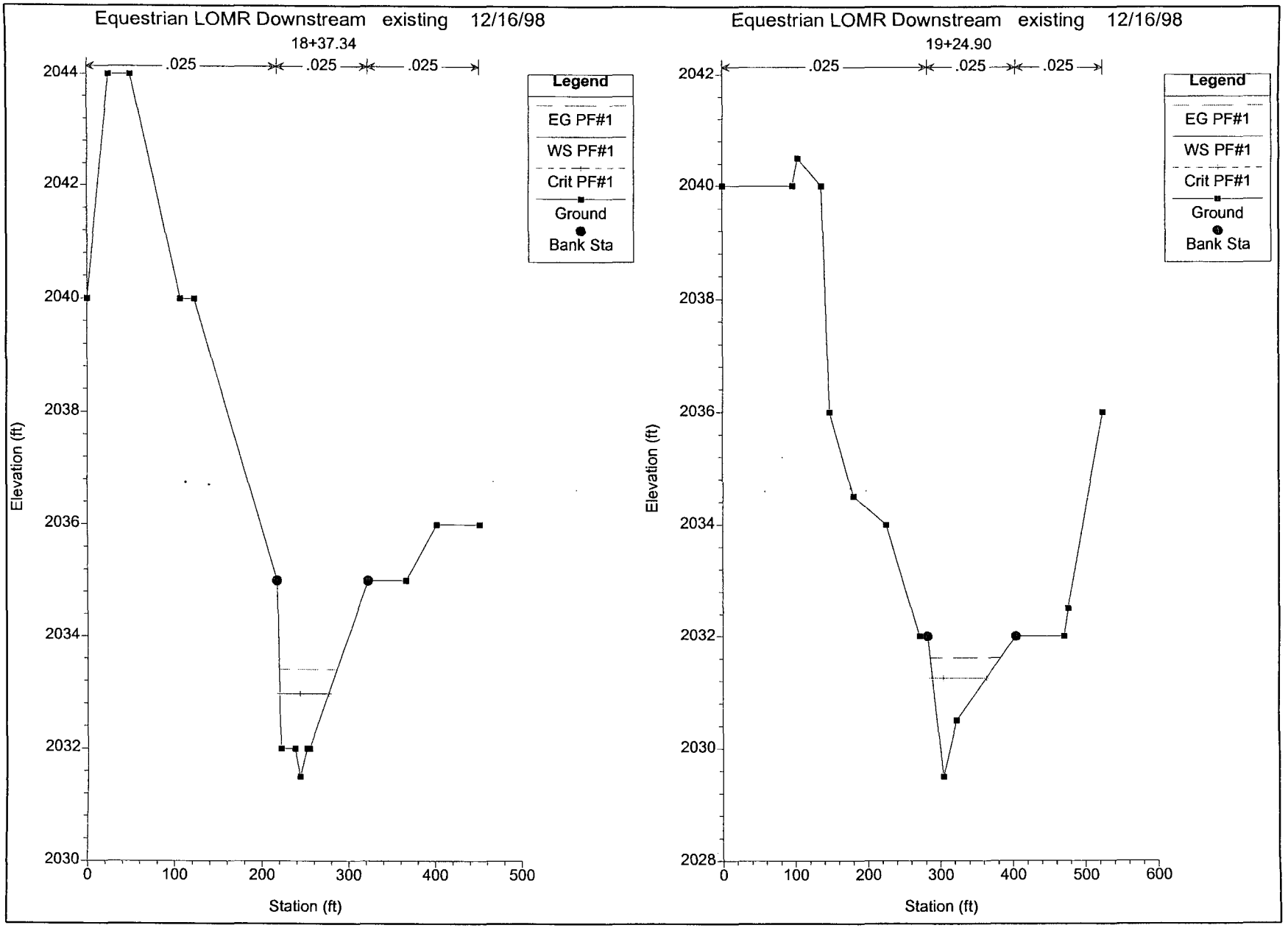
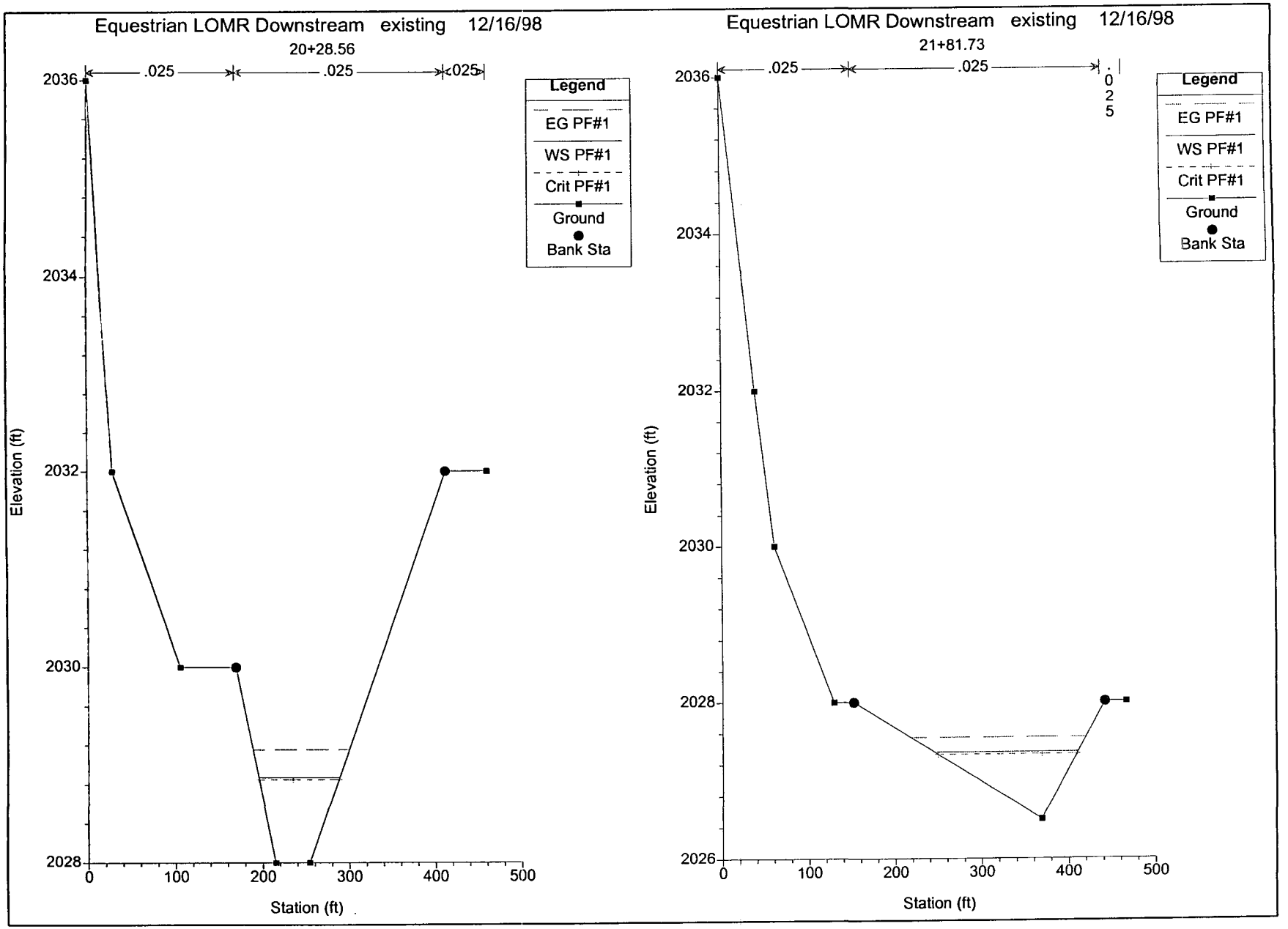
15+98.04
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2044
2042
2040
2038
2036
2034
0
100
200
300
400
500
Equestrian LOMR Downstream existing 12/16/98
17+30.68
.025
025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2044
2042
2040
2038
2036
2034
2032
0
100
200
300
400
500


Equestrian LOMR Downstream existing 12/16/98
18+37.34
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2044
2042
2040
2038
2036
2034
2032
2030
0
100
200
300
400
500
Equestrian LOMR Downstream existing 12/16/98
19+24.90
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2042
2040
2038
2036
2034
2032
2030
2028
0
100
200
300
400
500
600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20+28.56
.025
.025
.025
2036
2034
2032
2030
2028
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Equestrian LOMR Downstream existing 12/16/98
21+81.73
.025
.025
.025
2036
2034
2032
2030
2028
2026
Elevation (ft)
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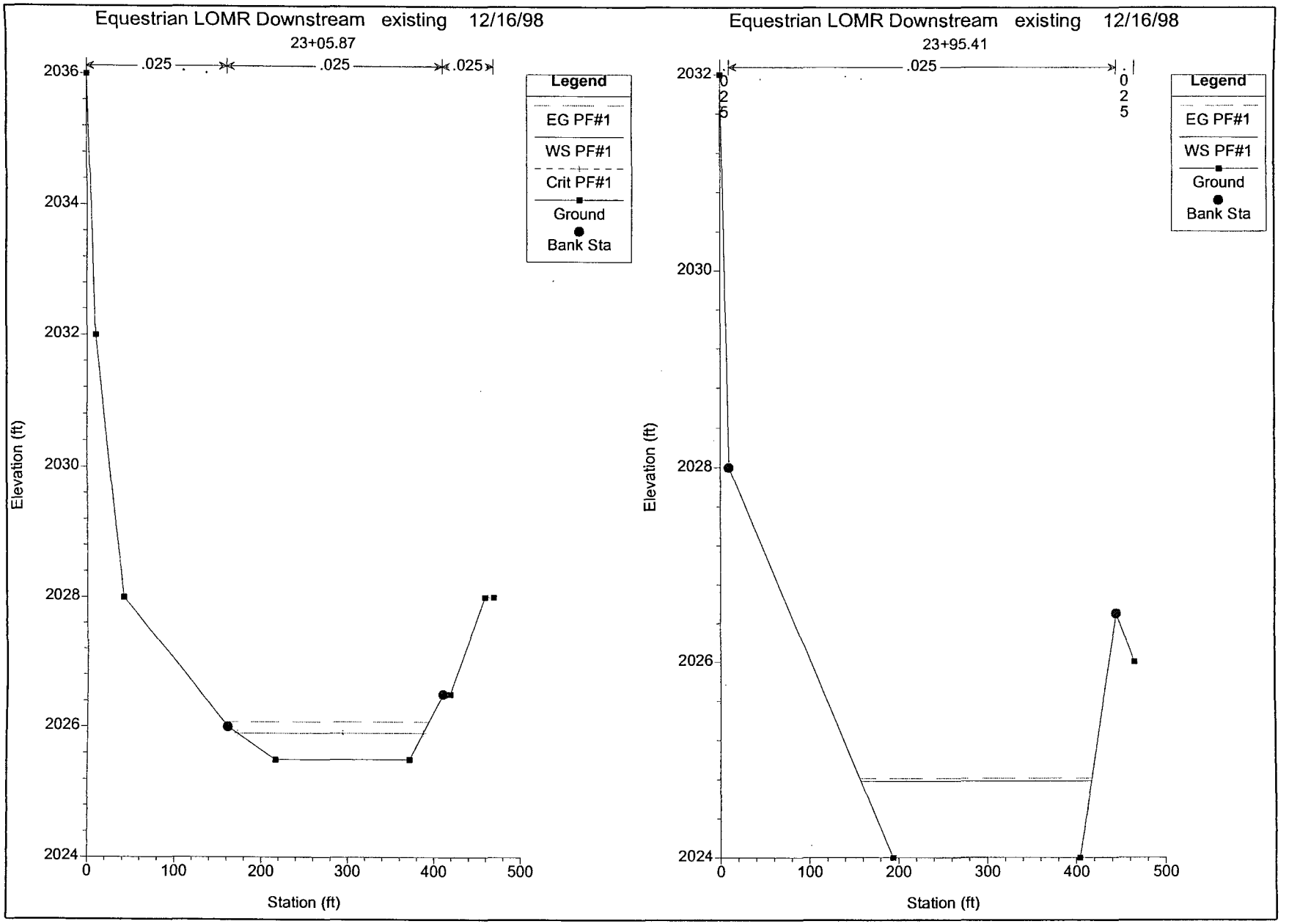
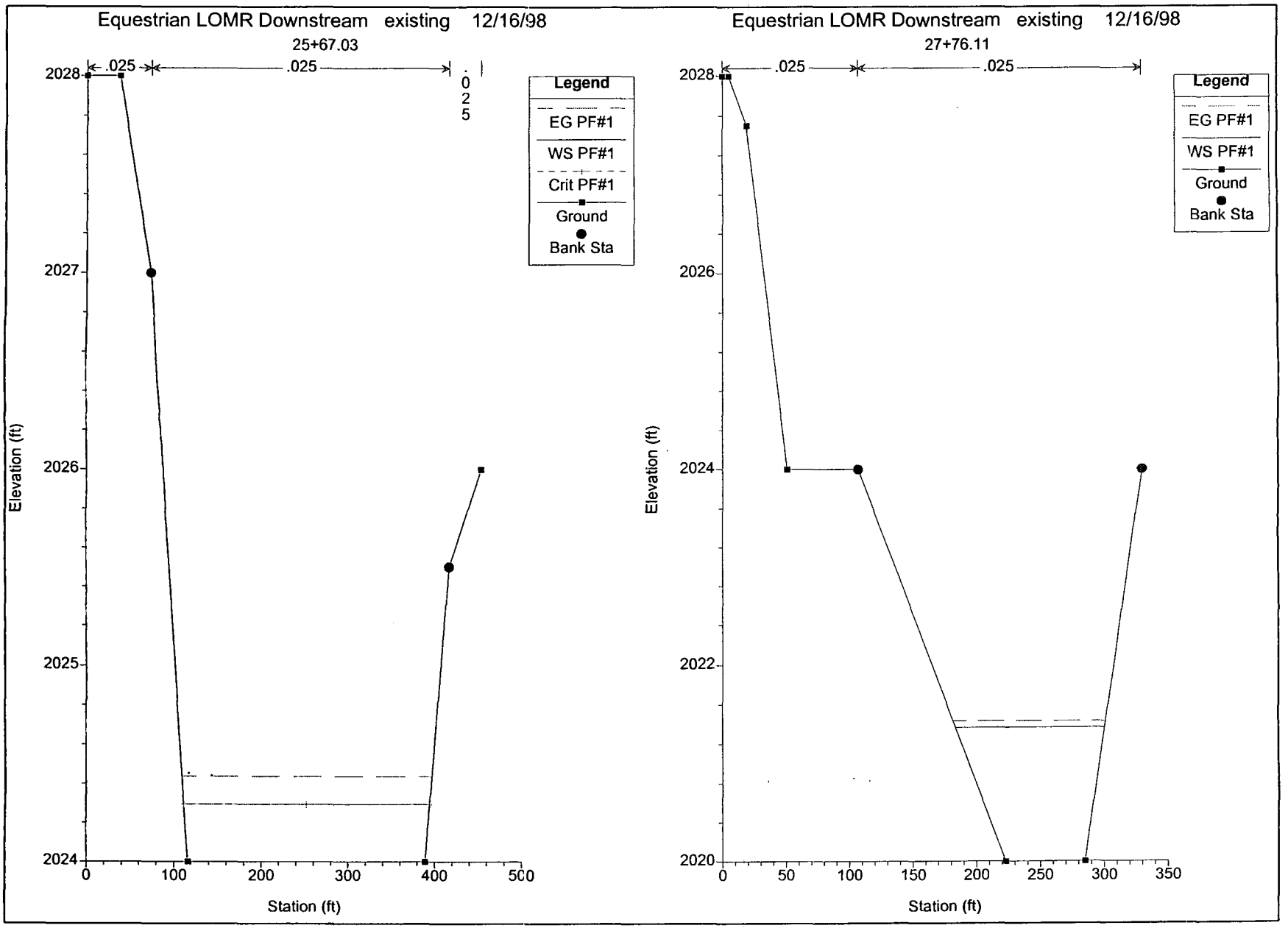
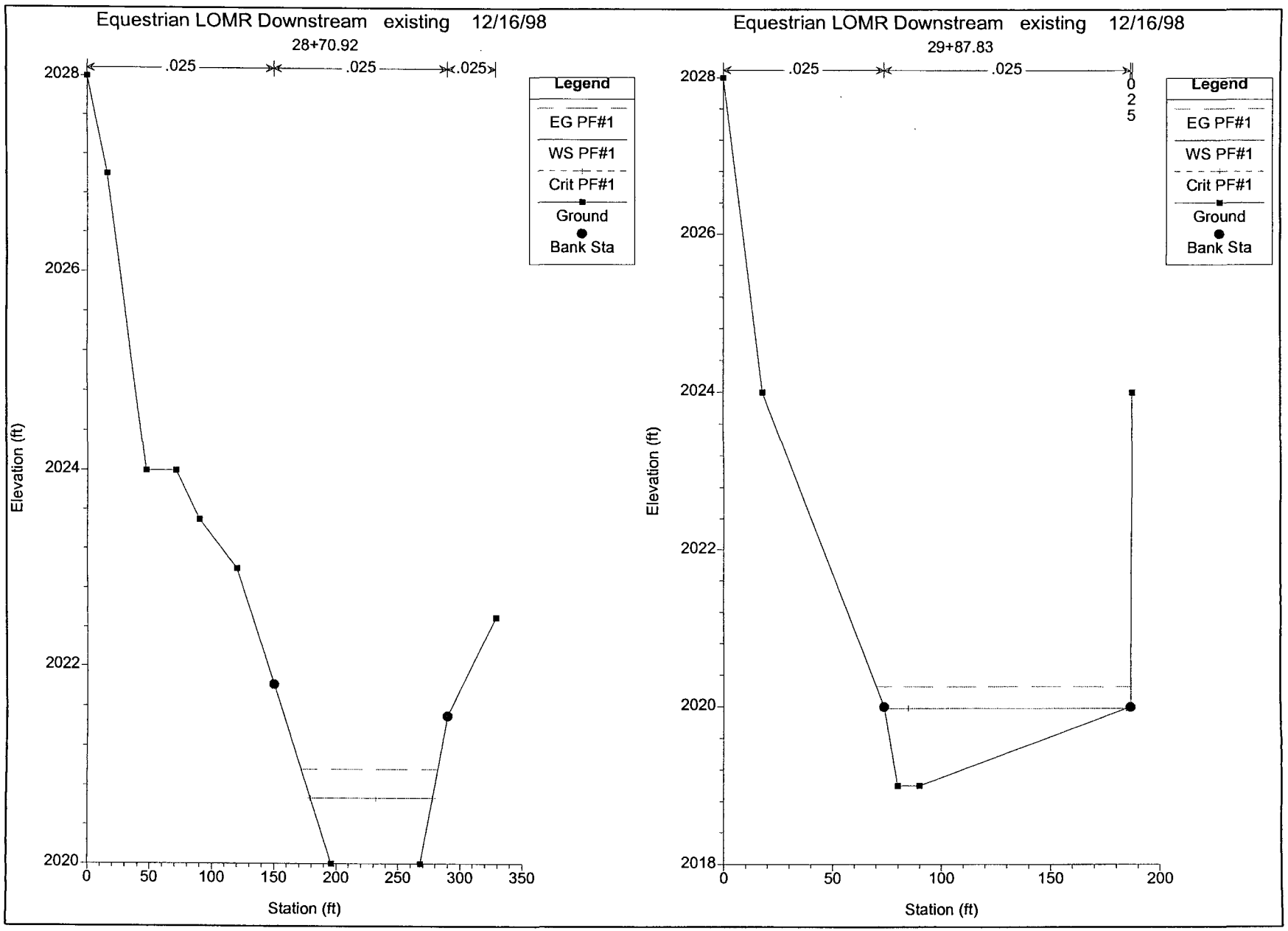
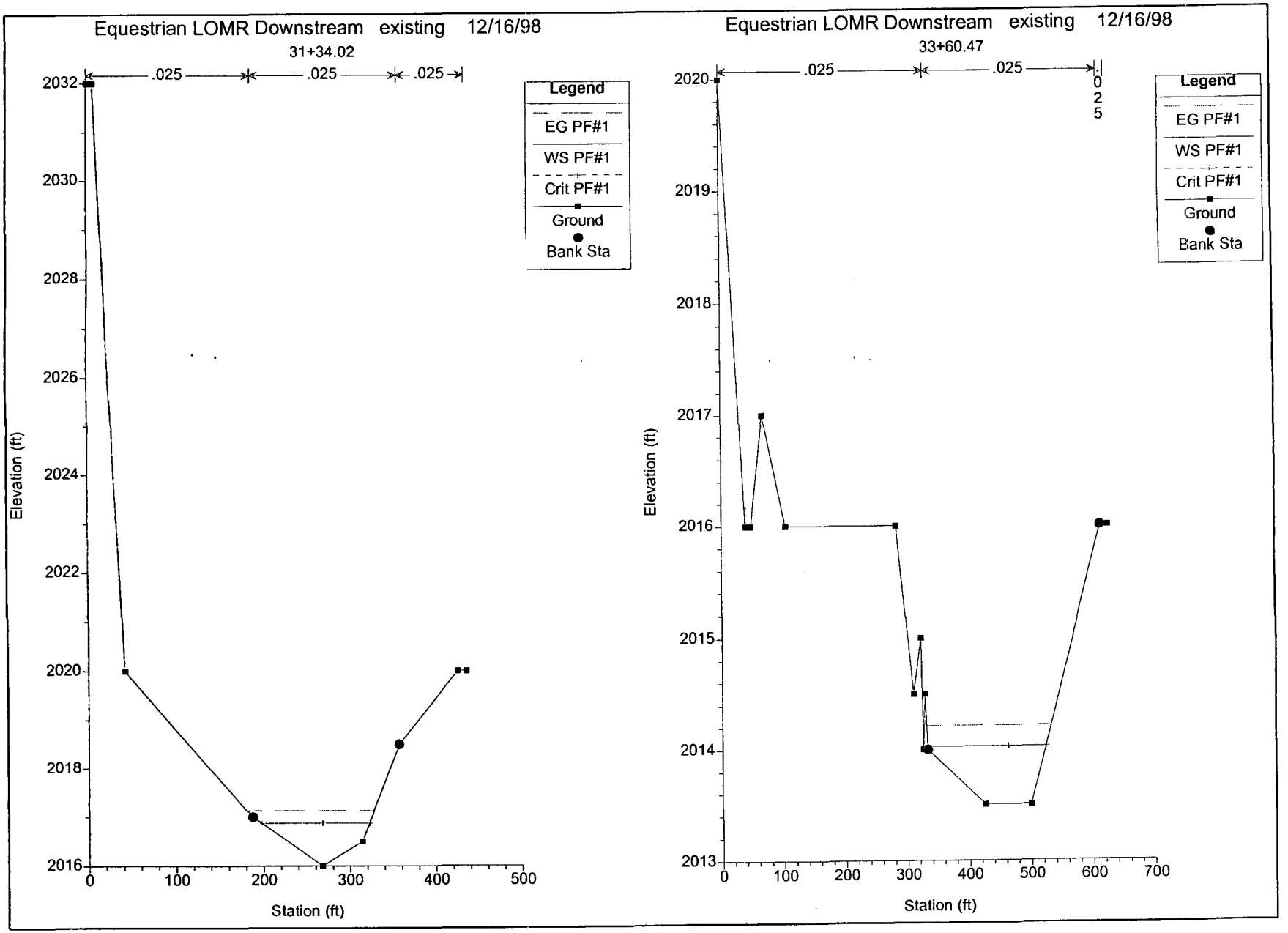
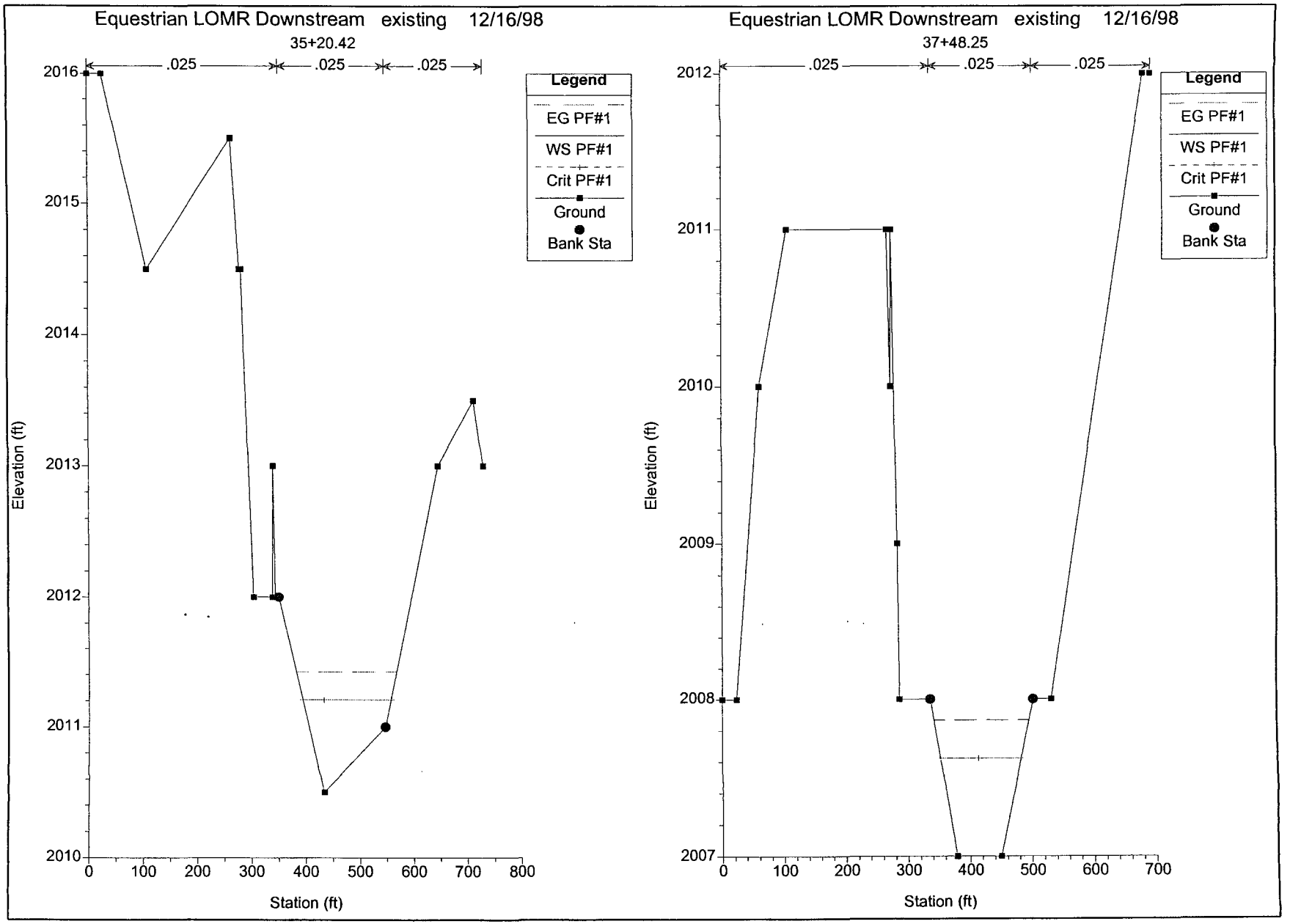
100
200
300
400
500
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta

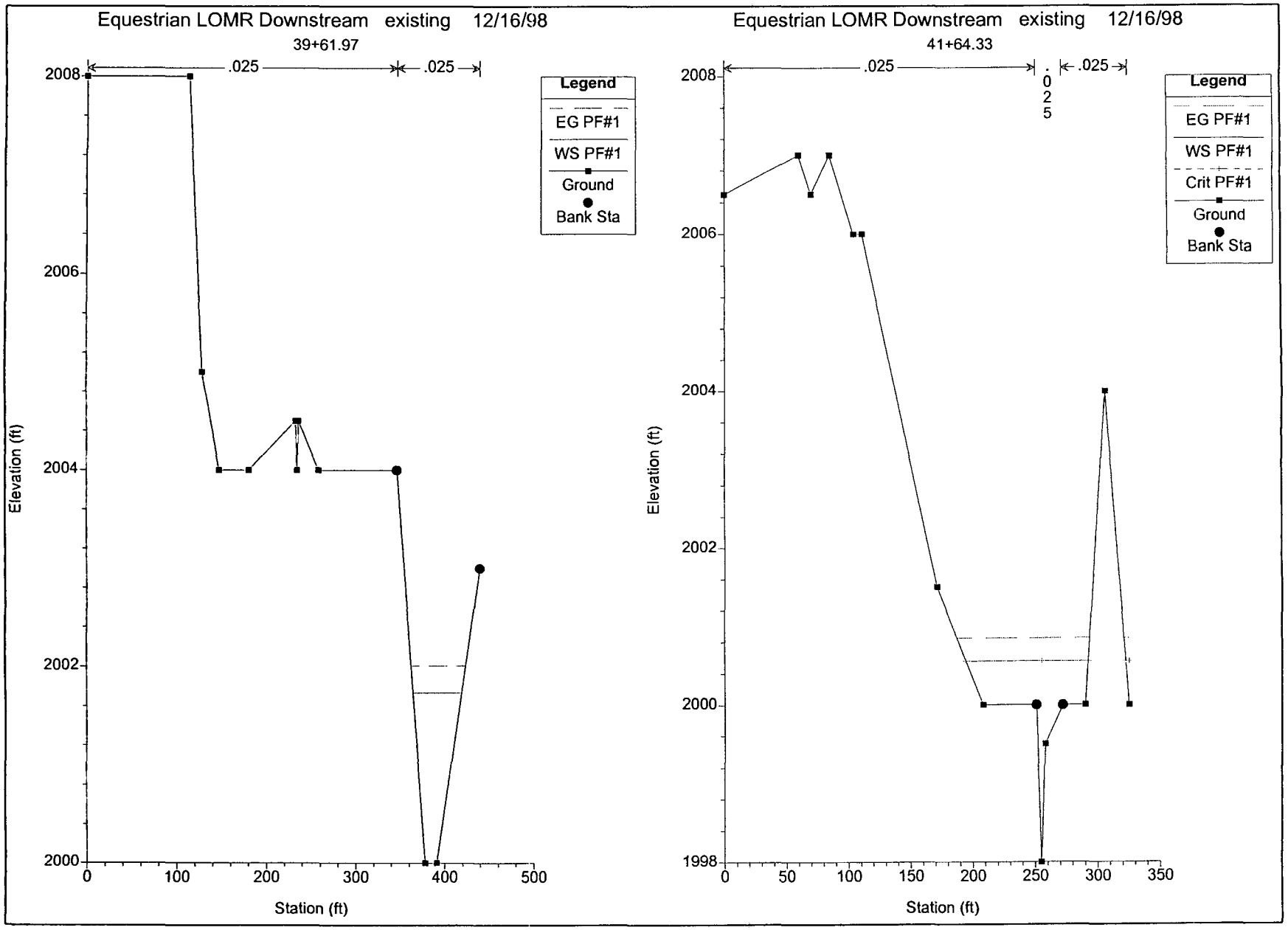

Equestrian LOMR Downstream existing 12/16/98
23+05.87
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2036
2034
2032
2030
2028
2026
2024
0
100
200
300
400
500
Equestrian LOMR Downstream existing 12/16/98
23+95.41
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2032
2030
2028
2026
2024
0
100
200
300
400
500

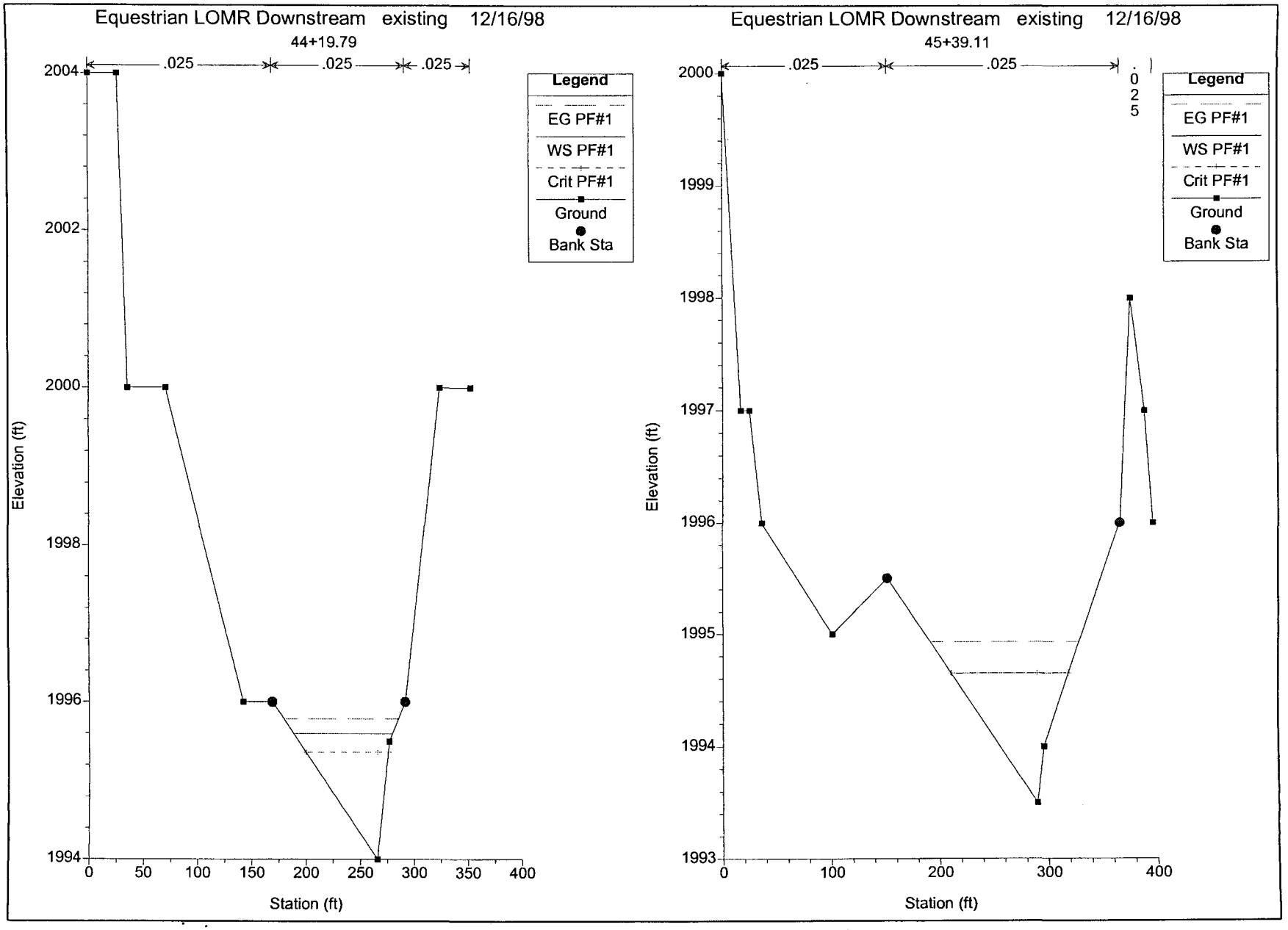

Equestrian LOMR Downstream existing 12/16/98
25+67.03
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
2028
2027
2026
2025
2024
0
100
200
300
400
500
Station (ft)
Equestrian LOMR Downstream existing 12/16/98
27+76.11
.025
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
2028
2026
2024
2022
2020
0
50
100
150
200
250
300
350
Station (ft)


Equestrian LOMR Downstream existing 12/16/98
28+70.92
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2028
2026
2024
2022
2020
0
50
100
150
200
250
300
350
Equestrian LOMR Downstream existing 12/16/98
29+87.83
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2028
2026
2024
2022
2020
2018
0
50
100
150
200


Equestrian LOMR Downstream existing 12/16/98
31+34.02
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2032
2030
2028
2026
2024
2022
2020
2018
2016
0
100
200
300
400
500
Equestrian LOMR Downstream existing 12/16/98
33+60.47
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2020
2019
2018
2017
2016
2015
2014
2013
0
100
200
300
400
500
600
700


Equestrian LOMR Downstream existing 12/16/98
35+20.42
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2016
2015
2014
2013
2012
2011
2010
0
100
200
300
400
500
600
700
800
Equestrian LOMR Downstream existing 12/16/98
37+48.25
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2012
2011
2010
2009
2008
2007
0
100
200
300
400
500
600
700


Equestrian LOMR Downstream existing 12/16/98
39+61.97
.025
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2008
2006
2004
2002
2000
0
100
200
300
400
500
Equestrian LOMR Downstream existing 12/16/98
41+64.33
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2008
2006
2004
2002
2000
1998
0
50
100
150
200
250
300
350


Equestrian LOMR Downstream existing 12/16/98
44+19.79
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.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2004
2002
2000
1998
1996
1994
0
50
100
150
200
250
300
350
400
Equestrian LOMR Downstream existing 12/16/98
45+39.11
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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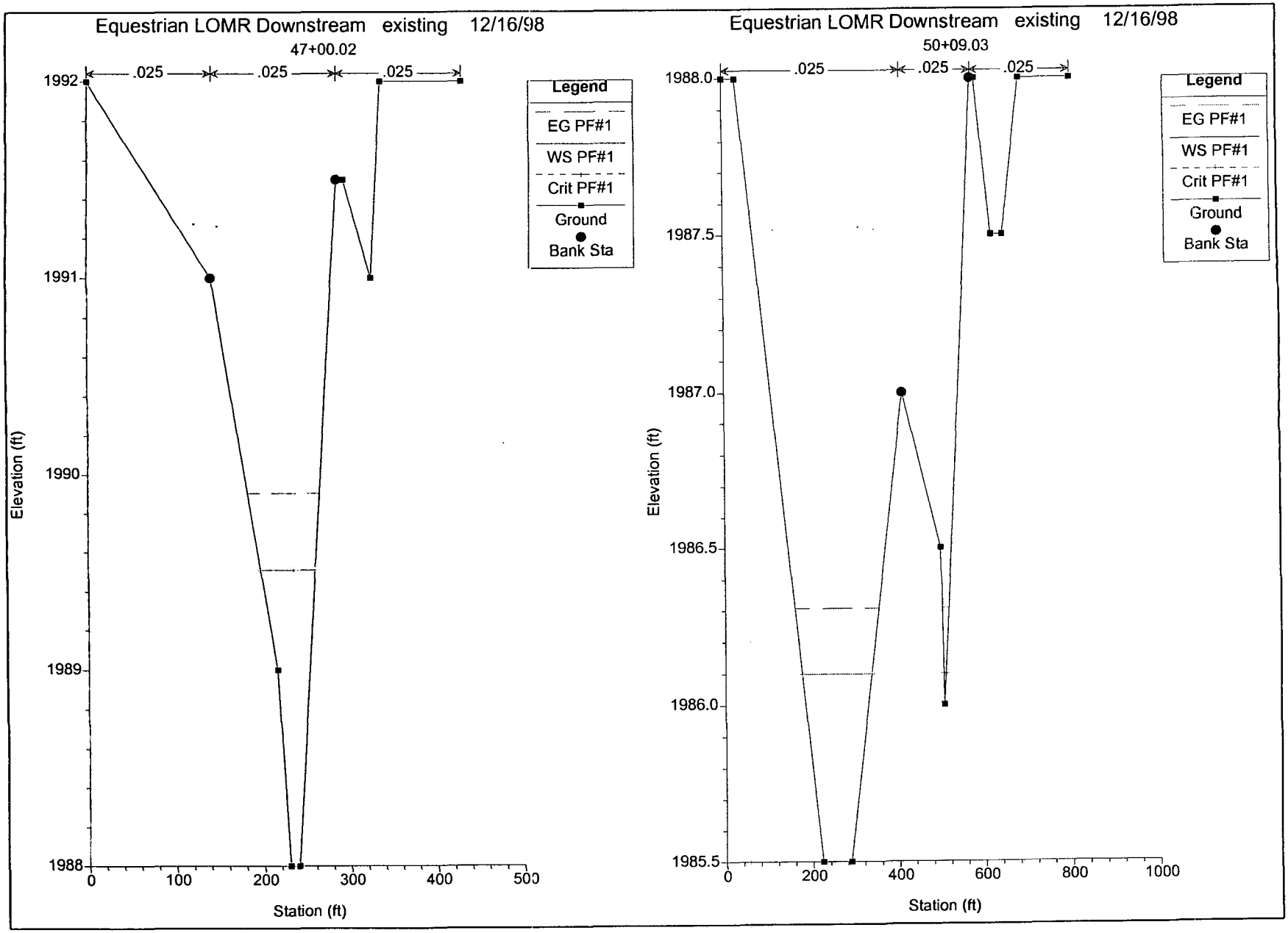
1999
1998
1997
1996
1995
1994
1993
0
100
200
300
400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47+00.02
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.025
.025
1992
1991
1990
1989
1988
Elevation (ft)
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100
200
300
400
500
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Equestrian LOMR Downstream existing 12/16/98
50+09.03
.025
.025
.025
1988.0
1987.5
1987.0
1986.5
1986.0
1985.5
Elevation (ft)
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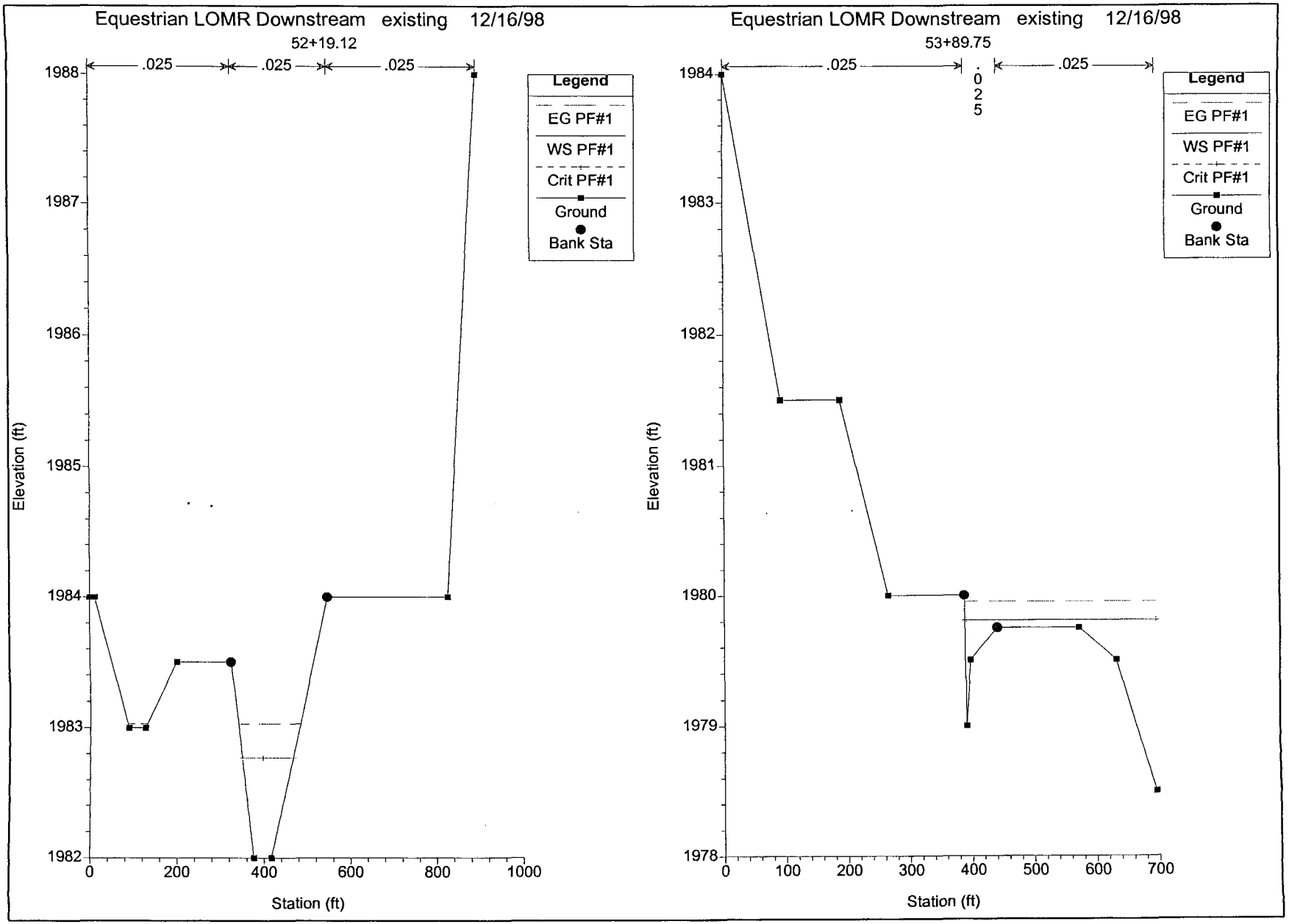
200
400
600
800
1000
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta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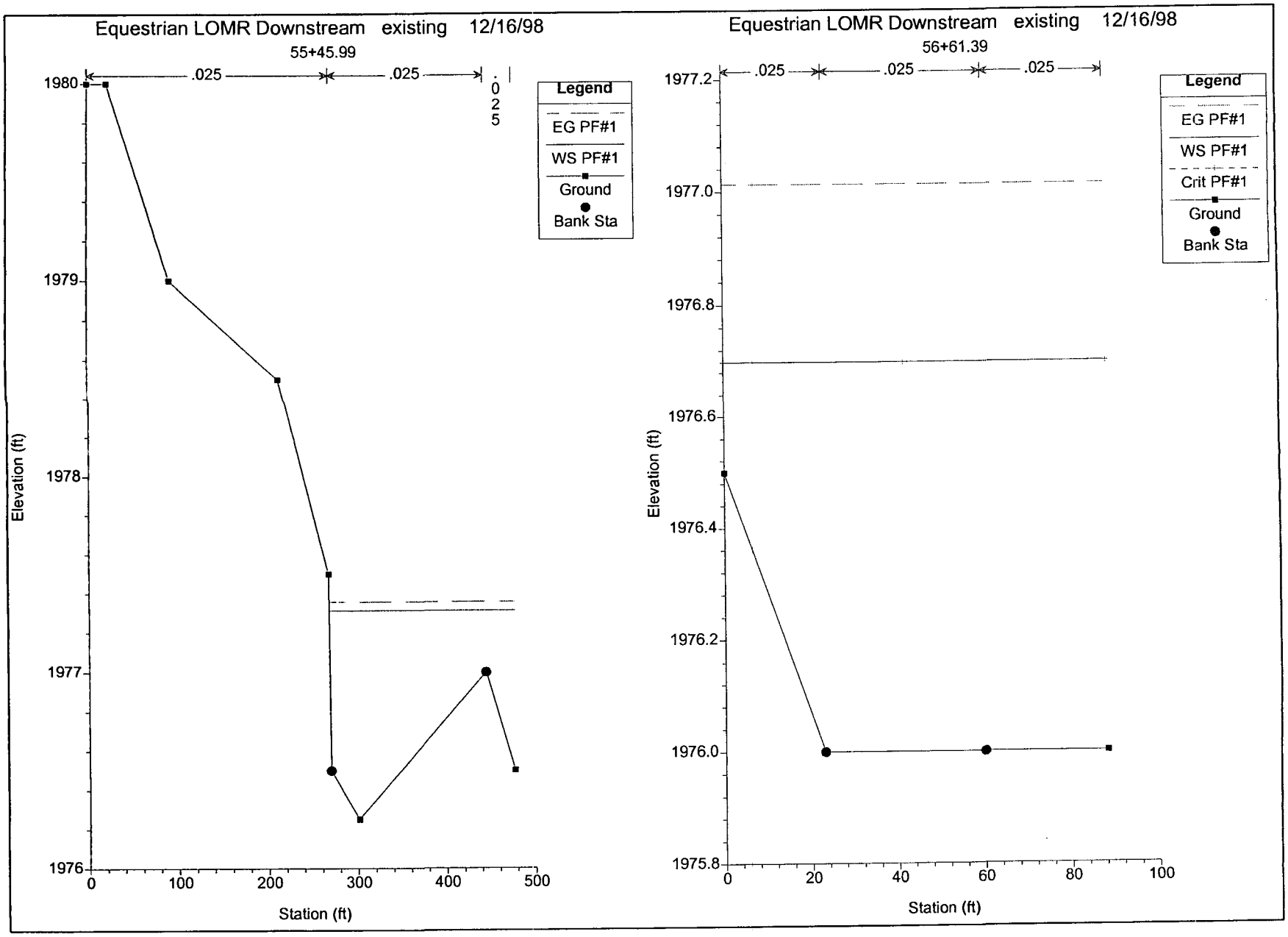
52+19.12
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
1988
1987
1986
1985
1984
1983
1982
0
200
400
600
800
1000
Station (ft)
Equestrian LOMR Downstream existing 12/16/98
53+89.75
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
1984
1983
1982
1981
1980
1979
1978
0
100
200
300
400
500
600
700
Station (ft)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55+45.99
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.025
.025
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1980
1979
1978
1977
1976
0
100
200
300
400
500
Equestrian LOMR Downstream existing 12/16/98
56+61.39
.025
.025
.025
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1977.2
1977.0
1976.8
1976.6
1976.4
1976.2
1976.0
1975.8
0
20
40
60
80
100

HEC-RAS Version 2.1 October 1997
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Equestrian LOMR Downstream
Project File : equstds.prj
Run Date and Time: 12/16/98 11:45:20 AM

Project in English units

Project Description:
Equestrian LOMR Basin Discharge ******* Softdesk, Inc. HEC-2 Input Data file
****

********** Minimum
Data Input **********

****

PLAN DATA

Plan Title: existing
Plan File : j:\1002005\HECRAS\equstds.p02

Geometry Title: EXISTING CONDITIONS
Geometry File : j:\1002005\HECRAS\equstds.g02

Flow Title : Imported Flow 01
Flow File : j:\1002005\HECRAS\equstds.f01

Plan Summary Information:

Number of:	Cross Sections	= 32	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 0			

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculaton tolerance	= 0.01
Maximum number of interations	= 20
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Imported Flow 01
Flow File : j:\1002005\HECRAS\equstds.f01

Flow Data (cfs)

River	Reach	RS	PF#1
Equestrian Outfa1		33.2	247
Equestrian Outfa1		1.1	247

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Equestrian Outfa1		PF#1	Critical	Critical

GEOMETRY DATA

Geometry Title: EXISTING CONDITIONS
Geometry File : j:\1002005\HECRAS\equstds.g02

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 33.2

INPUT
Description: 10+00
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2048	71	2052	110	2052	122	2048	143	2047
153	2052	240	2052	243	2052.5	260	2052.5	305	2054
384	2054	407	2053.5	427	2054	453	2053.5	462	2054
479	2053	487	2055	512	2056				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	110	.025	153	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	153	75 101.1	125	.1	.3

Left Levee Station= 110 Elevation= 2052

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2049.85	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.025	
E.G. Elev (ft)	2050.09	Reach Len. (ft)	75.00	101.10	125.00
Crit W.S. (ft)	2049.01	Flow Area (sq ft)		62.46	
E.G. Slope (ft/ft)	0.001908	Area (sq ft)		62.46	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	32.23	Top Width (ft)		32.23	
Vel Total (ft/s)	3.95	Avg. Vel. (ft/s)		3.95	

Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)		1.94	
Conv. Total (cfs)	5655.1	Conv. (cfs)		5655.1	
Length Wtd. (ft)	101.10	Wetted Per. (ft)		33.22	
Min Ch El (ft)	2047.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.89	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.61	6.25	0.35
C & E Loss (ft)	0.04	Cum SA (acres)	1.41	10.54	1.06

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 32.1

INPUT
Description: 11+49.53
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2048	71	2052	110	2052	122	2048	143	2047
153	2052	240	2052	243	2052.5	260	2052.5	305	2054
384	2054	407	2053.5	427	2054	453	2053.5	462	2054
479	2053	487	2055	512	2056				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	110	.025	153	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110	153	75 101.1	125	.1	.3

Left Levee Station= 110 Elevation= 2052

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2049.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.025	
E.G. Elev (ft)	2049.69	Reach Len. (ft)	75.00	101.10	125.00
Crit W.S. (ft)	2049.03	Flow Area (sq ft)		37.75	
E.G. Slope (ft/ft)	0.008446	Area (sq ft)		37.75	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	28.13	Top Width (ft)		28.13	
Vel Total (ft/s)	6.54	Avg. Vel. (ft/s)		6.54	
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		1.34	

Conv. Total (cfs)	2687.6	Conv. (cfs)			2687.6		
Length Wtd. (ft)	101.10	Wetted Per. (ft)			28.80		
Min Ch El (ft)	2047.00	Shear (lb/sq ft)			0.69		
Alpha	1.00	Stream Power (lb/ft s)			4.52		
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)		0.61	6.13		0.35
C & E Loss (ft)	0.01	Cum SA (acres)		1.41	10.47		1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note - Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 31.1

INPUT
Description: 12+50.63
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2048	48	2048	59	2044	81	2044	104	2048
145	2048	152	2044	171	2044	177	2048	185	2050
209	2050	262	2052	327	2052				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	145	.025	177	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
145	177	110	90	50 .1	.3

Left Levee Station= 145 Elevation= 2048

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2045.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.025	

E.G. Elev (ft)	2046.39	Reach Len. (ft)	110.00	90.00	50.00
Crit W.S. (ft)	2045.66	Flow Area (sq ft)		36.09	
E.G. Slope (ft/ft)	0.008276	Area (sq ft)		36.09	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	24.41	Top Width (ft)		24.41	
Vel Total (ft/s)	6.84	Avg. Vel. (ft/s)		6.84	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	2715.0	Conv. (cfs)		2715.0	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		25.35	
Min Ch El (ft)	2044.00	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		5.03	
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.61	6.05	0.35
C & E Loss (ft)	0.04	Cum SA (acres)	1.41	10.41	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note - Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 30.1

INPUT
Description: 13+40.63
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2048	47	2048	65	2047	89	2044	144	2044
147	2040	153	2040	162	2045	164	2045.5	185	2048
205	2048	215	2045	228	2045.5	254	2048	273	2048

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	144	.025	162	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

144	162		85	85.31	85	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2043.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.025	
E.G. Elev (ft)	2044.09	Reach Len. (ft)	85.00	85.31	85.00
Crit W.S. (ft)	2043.00	Flow Area (sq ft)		29.43	
E.G. Slope (ft/ft)	0.008784	Area (sq ft)		29.43	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	13.64	Top Width (ft)		13.64	
Vel Total (ft/s)	8.39	Avg. Vel. (ft/s)		8.39	
Max Chl Dpth (ft)	3.00	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	2635.4	Conv. (cfs)		2635.4	
Length Wtd. (ft)	85.31	Wetted Per. (ft)		15.92	
Min Ch El (ft)	2040.00	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		8.51	
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	0.61	5.98	0.35
C & E Loss (ft)	0.19	Cum SA (acres)	1.41	10.37	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 29.1

INPUT
Description: 14+25.94
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2044	54	2044.5	72	2044	117	2044	123	2041.5
139	2040	169	2040	195	2044	265	2044	292	2046
304	2046	321	2048	420	2048				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	117	.025	195	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
117	195	110 97.76	65	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2041.14	Element			
Vel Head (ft)	0.46	Wt. n-Val.		0.025	
E.G. Elev (ft)	2041.60	Reach Len. (ft)	110.00	97.76	65.00
Crit W.S. (ft)	2041.14	Flow Area (sq ft)		45.41	
E.G. Slope (ft/ft)	0.009454	Area (sq ft)		45.41	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	49.59	Top Width (ft)		49.59	
Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)		5.44	
Max Chl Dpth (ft)	1.14	Hydr. Depth (ft)		0.92	
Conv. Total (cfs)	2540.4	Conv. (cfs)		2540.4	
Length Wtd. (ft)	97.76	Wetted Per. (ft)		49.73	
Min Ch El (ft)	2040.00	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)		2.93	
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.61	5.91	0.35
C & E Loss (ft)	0.01	Cum SA (acres)	1.41	10.31	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 28.1

INPUT
Description: 15+23.70
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2044	68	2044	100	2043	116	2043	156	2044

217	2044	222	2040	229	2038	237	2037	245	2037.5
247	2038	250	2036	254	2036	267	2040	342	2043
372	2043	416	2044	437	2044				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	222	.025	267	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
222	267	50 74.34	120	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2038.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.025	
E.G. Elev (ft)	2038.96	Reach Len. (ft)	50.00	74.34	120.00
Crit W.S. (ft)	2038.35	Flow Area (sq ft)		39.53	
E.G. Slope (ft/ft)	0.009408	Area (sq ft)		39.53	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	33.88	Top Width (ft)		33.88	
Vel Total (ft/s)	6.25	Avg. Vel. (ft/s)		6.25	
Max Chl Dpth (ft)	2.35	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	2546.6	Conv. (cfs)		2546.6	
Length Wtd. (ft)	74.34	Wetted Per. (ft)		35.03	
Min Ch El (ft)	2036.00	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		4.14	
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	0.61	5.81	0.35
C & E Loss (ft)	0.02	Cum SA (acres)	1.41	10.22	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 27.1

INPUT
Description: 15+98.04
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2044	163	2040.5	183	2041	240	2041	251	2040
283	2040	287	2036	303	2036	304	2034.5	306	2036
322	2036	340	2040	360	2040	485	2044		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	283	.025	340	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
283	340	132 132.64	132	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2037.06	Element			
Vel Head (ft)	0.53	Wt. n-Val.		0.025	
E.G. Elev (ft)	2037.59	Reach Len. (ft)	132.00	132.64	132.00
Crit W.S. (ft)	2037.06	Flow Area (sq ft)		42.29	
E.G. Slope (ft/ft)	0.009769	Area (sq ft)		42.29	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	40.81	Top Width (ft)		40.81	
Vel Total (ft/s)	5.84	Avg. Vel. (ft/s)		5.84	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	2499.0	Conv. (cfs)		2499.0	
Length Wtd. (ft)	132.64	Wetted Per. (ft)		42.67	
Min Ch El (ft)	2034.50	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		3.53	
Frctn Loss (ft)	1.22	Cum Volume (acre-ft)	0.61	5.74	0.35
C & E Loss (ft)	0.02	Cum SA (acres)	1.41	10.15	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 26.1

INPUT
Description: 17+30.68
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2040	47	2044	55	2044	180	2040	189	2040
314	2036	319	2032	333	2032	358	2036	388	2036
473	2040	477	2040						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	314	.025	358	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
314	358	110 106.66	90	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2033.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.		0.025	
E.G. Elev (ft)	2034.48	Reach Len. (ft)	110.00	106.66	90.00
Crit W.S. (ft)	2033.79	Flow Area (sq ft)		37.16	
E.G. Slope (ft/ft)	0.008667	Area (sq ft)		37.16	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	27.45	Top Width (ft)		27.45	
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)		6.65	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	2653.1	Conv. (cfs)		2653.1	
Length Wtd. (ft)		Wetted Per. (ft)		28.22	
Min Ch El (ft)	2032.00	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)		4.74	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.61	5.62	0.35
C & E Loss (ft)		Cum SA (acres)	1.41	10.05	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa

REACH: 1 RS: 25.1

INPUT
Description: 18+37.34
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2040	25	2044	50	2044	107	2040	123	2040
218	2035	222	2032	238	2032	244	2031.5	252	2032
255	2032	323	2035	367	2035	402	2036	452	2036

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	218	.025	323	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
218	323	87 87.56	87	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2032.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.025	
E.G. Elev (ft)	2033.40	Reach Len. (ft)	87.00	87.56	87.00
Crit W.S. (ft)	2032.97	Flow Area (sq ft)		46.99	
E.G. Slope (ft/ft)	0.010056	Area (sq ft)		46.99	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	56.36	Top Width (ft)		56.36	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)		5.26	
Max Chl Dpth (ft)	1.47	Hydr. Depth (ft)		0.83	
Conv. Total (cfs)	2463.1	Conv. (cfs)		2463.1	
Length Wtd. (ft)	87.56	Wetted Per. (ft)		56.74	
Min Ch El (ft)	2031.50	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		2.73	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.61	5.52	0.35
C & E Loss (ft)	0.02	Cum SA (acres)	1.41	9.95	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that

there is
not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 24.1

INPUT
Description: 19+24.90
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2040	97	2040	104	2040.5	137	2040	148	2036
181	2034.5	226	2034	272	2032	283	2032	305	2029.5
323	2030.5	405	2032	471	2032	477	2032.5	525	2036

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	283	.025	405	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
283	405	85 103.66	115	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2031.25	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.025	
E.G. Elev (ft)	2031.61	Reach Len. (ft)	85.00	103.66	115.00
Crit W.S. (ft)	2031.25	Flow Area (sq ft)		51.43	
E.G. Slope (ft/ft)	0.010720	Area (sq ft)		51.43	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	74.47	Top Width (ft)		74.47	
Vel Total (ft/s)	4.80	Avg. Vel. (ft/s)		4.80	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	2385.6	Conv. (cfs)		2385.6	
Length Wtd. (ft)	103.66	Wetted Per. (ft)		74.60	
Min Ch El (ft)	2029.50	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)		2.22	
Frctn Loss (ft)	1.07	Cum Volume (acre-ft)	0.61	5.42	0.35
C & E Loss (ft)	0.02	Cum SA (acres)	1.41	9.82	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 23.1

INPUT
Description: 20+28.56
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2036	29	2032	106	2030	170	2030	215	2028
254	2028	413	2032	461	2032				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	170	.025	413	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
170	413	80 153.17	190	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2028.87	Element			
Vel Head (ft)	0.29	Wt. n-Val.		0.025	
E.G. Elev (ft)	2029.16	Reach Len. (ft)	80.00	153.17	190.00
Crit W.S. (ft)	2028.85	Flow Area (sq ft)		57.48	
E.G. Slope (ft/ft)	0.009956	Area (sq ft)		57.48	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	93.15	Top Width (ft)		93.15	
Vel Total (ft/s)	4.30	Avg. Vel. (ft/s)		4.30	
Max Chl Dpth (ft)	0.87	Hydr. Depth (ft)		0.62	
Conv. Total (cfs)	2475.5	Conv. (cfs)		2475.5	
Length Wtd. (ft)	153.17	Wetted Per. (ft)		93.18	
Min Ch El (ft)	2028.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		1.65	
Frctn Loss (ft)	1.58	Cum Volume (acre-ft)	0.61	5.29	0.35
C & E Loss (ft)	0.03	Cum SA (acres)	1.41	9.62	1.06

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 22.1

INPUT
Description: 21+81.73
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2036	39	2032	61	2030	129	2028	152	2028
369	2026.5	442	2028	466	2028				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	152	.025	442	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
152	442	60 124.14	130	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2027.35	Element			
Vel Head (ft)	0.19	Wt. n-Val.		0.025	
E.G. Elev (ft)	2027.54	Reach Len. (ft)	60.00	124.14	130.00
Crit W.S. (ft)	2027.33	Flow Area (sq ft)		70.56	
E.G. Slope (ft/ft)	0.010782	Area (sq ft)		70.56	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	165.18	Top Width (ft)		165.18	
Vel Total (ft/s)	3.50	Avg. Vel. (ft/s)		3.50	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	2378.7	Conv. (cfs)		2378.7	
Length Wtd. (ft)	124.14	Wetted Per. (ft)		165.19	
Min Ch El (ft)	2026.50	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)		1.01	
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)	0.61	5.06	0.35
C & E Loss (ft)	0.01	Cum SA (acres)	1.41	9.16	1.06

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 21.1

INPUT
Description: 23+05.87
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2036	10	2032	42	2028	162	2026	217	2025.5
372	2025.5	411	2026.5	419	2026.5	460	2028	470	2028

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	162	.025	411	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
162	411	89 89.54	89	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2025.90	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.025	
E.G. Elev (ft)	2026.07	Reach Len. (ft)	89.00	89.54	89.00
Crit W.S. (ft)	2025.90	Flow Area (sq ft)		74.11	
E.G. Slope (ft/ft)	0.012990	Area (sq ft)		74.11	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	214.73	Top Width (ft)		214.73	
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)		3.33	
Max Chl Dpth (ft)	0.40	Hydr. Depth (ft)		0.35	
Conv. Total (cfs)	2167.2	Conv. (cfs)		2167.2	
Length Wtd. (ft)	89.54	Wetted Per. (ft)		214.74	
Min Ch El (ft)	2025.50	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		0.93	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.61	4.86	0.35
C & E Loss (ft)	0.04	Cum SA (acres)	1.41	8.62	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 20.1

INPUT
Description: 23+95.41
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2032	10	2028	194	2024	404	2024	446	2026.5
466	2026								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	10	.025	446	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10	446	100 171.62	180	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2024.78	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.025	
E.G. Elev (ft)	2024.81	Reach Len. (ft)	100.00	171.62	180.00
Crit W.S. (ft)		Flow Area (sq ft)		183.51	
E.G. Slope (ft/ft)	0.000813	Area (sq ft)		183.51	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	259.13	Top Width (ft)		259.13	
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	8665.2	Conv. (cfs)		8665.2	
Length Wtd. (ft)	171.62	Wetted Per. (ft)		259.16	
Min Ch El (ft)	2024.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	0.61	4.59	0.35
C & E Loss (ft)	0.01	Cum SA (acres)	1.41	8.13	1.06

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 19.1

INPUT
Description: 25+67.03
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2028	38	2028	74	2027	116	2024	389	2024
417	2025.5	454	2026						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	74	.025	417	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
74	417	50 127.18	150	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2024.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.025	
E.G. Elev (ft)	2024.44	Reach Len. (ft)	50.00	127.18	150.00
Crit W.S. (ft)	2024.29	Flow Area (sq ft)		81.18	
E.G. Slope (ft/ft)	0.013826	Area (sq ft)		81.18	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	282.55	Top Width (ft)		282.55	
Vel Total (ft/s)	3.04	Avg. Vel. (ft/s)		3.04	
Max Chl Dpth (ft)	0.29	Hydr. Depth (ft)		0.29	
Conv. Total (cfs)	2100.6	Conv. (cfs)		2100.6	
Length Wtd. (ft)	127.18	Wetted Per. (ft)		282.56	
Min Ch El (ft)	2024.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.75	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.61	4.07	0.35
C & E Loss (ft)	0.01	Cum SA (acres)	1.41	7.07	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 17.1

INPUT
Description: 27+76.11
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2028	5	2028	19	2027.5	51	2024	107	2024
223	2020	285	2020	330	2024				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	107	.025	330	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
107	330	190 176.7	90	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2021.37	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.025	
E.G. Elev (ft)	2021.43	Reach Len. (ft)	190.00	176.70	90.00
Crit W.S. (ft)		Flow Area (sq ft)		122.37	
E.G. Slope (ft/ft)	0.001088	Area (sq ft)		122.37	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	117.02	Top Width (ft)		117.02	
Vel Total (ft/s)	2.02	Avg. Vel. (ft/s)		2.02	
Max Chl Dpth (ft)	1.37	Hydr. Depth (ft)		1.05	
Conv. Total (cfs)	7489.4	Conv. (cfs)		7489.4	
Length Wtd. (ft)	176.70	Wetted Per. (ft)		117.11	
Min Ch El (ft)	2020.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.14	
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.61	3.78	0.35
C & E Loss (ft)	0.02	Cum SA (acres)	1.41	6.48	1.06

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 16.1

INPUT
Description: 28+70.92
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2028	16	2027	47	2024	71	2024	90	2023.5
120	2023	150	2021.816	196	2020	268	2020	290	2021.5
329	2022.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	150	.025	290	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150	290	70 62.62	40	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2020.67	Element			
Vel Head (ft)	0.29	Wt. n-Val.		0.025	
E.G. Elev (ft)	2020.96	Reach Len. (ft)	70.00	62.62	40.00
Crit W.S. (ft)	2020.67	Flow Area (sq ft)		57.02	
E.G. Slope (ft/ft)	0.011049	Area (sq ft)		57.02	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	98.72	Top Width (ft)		98.72	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	0.67	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	2349.8	Conv. (cfs)		2349.8	
Length Wtd. (ft)	62.62	Wetted Per. (ft)		98.75	
Min Ch El (ft)	2020.00	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		1.73	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.61	3.41	0.35
C & E Loss (ft)	0.01	Cum SA (acres)	1.41	6.05	1.06

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 15.1

INPUT
Description: 29+87.83
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2028	18	2024	74	2020	80	2019	90	2019

187 2020 188 2024

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	74	.025	187	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
74	187	130 146.19	170	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2019.98	Element			
Vel Head (ft)	0.27	Wt. n-Val.		0.025	
E.G. Elev (ft)	2020.25	Reach Len. (ft)	130.00	146.19	170.00
Crit W.S. (ft)	2019.98	Flow Area (sq ft)		59.10	
E.G. Slope (ft/ft)	0.011443	Area (sq ft)		59.10	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	110.79	Top Width (ft)		110.79	
Vel Total (ft/s)	4.18	Avg. Vel. (ft/s)		4.18	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	2309.1	Conv. (cfs)		2309.1	
Length Wtd. (ft)	146.19	Wetted Per. (ft)		110.87	
Min Ch El (ft)	2019.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		1.59	
Frctn Loss (ft)	1.70	Cum Volume (acre-ft)	0.61	3.33	0.35
C & E Loss (ft)	0.01	Cum SA (acres)	1.41	5.89	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 14.1

INPUT
Description: 31+34.02
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2032	7	2032	42	2020	188	2017	268	2016
314	2016.5	358	2018.5	426	2020	436	2020		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	188	.025	358	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
188	358	180 226.45	270	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2016.88	Element			
Vel Head (ft)	0.25	Wt. n-Val.		0.025	
E.G. Elev (ft)	2017.13	Reach Len. (ft)	180.00	226.45	270.00
Crit W.S. (ft)	2016.88	Flow Area (sq ft)		61.33	
E.G. Slope (ft/ft)	0.011813	Area (sq ft)		61.33	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	124.59	Top Width (ft)		124.59	
Vel Total (ft/s)	4.03	Avg. Vel. (ft/s)		4.03	
Max Chl Dpth (ft)	0.88	Hydr. Depth (ft)		0.49	
Conv. Total (cfs)	2272.6	Conv. (cfs)		2272.6	
Length Wtd. (ft)	226.45	Wetted Per. (ft)		124.60	
Min Ch El (ft)	2016.00	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)		1.46	
Frctn Loss (ft)	2.80	Cum Volume (acre-ft)	0.61	3.13	0.35
C & E Loss (ft)	0.02	Cum SA (acres)	1.41	5.50	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 13.1

INPUT
Description: 33+60.47
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2020	39	2016	48	2016	67	2017	104	2016
283	2016	310	2014.5	322	2015	326	2014	328	2014.5
333	2014	426	2013.5	500	2013.5	613	2016	625	2016

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	333	.025	613	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
333	613	159 159.95	159	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	2014.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.025	0.025	
E.G. Elev (ft)	2014.21	Reach Len. (ft)	159.00	159.95	159.00
Crit W.S. (ft)	2014.03	Flow Area (sq ft)	0.01	70.73	
E.G. Slope (ft/ft)	0.012960	Area (sq ft)	0.01	70.73	
Q Total (cfs)	247.00	Flow (cfs)	0.00	247.00	
Top Width (ft)	191.20	Top Width (ft)	0.46	190.75	
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)	0.36	3.49	
Max Chl Dpth (ft)	0.53	Hydr. Depth (ft)	0.01	0.37	
Conv. Total (cfs)	2169.7	Conv. (cfs)	0.0	2169.7	
Length Wtd. (ft)	159.95	Wetted Per. (ft)	0.46	190.75	
Min Ch El (ft)	2013.50	Shear (lb/sq ft)	0.01	0.30	
Alpha	1.00	Stream Power (lb/ft s)	0.00	1.05	
Frctn Loss (ft)	2.00	Cum Volume (acre-ft)	0.61	2.78	0.35
C & E Loss (ft)	0.00	Cum SA (acres)	1.40	4.68	1.06

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - Divided flow computed for this cross-section.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 12.1

INPUT
Description: 35+20.42
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2016	26	2016	108	2014.5	263	2015.5	279	2014.5
282	2014.5	304	2012	339	2012	340	2013	344	2012
351	2012	434	2010.5	548	2011	646	2013	713	2013.5
730	2013								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	351	.025	548	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
351	548	170 227.83	290	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2011.21	Element			
Vel Head (ft)	0.21	Wt. n-Val.		0.025	0.025
E.G. Elev (ft)	2011.42	Reach Len. (ft)	170.00	227.83	290.00
Crit W.S. (ft)	2011.21	Flow Area (sq ft)		65.88	1.05
E.G. Slope (ft/ft)	0.012103	Area (sq ft)		65.88	1.05
Q Total (cfs)	247.00	Flow (cfs)		245.49	1.51
Top Width (ft)	163.23	Top Width (ft)		153.10	10.13
Vel Total (ft/s)	3.69	Avg. Vel. (ft/s)		3.73	1.44
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.43	0.10
Conv. Total (cfs)	2245.2	Conv. (cfs)		2231.5	13.7
Length Wtd. (ft)	228.02	Wetted Per. (ft)		153.11	10.13
Min Ch El (ft)	2010.50	Shear (lb/sq ft)		0.33	0.08
Alpha	1.01	Stream Power (lb/ft s)		1.21	0.11
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	0.61	2.53	0.35
C & E Loss (ft)	0.00	Cum SA (acres)	1.40	4.05	1.05

Warning - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 11.1

INPUT
Description: 37+48.25
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2008	23	2008	61	2010	106	2011	268	2011
274	2010	275	2011	284	2009	287	2008	337	2008
379	2007	450	2007	503	2008	532	2008	682	2012
694	2012								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	337	.025	503	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
337	503	270 312.72	170	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2007.62	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.025	
E.G. Elev (ft)	2007.86	Reach Len. (ft)	270.00	312.72	170.00
Crit W.S. (ft)	2007.62	Flow Area (sq ft)		62.48	
E.G. Slope (ft/ft)	0.011756	Area (sq ft)		62.48	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	130.05	Top Width (ft)		130.05	
Vel Total (ft/s)	3.95	Avg. Vel. (ft/s)		3.95	
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	2278.1	Conv. (cfs)		2278.1	
Length Wtd. (ft)	312.72	Wetted Per. (ft)		130.06	
Min Ch El (ft)	2007.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)		1.39	
Frctn Loss (ft)	2.17	Cum Volume (acre-ft)	0.61	2.20	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	1.40	3.31	1.01

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 10.1

INPUT
Description: 39+61.97
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2008	114	2008	129	2005	148	2004	181	2004
233	2004.5	235	2004	236	2004.5	259	2004	347	2004
378	2000	391	2000	440	2003				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	347	.025	440	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
347	440	230 202.36	150	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2001.73	Element			
Vel Head (ft)	0.27	Wt. n-Val.		0.025	
E.G. Elev (ft)	2002.01	Reach Len. (ft)	230.00	202.36	150.00
Crit W.S. (ft)		Flow Area (sq ft)		58.76	
E.G. Slope (ft/ft)	0.004573	Area (sq ft)		58.76	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	54.76	Top Width (ft)		54.76	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	1.73	Hydr. Depth (ft)		1.07	
Conv. Total (cfs)	3652.6	Conv. (cfs)		3652.6	
Length Wtd. (ft)	203.40	Wetted Per. (ft)		54.93	

Min Ch El (ft)	2000.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.28	
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)	0.61	1.76	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	1.40	2.65	1.01

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 9.1

INPUT
Description: 41+64.33
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2006.5	60	2007	70	2006.5	85	2007	104	2006
111	2006	171	2001.5	208	2000	251	2000	255	1998
258	1999.5	272	2000	290	2000	306	2004	325	2000

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	251	.025	272	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
251	272	260 255.46	230	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	2000.56	Element			
Vel Head (ft)	0.29	Wt. n-Val.	0.025	0.025	0.025
E.G. Elev (ft)	2000.85	Reach Len. (ft)	260.00	255.46	230.00
Crit W.S. (ft)	2000.56	Flow Area (sq ft)	27.91	23.00	11.44
E.G. Slope (ft/ft)	0.007363	Area (sq ft)	27.91	23.00	11.44
Q Total (cfs)	247.00	Flow (cfs)	88.62	121.40	36.98
Top Width (ft)	100.69	Top Width (ft)	56.80	21.00	22.89
Vel Total (ft/s)	3.96	Avg. Vel. (ft/s)	3.18	5.28	3.23
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)	0.49	1.10	0.50
Conv. Total (cfs)	2878.6	Conv. (cfs)	1032.8	1414.8	430.9
Length Wtd. (ft)	254.37	Wetted Per. (ft)	56.81	21.84	23.58
Min Ch El (ft)	1998.00	Shear (lb/sq ft)	0.23	0.48	0.22
Alpha	1.20	Stream Power (lb/ft s)	0.72	2.56	0.72
Frctn Loss (ft)	1.49	Cum Volume (acre-ft)	0.54	1.57	0.32

C & E Loss (ft)	0.03	Cum SA (acres)	1.25	2.47	0.97

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - Divided flow computed for this cross-section.
Warning - The cross-section end points had to be extended vertically for the computed water surface.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 8.1

INPUT
Description: 44+19.79
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2004	27	2004	36	2000	71	2000	142	1996
169	1996	266	1994	277	1995.5	292	1996	324	2000
353	2000								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	169	.025	292	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
169	292	80 119.32	170	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	1995.59	Element			
Vel Head (ft)	0.19	Wt. n-Val.		0.025	
E.G. Elev (ft)	1995.78	Reach Len. (ft)	80.00	119.32	170.00
Crit W.S. (ft)	1995.36	Flow Area (sq ft)		71.01	
E.G. Slope (ft/ft)	0.004784	Area (sq ft)		71.01	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	91.11	Top Width (ft)		91.11	
Vel Total (ft/s)	3.48	Avg. Vel. (ft/s)		3.48	
Max Chl Dpth (ft)	1.59	Hydr. Depth (ft)		0.78	

Conv. Total (cfs)	3571.3	Conv. (cfs)		3571.3	
Length Wtd. (ft)	119.32	Wetted Per. (ft)		91.23	
Min Ch El (ft)	1994.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		0.81	
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.46	1.30	0.29
C & E Loss (ft)	0.01	Cum SA (acres)	1.08	2.14	0.91

Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 7.1

INPUT
Description: 45+39.11
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2000	17	1997	25	1997	36	1996	101	1995
152	1995.5	290	1993.5	296	1994	366	1996	376	1998
389	1997	396	1996						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	152	.025	366	.025

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
152	366	200	160.91	120	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	1994.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.025	
E.G. Elev (ft)	1994.93	Reach Len. (ft)	200.00	160.91	120.00
Crit W.S. (ft)	1994.65	Flow Area (sq ft)		58.22	
E.G. Slope (ft/ft)	0.011603	Area (sq ft)		58.22	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	107.91	Top Width (ft)		107.91	
Vel Total (ft/s)	4.24	Avg. Vel. (ft/s)		4.24	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	2293.1	Conv. (cfs)		2293.1	
Length Wtd. (ft)	160.91	Wetted Per. (ft)		107.95	
Min Ch El (ft)	1993.50	Shear (lb/sq ft)		0.39	

Alpha	1.00	Stream Power (lb/ft s)		1.66	
Frctn Loss (ft)	1.73	Cum Volume (acre-ft)	0.46	1.12	0.29
C & E Loss (ft)	0.01	Cum SA (acres)	1.08	1.87	0.91

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 6.1

INPUT
Description: 47+00.02
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1992	142	1991	216	1989	230	1988	240	1988
286	1991.5	294	1991.5	326	1991	337	1992	431	1992

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	142	.025	286	.025

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
142	286	320	309.01	270	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	1989.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.025	
E.G. Elev (ft)	1989.90	Reach Len. (ft)	320.00	309.01	270.00
Crit W.S. (ft)	1989.51	Flow Area (sq ft)		48.97	
E.G. Slope (ft/ft)	0.010023	Area (sq ft)		48.97	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	62.67	Top Width (ft)		62.67	
Vel Total (ft/s)	5.04	Avg. Vel. (ft/s)		5.04	
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	2467.1	Conv. (cfs)		2467.1	

Length Wtd. (ft)	314.50	Wetted Per. (ft)		62.77	
Min Ch El (ft)	1988.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		2.46	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)	0.46	0.92	0.29
C & E Loss (ft)	0.06	Cum SA (acres)	1.08	1.55	0.91

Warning - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 5.1

INPUT
Description: 50+09.03

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1988	30	1988	223	1985.5	288	1985.5	411	1987
498	1986.5	505	1986	575	1988	584	1988	620	1987.5
646	1987.5	687	1988	805	1988				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	411	.025	575	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
411	575	250 210.09	160	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	1986.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.025	0.025	
E.G. Elev (ft)	1986.31	Reach Len. (ft)	250.00	210.09	160.00
Crit W.S. (ft)	1986.10	Flow Area (sq ft)	67.38	0.24	
E.G. Slope (ft/ft)	0.012057	Area (sq ft)	67.38	0.24	
Q Total (cfs)	247.00	Flow (cfs)	246.79	0.21	

Top Width (ft)	165.06	Top Width (ft)	160.24	4.82	
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)	3.66	0.87	
Max Chl Dpth (ft)	0.60	Hydr. Depth (ft)	0.42	0.05	
Conv. Total (cfs)	2249.5	Conv. (cfs)	2247.6	1.9	
Length Wtd. (ft)	230.03	Wetted Per. (ft)	160.25	4.82	
Min Ch El (ft)	1986.00	Shear (lb/sq ft)	0.32	0.04	
Alpha	1.00	Stream Power (lb/ft s)	1.16	0.03	
Frctn Loss (ft)	2.70	Cum Volume (acre-ft)	0.21	0.75	0.29
C & E Loss (ft)	0.01	Cum SA (acres)	0.50	1.31	0.91

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - Divided flow computed for this cross-section.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 4.1

INPUT
Description: 52+19.12
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1984	12	1984	89	1983	127	1983	200	1983.5
325	1983.5	377	1982	417	1982	547	1984	826	1984
893	1988								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	325	.025	547	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
325	547	230 170.63	110	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	1982.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.025	

E.G. Elev (ft)	1983.03	Reach Len. (ft)	230.00	170.63	110.00
Crit W.S. (ft)	1982.77	Flow Area (sq ft)		60.41	
E.G. Slope (ft/ft)	0.011403	Area (sq ft)		60.41	
Q Total (cfs)	247.00	Flow (cfs)		247.00	
Top Width (ft)	116.79	Top Width (ft)		116.79	
Vel Total (ft/s)	4.09	Avg. Vel. (ft/s)		4.09	
Max Chl Dpth (ft)	0.77	Hydr. Depth (ft)		0.52	
Conv. Total (cfs)	2313.1	Conv. (cfs)		2313.1	
Length Wtd. (ft)	144.71	Wetted Per. (ft)		116.81	
Min Ch El (ft)	1982.00	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)		1.51	
Frctn Loss (ft)	1.90	Cum Volume (acre-ft)	0.02	0.60	0.29
C & E Loss (ft)	0.03	Cum SA (acres)	0.04	1.02	0.91

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 3.1

INPUT
Description: 53+89.75
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1984	92	1981.5	188	1981.5	265	1980	388	1980
391	1979	398	1979.5	441	1979.75	572	1979.75	632	1979.5
695	1978.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	388	.025	441	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
388	441	156 156.24	156	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	1979.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.025	0.025
E.G. Elev (ft)	1979.95	Reach Len. (ft)	156.00	156.24	156.00
Crit W.S. (ft)	1979.81	Flow Area (sq ft)		12.61	68.80
E.G. Slope (ft/ft)	0.015324	Area (sq ft)		12.61	68.80
Q Total (cfs)	247.00	Flow (cfs)		35.83	211.17
Top Width (ft)	306.42	Top Width (ft)		52.42	254.00
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)		2.84	3.07
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)		0.24	0.27
Conv. Total (cfs)	1995.3	Conv. (cfs)		289.5	1705.8
Length Wtd. (ft)	156.12	Wetted Per. (ft)		52.57	255.31
Min Ch El (ft)	1979.00	Shear (lb/sq ft)		0.23	0.26
Alpha	1.00	Stream Power (lb/ft s)		0.65	0.79
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.02	0.46	0.21
C & E Loss (ft)	0.03	Cum SA (acres)	0.04	0.69	0.59

Warning - The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning - The cross-section end points had to be extended vertically for the computed water surface.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning - The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning - During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 2.1

INPUT
Description: 55+45.99
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1980	22	1980	92	1979	213	1978.5	268	1977.5
270	1976.5	301	1976.25	445	1977	477	1976.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	270	.025	445	.025

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
270	445	115	115.4	115	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
W.S. Elev (ft)	1977.31	Element			
Vel Head (ft)	0.04	Wt. n-Val.	0.025	0.025	0.025
E.G. Elev (ft)	1977.36	Reach Len. (ft)	115.00	115.40	115.00
Crit W.S. (ft)		Flow Area (sq ft)	0.66	128.23	18.03
E.G. Slope (ft/ft)	0.001269	Area (sq ft)	0.66	128.23	18.03
Q Total (cfs)	247.00	Flow (cfs)	0.71	220.68	25.61
Top Width (ft)	208.63	Top Width (ft)	1.63	175.00	32.00
Vel Total (ft/s)	1.68	Avg. Vel. (ft/s)	1.08	1.72	1.42
Max Chl Dpth (ft)	1.06	Hydr. Depth (ft)	0.41	0.73	0.56
Conv. Total (cfs)	6933.8	Conv. (cfs)	20.0	6194.8	718.9
Length Wtd. (ft)	115.28	Wetted Per. (ft)	1.82	175.00	32.82
Min Ch El (ft)	1976.25	Shear (lb/sq ft)	0.03	0.06	0.04
Alpha	1.01	Stream Power (lb/ft s)	0.03	0.10	0.06
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.01	0.20	0.05
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	0.28	0.08

Warning - The cross-section end points had to be extended vertically for the computed water surface.
Warning - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Equestrian Outfa
REACH: 1 RS: 1.1

INPUT
Description: 56+61.39
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1976.5	23	1976	60	1976	88	1976

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	23	.025	60	.025

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
23	60	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

W.S. Elev (ft)	1976.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.025	0.025	0.025
E.G. Elev (ft)	1977.01	Reach Len. (ft)			
Crit W.S. (ft)	1976.70	Flow Area (sq ft)	10.32	25.86	19.57
E.G. Slope (ft/ft)	0.010009	Area (sq ft)	10.32	25.86	19.57
Q Total (cfs)	247.00	Flow (cfs)	35.78	121.09	90.14
Top Width (ft)	88.00	Top Width (ft)	23.00	37.00	28.00
Vel Total (ft/s)	4.43	Avg. Vel. (ft/s)	3.47	4.68	4.61
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)	0.45	0.70	0.70
Conv. Total (cfs)	2468.9	Conv. (cfs)	357.6	1210.3	901.0
Length Wtd. (ft)		Wetted Per. (ft)	23.20	37.00	28.70
Min Ch El (ft)	1976.00	Shear (lb/sq ft)	0.28	0.44	0.43
Alpha	1.03	Stream Power (lb/ft s)	0.96	2.04	1.96
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Equestrian Outfa

Reach	River Sta.	n1	n2	n3
1	33.2	.025	.025	.025
1	32.1	.025	.025	.025
1	31.1	.025	.025	.025
1	30.1	.025	.025	.025
1	29.1	.025	.025	.025
1	28.1	.025	.025	.025
1	27.1	.025	.025	.025
1	26.1	.025	.025	.025
1	25.1	.025	.025	.025
1	24.1	.025	.025	.025
1	23.1	.025	.025	.025
1	22.1	.025	.025	.025
1	21.1	.025	.025	.025
1	20.1	.025	.025	.025
1	19.1	.025	.025	.025
1	17.1	.025	.025	.025

1	16.1	.025	.025	.025
1	15.1	.025	.025	.025
1	14.1	.025	.025	.025
1	13.1	.025	.025	.025
1	12.1	.025	.025	.025
1	11.1	.025	.025	.025
1	10.1	.025	.025	.025
1	9.1	.025	.025	.025
1	8.1	.025	.025	.025
1	7.1	.025	.025	.025
1	6.1	.025	.025	.025
1	5.1	.025	.025	.025
1	4.1	.025	.025	.025
1	3.1	.025	.025	.025
1	2.1	.025	.025	.025
1	1.1	.025	.025	.025

SUMMARY OF REACH LENGTHS

River: Equestrian Outfa

Reach	River Sta.	Left	Channel	Right
1	33.2	75	101.1	125
1	32.1	75	101.1	125
1	31.1	110	90	50
1	30.1	85	85.31	85
1	29.1	110	97.76	65
1	28.1	50	74.34	120
1	27.1	132	132.64	132
1	26.1	110	106.66	90
1	25.1	87	87.56	87
1	24.1	85	103.66	115
1	23.1	80	153.17	190
1	22.1	60	124.14	130
1	21.1	89	89.54	89
1	20.1	100	171.62	180
1	19.1	50	127.18	150
1	17.1	190	176.7	90
1	16.1	70	62.62	40

1	15.1	130	146.19	170
1	14.1	180	226.45	270
1	13.1	159	159.95	159
1	12.1	170	227.83	290
1	11.1	270	312.72	170
1	10.1	230	202.36	150
1	9.1	260	255.46	230
1	8.1	80	119.32	170
1	7.1	200	160.91	120
1	6.1	320	309.01	270
1	5.1	250	210.09	160
1	4.1	230	170.63	110
1	3.1	156	156.24	156
1	2.1	115	115.4	115
1	1.1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Equestrian Outfa

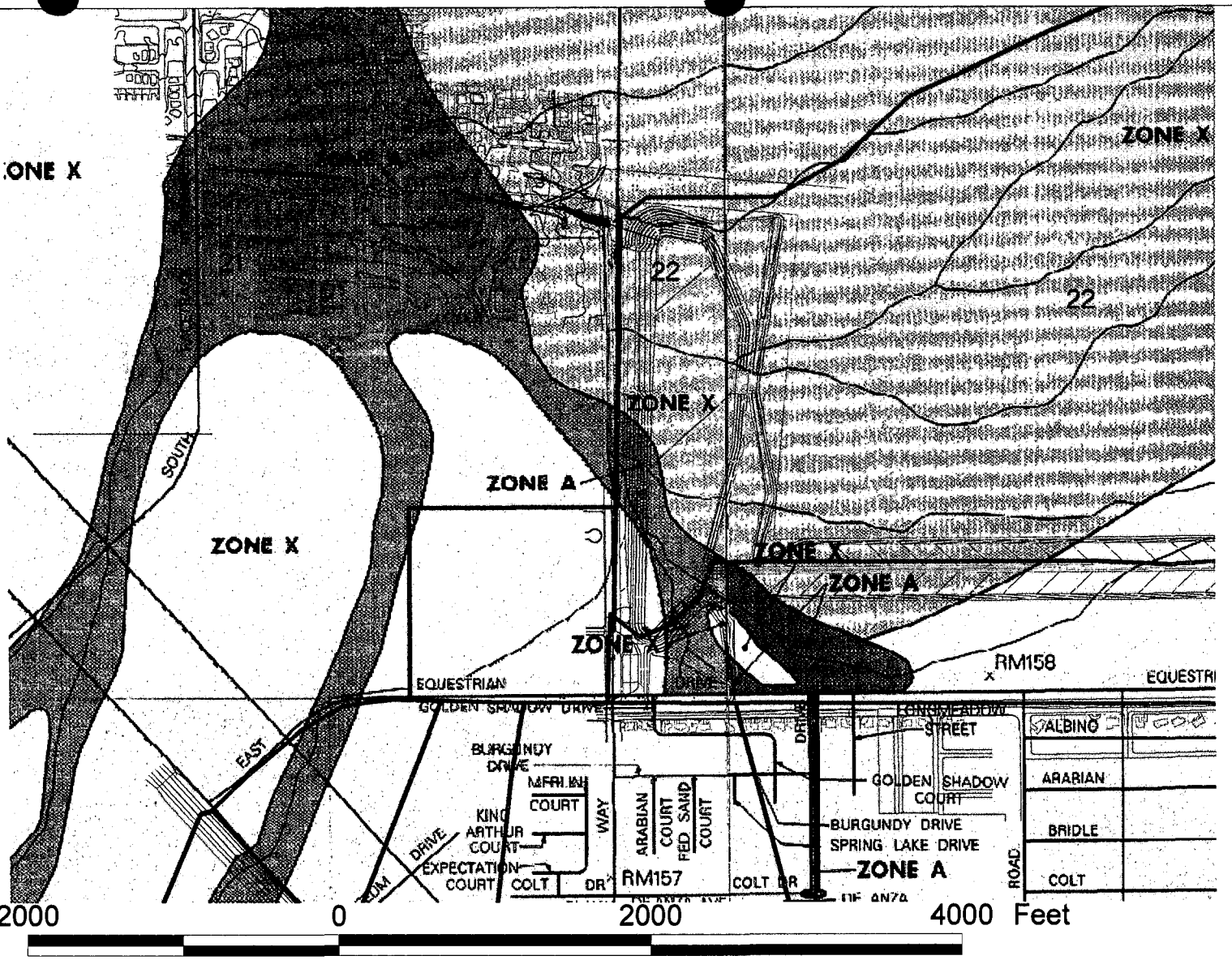
Reach	River Sta.	Contr.	Expan.
1	33.2	.1	.3
1	32.1	.1	.3
1	31.1	.1	.3
1	30.1	.1	.3
1	29.1	.1	.3
1	28.1	.1	.3
1	27.1	.1	.3
1	26.1	.1	.3
1	25.1	.1	.3
1	24.1	.1	.3
1	23.1	.1	.3
1	22.1	.1	.3
1	21.1	.1	.3
1	20.1	.1	.3
1	19.1	.1	.3
1	17.1	.1	.3
1	16.1	.1	.3
1	15.1	.1	.3

1	14.1	.1	.3
1	13.1	.1	.3
1	12.1	.1	.3
1	11.1	.1	.3
1	10.1	.1	.3
1	9.1	.1	.3
1	8.1	.1	.3
1	7.1	.1	.3
1	6.1	.1	.3
1	5.1	.1	.3
1	4.1	.1	.3
1	3.1	.1	.3
1	2.1	.1	.3
1	1.1	.1	.3

APPENDIX G

DOWNSTREAM MAPPING

AND F.I.R.M.'s

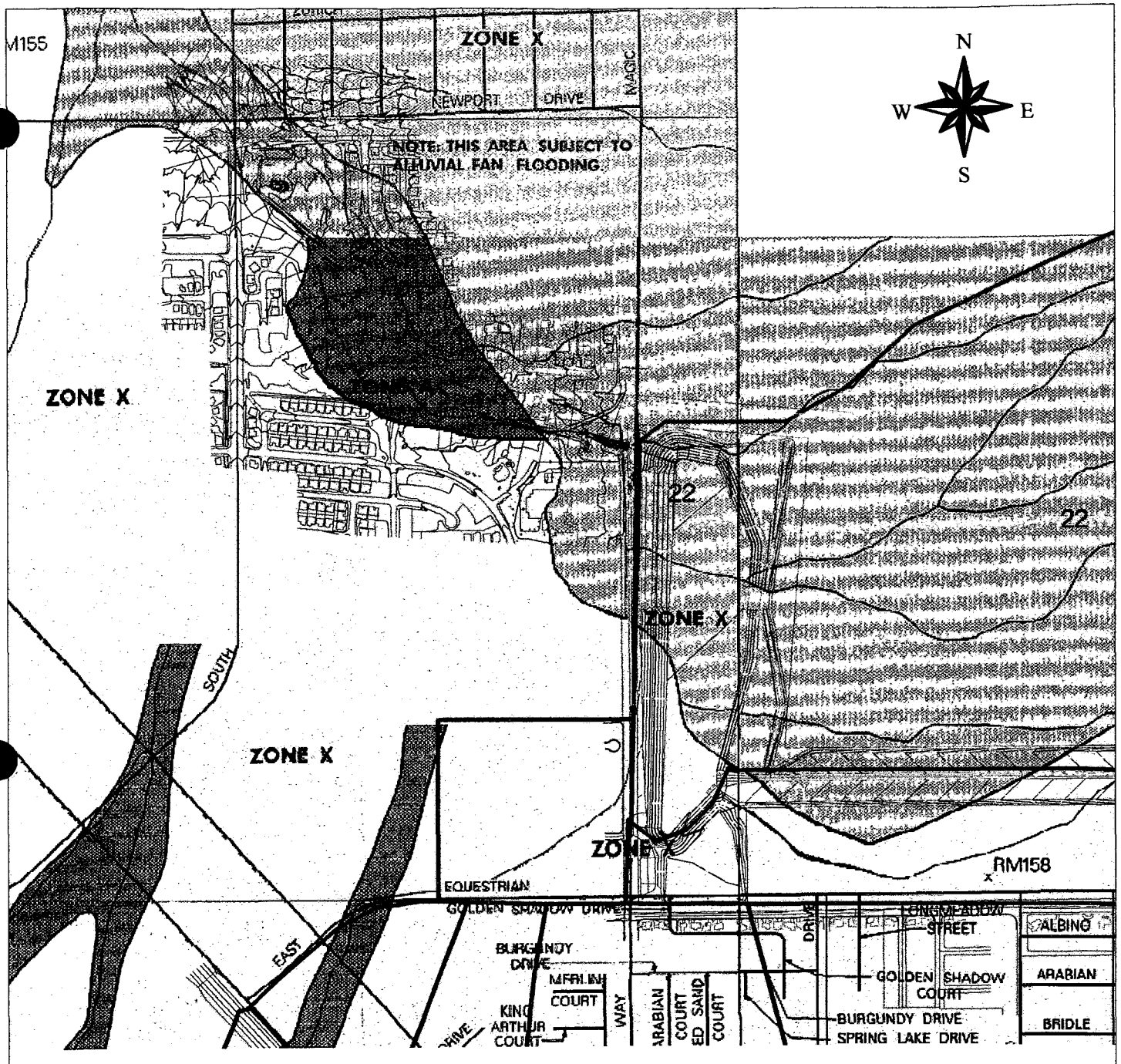


CITY OF HENDERSON
EQUESTRIAN DETENTION BASIN
A PORTION OF
FIRM 325276C2615
AUGUST 16, 1995

POGGEMEYER DESIGN GROUP
ENGINEERS + PLANNERS + SURVEYORS
2601 North Tenaya Way
Las Vegas , Nevada 89128
(702) 255-8100 FAX (702) 255-8375
PDG-LV@POGGEMEYER.COM

PDG# 1002005

FIGURE Ca
FIRM MAP



2000 0 2000 Feet

CITY OF HENDERSON
EQUESTRIAN DETENTION BASIN
A PORTION OF
FIRM 325276C2615
AUGUST 16, 1995

POGGEMEYER DESIGN GROUP
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2601 North Tenaya Way
Las Vegas , Nevada 89128
(702) 255-8100 FAX (702) 255-8375
PDG-LV@POGGEMEYER.COM

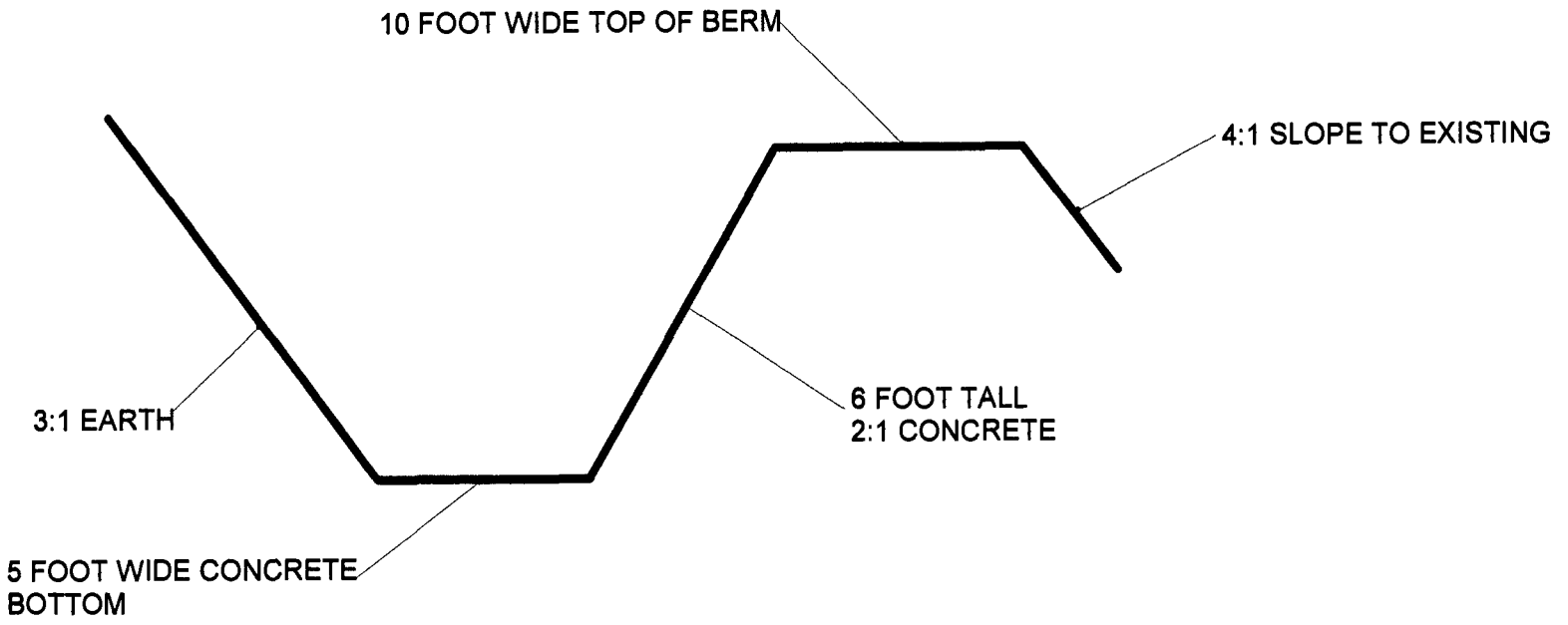
PDG# 1002005

FIGURE Cb
REVISED
FIRM MAP

APPENDIX H

EXISTING CHANNEL SECTION

AND EROSION CALCULATIONS



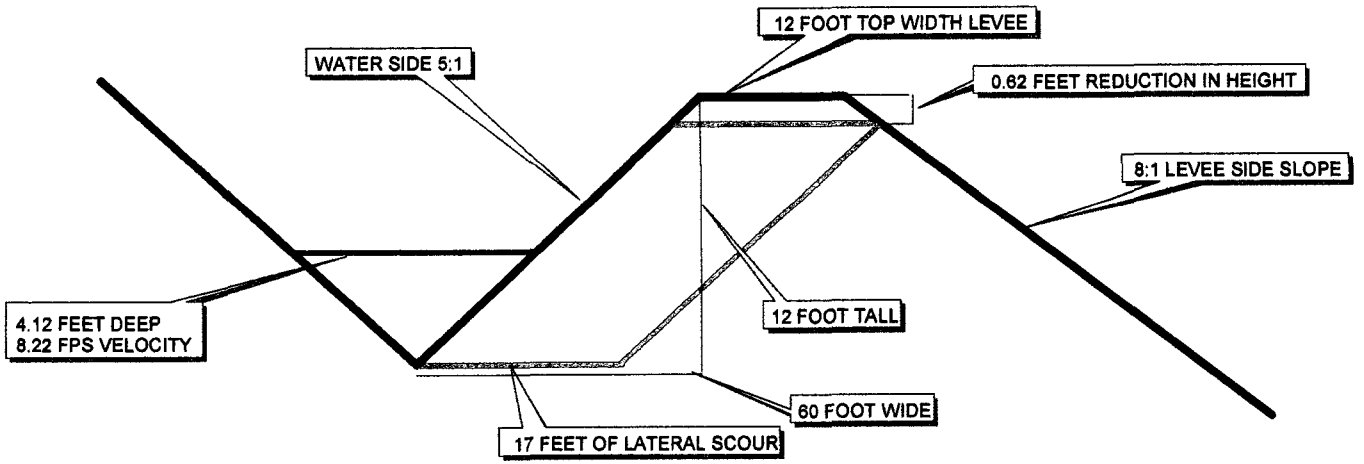
AS BUILT OF EXISTING UPSTREAM
BOULDER HIGHWAY CHANNEL

CITY OF HENDERSON
EQUESTRIAN DETENTION BASIN
LOMR SUBMISSION

POGGEMEYER DESIGN GROUP
ENGINEERS + PLANNERS + SURVEYORS
2601 North Tenaya Way
Las Vegas , Nevada 89128
(702) 255-8100 FAX (702) 255-8375
PDG-LV@POGGEMEYER.COM

PDG# 1002005

FIGURE D



WORST CASE SCOUR
STATION 150+00

CITY OF HENDERSON
EQUESTRIAN DETENTION BASIN
LOMR SUBMISSION

POGGEMEYER DESIGN GROUP
ENGINEERS + PLANNERS + SURVEYORS
2601 North Tenaya Way
Las Vegas , Nevada 89128
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PDG-LV@POGGEMEYER.COM

PDG# 1002005

FIGURE E

STATION	INVERT EL.	W.S. ELEV.	EGL	TOP OF BANK	T.O.B. W.S.E.	T.O.B. E.G.L.
10+00.00	2059.69	2069.99	2083.92	2069.69	(0.30)	(14.23)
11+00.00	2069.69	2072.00	2086.76	2079.69	7.69	(7.07)
12+00.00	2072.00	2075.82	2089.86	2082.00	6.18	(7.86)
36+00.00	2127.38	2131.18	2145.43	2137.38	6.20	(8.05)
39+00.00	2134.30	2138.07	2152.63	2144.30	6.23	(8.33)
42+00.00	2141.22	2144.89	2160.40	2151.22	6.33	(9.18)
50+00.00	2162.64	2166.19	2183.07	2172.64	6.45	(10.43)
50+50.00	2163.80	2167.31	2184.75	2173.80	6.49	(10.95)
51+00.00	2164.95	2168.40	2186.57	2174.95	6.55	(11.62)
52+00.00	2167.26	2170.76	2188.25	2177.26	6.50	(10.99)
52+50.00	2168.42	2171.87	2190.04	2178.42	6.55	(11.62)
53+00.00	2172.25	2175.89	2191.73	2182.25	6.36	(9.48)
54+00.00	2174.70	2178.30	2194.66	2184.70	6.40	(9.96)
55+00.00	2177.15	2180.69	2197.78	2187.15	6.46	(10.63)
55+50.00	2180.98	2184.74	2199.38	2190.98	6.24	(8.40)
56+00.00	2182.21	2186.48	2200.52	2192.21	5.73	(8.31)
57+00.00	2184.86	2188.67	2202.80	2194.86	6.19	(7.94)
57+50.00	2185.88	2189.67	2204.03	2195.88	6.21	(8.15)
58+00.00	2189.71	2193.83	2205.38	2199.71	5.88	(5.67)
59+00.00	2192.16	2196.41	2207.06	2202.16	5.75	(4.90)
60+00.00	2194.61	2199.04	2208.60	2204.61	5.57	(3.99)
60+37.00	2195.53	2200.05	2209.12	2205.53	5.48	(3.59)
61+50.00	2204.15	2209.06	2210.93	2214.15	5.09	3.22
62+00.00	2204.43	2210.45	2211.21	2216.43	5.98	5.22
64+00.00	2205.55	2211.23	2211.58	2217.55	6.32	5.97
67+00.00	2207.20	2211.80	2213.45	2219.20	7.40	5.75
73+50.00	2210.78	2215.76	2217.08	2222.78	7.02	5.70
74+50.00	2211.33	2216.49	2217.53	2227.33	10.84	9.80
78+00.00	2213.25	2217.81	2219.27	2229.25	11.44	9.98
82+00.00	2215.45	2220.17	2221.49	2231.45	11.28	9.96
85+00.00	2217.10	2221.81	2222.95	2233.10	11.29	10.15
86+00.00	2218.60	2222.42	2223.41	2230.60	8.18	7.19
90+00.00	2224.60	2227.30	2229.64	2236.60	9.30	6.96
95+00.00	2232.10	2234.80	2237.17	2244.10	9.30	6.93
100+00.00	2239.60	2242.33	2244.61	2251.60	9.27	6.99
105+00.00	2247.10	2249.76	2252.18	2259.10	9.34	6.92
110+00.00	2254.60	2257.36	2259.58	2266.60	9.24	7.02
115+00.00	2262.10	2264.71	2267.25	2274.10	9.39	6.85
120+00.00	2269.60	2272.44	2274.51	2281.60	9.16	7.09
125+00.00	2277.10	2279.61	2282.41	2289.10	9.49	6.69
127+00.00	2280.10	2283.82	2286.95	2292.10	8.28	5.15
132+50.00	2293.58	2297.36	2300.29	2305.58	8.22	5.29
138+00.00	2307.05	2310.55	2313.36	2319.05	8.50	5.69
141+00.00	2314.40	2317.90	2320.70	2326.40	8.50	5.70
144+00.00	2321.75	2325.26	2328.03	2333.75	8.49	5.72
147+00.00	2329.10	2332.60	2335.40	2341.10	8.50	5.70
150+00.00	2336.45	2339.94	2342.78	2348.45	8.51	5.67
153+00.00	2343.80	2347.26	2349.56	2355.80	8.54	6.24
156+00.00	2351.15	2354.29	2357.66	2361.15	6.86	3.49
159+50.00	2359.73	2363.43	2365.19	2369.73	6.30	4.54
160+00.00	2359.73	2362.63	2367.26	2368.73	6.10	1.47
161+50.00	2364.63	2368.82	2369.89	2373.63	4.81	3.74
162+00.00	2365.85	2370.04	2370.08	2372.85	2.81	2.77
163+00.00	2368.30	2370.08	2371.23	2374.30	4.22	3.07
164+00.00	2370.75	2372.53	2373.68	2376.75	4.22	3.07
165+00.00	2373.20	2375.00	2376.18	2379.20	4.20	3.02
165+50.00	2374.43	2376.22	2377.44	2380.43	4.21	2.99
166+00.00	2375.65	2377.65	2378.43	2381.65	4.00	3.22
167+00.00	2378.10	2379.99	2380.97	2382.10	2.11	1.13

STATION	INVERT EL.	W.S. ELEV.	DEPTH	EGL	TOP OF BANK	T.O.B. W.S.E.	T.O.B. E.G.L.
60+37.00	2195.53	2202.59	7.06	2205.09	2205.53	2.94	0.44
61+50.00	2204.15	2208.86	4.71	2210.67	2214.15	5.29	3.48
62+00.00	2204.43	2210.20	5.77	2210.95	2216.43	6.23	5.48
64+00.00	2205.55	2210.98	5.43	2211.33	2217.55	6.57	6.22
67+00.00	2207.20	2211.63	4.43	2213.22	2219.20	7.57	5.98
73+50.00	2210.78	2215.58	4.80	2216.85	2222.78	7.20	5.93
74+50.00	2211.33	2216.29	4.96	2217.30	2227.33	11.04	10.03
78+00.00	2213.25	2217.65	4.40	2218.97	2229.25	11.60	10.28
82+00.00	2215.45	2219.89	4.44	2221.18	2231.45	11.56	10.27
85+00.00	2217.10	2221.61	4.51	2222.64	2233.10	11.49	10.46
86+00.00	2218.60	2222.12	3.52	2223.09	2230.60	8.48	7.51
90+00.00	2224.60	2227.75	3.15	2229.03	2236.60	8.85	7.57
95+00.00	2232.10	2235.26	3.16	2236.54	2244.10	8.84	7.56
100+00.00	2239.60	2242.74	3.14	2244.03	2251.60	8.86	7.57
105+00.00	2247.10	2250.25	3.15	2251.53	2259.10	8.85	7.57
110+00.00	2254.60	2257.75	3.15	2259.03	2266.60	8.85	7.57
115+00.00	2262.10	2265.25	3.15	2266.53	2274.10	8.85	7.57
120+00.00	2269.60	2272.75	3.15	2274.03	2281.60	8.85	7.57
125+00.00	2277.10	2280.25	3.15	2281.53	2289.10	8.85	7.57
127+00.00	2280.10	2284.63	4.53	2285.76	2292.10	7.47	6.34
132+50.00	2293.58	2298.10	4.52	2299.24	2305.58	7.48	6.34
138+00.00	2307.05	2311.16	4.11	2312.22	2319.05	7.89	6.83
141+00.00	2314.40	2318.52	4.12	2319.57	2326.40	7.88	6.83
144+00.00	2321.75	2325.87	4.12	2326.92	2333.75	7.88	6.83
147+00.00	2329.10	2333.50	4.40	2334.27	2341.10	7.60	6.83
150+00.00	2336.45	2340.57	4.12	2341.62	2348.45	7.88	6.83
153+00.00	2343.80	2347.72	3.92	2348.70	2355.80	8.08	7.10
156+00.00	2351.15	2355.05	3.90	2356.41	2361.15	6.10	4.74
159+50.00	2359.73	2363.64	3.91	2364.63	2369.73	6.09	5.10
160+00.00	2359.73	2364.42	4.69	2364.90	2368.73	4.31	3.83
161+50.00	2364.63	2368.53	3.90	2369.53	2373.63	5.10	4.10
162+00.00	2365.85	2369.69	3.84	2369.71	2372.85	3.16	3.14
163+00.00	2368.30	2369.69	1.39	2370.43	2374.30	4.61	3.87
164+00.00	2370.75	2372.44	1.69	2372.88	2376.75	4.31	3.87
165+00.00	2373.20	2374.92	1.72	2375.36	2379.20	4.28	3.84
165+50.00	2374.43	2376.15	1.72	2376.59	2380.43	4.28	3.84
166+00.00	2375.65	2377.37	1.72	2377.81	2381.65	4.28	3.84
167+00.00	2378.10	2379.82	1.72	2380.26	2382.10	2.28	1.84

STA	VEL	SLOPE	DEPTH	BOTTOM WIDTH	SIDE SLOPE L	SIDE SLOPE R	TOP WIDTH	AREA	HYDRA DEPTH	Zgs	Za	Zls	Zbs	Zlfl	Zt
6150.0	10.78	0.004	4.71	20.00	2	2	38.84	98.910	2.547	2.955	1.592	0.000	0.000	2.000	8.511
6200.0	6.93	0.002	5.77	20.00	3	3	54.62	124.055	2.271	2.947	0.658	0.000	0.000	2.000	7.286
6400.0	4.65	0.007	5.43	20.00	7	7	96.02	127.605	1.329	0.000	0.296	0.000	0.000	2.000	2.985
6700.0	10.14	0.001	4.43	20.00	3	3	46.58	95.245	2.045	6.414	1.409	0.000	0.000	2.000	12.769
7350.0	9.04	0.005	4.80	20.00	3	3	48.80	103.200	2.115	2.092	1.120	0.000	0.000	2.000	6.775
7450.0	8.06	0.004	4.96	20.00	3	4	54.72	109.120	1.994	2.182	0.890	0.000	0.000	2.000	6.593
8500.0	8.14	0.004	4.51	20.00	3	4	51.57	99.220	1.924	1.896	0.908	0.000	0.000	2.000	6.245
8600.0	7.89	0.003	3.52	35.00	3	4	59.64	130.240	2.184	1.470	0.853	0.000	0.000	2.000	5.619
12500.0	9.09	0.022	3.15	35.00	3	4	57.05	116.550	2.043	0.000	1.132	0.000	0.000	2.000	4.072
12700.0	8.55	0.025	4.53	0.01	5	10	67.96	22.695	0.334	3.298	1.002	0.000	0.000	2.000	8.190
13250.0	8.57	0.004	4.52	0.01	5	10	67.81	22.645	0.334	8.670	1.006	0.000	0.000	2.000	15.179
15000.1	8.22	0.002	4.12	0.01	5	10	61.81	20.641	0.334	10.510	0.926	0.000	0.000	2.000	17.466
16150.0	8.00	0.008	3.90	0.01	5	10	58.51	19.539	0.334	5.179	0.877	0.000	0.000	2.000	10.473
16200.0	1.00	0.024	3.84	0.01	5	20	96.01	38.438	0.400	0.000	0.014	0.000	0.000	2.000	2.618
16500.0	5.27	0.020	1.72	0.01	4	20	41.29	17.217	0.417	0.232	0.380	0.000	0.000	2.000	3.397
16550.0	5.31	0.024	1.72	0.01	4	20	41.29	17.217	0.417	0.138	0.386	0.000	0.000	2.000	3.282
16700.0	5.31	0.021	1.72	0.01	4	20	41.29	17.217	0.417	0.237	0.386	0.000	0.000	2.000	3.410

STATION		LT	LTOF	LB	LBOF	RB	RBOF	RT	RTOF	DEPTH	BW	SSL	SSR
1000	2059.69	2069.69	100.0	2059.69	120.0	2059.69	160.0	2069.69	180.0	10	40	2	2
1100	2069.69	2079.69	100.0	2069.69	120.0	2069.69	160.0	2079.69	180.0	10	40	2	2
1200	2072.00	2082.00	110.0	2072.00	130.0	2072.00	150.0	2082.00	170.0	10	20	2	2
3600	2127.38	2137.38	110.0	2127.38	130.0	2127.38	150.0	2137.38	170.0	10	20	2	2
3900	2134.30	2144.30	110.0	2134.30	130.0	2134.30	150.0	2144.30	170.0	10	20	2	2
4200	2141.22	2151.22	110.0	2141.22	130.0	2141.22	150.0	2151.22	170.0	10	20	2	2
5000	2162.64	2172.64	110.0	2162.64	130.0	2162.64	150.0	2172.64	170.0	10	20	2	2
5050	2163.80	2173.80	110.0	2163.80	130.0	2163.80	150.0	2173.80	170.0	10	20	2	2
5100	2164.95	2174.95	110.0	2164.95	130.0	2164.95	150.0	2174.95	170.0	10	20	2	2
5200	2167.26	2177.26	110.0	2167.26	130.0	2167.26	150.0	2177.26	170.0	10	20	2	2
5250	2168.42	2178.42	110.0	2168.42	130.0	2168.42	150.0	2178.42	170.0	10	20	2	2
5300	2172.25	2182.25	110.0	2172.25	130.0	2172.25	150.0	2182.25	170.0	10	20	2	2
5400	2174.70	2184.70	110.0	2174.70	130.0	2174.70	150.0	2184.70	170.0	10	20	2	2
5500	2177.15	2187.15	110.0	2177.15	130.0	2177.15	150.0	2187.15	170.0	10	20	2	2
5550	2180.98	2190.98	110.0	2180.98	130.0	2180.98	150.0	2190.98	170.0	10	20	2	2
5600	2182.21	2192.21	110.0	2182.21	130.0	2182.21	150.0	2192.21	170.0	10	20	2	2
5700	2184.86	2194.86	110.0	2184.86	130.0	2184.86	150.0	2194.86	170.0	10	20	2	2
5750	2185.88	2195.88	110.0	2185.88	130.0	2185.88	150.0	2195.88	170.0	10	20	2	2
5800	2189.71	2199.71	110.0	2189.71	130.0	2189.71	150.0	2199.71	170.0	10	20	2	2
5900	2192.16	2202.16	110.0	2192.16	130.0	2192.16	150.0	2202.16	170.0	10	20	2	2
6000	2194.61	2204.61	110.0	2194.61	130.0	2194.61	150.0	2204.61	170.0	10	20	2	2
6037	2195.53	2205.53	110.0	2195.53	130.0	2195.53	150.0	2205.53	170.0	10	20	2	2
6150	2204.15	2214.15	110.0	2204.15	130.0	2204.15	150.0	2214.15	170.0	10	20	2	2
6200	2204.43	2216.43	94.0	2204.43	130.0	2204.43	150.0	2216.43	186.0	12	20	3	3
6400	2205.55	2217.55	46.0	2205.55	130.0	2205.55	150.0	2217.55	234.0	12	20	7	7
6700	2207.20	2219.20	94.0	2207.20	130.0	2207.20	150.0	2219.20	186.0	12	20	3	3
7350	2210.78	2222.78	94.0	2210.78	130.0	2210.78	150.0	2222.78	186.0	12	20	3	3
7450	2211.33	2227.33	82.0	2211.33	130.0	2211.33	150.0	2227.33	214.0	16	20	3	4
7800	2213.25	2229.25	82.0	2213.25	130.0	2213.25	150.0	2229.25	214.0	16	20	3	4
8200	2215.45	2231.45	82.0	2215.45	130.0	2215.45	150.0	2231.45	214.0	16	20	3	4
8500	2217.10	2233.10	82.0	2217.10	130.0	2217.10	150.0	2233.10	214.0	16	20	3	4
8600	2218.60	2230.60	86.5	2218.60	122.5	2218.60	157.5	2230.60	205.5	12	35	3	4
9000	224.60	236.60	86.5	224.60	122.5	224.60	157.5	236.60	205.5	12	35	3	4
9500	2232.10	2244.10	86.5	2232.10	122.5	2232.10	157.5	2244.10	205.5	12	35	3	4
10000	2239.60	2251.60	86.5	2239.60	122.5	2239.60	157.5	2251.60	205.5	12	35	3	4

STATION		LT	LTOF	LB	LBOF	RB	RBOF	RT	RTOF	DEPTH	BW	SSL	SSR
10500	2247.10	2259.10	86.5	2247.10	122.5	2247.10	157.5	2259.10	205.5	12	35	3	4
11000	2254.60	2266.60	86.5	2254.60	122.5	2254.60	157.5	2266.60	205.5	12	35	3	4
11500	2262.10	2274.10	86.5	2262.10	122.5	2262.10	157.5	2274.10	205.5	12	35	3	4
12000	2269.60	2281.60	86.5	2269.60	122.5	2269.60	157.5	2281.60	205.5	12	35	3	4
12500	2277.10	2289.10	86.5	2277.10	122.5	2277.10	157.5	2289.10	205.5	12	35	3	4
12700	2280.10	2292.10	80.0	2280.10	140.0	2280.10	140.0	2292.10	260.0	12	0	5	10
13250	2293.58	2305.58	80.0	2293.58	140.0	2293.58	140.0	2305.58	260.0	12	0	5	10
13800	2307.05	2319.05	80.0	2307.05	140.0	2307.05	140.0	2319.05	260.0	12	0	5	10
14100	2314.40	2326.40	80.0	2314.40	140.0	2314.40	140.0	2326.40	260.0	12	0	5	10
14400	2321.75	2333.75	80.0	2321.75	140.0	2321.75	140.0	2333.75	260.0	12	0	5	10
14700	2329.10	2341.10	80.0	2329.10	140.0	2329.10	140.0	2341.10	260.0	12	0	5	10
15000	2336.45	2348.45	80.0	2336.45	140.0	2336.45	140.0	2348.45	260.0	12	0	5	10
15300	2343.80	2355.80	80.0	2343.80	140.0	2343.80	140.0	2355.80	260.0	12	0	5	10
15550	2349.93	2359.93	90.0	2349.93	140.0	2349.93	140.0	2359.93	240.0	10	0	5	10
15600	2351.15	2361.15	90.0	2351.15	140.0	2351.15	140.0	2361.15	240.0	10	0	5	10
15950	2359.73	2369.73	90.0	2359.73	140.0	2359.73	140.0	2369.73	240.0	10	0	5	10
16000	2359.73	2368.73	95.0	2359.73	140.0	2359.73	140.0	2368.73	230.0	9	0	5	10
16150	2364.63	2373.63	95.0	2364.63	140.0	2364.63	140.0	2373.63	230.0	9	0	5	10
16200	2365.85	2372.85	105.0	2365.85	140.0	2365.85	140.0	2372.85	280.0	7	0	5	20
16300	2368.30	2374.30	110.0	2368.30	140.0	2368.30	140.0	2374.30	260.0	6	0	5	20
16400	2370.75	2376.75	110.0	2370.75	140.0	2370.75	140.0	2376.75	260.0	6	0	5	20
16500	2373.20	2379.20	116.0	2373.20	140.0	2373.20	140.0	2379.20	260.0	6	0	4	20
16550	2374.43	2380.43	116.0	2374.43	140.0	2374.43	140.0	2380.43	260.0	6	0	4	20
16600	2375.65	2381.65	116.0	2375.65	140.0	2375.65	140.0	2381.65	260.0	6	0	4	20
16700	2378.10	2382.10	124.0	2378.10	140.0	2378.10	140.0	2382.10	220.0	4	0	4	20

APPENDIX I

BASINS SEDIMENT DEPOSITION

The flow rates were taken from the Modified Stage-Time Stage-Outflow (HEC-1) section 1 of the Supplemental Design Calculations for the EDB. The inflow sediment data was extracted from the HEC-6 evaluation used for the sediment transport evaluation of the unlined channel.

SCOUR AND DEPOSITION IN RIVERS AND RESERVOIRS

Q = 25 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	104.07	2,671.13	0.00	2,775.20
SANDS	155.32	47.13	22.06	15.03	11.45	250.99
GRAVELS	2.10	0.28	0.00	0.00	0.00	2.38
						3,028.57

Q = 37 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	117.65	3,019.56	0.00	3,137.21
SANDS	316.33	101.06	46.96	32.08	24.67	521.10
GRAVELS	5.10	3.89	0.00	0.00	0.00	8.99
						3,667.30

Q = 274 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	1,864.26	47,849.34	0.00	49,713.60
SANDS	10,138.40	3,112.92	1,399.14	960.39	764.06	16,374.91
GRAVELS	68.28	135.50	215.61	115.22	0.00	534.61
						66,623.12

Q = 593 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	4,464.20	114,581.00	0.00	119,045.20
SANDS	36,022.68	11,123.62	4,809.07	3,201.88	2,516.73	57,673.98
GRAVELS	138.92	299.01	559.88	489.02	157.21	1,644.04
						178,363.22

Q = 2,434 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	19,549.47	501,769.73	0.00	521,319.20
SANDS	217,988.88	95,688.32	41,308.67	27,070.24	20,726.05	402,782.16
GRAVELS	474.87	1,094.64	2,330.25	2,728.08	2,549.92	9,177.76
						933,279.12

Q = 1,795 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	13,843.56	355,318.04	0.00	369,161.60
SANDS	161,242.01	58,449.02	25,363.35	16,646.19	12,782.17	274,482.74
GRAVELS	342.24	783.96	1,648.10	1,874.85	1,616.53	6,265.68
						649,910.02

SCOUR AND DEPOSITION IN RIVERS AND RESERVOIRS

Q = 873 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	5,911.31	151,723.50	0.00	157,634.81
SANDS	54,207.86	16,734.22	7,062.22	4,611.36	3,602.11	86,217.77
GRAVELS	155.31	343.94	677.28	664.56	359.31	2,200.40
						246,052.98

Q = 1,612 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	12,340.10	316,729.11	0.00	329,069.21
SANDS	144,251.05	48,578.05	20,474.78	13,084.30	9,987.89	236,376.07
GRAVELS	260.83	600.03	1,258.91	1,406.03	1,123.74	4,649.54
						570,094.82

Q = 341 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	2,134.03	54,773.56	0.00	56,907.59
SANDS	12,369.46	3,614.43	1,443.35	979.56	787.19	19,193.99
GRAVELS	59.94	121.85	200.55	115.81	0.00	498.15
						76,599.73

Q = 89 CFS TRANSPORT CAPACITY

	Very Fine	Fine	Medium	Coarse	Very Coarse	TOTAL
SILT	0.00	0.00	378.75	9,721.25	0.00	10,100.00
SANDS	1,225.50	366.03	171.92	120.23	95.63	1,979.31
GRAVELS	14.89	22.13	14.46	0.00	0.00	51.48
						12,130.79

																				FALL VELOCITY									
																				0.00135	0.00523	0.01940	0.05950	0.135	0.280	0.474	0.706	1.020	1.443
																				SILT		SAND							GRAVEL
Time	Inflow Q	Outflow Q	Storage	Stage Storage	Depth at Section 1	Area at Section 1	Velocity Section 1	Depth at Section 2	Area at Section 2	Velocity Section 2	Depth at Section 3	Area at Section 3	Velocity Section 3	Depth at Section 4	Area at Section 4	Velocity Section 4	Depth at Section 5	Area at Section 5	Velocity Section 5	M	C	VF	F	M	C	VC	VF	F	M
56	1	0.0	0.0	2048.0	0.14	1.45	0.6896	0.12	1.56	0.6403	0.12	1.6304	0.6133	0.1200	9.53	0.1049	0.12	1.57	0.6373	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
[illegible]	3	0.0	0.0	2048.0	0.22	3.58	0.8378	0.19	3.92	0.7662	0.18	3.6685	0.8178	0.1800	21.45	0.1399	0.19	3.93	0.7626	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
[illegible]	3	1.0	0.0	2048.0	0.22	3.58	0.8378	0.19	3.92	0.7662	0.18	3.6685	0.8178	0.1800	21.45	0.1399	0.19	3.93	0.7626	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
117	3	1.0	0.1	2048.1	0.22	3.58	0.8378	0.19	3.92	0.7662	0.18	3.6685	0.8178	0.1800	21.45	0.1399	0.19	3.93	0.7626	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
124	4	2.0	0.1	2048.1	0.24	4.26	0.9387	0.21	4.78	0.8363	0.20	4.5290	0.8832	0.2000	26.48	0.1511	0.21	4.81	0.8324	0.081	2.078	0.121	0.037	0.017	0.012	0.009	0.002	0.000	0.000
131	6	2.0	0.1	2048.1	0.28	5.80	1.0344	0.24	6.25	0.9604	0.24	6.5217	0.9200	0.2300	35.02	0.1713	0.24	6.28	0.9560	0.121	3.117	0.181	0.055	0.026	0.018	0.013	0.002	0.000	0.000
138	12	4.0	0.2	2048.2	0.36	9.59	1.2515	0.31	10.42	1.1513	0.30	10.1902	1.1776	0.3000	59.58	0.2014	0.31	10.47	1.1460	0.243	6.233	0.362	0.110	0.051	0.035	0.027	0.005	0.001	0.000
145	23	6.0	0.3	2048.3	0.46	15.65	1.4692	0.39	16.50	1.3942	0.39	17.2214	1.3355	0.3800	95.60	0.2406	0.39	16.57	1.3877	0.465	11.947	0.695	0.211	0.099	0.067	0.051	0.009	0.001	0.000
152	35	11.0	0.5	2048.6	0.53	20.78	1.6842	0.46	22.95	1.5250	0.45	22.9279	1.5265	0.4400	128.17	0.2731	0.46	23.06	1.5180	0.561	14.397	1.407	0.448	0.208	0.142	0.109	0.022	0.016	0.000
159	44	17.0	0.7	2048.9	0.58	24.89	1.7679	0.50	27.12	1.6227	0.49	27.1852	1.6185	0.4800	152.53	0.2885	0.50	27.24	1.6152	0.743	19.065	2.133	0.665	0.310	0.214	0.166	0.031	0.031	0.009
206	47	23.0	1.0	2049.2	0.60	26.63	1.7647	0.51	28.21	1.6660	0.50	28.3061	1.6604	0.5000	165.50	0.2840	0.51	28.34	1.6583	0.816	20.945	2.388	0.739	0.345	0.238	0.186	0.034	0.036	0.014
213	46	27.0	1.2	2049.4	0.59	25.75	1.7862	0.51	28.21	1.6306	0.50	28.3061	1.6251	0.4900	158.95	0.2894	0.51	28.34	1.6230	0.792	20.318	2.303	0.714	0.333	0.230	0.180	0.033	0.034	0.012
220	47	31.0	1.3	2049.6	0.60	26.63	1.1639	0.51	28.21	1.6660	0.50	28.3061	1.6604	0.5000	165.50	0.2840	0.51	28.34	1.6583	0.816	20.945	2.388	0.739	0.345	0.238	0.186	0.034	0.036	0.014
227	56	35.0	1.5	2049.9	0.64	30.30	1.1550	0.55	32.81	1.7068	0.54	33.0162	1.6961	0.5300	185.96	0.3011	0.55	32.96	1.6989	1.036	26.584	3.153	0.962	0.450	0.313	0.246	0.042	0.051	0.026
234	73	39.0	1.8	2050.0	0.70	36.25	1.0758	0.60	39.05	1.8696	0.59	39.4134	1.8522	0.5800	222.70	0.3278	0.60	39.23	1.8609	1.451	37.235	4.598	1.383	0.649	0.453	0.359	0.058	0.080	0.049
241	93	41.0	2.2	2050.1	0.77	43.86	0.9347	0.66	47.25	1.9684	0.65	47.8373	1.9441	0.6400	271.16	0.3430	0.66	47.47	1.9593	1.997	51.267	6.895	2.068	0.965	0.673	0.535	0.078	0.120	0.091
248	112	43.0	2.8	2050.2	0.82	49.75	0.8644	0.71	54.68	2.0484	0.70	55.4799	2.0187	0.6900	315.19	0.3553	0.71	54.93	2.0390	2.739	70.304	11.345	3.440	1.578	1.092	0.869	0.105	0.176	0.192
255	129	47.0	3.5	2050.4	0.87	56.00	0.8393	0.74	59.39	2.1719	0.73	60.3373	2.1380	0.7200	343.19	0.3759	0.74	59.67	2.1619	3.403	87.337	15.326	4.667	2.126	1.468	1.168	0.129	0.227	0.282
302	145	51.0	4.4	2050.5	0.95	66.77	0.7638	0.78	65.99	2.1973	0.77	67.1307	2.1600	0.7500	372.39	0.3894	0.78	66.29	2.1872	4.027	103.368	19.074	5.822	2.642	1.821	1.449	0.151	0.274	0.366
309	171	56.0	5.4	2050.7	1.15	97.84	0.5723	0.83	74.72	2.2885	0.81	74.2865	2.3019	0.8000	423.69	0.4036	0.83	75.07	2.2780	5.042	129.418	25.163	7.698	3.480	2.395	1.905	0.187	0.352	0.504
316	241	63.0	6.8	2051.0	1.45	155.55	0.4050	0.94	95.84	2.5147	0.93	97.9278	2.4610	0.9100	548.22	0.4396	0.94	96.28	2.5031	7.775	199.553	41.558	12.751	5.738	3.940	3.135	0.286	0.560	0.874
323	453	75.0	9.5	2051.5	1.95	281.32	0.2666	1.19	153.59	2.9493	1.17	154.9929	2.9227	1.1500	875.52	0.5174	1.19	154.31	2.9357	15.409	395.501	111.240	33.796	14.289	9.564	7.564	0.462	0.975	1.751
330	945	94.0	15.4	2052.3	2.75	559.50	0.1680	1.57	267.35	3.5347	1.54	268.5229	3.5193	1.5200	1529.53	0.6178	1.56	265.18	3.5636	31.783	815.750	306.177	96.435	40.685	26.431	20.536	0.805	1.793	3.568
337	1687	114.0	27.1	2053.7	4.15	1210.53	0.0942	2.25	549.10	3.0723	1.91	413.0539	4.0842	1.8900	2364.80	0.7134	1.92	400.18	4.2156	62.986	1,616.647	735.122	255.827	109.277	70.705	54.123	1.430	3.283	6.896
344	2526	134.0	46.2	2055.2	5.65	1933.27	0.0693	3.75	1376.80	1.8347	2.23	563.0535	4.4863	2.1700	553.64	4.5625	2.20	510.58	4.9474	95.039	2,439.328	1,059.742	465.184	200.820	131.601	100.759	2.309	5.322	11.328
351	3309	154.0	72.9	2057.0	7.45	2834.15	0.0543	5.55	2413.02	1.3713	3.55	1271.9052	2.6016	2.3700	650.67	5.0855	2.43	601.71	5.4993	95.039	2,439.328	1,059.742	465.184	200.820	131.601	100.759	2.309	5.322	11.328
258	3607	171.0	104.7	2058.8	9.25	3771.67	0.0453	7.35	3483.98	1.0353	5.35	2262.1894	1.5945	3.3500	1130.55	3.1905	2.51	633.50	5.6937	95.039	2,439.328	1,059.742	465.184	200.820	131.601	100.759	2.309	5.322	11.328
405	3534	185.0	136.9	2060.3	10.75	4580.92	0.0404	8.85	4402.99	0.8026	6.85	3106.0643	1.1378	4.8500	1879.30	1.8805	2.85	769.17	4.5945	95.039	2,439.328	1,059.742	465.184	200.820	131.601	100.759	2.309	5.322	11.328
412	3049	193.0	166.4	2061.4	11.85	5190.54	0.0372	9.95	5092.27	0.5988	7.95	3735.6746	0.8162	5.9500	2439.31	1.2499	3.95	1214.20	2.5111	95.039	2,439.328	1,059.742	465.184	200.820	131.601	100.759	2.309	5.322	11.328
419	2637	201.0	191.9	2062.3	12.75	5699.50	0.0353	10.85	5665.87	0.4654	8.85	4257.5877	0.6194	6.8500	2904.39	0.9079	4.85	1585.22	1.6635	95.039	2,439.328	1,059.742	465.184	200.820	131.601	100.759	2.309	5.322	11.328
426	2280	208.0	213.6	2063.2	13.65	6217.62	0.0335	11.75	6248.15	0.3649	9.75	4785.6006	0.4764	7.7500	3375.67	0.6754	5.75	1962.46	1.1618	88.354	2,267.743	993.256	421.554	182.138	119.388	91.451	2.153	4.958	10.529
433	2010	213.0	232.2	2063.9	14.35	6626.94	0.0321	12.45	6707.05	0.2997	10.45	5200.4944	0.3865	8.4500	3746.50	0.5365	6.45	2260.17	0.8893	76.633	1,966.911	876.691	345.059	149.384	97.975	75.134	1.881	4.319	9.128
440	1835	218.0	248.7	2064.6	15.05	7041.80	0.0310	13.15	7171.19	0.2559	11.15	5619.0782	0.3266	9.1500	4121.08	0.4453	7.15	2561.64	0.7163	69.036	1,771.928	801.139	295.479	128.155	84.097	64.557	1.704	3.906	8.220
447	1731	222.0	263.8	2065.1	15.55	7341.51	0.0302	13.65	7505.94	0.2306	11.65	5920.3257	0.2924	9.6500	4390.93	0.3942	7.65	2779.28	0.6228	64.744	1,661.752	754.982	267.364	114.991	74.869	57.389	1.525	3.498	7.350
454	1665	226.0	278.0	2065.7	16.15	7704.91	0.0293	14.25	7911.18	0.2105	12.25	6284.3079	0.2649	10.2500	4717.28	0.3530	8.25	3042.98	0.5472	62.108	1,594.094	725.192	250.058	106.420	68.624	52.490	1.383	3.176	6.668
501	1608	230.0	291.6	2066.2	16.65	8010.85	0.0287	14.75	8251.83	0.1949	12.75	6589.6972	0.2440	10.7500	4991.34	0.3222	8.75	3264.85	0.4925	59.822	1,535.420	698.900	235.322	99.184	63.386	48.388	1.265	2.910	6.105
508	1529	233.0	304.5	2066.7	17.15	8319.61	0.0280	15.25	8595.16	0.1779	13.25	6896.9692	0.2217	11.2500	5267.31	0.2903	9.25	3488.63	0.4383	56.481	1,449.668	652.105	218.773	92.214	58.982	45.069	1.210	2.777	5.803
[illegible]5	1406	236.0	316.4	2067.1	17.55	8568.66	0.0275	15.65	8871.75	0.1585	13.65	7144.1423	0.1968	11.6500	5489.47	0.2561	9.65	3669.04	0.3832	51.279	1,316.154	579.247	193.006	81.361	52.127	39.902	1.125	2.570	5.332
[illegible]2	1249	238.0	326.9	2067.5	17.95	8819.52	0.0270	16.05	9150.06	0.1365	14.05	7392.5203	0.1690	12.0500	5712.85	0.2186	10.05	3850.68	0.3244	44.639	1,145.735	486.249	160.118	67.508	43.376	33.307	1.016	2.305	4.731
529	1080	241.0	335.8	2067.8	18.25	9008.85	0.0268	16.35	9359.92	0.1154	14.35	7579.5945	0.1425	12.3500	5881.19	0.1836	10.35	3987.72	0.2708	37.492	962.289	386.143	124.715	52.597	33.956	26.207	0.899	2.021	4.085
536	917	242.0	343.1	2068.1	18.55	9199.19	0.0263	16.65	9570.74	0.0958	14.65	7767.3464	0.1181	12.6500	6050.21	0.1516	10.65	4125.45	0.2223	30.598	785.357	289.592	90.570	38.215	24.870	19.360	0.786	1.746	3.461
543	772	244.0	348.9	2068.3	18.75	9326.66	0.0262	16.85	9711.83	0.0795	14.85	7892.8909	0.0978	12.8500	6163.28	0.1253	10.85	4217.65	0.1830	26.200	672.463	231.639	71.514	30.382	19.946	15.608	0.726	1.593	3.087
550	650	245.0	353.4	2068.5	18.95	9454.58	0.0259	17.05	9853.34	0.0660	15.05	8018.7366	0.0811	13.0500	6276.65	0.1036	11.05	4310.16	0.1508	23.135	593.788	193.119	59.629	25.609	16.961	13.309	0.692	1.498	2.838
557	550	246.0	356.8	2068.6	19.05	9518.70	0.0258	17.15	9924.26	0.0554	15.15	8081.7724	0.0681	13.1500	6333.45	0.0868	11.15	4356.53	0.1262	19.770	507.417	155.501	47.848	20.587	13.722	10.800	0.610	1.307	2.424
604	466	246.0	359.3	2068.7	19.15	9582.94	0.0257	17.25	9995.28	0.0466	15.25	8144.8835	0.0572	13.2500	6390.33	0.0729	11.25	4402.97	0.1058	15.994	410.500	117.172	35.679	15.133	10.121	7.998	0.482	1.020	1.841
611	394	247.0	361.1	2068.8	19.25	9647.30	0.0256	17.35	10066.41	0.0391	15.35	8208.0699	0.0480	13.3500	6447.28	0.0611	11.35	4449.50	0.0885	12.757	327.429	84.318	25.249	10.458	7.034	5.595	0.372	0.774	1.342
618	331	247.0	362.2	2068.8	19.25	9647.30	0.0256	17.35	10066.41	0.0329	15.35	8208.0699	0.0403	13.3500	6447.28	0.0513	11.35	4449.50	0.0744	10.179	261.255	58.515	17.207	6.985	4.748	3.810	0.297	0.602	0.986
625	277	247.0	362.8	2068.8	19.25	9647.30	0.0256	17.35	10066.41	0.0275	15.35	8208.0699	0.0337	13.3500	6447.28	0.0430	11.35	4449.50	0.0623	9.122	234.124	49.773	15.242	6.811	4.673	3.719	0.330	0.656	1.045
632	230	247.0	362.9	2068.8	19.25	9647.30	0.0256	17.35	10066.41	0.0228	15.35	8208.0699	0.0280	13.3500	6447.28	0.0357	11.35	4449.50	0.0517	7.345	188.532	38.982	11.957	5.383	3.697	2.942	0.270	0.528	0.816
639	192	247.0	362.5	2068.8	19.25	9647.30	0.0256	17.35	10066.41	0.0191	15.35	8208.0699	0.0234	13.3500	6447.28	0.0298	11.35	4449.50	0.0432	5.862	150.459	30.082	9.214	4.157	2.859	2.274	0.217	0.414	0.615
646	160	247.0	361.8	2068.8	19.25	9647.30	0.0256	17.35	10066.41	0.0159	15.35	8208.0699	0.0195	13.3500	6447.28	0.0248	11.35	4449.50	0.0360	4.613	118.397	22.587	6.904	3.125	2.152	1.712	0.172	0.319	0.446
653	134	247.0	360.9	2068.8	19.25	9647.30	0.0256	17.35	10066.41	0.0133	15.35	8208.0699	0.0163	13.3500	6447.28	0.0208	11.35	4449.50	0.0301	3.598	92.346	16.497	5.028	2.287	1.578	1.255	0.136	0.242	0.308
700	113	246.0	359.7	2068.7	19.15	9582.94	0.0257	17.25	9995.28	0.0113	15.25	8144.8835	0.0139	13.2500	6390.33	0.0177	11.25	4402.97	0.0257	2.778	71.306	11.579	3.512	1.610	1.114	0.886	0.106	0.179	0.197
707	96	246.0	358.3	2068.7	19.15	9582.94	0.0257	17.25	9995.28	0.0096	15.25	8144.8835	0.0118	13.2500	6390.33	0.0150	11.25	4402.97	0.0218	2.115	54.273	7.597	2.285	1.062	0.739	0.588	0.082	0.128	0.107
714	82	246.0	356.8	2068.6	19.05	9518.70	0.0258	17.15	9924.26	0.0083	15.15	8081.7724	0.0101	13.1500	6333.45	0.0129	11.15	4356.53	0.0188	1.670	42.874	5.363	1.606	0.754	0.527	0.418	0.066	0.096	0.061
721	70	245.0	355.2	2068.6	19.05	9518.70	0.0257	17.15	9924.26	0.0071	15.15	8081.7724	0.0087	13.1500	6333.45	0.0111	11.15	4356.53	0.0161	1.377	35.355	4.343	1.309	0.614	0.428	0.339	0.055	0.075	0.045
728	60	245.0	353.4	2068.5	18.95	9454.58	0.0259	17.05	9853.34	0.0061	15.05	8018.7366	0.0075	13.0500	6276.65	0.0096	11.05	4310.16	0.0139	1.133	29.090	3.493	1.061	0.497	0.346	0.273	0.046	0.058	0.031
735	52	244.0	351.6	2068.4	18.85	9390.56	0.0260	16.95	9782.53	0.0053	14.95	7955.7761	0.0065	12.9500	6219.93	0.0084	10.95	4263.86	0.0122	0.938	24.077	2.813	0.863	0.404	0.280	0.219	0.039	0.044	0.020
742	45	244.0	349.7	2068.4	18.85	9390.56	0.0260	16.95	9782.53	0.0046	14.95	7955.7761	0.0057	12.9500	6219.93	0.0072	10.95	4263.86	0.0106	0.767	19.692	2.218	0.689	0.322	0.222	0.173	0.032	0.033	0.011
749	39	243.0	347.8	2068.3	18.75	9326.66	0.0261	16.85	9711.83	0.0040	14.85	7892.8909	0.0049	12.8500	6163.28	0.0063	10.85	4217.65	0.0092	0.621	15.933	1.708	0.541	0.252	0.172	0.133	0.027	0.022	0.003
756	34	243.0	345.8	2068.2	18.65	9262.87	0.0262	16.75	9641.23	0.0035	14.75	7830.0810	0.0043	12.7500	6106.71	0.0056	10.75	4171.51	0.0082	0.555	14.256	1.342	0.426	0.198	0.135	0.104	0.021	0.015	0.000
803	30	242.0	343.7	2068.1	18.55	9199.19	0.0263	16.65	9570.74	0.0031	14.65	7767.3464	0.0039	12.6500	6050.21	0.0050	10.65	4125.45	0.0073	0.533	13.691	1.081	0.338	0.158	0.108	0.082	0.016	0.009	0.000
810	26	242.0	341.7	2068.1	18.55	9199.19	0.0263	16.65	9570.74	0.0027	14.65	7767.3464	0.0033	12.6500	6050.21	0.0043	10.65	4125.45	0.0063	0.511	13.127	0.820	0.251	0.117	0.080	0.061	0.011	0.003	0.000
817	23	242.0	339.6	2068.0	18.45	9135.63	0.0265	16.55	9500.36	0.0024	14.55	7704.6871	0.0030	12.5500	5993.79	0.0038	10.55	4079.46	0.0056	0.465	11.947	0.695	0.211	0.099	0.067	0.051	0.009	0.001	0.000
824	20	241.0	337.5	2067.9	18.35	9072.18	0.0266	16.45	9430.09	0.0021	14.45	7642.1031	0.0026	12.4500	5937.45	0.0034	10.45	4033.55	0.0050	0.405	10.388	0.604	0.183	0.086	0.058	0.045	0.008	0.001	0.000
831	18	240.0	335.3	2067.8	18.25	9008.85	0.0266	16.35	9359.92	0.0019	14.35	7579.5945	0.0024	12.3500	5881.19	0.0031	10.35	3987.72	0.0045	0.364	9.350	0.544	0.165	0.077	0.053	0.040	0.007	0.001	0.000
838	16	240.0	333.2	2067.8	18.25	9008.85	0.0266	16.35	9359.92	0.0017	14.35	7579.5945	0.0021	12.3500	5881.19	0.0027	10.35	3987.72	0.0040	0.324	8.311	0.483	0.147	0.069	0.047	0.036	0.007	0.001	0.000
845	15	239.0	331.0	2067.7	18.15	8945.62	0.0267	16.25	9289.86	0.0016	14.25	7517.1611	0.0020	12.2500	5825.00	0.0026	10.25	3941.96	0.0038	0.304	7.791	0.453	0.137	0.064	0.044	0.033	0.006	0.001	0.000
852	13	239.0	328.8	2067.6	18.05	8882.51	0.0269	16.15	9219.91	0.0014	14.15	7454.8030	0.0017	12.1500	5768.88	0.0023	10.15	3896.28	0.0033	0.263	6.752	0.393	0.119	0.056	0.038	0.029	0.005	0.001	0.000
859	12	238.0	326.7	2067.5	17.95	8819.52	0.0270	16.05	9150.06	0.0013	14.05	7392.5203	0.0016	12.0500	5712.85	0.0021	10.05	3850.68	0.0031	0.243	6.233	0.362	0.110	0.051	0.035	0.027	0.005	0.001	0.000
906	11	238.0	324.5	2067.4	17.85	8756.63	0.0272	15.95	9080.32	0.0012	13.95	7330.3128	0.0015	11.9500	5656.89	0.0019	9.95	3805.16	0.0029	0.223	5.714	0.332	0.101	0.047	0.032	0.024	0.004	0.001	0.000
913	10	237.0	322.3	2067.3	17.75	8693.86	0.0273	15.85	9010.69	0.0011	13.85	7268.1807	0.0014	11.8500	5601.01	0.0018	9.85	3759.71	0.0027	0.202	5.194	0.302	0.092	0.043	0.029	0.022	0.004	0.001	0.000
920	9	237.0	320.1	2067.3	17.75	8693.86	0.0273	15.85	9010.69	0.0010	13.85	7268.1807	0.0012	11.8500	5601.01	0.0016	9.85	3759.71	0.0024	0.182	4.675	0.272	0.082	0.039	0.026	0.020	0.004	0.000	0.000
[illegible]27	8	236.0	317.9	2067.2	17.65	8631.20	0.0273	15.75	8941.17	0.0009	13.75	7206.1238	0.0011	11.7500	5545.20	0.0014	9.75	3714.34	0.0022	0.162	4.155	0.242	0.073	0.034	0.023	0.018	0.003	0.000	0.000
[illegible]34	7	236.0	315.7	2067.1	17.55	8568.66	0.0275	15.65	8871.75	0.0008	13.65	7144.1423	0.0010	11.6500	5489.47	0.0013	9.65	3669.04	0.0019	0.142	3.636	0.211	0.064	0.030	0.020	0.016	0.003	0.000	0.000
941	7	235.0	313.5	2067.0	17.45	8506.23	0.0276	15.55	8802.44	0.0008	13.55	7082.2361	0.0010	11.5500	5433.82	0.0013	9.55	3623.83	0.0019	0.142	3.636	0.211	0.064	0.030	0.020	0.016	0.003	0.000	0.000
948	6	234.0	311.3	2066.9	17.35	8443.91	0.0277	15.45	8733.24	0.0007	13.45	7020.4051	0.0009	11.4500	5378.24	0.0011	9.45	3578.69	0.0017	0.121	3.117	0.181	0.055	0.026	0.018	0.013	0.002	0.000	0.000
955	6	234.0	309.1	2066.9	17.35	8443.91	0.0277	15.45	8733.24	0.0007	13.45	7020.4051	0.0009	11.4500	5378.24	0.0011	9.45	3578.69	0.0017	0.121	3.117	0.181	0.055	0.026	0.018	0.013	0.002	0.000	0.000
1002	5	233.0	306.9	2066.8	17.25	8381.70	0.0278	15.35	8664.15	0.0006	13.35	6958.6495	0.0007	11.3500	5322.74	0.0009	9.35	3533.62	0.0014	0.101	2.597	0.151	0.046	0.021	0.015	0.011	0.002	0.000	0.000
1009	5	233.0	304.7	2066.7	17.15	8319.61	0.0280	15.25	8595.16	0.0006	13.25	6896.9692	0.0007	11.2500	5267.31	0.0009	9.25	3488.63	0.0014	0.101	2.597	0.151	0.046	0.021	0.015	0.011	0.002	0.000	0.000

Time	Inflow Q	Outflow Q	Storage	Stage Storage	Depth at Section 1	Area at Section 1	Velocity Section 1	Depth at Section 2	Area at Section 2	Velocity Section 2	Depth at Section 3	Area at Section 3	Velocity Section 3	Depth at Section 4	Area at Section 4	Velocity Section 4	Depth at Section 5	Area at Section 5	Velocity Section 5	SILT M	SILT C	SAND VF	SAND F	SAND M	SAND C	SAND VC	GRAVEL VF	GRAVEL F	GRAVEL M
1016	5	232.0	302.5	2066.6	17.05	8257.63	0.0281	15.15	8526.28	0.0006	13.15	6835.3642	0.0007	11.1500	5211.97	0.0010	9.15	3443.72	0.0015	0.101	2.597	0.151	0.046	0.021	0.015	0.011	0.002	0.000	0.000
1023	4	232.0	300.3	2066.5	16.95	8195.77	0.0283	15.05	8457.51	0.0005	13.05	6773.8345	0.0006	11.0500	5156.70	0.0008	9.05	3398.89	0.0012	0.081	2.078	0.121	0.037	0.017	0.012	0.009	0.002	0.000	0.000
1030	4	231.0	298.1	2066.5	16.95	8195.77	0.0282	15.05	8457.51	0.0005	13.05	6773.8345	0.0006	11.0500	5156.70	0.0008	9.05	3398.89	0.0012	0.081	2.078	0.121	0.037	0.017	0.012	0.009	0.002	0.000	0.000
1037	4	231.0	295.9	2066.4	16.85	8134.01	0.0284	14.95	8388.84	0.0005	12.95	6712.3801	0.0006	10.9500	5101.50	0.0008	8.95	3354.13	0.0012	0.081	2.078	0.121	0.037	0.017	0.012	0.009	0.002	0.000	0.000
1044	3	230.0	293.7	2066.3	16.75	8072.37	0.0285	14.85	8320.28	0.0004	12.85	6651.0010	0.0005	10.8500	5046.38	0.0006	8.85	3309.45	0.0009	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
1551	3	230.0	291.6	2066.2	16.65	8010.85	0.0287	14.75	8251.83	0.0004	12.75	6589.6972	0.0005	10.7500	4991.34	0.0006	8.75	3264.85	0.0009	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
[redacted]	3	229.0	289.4	2066.1	16.55	7949.43	0.0288	14.65	8183.49	0.0004	12.65	6528.4687	0.0005	10.6500	4936.38	0.0006	8.65	3220.32	0.0009	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
[redacted]	3	228.0	287.2	2066.0	16.45	7888.13	0.0289	14.55	8115.25	0.0004	12.55	6467.3156	0.0005	10.5500	4881.49	0.0006	8.55	3175.87	0.0009	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
1112	3	228.0	285.0	2066.0	16.45	7888.13	0.0289	14.55	8115.25	0.0004	12.55	6467.3156	0.0005	10.5500	4881.49	0.0006	8.55	3175.87	0.0009	0.061	1.558	0.091	0.027	0.013	0.009	0.007	0.001	0.000	0.000
1119	2	227.0	282.9	2065.9	16.35	7826.94	0.0290	14.45	8047.12	0.0002	12.45	6406.2377	0.0003	10.4500	4826.68	0.0004	8.45	3131.50	0.0006	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1126	2	227.0	280.7	2065.8	16.25	7765.87	0.0292	14.35	7979.10	0.0003	12.35	6345.2351	0.0003	10.3500	4771.94	0.0004	8.35	3087.20	0.0006	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1133	2	226.0	278.5	2065.7	16.15	7704.91	0.0293	14.25	7911.18	0.0003	12.25	6284.3079	0.0003	10.2500	4717.28	0.0004	8.25	3042.98	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1140	2	226.0	276.4	2065.6	16.05	7644.06	0.0296	14.15	7843.38	0.0003	12.15	6223.4559	0.0003	10.1500	4662.70	0.0004	8.15	2998.84	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1147	2	225.0	274.2	2065.5	15.95	7583.32	0.0297	14.05	7775.68	0.0003	12.05	6162.6793	0.0003	10.0500	4608.19	0.0004	8.05	2954.78	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1154	2	224.0	272.1	2065.5	15.95	7583.32	0.0295	14.05	7775.68	0.0003	12.05	6162.6793	0.0003	10.0500	4608.19	0.0004	8.05	2954.78	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1201	2	224.0	269.9	2065.4	15.85	7522.70	0.0298	13.95	7708.08	0.0003	11.95	6101.9779	0.0003	9.9500	4553.76	0.0004	7.95	2910.79	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1208	2	223.0	267.8	2065.3	15.75	7462.19	0.0299	13.85	7640.60	0.0003	11.85	6041.3519	0.0003	9.8500	4499.41	0.0004	7.85	2866.87	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1215	2	223.0	265.7	2065.2	15.65	7401.80	0.0301	13.75	7573.22	0.0003	11.75	5980.8012	0.0003	9.7500	4445.13	0.0004	7.75	2823.04	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1222	2	222.0	263.5	2065.1	15.55	7341.51	0.0302	13.65	7505.94	0.0003	11.65	5920.3257	0.0003	9.6500	4390.93	0.0005	7.65	2779.28	0.0007	0.040	1.039	0.060	0.018	0.009	0.006	0.004	0.001	0.000	0.000
1229	1	221.0	261.4	2065.1	15.55	7341.51	0.0301	13.65	7505.94	0.0001	11.65	5920.3257	0.0002	9.6500	4390.93	0.0002	7.65	2779.28	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1236	1	221.0	259.3	2065.0	15.45	7281.34	0.0304	13.55	7438.78	0.0001	11.55	5859.9256	0.0002	9.5500	4336.81	0.0002	7.55	2735.60	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1243	1	220.0	257.2	2064.9	15.35	7221.29	0.0305	13.45	7371.72	0.0001	11.45	5799.6008	0.0002	9.4500	4282.76	0.0002	7.45	2691.99	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1250	1	220.0	255.1	2064.8	15.25	7161.34	0.0307	13.35	7304.77	0.0001	11.35	5739.3513	0.0002	9.3500	4228.79	0.0002	7.35	2648.46	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1257	1	219.0	253.0	2064.7	15.15	7101.51	0.0308	13.25	7237.93	0.0001	11.25	5679.1771	0.0002	9.2500	4174.90	0.0002	7.25	2605.01	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1304	1	219.0	250.9	2064.7	15.15	7101.51	0.0308	13.25	7237.93	0.0001	11.25	5679.1771	0.0002	9.2500	4174.90	0.0002	7.25	2605.01	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1311	1	218.0	248.8	2064.6	15.05	7041.80	0.0310	13.15	7171.19	0.0001	11.15	5619.0782	0.0002	9.1500	4121.08	0.0002	7.15	2561.64	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1318	1	217.0	246.7	2064.5	14.95	6982.19	0.0311	13.05	7104.57	0.0001	11.05	5559.0546	0.0002	9.0500	4067.34	0.0002	7.05	2518.34	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1325	1	217.0	244.6	2064.4	14.85	6922.70	0.0313	12.95	7038.04	0.0001	10.95	5499.1063	0.0002	8.9500	4013.68	0.0002	6.95	2475.12	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1332	1	216.0	242.5	2064.3	14.75	6863.32	0.0315	12.85	6971.63	0.0001	10.85	5439.2333	0.0002	8.8500	3960.09	0.0003	6.85	2431.97	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1339	1	216.0	240.5	2064.3	14.75	6863.32	0.0315	12.85	6971.63	0.0001	10.85	5439.2333	0.0002	8.8500	3960.09	0.0003	6.85	2431.97	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1346	1	215.0	238.4	2064.2	14.65	6804.06	0.0316	12.75	6905.32	0.0001	10.75	5379.4356	0.0002	8.7500	3906.58	0.0003	6.75	2388.91	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1353	1	215.0	236.3	2064.1	14.55	6744.90	0.0319	12.65	6839.12	0.0001	10.65	5319.7132	0.0002	8.6500	3853.14	0.0003	6.65	2345.92	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1400	1	214.0	234.3	2064.0	14.45	6685.87	0.0320	12.55	6773.03	0.0001	10.55	5260.0662	0.0002	8.5500	3799.78	0.0003	6.55	2303.00	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1407	1	213.0	232.2	2063.9	14.35	6626.94	0.0321	12.45	6707.05	0.0001	10.45	5200.4944	0.0002	8.4500	3746.50	0.0003	6.45	2260.17	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1414	1	213.0	230.2	2063.9	14.35	6626.94	0.0321	12.45	6707.05	0.0001	10.45	5200.4944	0.0002	8.4500	3746.50	0.0003	6.45	2260.17	0.0004	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1421	1	212.0	228.1	2063.8	14.25	6568.13	0.0323	12.35	6641.17	0.0002	10.35	5140.9980	0.0002	8.3500	3693.30	0.0003	6.35	2217.41	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1428	1	211.0	226.1	2063.7	14.15	6509.43	0.0324	12.25	6575.40	0.0002	10.25	5081.5768	0.0002	8.2500	3640.17	0.0003	6.25	2174.72	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1435	1	211.0	224.1	2063.6	14.05	6450.84	0.0327	12.15	6509.73	0.0002	10.15	5022.2310	0.0002	8.1500	3587.11	0.0003	6.15	2132.12	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1442	1	210.0	222.0	2063.5	13.95	6392.37	0.0329	12.05	6444.18	0.0002	10.05	4962.9604	0.0002	8.0500	3534.14	0.0003	6.05	2089.59	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1449	1	210.0	220.0	2063.4	13.85	6334.01	0.0332	11.95	6378.73	0.0002	9.95	4903.7652	0.0002	7.9500	3481.24	0.0003	5.95	2047.13	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1456	1	209.0	218.0	2063.4	13.85	6334.01	0.0330	11.95	6378.73	0.0002	9.95	4903.7652	0.0002	7.9500	3481.24	0.0003	5.95	2047.13	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
1503	1	208.0	216.0	2063.3	13.75	6275.76	0.0331	11.85	6313.39	0.0002	9.85	4844.6452	0.0002	7.8500	3428.42	0.0003	5.85	2004.76	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
[redacted]	1	208.0	214.0	2063.2	13.65	6217.62	0.0335	11.75	6248.15	0.0002	9.75	4785.6006	0.0002	7.7500	3375.67	0.0003	5.75	1962.46	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
[redacted]	1	207.0	212.0	2063.1	13.55	6159.60	0.0336	11.65	6183.03	0.0002	9.65	4726.6313	0.0002	7.6500	3323.00	0.0003	5.65	1920.23	0.0005	0.020	0.519	0.030	0.009	0.004	0.003	0.002	0.000	0.000	0.000
																				1,510.902	38,779.809	15,942.511	6,142.589	2,638.797	1,723.755	1,323.540	37.622	83.793	170.251
																				2.20%	56.46%	23.21%	8.94%	3.84%	2.51%	1.93%	0.05%	0.12%	0.25%

INFLOW TONS

SILT SAND GRAVEL

														PASS THROUGH																					
		0.00135	0.00523	0.01940	0.05950	0.135	0.280	0.474	0.706	1.020	1.443	2.040	2.887																	0.00135	0.00523	0.01940	0.05950	0.135
2.040	2.887	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5	SECTION 5																	SECTION 4	SECTION 4	SECTION 4	SECTION 4	SECTION 4
		SILT		SAND					GRAVEL					SILT		SAND					GRAVEL					SILT		SAND						
C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M				
0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.000054	0.000000	0.000000	0.000000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0043				
0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000163	0.000000	0.000000	0.000000	0.0607	1.5583	0.0906	0.0275	0.0129	0.0088	0.0067	0.0012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

		SILT		SAND					GRAVEL					SILT		SAND					GRAVEL					SILT				
C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M
0.000	0.000	0.0000	2.5971	0.1510	0.0458	0.0214	0.0146	0.0111	0.0020	0.000272	0.000000	0.000000	0.000000	0.1012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1012	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0809	2.0777	0.1208	0.0367	0.0172	0.0117	0.0089	0.0016	0.000218	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0809	2.0777	0.1208	0.0367	0.0172	0.0117	0.0089	0.0016	0.000218	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0809	2.0777	0.1208	0.0367	0.0172	0.0117	0.0089	0.0016	0.000218	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0607	1.5583	0.0906	0.0275	0.0129	0.0088	0.0067	0.0012	0.000163	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0607	1.5583	0.0906	0.0275	0.0129	0.0088	0.0067	0.0012	0.000163	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0607	1.5583	0.0906	0.0275	0.0129	0.0088	0.0067	0.0012	0.000163	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0607	1.5583	0.0906	0.0275	0.0129	0.0088	0.0067	0.0012	0.000163	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0607	1.5583	0.0906	0.0275	0.0129	0.0088	0.0067	0.0012	0.000163	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0405	1.0388	0.0604	0.0183	0.0086	0.0058	0.0045	0.0008	0.000109	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.000	0.000	0.0202	0.5194	0.0302	0.0092	0.0043	0.0029	0.0022	0.0004	0.000054	0.000000	0.000000	0.000000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
185.419	152.119	1.457	127.259	31.275	48.440	82.063	151.251	236.741	14.124	38.859	87.633	105.387	93.640	1,509.445	38,652.551	15,911.236	6,094.148	2,556.734	1,572.503	1,086.799	23.498	44.934	82.617	80.032	58.479	0.830	38.765	19.176	32.450	55.995
	68,691.106												1,018.130												67,672.976					
0.27%	0.22%	0.14%	12.50%	3.07%	4.76%	8.06%	14.86%	23.25%	1.39%	3.82%	8.61%	10.35%	9.20%	2.23%	57.12%	23.51%	9.01%	3.78%	2.32%	1.61%	0.03%	0.07%	0.12%	0.12%	0.09%	0.14%	6.44%	3.19%	5.39%	9.30%
ACRE FEET	24.260											ACRE FEET	0.360											ACRE FEET	23.901					

									PASS THROUGH																									
0.280	0.474	0.706	1.020	1.443	2.040	2.887																	0.00135	0.00523	0.01940	0.05950	0.135	0.280	0.474	0.706	1.020	1.443	2.040	2.887
SECTION 4	SECTION 4	SECTION 4	SECTION 4	SECTION 4	SECTION 4	SECTION 4																	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3	SECTION 3
		GRAVEL					SILT		SAND						GRAVEL					SILT		SAND					GRAVEL						
C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC		
0.0029	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0202	0.5194	0.0302	0.0092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
0.0088	0.0067	0.0012	0.0000	0.0000	0.0000	0.0000	0.0607	1.5583	0.0906	0.0275	0.0129

		GRAVEL					SILT		SAND					GRAVEL					SILT		SAND					GRAVEL				
C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PASS THROUGH

												0.00135	0.00523	0.01940	0.05950	0.135	0.280	0.474	0.706	1.020	1.443	2.040	2.887							
												SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2	SECTION 2							
SILT		SAND					GRAVEL					SILT		SAND					GRAVEL					SILT		SAND				
M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC
0.0202	0.5194	0.0302	0.0092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0202	0.5194	0.0302	0.0092	0.0000	0.0000	0.0000
0.0607	1.5583	0.0906	0.0275	0.0129	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0607	1.5583	0.0906	0.0275	0.0129

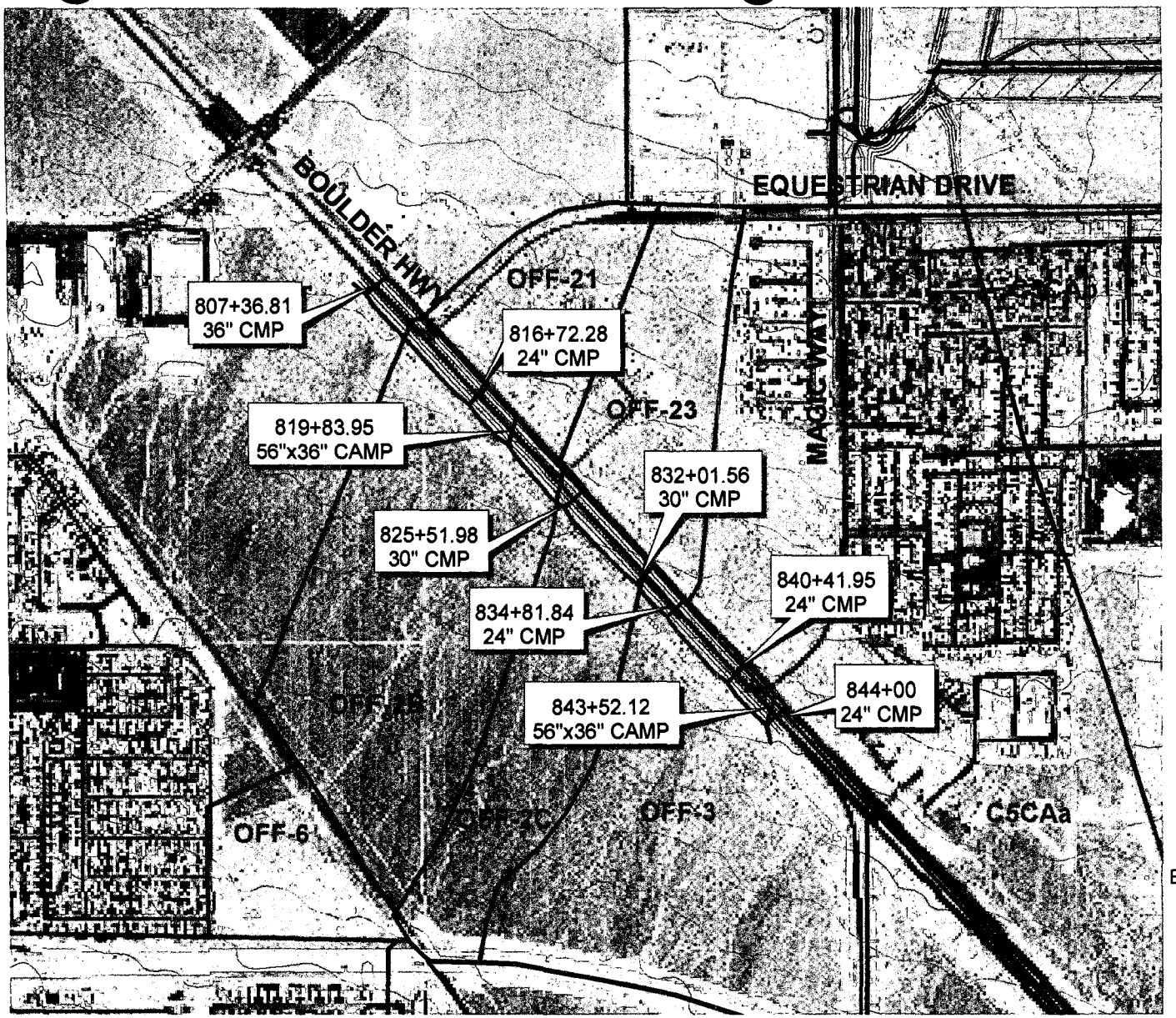
SILT		SAND					GRAVEL					SILT		SAND					GRAVEL					SILT		SAND				
M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

																		PASS THROUGH															
					0.00135	0.00523	0.01940	0.05950	0.135	0.280	0.474	0.706	1.020	1.443	2.040	2.887																		
					SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1	SECTION 1																		
GRAVEL					SILT		SAND					GRAVEL					SILT		SAND					GRAVEL									
VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC					
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0202	0.5194	0.0302	0.0092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000					
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0607	1.5583	0.0906	0.0275	0.0129

GRAVEL					SILT		SAND					GRAVEL					SILT		SAND					GRAVEL				
VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC	M	C	VF	F	M	C	VC	VF	F	M	C	VC
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

APPENDIX J

BOULDER HIGHWAY CULVERTS



N
W E
S

500 0 500 1000 1500 Feet

CITY OF HENDERSON
DEPARTMENT OF PUBLIC WORKS
EQUESTRIAN DETENTION BASIN
BOULDER HIGHWAY CULVERTS

POGGEMEYER DESIGN GROUP
ENGINEERS + PLANNERS + SURVEYORS
2601 North Tenaya Way
Las Vegas , Nevada 89128
(702) 255-8100 FAX (702) 255-8375
PDG-LV@POGGEMEYER.COM

PDG# 1002005

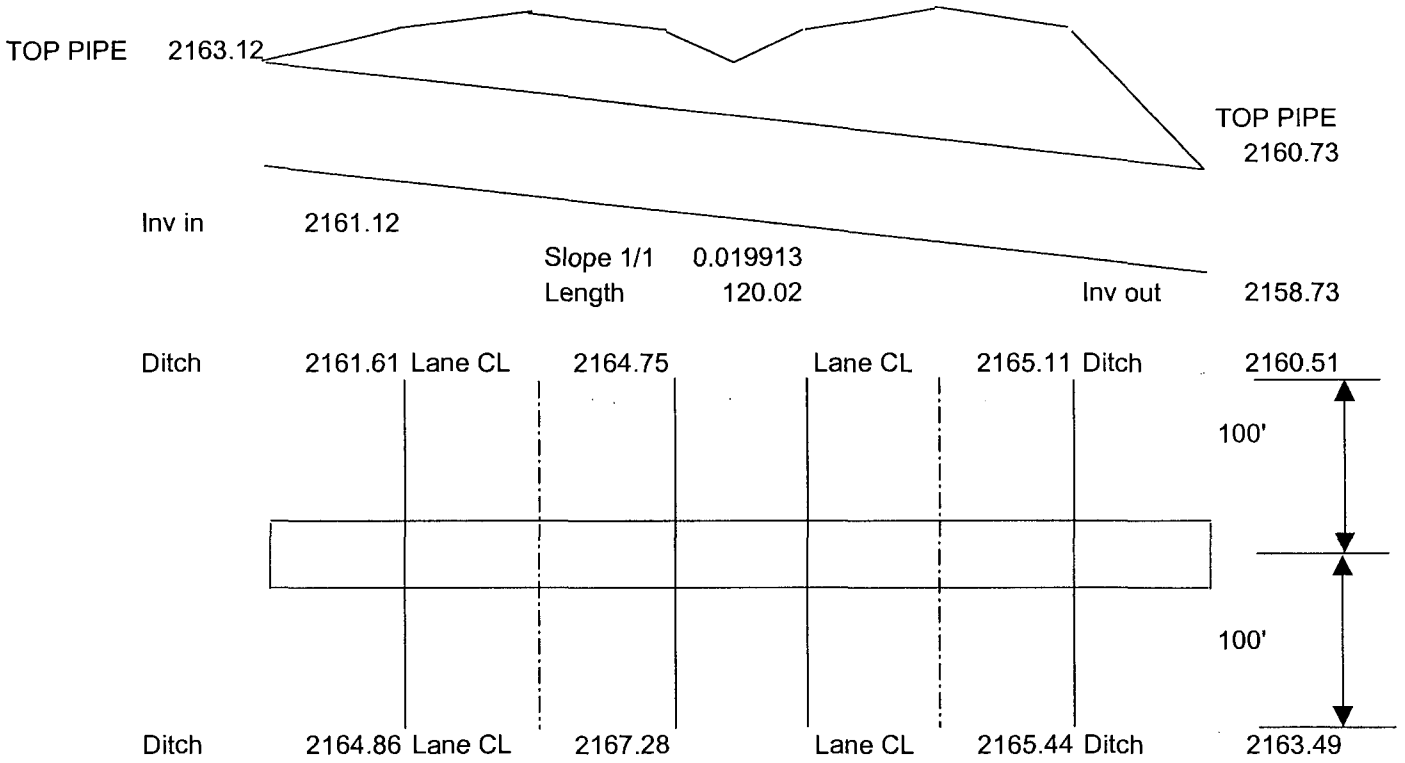
FIGURE D
CULVERTS

SIDE WEIR FLOW CALCULATIONS ON EAST SIDE OF EXISTING CHANNEL

				CHANNEL		AVERAGE		
		WEIR	WS	FLOW	DEPTH	DEPTH	AREA	FLOW OUT
	84500	2167.26	2167.01	1255.00	0.00			
100	84400	2165.12	2164.75		0.00	0.00	0.00	0.00
90	84310	2164.75	2164.25		0.00	0.00	0.00	0.00
168	84142	2162.98	2163.08		0.10	0.05	8.40	0.06
100	84042	2162.14	2161.32		0.00	0.05	5.00	0.03
100	83942	2161.28	2160.55		0.00	0.00	0.00	0.00
361	83581	2156.08	2157.50		1.42	0.71	256.31	92.00
100	83481	2155.93	2154.67		0.00	0.71	71.00	25.49
100	83381	2155.52	2153.87		0.00	0.00	0.00	0.00
81	83300	2154.46	2152.24		0.00	0.00	0.00	0.00
100	83200	2152.52	2150.47		0.00	0.00	0.00	0.00
100	83100	2151.05	2149.72		0.00	0.00	0.00	0.00
449	82651	2145.89	2145.60		0.00	0.00	0.00	0.00
100	82551	2144.57	2144.01		0.00	0.00	0.00	0.00
100	82451	2143.57	2143.38		0.00	0.00	0.00	0.00
368	82083	2140.57	2140.20		0.00	0.00	0.00	0.00
100	81983	2139.24	2138.02		0.00	0.00	0.00	0.00
100	81883	2136.37	2137.41		1.04	0.52	52.00	11.70
112	81771	2136.74	2136.21		0.00	0.52	58.24	13.10
100	81671	2135.56	2134.83		0.00	0.00	0.00	0.00
100	81571	2134.64	2134.19		0.00	0.00	0.00	0.00
737	80834	2127.05	2126.76		0.00	0.00	0.00	0.00
100	80734	2166.06	2125.46		0.00	0.00	0.00	0.00
100	80634	2125.06	2124.90		0.00	0.00	0.00	0.00

BOLDER HIGHWAY CULVERTS FIELD INFORMATION CHART

Location	STA 844+00 BOULDER HIGHWAY		84400
Type	24" ROUND CMP		
Rise	24"	24	
Width	24"		



CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:33:02 FILE NAME: B84400

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULVERT NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2161.12	2158.73	120.02	1 CSP	2.00	2.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: B84400 DATE: 12-11-1998

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
2161.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2162.93	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2164.55	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2166.20	30.0	23.0	0.0	0.0	0.0	0.0	0.0	6.79	16
2166.27	40.0	23.1	0.0	0.0	0.0	0.0	0.0	16.70	7
2166.32	50.0	23.2	0.0	0.0	0.0	0.0	0.0	26.34	5
2166.37	60.0	23.2	0.0	0.0	0.0	0.0	0.0	36.42	5
2166.41	70.0	23.2	0.0	0.0	0.0	0.0	0.0	46.15	4
2166.45	80.0	23.2	0.0	0.0	0.0	0.0	0.0	56.22	4
2166.49	90.0	23.3	0.0	0.0	0.0	0.0	0.0	66.29	4
2166.52	100.0	23.3	0.0	0.0	0.0	0.0	0.0	76.33	4
2166.12	22.8	22.8	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: B84400 DATE: 12-11-1998

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
2161.12	0.000	0.00	0.00	0.00
2162.93	0.000	10.00	0.00	0.00
2164.55	0.000	20.00	0.00	0.00
2166.20	-0.003	30.00	0.25	0.83
2166.27	-0.001	40.00	0.23	0.57
2166.32	-0.003	50.00	0.49	0.98
2166.37	-0.002	60.00	0.35	0.58
2166.41	-0.004	70.00	0.62	0.89
2166.45	-0.004	80.00	0.55	0.69
2166.49	-0.003	90.00	0.46	0.51
2166.52	-0.003	100.00	0.38	0.38

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:33:02 FILE NAME: B84400

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2161.12	0.00	-2.39	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2162.93	1.81	0.27	1-S2n	1.09	1.13	1.03	0.57	6.15	4.78
20.00	2164.55	3.43	3.33	2-M2c	2.00	1.60	1.60	0.79	7.40	5.76
22.95	2166.20	4.11	5.08	2-M2c	2.00	1.69	1.69	0.96	8.13	6.41
23.07	2166.27	4.14	5.15	2-M2c	2.00	1.70	1.70	1.10	8.15	6.90
23.17	2166.32	4.17	5.20	2-M2c	2.00	1.70	1.70	1.21	8.18	7.31
23.23	2166.35	4.18	5.23	2-M2c	2.00	1.70	1.70	1.32	8.19	7.66
23.23	2166.35	4.18	5.23	2-M2c	2.00	1.70	1.70	1.41	8.19	7.97
23.23	2166.53	4.18	5.41	7-M2c	2.00	1.70	1.70	1.50	8.19	8.24
23.25	2166.49	4.19	5.37	2-M2c	2.00	1.70	1.70	1.58	8.20	8.49
23.29	2166.51	4.20	5.39	2-M2c	2.00	1.70	1.70	1.65	8.20	8.72

El. inlet face invert 2161.12 ft El. outlet invert 2158.73 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2161.12 ft
OUTLET STATION	120.00 ft
OUTLET ELEVATION	2158.73 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0199
CULVERT LENGTH ALONG SLOPE	120.02 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.00 ft
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:33:02 FILE NAME: B84400

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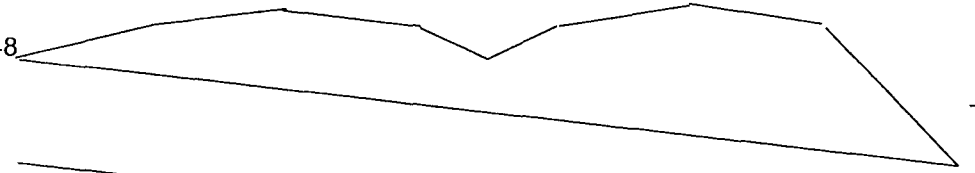
BOLDER HIGHWAY CULVERTS FIELD INFORMATION CHART

Location	STA 843+52 BOULDER HIGHWAY		84352
Type	ARCH CMAP		
Rise	36"	36	
Width	56"		
Lane CL	2166.12	Lane CL	2165.11



TOP PIPE 2161.48

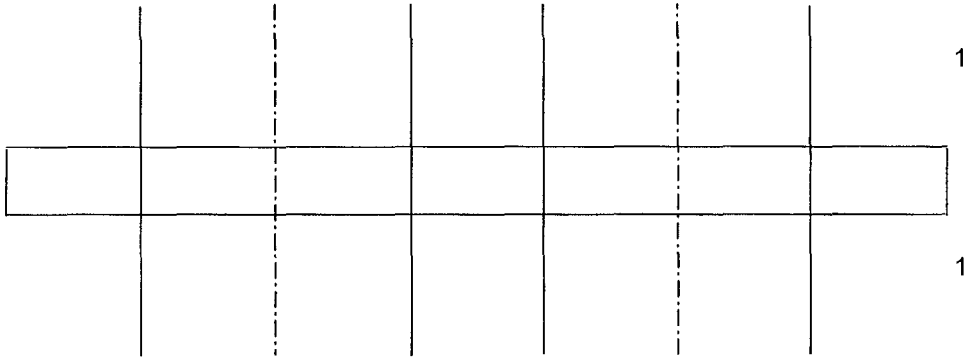
TOP PIPE 2160.03

Inv in 2161.48

Slope 1/1 0.022932

Length 194.05

Inv out 2157.03



Ditch 2161.61 Lane CL 2164.75 Lane CL 2162.38 Ditch 2160.75

100'

100'

Ditch 2164.86 Lane CL 2164.12 Lane CL 2164.51 Ditch 2160.51

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 09:00:40 FILE NAME: B84352

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULVERT NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2161.48	2157.03	194.05	1 CMPA	4.82	2.96	.024	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: B84352 DATE: 12-11-1998

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
2161.48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2162.33	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2162.76	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2163.14	30.0	30.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2163.51	40.0	40.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2163.87	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2164.23	60.0	60.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2164.60	70.0	70.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2164.99	80.0	80.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2165.41	90.0	90.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2165.86	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2166.12	105.3	105.3	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: B84352 DATE: 12-11-1998

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
2161.48	0.000	0.00	0.00	0.00
2162.33	0.000	10.00	0.00	0.00
2162.76	0.000	20.00	0.00	0.00
2163.14	0.000	30.00	0.00	0.00
2163.51	0.000	40.00	0.00	0.00
2163.87	0.000	50.00	0.00	0.00
2164.23	0.000	60.00	0.00	0.00
2164.60	0.000	70.00	0.00	0.00
2164.99	0.000	80.00	0.00	0.00
2165.41	0.000	90.00	0.00	0.00
2165.86	0.000	100.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 09:00:40 FILE NAME: B84352

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.82 (ft) BY 2.96 (ft)) CMPA

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2161.48	0.00	-4.45	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2162.33	0.85	-2.60	1-S2n	0.52	0.62	0.42	0.38	6.62	4.27
20.00	2162.76	1.28	-2.26	1-S2n	0.76	0.93	0.63	0.56	8.19	5.32
30.00	2163.14	1.66	-1.83	1-S2n	0.97	1.18	0.88	0.70	8.22	6.02
40.00	2163.51	2.03	-1.29	1-S2n	1.16	1.39	1.09	0.82	8.56	6.55
50.00	2163.87	2.39	-0.64	1-S2n	1.34	1.59	1.29	0.92	8.94	6.99
60.00	2164.23	2.75	0.13	1-S2n	1.53	1.78	1.52	1.01	9.02	7.36
70.00	2164.60	3.12	1.01	1-S2n	1.71	1.94	1.64	1.10	9.78	7.68
80.00	2164.99	3.51	2.02	1-S2n	1.92	2.10	1.80	1.18	10.21	7.97
90.00	2165.41	3.93	3.13	5-S2n	2.14	2.23	2.03	1.25	10.27	8.24
100.00	2165.86	4.38	4.25	2-M2c	2.45	2.37	2.37	1.32	10.05	8.48

El. inlet face invert 2161.48 ft El. outlet invert 2157.03 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2161.48 ft
OUTLET STATION	194.00 ft
OUTLET ELEVATION	2157.03 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0229
CULVERT LENGTH ALONG SLOPE	194.05 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	PIPE ARCH
BARREL SPAN	4.82 ft
BARREL RISE	2.96 ft
BARREL MATERIAL	STEEL OR ALUMINUM
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	MITERED
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998
CURRENT TIME: 09:00:40

FILE DATE: 12-11-1998
FILE NAME: B84352

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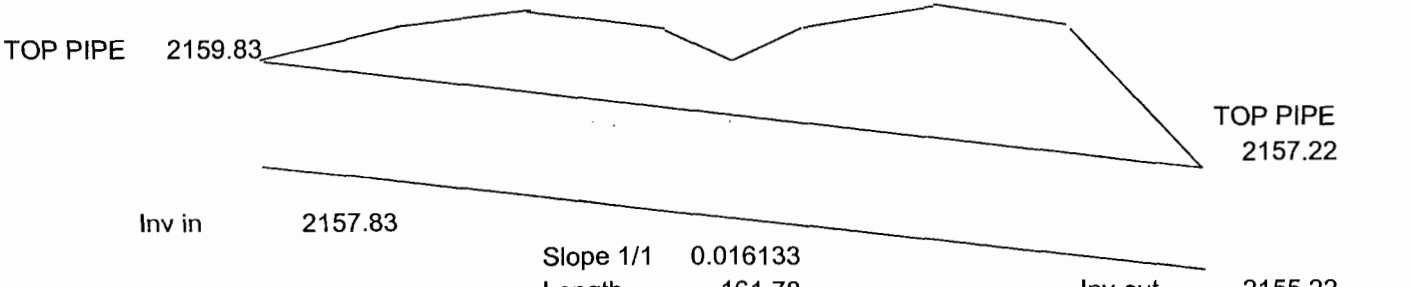
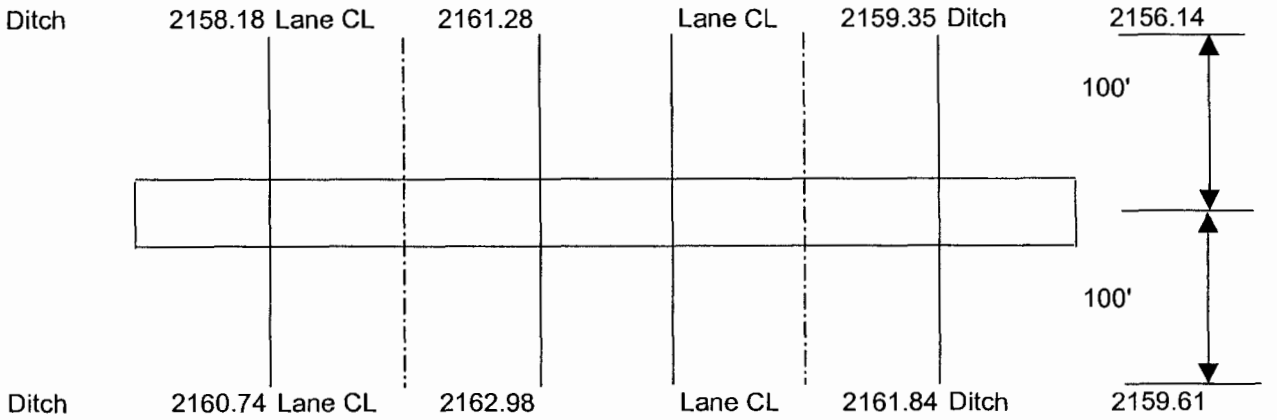
Location	STA 840+42 BOULDER HIGHWAY		84041.95
Type	24" ROUND CMP		
Rise	24"	24	
Width	24"		
Lane CL	2162.14	Lane CL	2160.68



Inv in 2157.83

Slope 1/1 0.016133

Length 161.78 Inv out 2155.22



CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:35:19 FILE NAME: B84042

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULV NO.	SITE DATA: INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2157.83	2155.22	161.80	1 CSP	2.00	2.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: B84042 DATE: 12-11-1998

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
2157.83	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2159.84	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2161.91	20.0	19.6	0.0	0.0	0.0	0.0	0.0	0.00	30
2162.25	30.0	19.8	0.0	0.0	0.0	0.0	0.0	9.93	13
2162.30	40.0	19.9	0.0	0.0	0.0	0.0	0.0	19.72	6
2162.35	50.0	20.0	0.0	0.0	0.0	0.0	0.0	29.54	5
2162.40	60.0	20.1	0.0	0.0	0.0	0.0	0.0	39.59	5
2162.44	70.0	20.1	0.0	0.0	0.0	0.0	0.0	49.28	4
2162.48	80.0	20.2	0.0	0.0	0.0	0.0	0.0	59.32	4
2162.52	90.0	20.3	0.0	0.0	0.0	0.0	0.0	69.35	4
2162.55	100.0	20.4	0.0	0.0	0.0	0.0	0.0	79.26	4
2162.14	19.8	19.8	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: B84042 DATE: 12-11-1998

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
2157.83	0.000	0.00	0.00	0.00
2159.84	0.000	10.00	0.00	0.00
2161.91	-0.002	20.00	0.42	2.10
2162.25	-0.002	30.00	0.23	0.77
2162.30	-0.002	40.00	0.34	0.85
2162.35	-0.003	50.00	0.45	0.90
2162.40	-0.002	60.00	0.34	0.57
2162.44	-0.004	70.00	0.57	0.81
2162.48	-0.004	80.00	0.47	0.59
2162.52	-0.003	90.00	0.38	0.42
2162.55	-0.002	100.00	0.36	0.36

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:35:19 FILE NAME: B84042

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2157.83	0.00	-2.61	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2159.84	1.82	2.01	2-M2c	1.17	1.13	1.13	0.57	5.48	4.78
19.58	2161.91	3.35	4.08	2-M2c	2.00	1.59	1.59	0.79	7.32	5.76
19.84	2162.25	3.40	4.42	2-M2c	2.00	1.60	1.60	0.96	7.36	6.41
19.94	2162.31	3.42	4.48	2-M2c	2.00	1.60	1.60	1.10	7.39	6.90
20.01	2162.35	3.44	4.52	2-M2c	2.00	1.60	1.60	1.21	7.40	7.31
20.07	2162.39	3.45	4.56	2-M2c	2.00	1.61	1.61	1.32	7.42	7.66
20.15	2162.44	3.47	4.61	2-M2c	2.00	1.61	1.61	1.41	7.43	7.97
20.21	2162.48	3.48	4.65	2-M2c	2.00	1.61	1.61	1.50	7.45	8.24
20.27	2162.51	3.49	4.68	2-M2c	2.00	1.61	1.61	1.58	7.46	8.49
20.38	2162.54	3.52	4.71	3-M2t	2.00	1.62	1.65	1.65	7.37	8.72

El. inlet face invert 2157.83 ft El. outlet invert 2155.22 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2157.83 ft
OUTLET STATION	161.78 ft
OUTLET ELEVATION	2155.22 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0161
CULVERT LENGTH ALONG SLOPE	161.80 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.00 ft
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:35:19 FILE NAME: B84042

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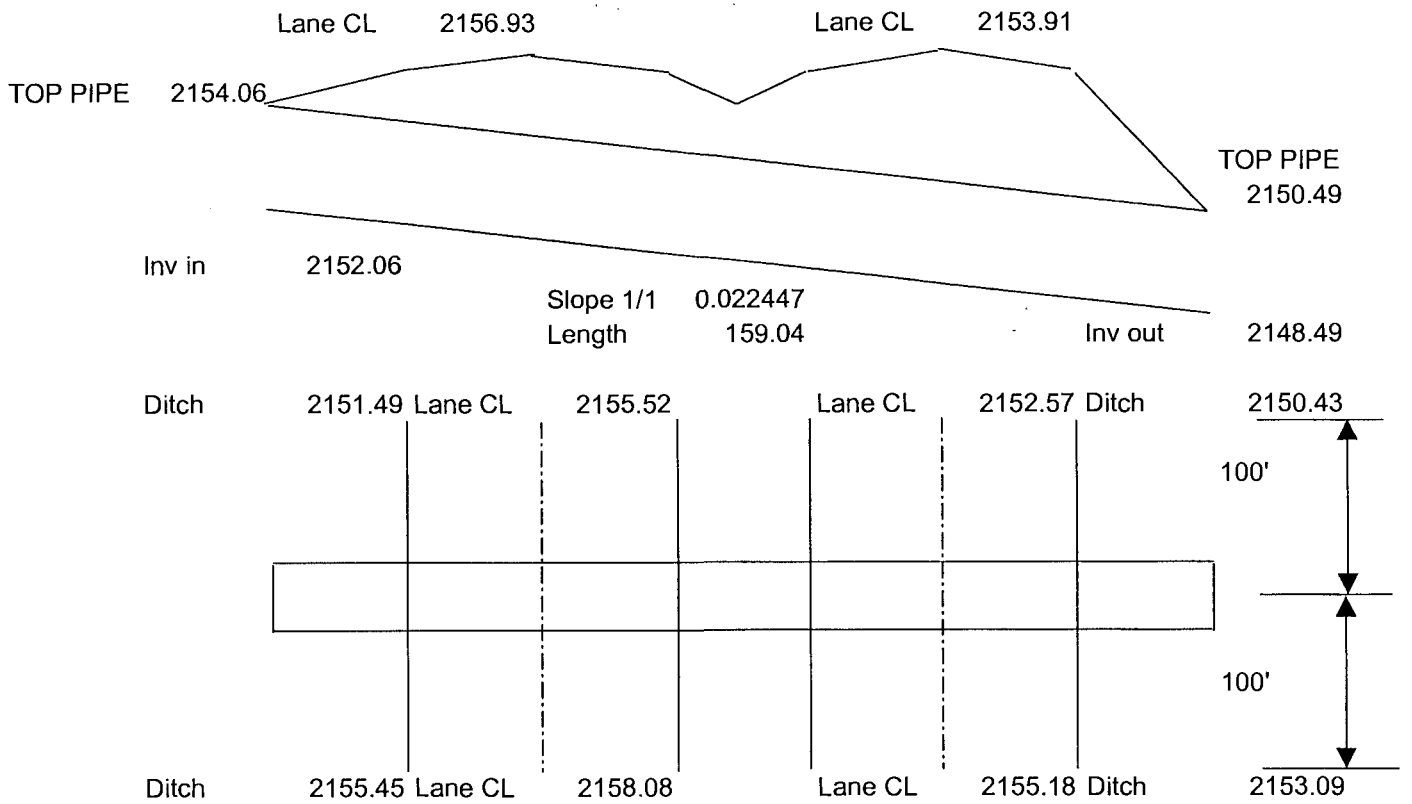
Location	STA 834+82 BOULDER HIGHWAY		83482
Type	24" ROUND		
Rise	24"	24	
Width	24"		



CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:52:35 FILE NAME: B834282

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CU LV NO.	SITE DATA: INLET ELEV. (ft)	SITE DATA: OUTLET ELEV. (ft)	SITE DATA: CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS	SHAPE	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2152.06	2148.49	158.93	1	CSP	2.00	2.00	.024	CONVENTIONAL
2									
3									
4									
5									
6									

FILE: B834282 CULVERT HEADWATER ELEVATION (ft) DATE: 12-11-1998

DISCHARGE (cfs)	1	2	3	4	5	6	ROADWAY
0	2152.06	0.00	0.00	0.00	0.00	0.00	0.00
10	2153.87	0.00	0.00	0.00	0.00	0.00	0.00
20	2155.49	0.00	0.00	0.00	0.00	0.00	0.00
30	2162.61	0.00	0.00	0.00	0.00	0.00	0.00
40	2172.11	0.00	0.00	0.00	0.00	0.00	0.00
50	2184.28	0.00	0.00	0.00	0.00	0.00	0.00
60	2199.14	0.00	0.00	0.00	0.00	0.00	0.00
70	2216.71	0.00	0.00	0.00	0.00	0.00	0.00
80	2236.98	0.00	0.00	0.00	0.00	0.00	0.00
90	2259.95	0.00	0.00	0.00	0.00	0.00	0.00
100	2285.63	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The last row, if not 0, is for a point above the roadway.

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:52:35 FILE NAME: B834282

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2152.06	0.00	-3.57	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2153.87	1.81	-0.65	1-S2n	1.05	1.13	0.93	0.57	7.01	4.78
20.00	2155.49	3.43	2.23	2-M2c	2.00	1.60	1.60	0.79	7.40	5.76
30.00	2162.61	6.22	10.55	2-M2c	2.00	1.90	1.90	0.96	9.81	6.41
40.00	2172.11	10.33	20.05	6-FFc	2.00	2.00	2.00	1.10	12.73	6.90
50.00	2184.28	15.40	32.22	6-FFc	2.00	2.00	2.00	1.21	15.92	7.31
60.00	2199.14	20.96	47.08	6-FFc	2.00	2.00	2.00	1.32	19.10	7.66
70.00	2216.71	26.78	64.65	6-FFc	2.00	2.00	2.00	1.41	22.28	7.97
80.00	2236.98	33.24	84.92	6-FFc	2.00	2.00	2.00	1.50	25.46	8.24
90.00	2259.95	41.73	107.89	6-FFc	2.00	2.00	2.00	1.58	28.65	8.49
100.00	2285.63	54.98	133.57	6-FFc	2.00	2.00	2.00	1.65	31.83	8.72

El. inlet face invert 2152.06 ft El. outlet invert 2148.49 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2152.06 ft
OUTLET STATION	158.89 ft
OUTLET ELEVATION	2148.49 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0225
CULVERT LENGTH ALONG SLOPE	158.93 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.00 ft
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:52:35 FILE NAME: B834282

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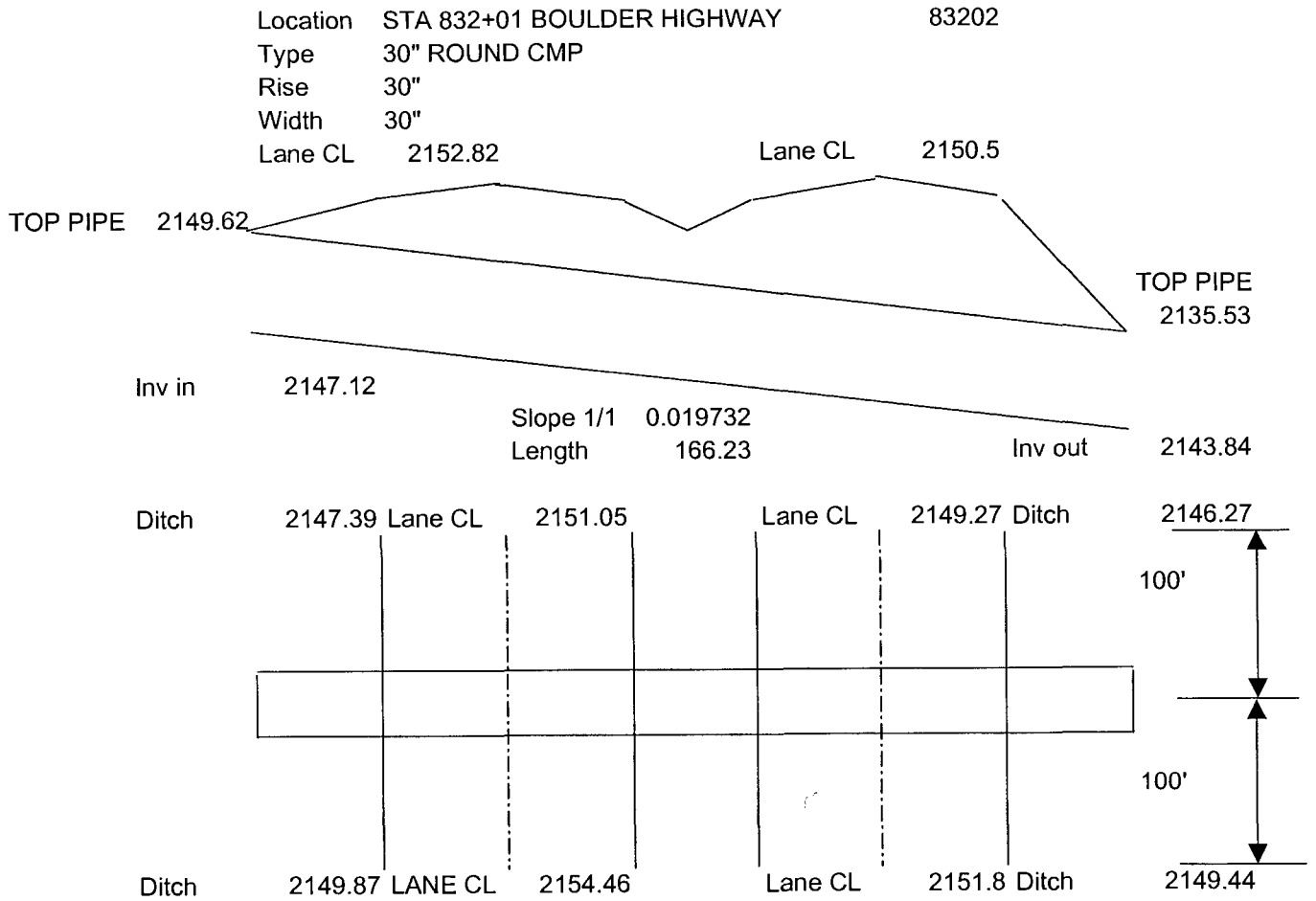
Location STA 832+01 BOULDER HIGHWAY 83202
Type 30" ROUND CMP
Rise 30"
Width 30"



CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:40:06 FILE NAME: B83202

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULVERT NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2147.12	2143.84	166.23	1 CSP	2.50	2.50	.024	CONVENTIONAL
2								
3								
4								
5								
6								

FILE: B83202 CULVERT HEADWATER ELEVATION (ft) DATE: 12-11-1998

DISCHARGE (cfs)	1	2	3	4	5	6	ROADWAY
0	2147.12	0.00	0.00	0.00	0.00	0.00	0.00
10	2148.71	0.00	0.00	0.00	0.00	0.00	0.00
20	2149.62	0.00	0.00	0.00	0.00	0.00	0.00
30	2150.72	0.00	0.00	0.00	0.00	0.00	0.00
40	2153.36	0.00	0.00	0.00	0.00	0.00	0.00
50	2157.72	0.00	0.00	0.00	0.00	0.00	0.00
60	2162.80	0.00	0.00	0.00	0.00	0.00	0.00
70	2168.75	0.00	0.00	0.00	0.00	0.00	0.00
80	2175.61	0.00	0.00	0.00	0.00	0.00	0.00
90	2183.38	0.00	0.00	0.00	0.00	0.00	0.00
100	2192.07	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The last row, if not 0, is for a point above the roadway.

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:40:06 FILE NAME: B83202

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.50 (ft) BY 2.50 (ft)) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2147.12	0.00	-3.28	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2148.71	1.59	-1.05	1-S2n	0.97	1.05	0.85	0.52	6.75	4.71
20.00	2149.62	2.50	0.56	1-S2n	1.45	1.52	1.32	0.74	7.64	5.70
30.00	2150.72	3.60	3.52	2-M2c	1.97	1.86	1.86	0.91	7.68	6.36
40.00	2153.36	5.13	6.24	2-M2c	2.50	2.11	2.11	1.04	9.07	6.86
50.00	2157.72	7.20	10.60	2-M2c	2.50	2.32	2.32	1.15	10.57	7.27
60.00	2162.80	9.82	15.68	6-FFc	2.50	2.50	2.50	1.26	12.22	7.63
70.00	2168.75	12.95	21.63	6-FFc	2.50	2.50	2.50	1.35	14.26	7.93
80.00	2175.61	16.48	28.49	6-FFc	2.50	2.50	2.50	1.43	16.30	8.21
90.00	2183.38	20.28	36.26	6-FFc	2.50	2.50	2.50	1.51	18.33	8.47
100.00	2192.07	24.25	44.95	6-FFc	2.50	2.50	2.50	1.58	20.37	8.70

El. inlet face invert 2147.12 ft El. outlet invert 2143.84 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2147.12 ft
OUTLET STATION	166.20 ft
OUTLET ELEVATION	2143.84 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0197
CULVERT LENGTH ALONG SLOPE	166.23 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.50 ft
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:40:06 FILE NAME: B83202

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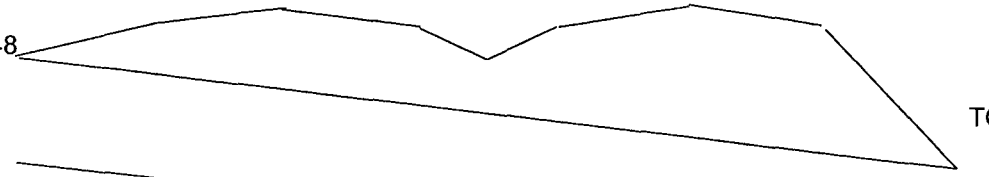
Location	STA 825+52 BOULDER HIGHWAY			82551
Type	30" ROUND CMP			
Rise	24"	24		
Width	24"			
Lane CL	2144.57		Lane CL	2143.03



TOP PIPE	2141.48			TOP PIPE 2138.82
Inv in	2139.48			
	Slope 1/1	0.015313		
	Length	173.71	Inv out	2136.82

Ditch	2141.23	Lane CL	2143.57	Lane CL	2141.92 Ditch	2137.69
						100'
						100'
Ditch	2143.4	Lane CL	2145.89	Lane CL	2144.04 Ditch	2141.22

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:42:23 FILE NAME: B82551

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULVERT NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2139.48	2136.82	173.72	1 CSP	2.50	2.50	.024	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: B82551 DATE: 12-11-1998

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
2139.48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2141.07	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2142.15	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2143.09	30.0	30.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2144.63	40.0	35.1	0.0	0.0	0.0	0.0	0.0	4.55	21
2144.70	50.0	35.3	0.0	0.0	0.0	0.0	0.0	14.44	7
2144.76	60.0	35.4	0.0	0.0	0.0	0.0	0.0	24.03	5
2144.81	70.0	35.5	0.0	0.0	0.0	0.0	0.0	34.14	5
2144.85	80.0	35.6	0.0	0.0	0.0	0.0	0.0	43.73	4
2144.89	90.0	35.7	0.0	0.0	0.0	0.0	0.0	53.68	4
2144.93	100.0	35.8	0.0	0.0	0.0	0.0	0.0	63.74	4
2144.57	34.9	34.9	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: B82551 DATE: 12-11-1998

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
2139.48	0.000	0.00	0.00	0.00
2141.07	0.000	10.00	0.00	0.00
2142.15	0.000	20.00	0.00	0.00
2143.09	0.000	30.00	0.00	0.00
2144.63	-0.003	40.00	0.36	0.90
2144.70	-0.002	50.00	0.28	0.56
2144.76	-0.003	60.00	0.58	0.97
2144.81	-0.002	70.00	0.34	0.49
2144.85	-0.004	80.00	0.64	0.80
2144.89	-0.004	90.00	0.58	0.64
2144.93	-0.003	100.00	0.43	0.43

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:42:23 FILE NAME: B82551

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.50 (ft) BY 2.50 (ft)) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2139.48	0.00	-2.66	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2141.07	1.59	-0.41	1-S2n	1.04	1.05	0.95	0.52	5.82	4.71
20.00	2142.15	2.51	2.67	2-M2c	1.58	1.52	1.52	0.74	6.42	5.70
30.00	2143.09	3.61	3.53	2-M2c	2.50	1.86	1.86	0.91	7.68	6.36
35.09	2144.64	4.32	5.16	2-M2c	2.50	2.01	2.01	1.04	8.30	6.86
35.28	2144.71	4.35	5.23	2-M2c	2.50	2.01	2.01	1.15	8.32	7.27
35.39	2144.76	4.37	5.28	2-M2c	2.50	2.02	2.02	1.26	8.34	7.63
35.52	2144.80	4.38	5.32	2-M2c	2.50	2.02	2.02	1.35	8.36	7.93
35.63	2144.85	4.40	5.37	2-M2c	2.50	2.02	2.02	1.43	8.38	8.21
35.74	2144.89	4.42	5.41	2-M2c	2.50	2.02	2.02	1.51	8.39	8.47
35.84	2144.92	4.43	5.44	2-M2c	2.50	2.02	2.02	1.58	8.41	8.70

El. inlet face invert 2139.48 ft El. outlet invert 2136.82 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2139.48 ft
OUTLET STATION	173.70 ft
OUTLET ELEVATION	2136.82 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0153
CULVERT LENGTH ALONG SLOPE	173.72 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.50 ft
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998
CURRENT TIME: 08:42:23

FILE DATE: 12-11-1998
FILE NAME: B82551

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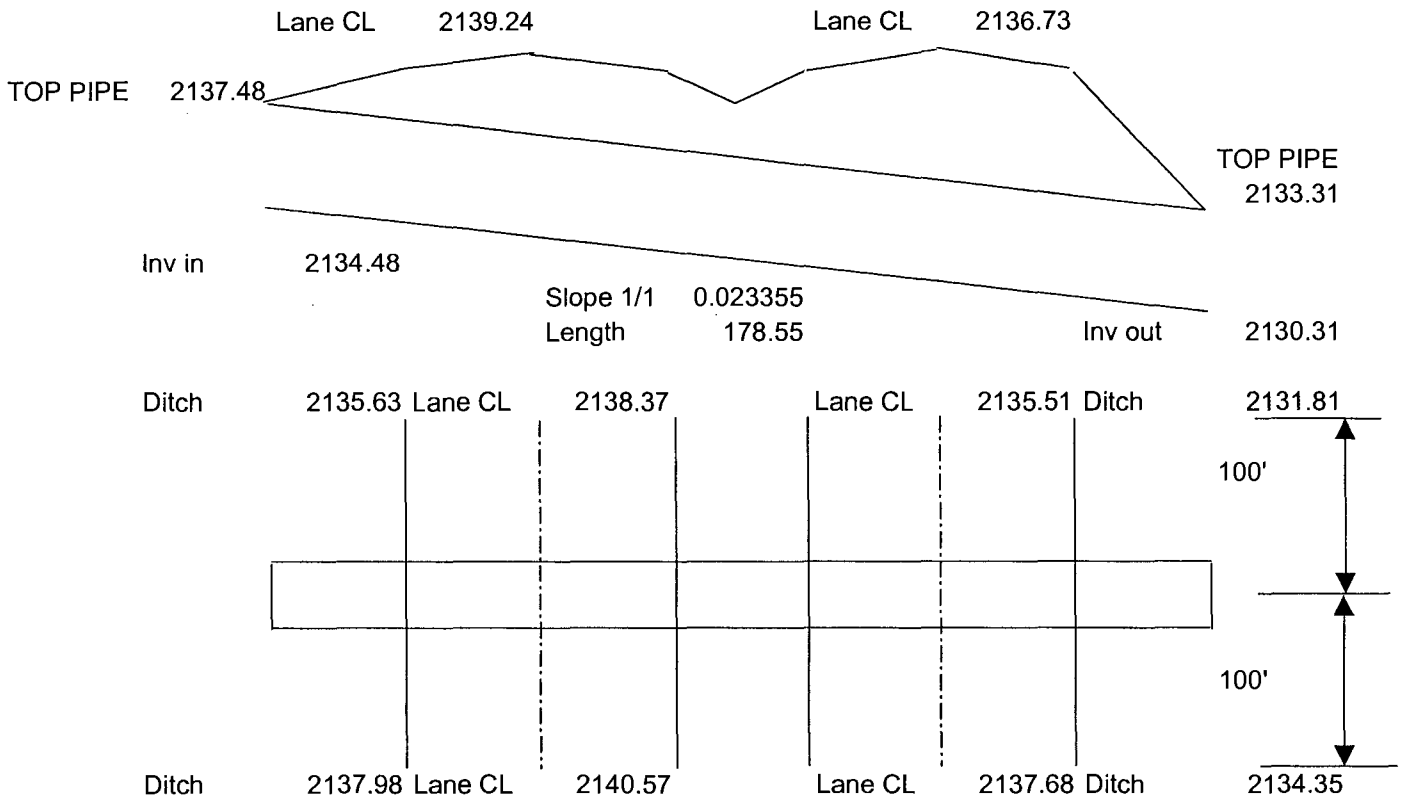
Location	STA 819+84 BOULDER HIGHWAY	81983
Type	D ARCH CMAP	
Rise	36"	36
Width	56"	



CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:58:47 FILE NAME: B81983

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULVERT NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2134.48	2130.31	178.55	1 CMPA	4.82	2.96	.024	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: B81983 DATE: 12-11-1998

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
2134.48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2135.36	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2135.79	40.0	40.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2139.41	60.0	40.0	0.0	0.0	0.0	0.0	0.0	19.72	12
2139.50	80.0	40.0	0.0	0.0	0.0	0.0	0.0	39.42	5
2139.58	100.0	40.0	0.0	0.0	0.0	0.0	0.0	59.06	4
2139.65	120.0	40.0	0.0	0.0	0.0	0.0	0.0	79.34	4
2139.72	140.0	40.0	0.0	0.0	0.0	0.0	0.0	99.47	4
2139.78	160.0	40.0	0.0	0.0	0.0	0.0	0.0	119.62	4
2139.83	180.0	40.0	0.0	0.0	0.0	0.0	0.0	138.67	3
2139.89	200.0	40.0	0.0	0.0	0.0	0.0	0.0	158.57	3
2139.24	40.0	40.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: B81983 DATE: 12-11-1998

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
2134.48	0.000	0.00	0.00	0.00
2135.36	0.000	20.00	0.00	0.00
2135.79	0.000	40.00	0.00	0.00
2139.41	-0.003	60.00	0.28	0.47
2139.50	-0.004	80.00	0.58	0.72
2139.58	-0.007	100.00	0.94	0.94
2139.65	-0.006	120.00	0.66	0.55
2139.72	-0.004	140.00	0.52	0.37
2139.78	-0.004	160.00	0.38	0.24
2139.83	-0.003	180.00	1.33	0.74
2139.89	-0.003	200.00	1.43	0.71

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:58:47 FILE NAME: B81983

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.82 (ft) BY 2.96 (ft)) CMPA

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2134.48	0.00	-4.17	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
20.00	2135.36	0.88	-2.01	1-S2n	0.75	0.93	0.63	0.56	8.19	5.32
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	0.82	8.56	6.55
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.01	8.56	7.36
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.18	8.56	7.97
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.32	8.56	8.48
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.44	8.56	8.91
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.56	8.56	9.30
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.66	8.56	9.64
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.76	8.56	9.94
40.00	2135.79	1.31	-1.11	1-S2n	1.15	1.39	1.09	1.85	8.56	10.23

El. inlet face invert 2134.48 ft El. outlet invert 2130.31 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2134.48 ft
OUTLET STATION	178.50 ft
OUTLET ELEVATION	2130.31 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0234
CULVERT LENGTH ALONG SLOPE	178.55 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	PIPE ARCH
BARREL SPAN	4.82 ft
BARREL RISE	2.96 ft
BARREL MATERIAL	STEEL OR ALUMINUM
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:58:47 FILE NAME: B81983

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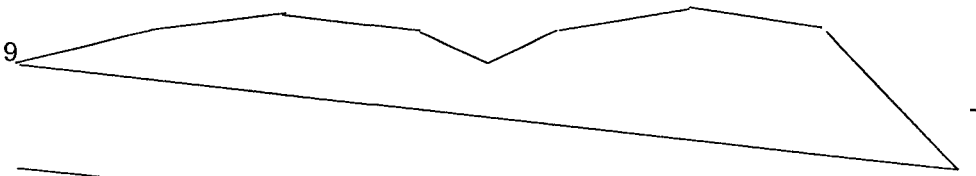
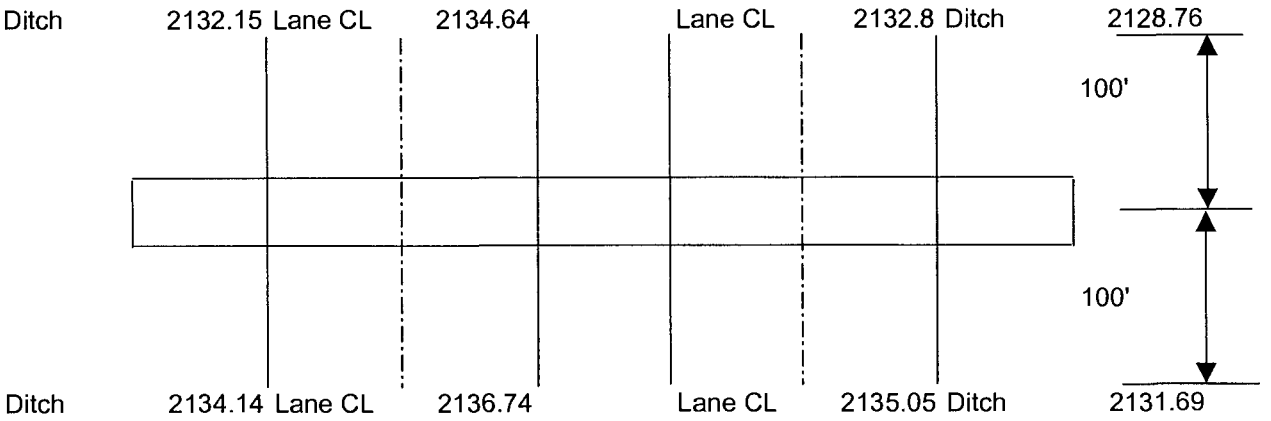
Location	STA 816+72 BOULDER HIGHWAY	81617
Type	24" ROUND CMP	
Rise	24" 24	
Width	24"	
Lane CL	2135.56	Lane CL 2133.97



Inv in 2131.19

Slope 1/1 0.016152

Length 156.02 Inv out 2128.67



CURRENT DATE: 12-11-1998
CURRENT TIME: 08:45:30

FILE DATE: 12-11-1998
FILE NAME: B81617

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULVERT NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2131.19	2128.67	156.02	1 CSP	2.00	2.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

FILE: B81617 CULVERT HEADWATER ELEVATION (ft) DATE: 12-11-1998

DISCHARGE (cfs)	1	2	3	4	5	6	ROADWAY
0	2131.19	0.00	0.00	0.00	0.00	0.00	0.00
10	2133.20	0.00	0.00	0.00	0.00	0.00	0.00
20	2135.64	0.00	0.00	0.00	0.00	0.00	0.00
30	2142.63	0.00	0.00	0.00	0.00	0.00	0.00
40	2151.98	0.00	0.00	0.00	0.00	0.00	0.00
50	2163.97	0.00	0.00	0.00	0.00	0.00	0.00
60	2178.63	0.00	0.00	0.00	0.00	0.00	0.00
70	2195.94	0.00	0.00	0.00	0.00	0.00	0.00
80	2215.93	0.00	0.00	0.00	0.00	0.00	0.00
90	2238.57	0.00	0.00	0.00	0.00	0.00	0.00
100	2263.88	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The last row, if not 0, is for a point above the roadway.

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:45:30 FILE NAME: B81617

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2131.19	0.00	-2.52	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2133.20	1.82	2.01	2-M2c	1.16	1.13	1.13	0.57	5.48	4.78
20.00	2135.64	3.44	4.45	2-M2c	2.00	1.60	1.60	0.79	7.40	5.76
30.00	2142.63	6.23	11.44	2-M2c	2.00	1.90	1.90	0.96	9.81	6.41
40.00	2151.98	10.33	20.79	6-FFc	2.00	2.00	2.00	1.10	12.73	6.90
50.00	2163.97	15.41	32.78	6-FFc	2.00	2.00	2.00	1.21	15.92	7.31
60.00	2178.63	20.97	47.44	6-FFc	2.00	2.00	2.00	1.32	19.10	7.66
70.00	2195.94	26.78	64.76	6-FFc	2.00	2.00	2.00	1.41	22.28	7.97
80.00	2215.93	33.25	84.74	6-FFc	2.00	2.00	2.00	1.50	25.46	8.24
90.00	2238.57	41.74	107.38	6-FFc	2.00	2.00	2.00	1.58	28.65	8.49
100.00	2263.88	54.99	132.69	6-FFc	2.00	2.00	2.00	1.65	31.83	8.72

El. inlet face invert 2131.19 ft El. outlet invert 2128.67 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2131.19 ft
OUTLET STATION	156.00 ft
OUTLET ELEVATION	2128.67 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0162
CULVERT LENGTH ALONG SLOPE	156.02 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.00 ft
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:45:30 FILE NAME: B81617

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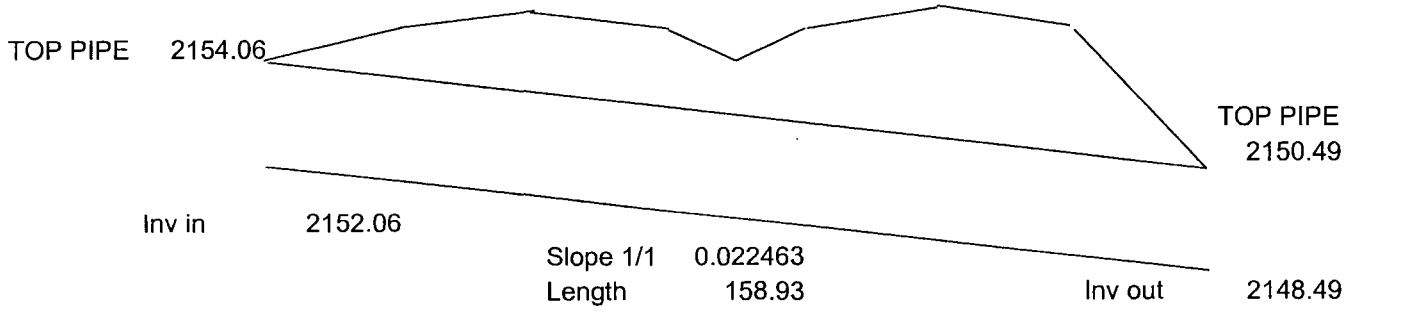
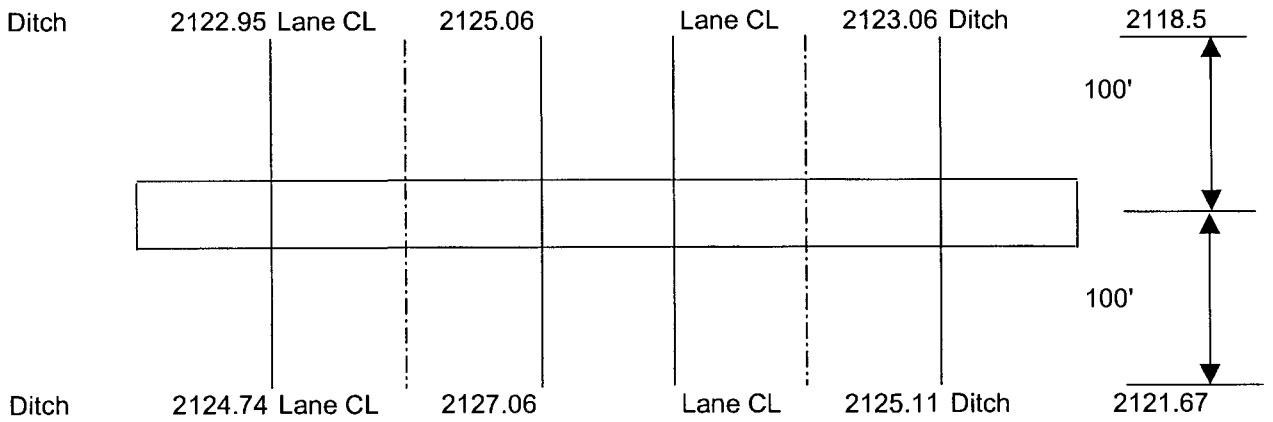
Location	STA 807+37 BOULDER HIGHWAY	80736.81
Type	24" ROUND CMP	
Rise	24" 24	
Width	24"	
Lane CL	2126.06	Lane CL 2124.06





CURRENT DATE: 12-07-1998 FILE DATE: 12-07-1998
CURRENT TIME: 09:21:15 FILE NAME: B80734

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULVERT NO.	SITE DATA: INLET ELEV. (ft)	SITE DATA: OUTLET ELEV. (ft)	SITE DATA: CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS / SHAPE / MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2120.36	2117.65	160.01	1 RCP	3.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: B80734 DATE: 12-07-1998

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
2120.36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2121.69	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2122.38	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2122.91	30.0	30.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2123.42	40.0	40.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2123.99	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2124.68	60.0	60.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2125.50	70.0	70.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2126.11	80.0	76.4	0.0	0.0	0.0	0.0	0.0	3.04	17
2126.18	90.0	77.2	0.0	0.0	0.0	0.0	0.0	12.19	6
2126.24	100.0	77.7	0.0	0.0	0.0	0.0	0.0	21.70	5
2126.06	75.9	75.9	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: B80734 DATE: 12-07-1998

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
2120.36	0.000	0.00	0.00	0.00
2121.69	0.000	10.00	0.00	0.00
2122.38	0.000	20.00	0.00	0.00
2122.91	0.000	30.00	0.00	0.00
2123.42	0.000	40.00	0.00	0.00
2123.99	0.000	50.00	0.00	0.00
2124.68	0.000	60.00	0.00	0.00
2125.50	0.000	70.00	0.00	0.00
2126.11	-0.004	80.00	0.53	0.66
2126.18	-0.003	90.00	0.65	0.72
2126.24	-0.004	100.00	0.58	0.58

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 12-07-1998 FILE DATE: 12-07-1998
CURRENT TIME: 09:21:15 FILE NAME: B80734

PERFORMANCE CURVE FOR CULVERT 1 - 1(3.00 (ft) BY 3.00 (ft)) RCP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2120.36	0.00	-2.71	0-NF	0.00	0.00	0.00	-0.22	0.00	0.00
10.00	2121.69	1.33	-0.65	1-S2n	0.65	0.99	0.59	0.26	10.11	4.69
20.00	2122.38	2.02	-0.23	1-S2n	0.94	1.43	0.95	0.47	10.37	5.72
30.00	2122.91	2.55	0.28	1-S2n	1.16	1.77	1.19	0.63	11.47	6.39
40.00	2123.42	3.06	0.90	1-S2n	1.36	2.06	1.41	0.76	12.29	6.91
50.00	2123.99	3.63	1.63	1-S2n	1.55	2.29	1.61	0.87	12.92	7.34
60.00	2124.68	4.32	2.47	1-S2n	1.74	2.49	1.81	0.97	13.50	7.70
70.00	2125.50	5.14	3.43	5-S2n	1.93	2.65	2.01	1.06	13.95	8.02
76.43	2126.11	5.75	4.12	5-S2n	2.05	2.75	2.13	1.14	14.24	8.30
77.16	2126.18	5.82	4.20	5-S2n	2.07	2.76	2.15	1.22	14.24	8.56
77.72	2126.24	5.88	4.27	5-S2n	2.08	2.77	2.16	1.29	14.29	8.80

El. inlet face invert 2120.36 ft El. outlet invert 2117.65 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** EMBANKMENT TOE **********

UPSTREAM STATION	0.00 ft
UPSTREAM ELEVATION	2120.55 ft
UPSTREAM EMBANKMENT SLOPE (X:1)	4.00
DOWMSTREAM STATION	184.10 ft
DOWNSTREAM ELEVATION	2117.43 ft
DOWNSTREAM EMBANKMENT SLOPE (X:1)	4.00

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	3.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	GROOVED END PROJECTION
INLET DEPRESSION	NONE

CURRENT DATE: 12-07-1998 FILE DATE: 12-07-1998
CURRENT TIME: 09:21:15 FILE NAME: B80734

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CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:48:44 FILE NAME: B29624

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

CULV NO.	SITE DATA: INLET ELEV. (ft)	SITE DATA: OUTLET ELEV. (ft)	SITE DATA: CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS	SHAPE	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	2227.85	2226.79	212.00	1	CSP	3.00	3.00	.024	CONVENTIONAL
2									
3									
4									
5									
6									

SUMMARY OF CULVERT FLOWS (cfs) FILE: B29624 DATE: 12-11-1998

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
2227.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2229.49	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2230.31	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2231.12	30.0	30.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2232.49	40.0	40.0	0.0	0.0	0.0	0.0	0.0	0.00	1
2234.48	50.0	48.4	0.0	0.0	0.0	0.0	0.0	1.54	5
2234.56	60.0	48.8	0.0	0.0	0.0	0.0	0.0	10.82	7
2234.62	70.0	49.0	0.0	0.0	0.0	0.0	0.0	20.34	5
2234.67	80.0	49.3	0.0	0.0	0.0	0.0	0.0	30.31	5
2234.71	90.0	49.5	0.0	0.0	0.0	0.0	0.0	39.82	4
2234.75	100.0	49.6	0.0	0.0	0.0	0.0	0.0	49.71	4
2234.45	48.3	48.3	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: B29624 DATE: 12-11-1998

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
2227.85	0.000	0.00	0.00	0.00
2229.49	0.000	10.00	0.00	0.00
2230.31	0.000	20.00	0.00	0.00
2231.12	0.000	30.00	0.00	0.00
2232.49	0.000	40.00	0.00	0.00
2234.48	-0.001	50.00	0.06	0.12
2234.56	-0.002	60.00	0.42	0.70
2234.62	-0.004	70.00	0.64	0.91
2234.67	-0.003	80.00	0.41	0.51
2234.71	-0.005	90.00	0.72	0.80
2234.75	-0.004	100.00	0.65	0.65

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:48:44 FILE NAME: B29624

PERFORMANCE CURVE FOR CULVERT 1 - 1(3.00 (ft) BY 3.00 (ft)) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	2227.85	0.00	-1.06	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2229.49	1.49	1.64	2-M2c	1.30	0.99	0.99	0.38	4.89	4.27
20.00	2230.31	2.22	2.46	2-M2c	2.00	1.43	1.43	0.56	6.01	5.32
30.00	2231.12	2.91	3.27	2-M2c	3.00	1.77	1.77	0.70	6.90	6.02
40.00	2232.49	3.68	4.64	2-M2c	3.00	2.06	2.06	0.82	7.75	6.55
48.39	2234.48	4.45	6.63	2-M2c	3.00	2.26	2.26	0.92	8.51	6.99
48.76	2234.56	4.49	6.71	2-M2c	3.00	2.26	2.26	1.01	8.54	7.36
49.02	2234.62	4.51	6.77	2-M2c	3.00	2.27	2.27	1.10	8.56	7.68
49.28	2234.68	4.54	6.83	2-M2c	3.00	2.28	2.28	1.18	8.58	7.97
49.47	2234.72	4.56	6.87	2-M2c	3.00	2.28	2.28	1.25	8.60	8.24
49.64	2234.76	4.57	6.91	2-M2c	3.00	2.28	2.28	1.32	8.61	8.48

El. inlet face invert 2227.85 ft El. outlet invert 2226.79 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	2227.85 ft
OUTLET STATION	212.00 ft
OUTLET ELEVATION	2226.79 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0050
CULVERT LENGTH ALONG SLOPE	212.00 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	3.00 ft
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 12-11-1998 FILE DATE: 12-11-1998
CURRENT TIME: 08:48:44 FILE NAME: B29624

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APPENDIX K

SOIL REPORT

KLEINFELDER

Geotechnical Investigation
Equestrian Detention Basin
Sections 22, 23, 26 and 35,
Township 22 North, Range 62 East
Clark County, Nevada

Prepared for: Poggemeyer Design Group
2601 North Tenaya Way
Las Vegas, Nevada 89128

Attention: Mr. Tim Pinter, P.E.

Kleinfelder Project No. 31-128834-001
January 19, 1994

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KLEINFELDER

January 19, 1994
Project No. 31-128834-001

Mr. Tim Pinter, P.E.
Poggemeyer Design Group
2601 North Tenaya Way
Las Vegas, Nevada 89128

Subject: **Geotechnical Investigation**
Proposed Equestrian Detention Basin
Sections 22, 23, 26 and 35,
Township 22 North, Range 63 East
Clark County, Nevada

Dear Mr. Pinter:

Enclosed please find our geotechnical investigation report for the proposed Equestrian Detention Basin site. The report details our field exploration and laboratory testing program for the proposed basin, embankments, diversion structures and energy dissipaters. The report presents our analyses, opinions and recommendations for design and construction of the proposed flood control structures.

We appreciate this opportunity to be of service on this phase of the project and look forward to providing additional services as the project progresses. If you have any questions, please do not hesitate to contact this office at your convenience.

Respectfully submitted,

KLEINFELDER, INC.

Walter E. Vanderpool, P.E.
Senior Engineer

Alan E. Money, P.E.
Geotechnical Engineering Manager

WEV/kmk

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KLEINFELDER 6650 South Paradise Road, Las Vegas, NV 89119 (702) 736-2936

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1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical investigation for the proposed Equestrian Detention Basin flood control structures in Henderson, Nevada. The site was located in Sections 22, 23, 26 and 35 of Township 22 North, Range 63 East, Clark County, Nevada, as shown on the General Vicinity Map (Plate 1).

The purposes of this investigation were to evaluate the surface and subsurface soil conditions and general site geology, and to provide recommendations for design and construction of a storm detention basin, runoff interception channel/dike, energy dissipaters, overflow spillway and outlet structures. This report presents recommendations for suitable embankment construction, foundations, site grading, trench backfill, compaction, earth pressures, moisture protection, soil corrosion and construction considerations.

The investigation included site reconnaissance, subsurface exploration, representative soil sampling, field and laboratory testing, engineering analyses, and preparation of this report.

The recommendations contained in this report are subject to the limitations presented herein. Attention is directed to the "Limitations" section of this report. In addition, a brochure prepared by ASFE (The Association of Firms Practicing in the Geosciences) has been included following this report. We recommend that all individuals reading this report also read the attached document.

1.2 PROJECT DESCRIPTION

The proposed Equestrian Detention Basin will consist of excavating a storm detention basin, constructing an embankment, overflow spillway and outlet structure. The

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improvements will also include construction of an interception channel and dike and placement of energy dissipating structures. Recommendations to control erosion are also provided.

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2.0 FIELD EXPLORATION

2.1 SITE RECONNAISSANCE

At the time of our field exploration the site including the detention basin and area of the interception channel/dike was undeveloped desert. Wildfire has recently burned the vegetation from an area in the northwest corner of Section 26. Other areas of the site do not appear to have been significantly altered in the recent past. Remnants of a breached embankment were observed along the west edge of the Detention Basin site. The site was located approximately as shown on the General Vicinity Map, Figure 1.

Natural vegetation consisted of creosote bush, white bursage and Indian rice grass. Some choya cactus were noted particularly at the higher elevations on the alluvial fan. Numerous braided rill erosion channels cut the site. Most of these channels were less than two feet deep. However, the erosion channels along the east edge of the site and particularly at the southern end were more active and more deeply incised. No surface water was present during our site reconnaissance. The site has a gentle overall gradient down toward the west and southwest. Surface elevations ranged from approximately 2050 feet MSL near the northwest corner to approximately 2380 feet at the southern end of the proposed interception channel/dike.

2.2 DRILLING EXPLORATION

The subsurface soil conditions in the area of the detention basin embankment were explored by drilling five (5) borings to depths of approximately 15 to 31 feet below existing site grade. Logs of the subsurface conditions, as encountered in the borings, were recorded at the time of drilling and are presented on the Log of Test Boring summary sheets, Plate A-1 through A-5, in Appendix A. The borings were located approximately as shown on Figure 2, Location of Explorations. A Key to Soil

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Symbols and Terms used with this report is presented on Plate A-33 following the Log of exploration summary sheets in Appendix A.

Drilling was accomplished with a truck-mounted rotary air drill rig equipped for soil sampling. Representative soil samples were obtained by bulk methods and with a ring-lined 2.63 inch inside diameter (ID) sampler. The ring-lined sampler was driven with a 350 pound hammer free-falling through a distance of 30 inches. The sampler driving resistance was recorded as number of blows per inches of penetration. The Penetration Test results are presented on the Log of Test Boring summary sheets at the sampling point. Representative soil samples from the borings were classified in the field by the field geologist and representative portions of each sample were packaged and transported to our laboratory for additional testing, as appropriate.

2.3 TRENCH EXPLORATION

The subsurface conditions within the proposed detention basin and along the proposed interception channel/dike were explored by excavating 26 trenches to depths of 8 to 10 feet below existing site grade. Logs of the subsurface conditions as encountered in the trenches were recorded at the time of excavation and are presented on the trench logs, Plate A-6 through A-31.

The trench explorations were located approximately as shown on Figure 2, following the text of this report. The trench explorations were backfilled and compacted to the extent possible with the equipment available. However, the compaction may not meet the minimum compacted density recommendations presented in Section 6 of this report. If structures will be founded over the trench explorations the backfill should be removed and replaced in accordance with the recommendations presented in Section 6.

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2.4 IN-SITU INFILTRATION TESTING

A two-inch (I.D.) well was installed in Boring B-5 upon completion of drilling. The bottom of the well was caped and the well extended to a total depth of 14 feet below existing site grade. The well consisted of 0.02 inch slotted PVC pipe from the bottom to a point nine feet below existing grade. The remainder of the pipe consisted of solid two-inch PVC pipe. The boring annulus was backfilled to 8.5 feet below existing grade with coarse, poorly graded sand pack. The slotted well and sand pack was then sealed with a two foot layer of powdered bentonite and the remainder of the boring annulus was backfilled with drill cuttings.

The infiltration tests were performed on November 9, 1993, approximately 24 hours after well construction.

The test procedure consisted of filling the well with potable water to the wellhead one foot above existing grade. The well casing was filled and maintained full for a period of 15 minutes. The feed water was then shut off and the time vs head data was collected as water infiltrated into the subgrade. The test was repeated six more times. The final data set was collected 2-1/4 hours after initial flooding of the well.

The water level vs time data for the seven tests are presented on Plates B-11 through B-17 in Appendix B.

The test was not run to steady state, however, the infiltration rate roughly calculates to a permeability of 0.00002 centimeters per second or approximately one half the rate observed in laboratory permeability tests on the 1/4 inch and finer fraction of remolded soils.

A second well was constructed at boring location B-4, however, the well was vandalized before the test could be performed. The well was subsequently backfilled and abandoned.

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3.0 LABORATORY TESTING

Representative soil samples from the borings were tested in the laboratory to evaluate their pertinent engineering properties. The laboratory tests include natural moisture content and dry unit weight tests. These test results are presented on the boring and trench logs at the sampling point.

3.1 SIEVE ANALYSES

Nine sieve analyses were performed on soil samples from the trench explorations. The sieve analyses characterize grainsize distribution along the interception channel/dike alignment and in the detention basin. The test results are presented on Plates B-1 through B-3 in Appendix B.

3.2 ATTERBERG LIMITS TESTS

Atterberg limits tests were performed on each sieve sample. All of the soils encountered during our field exploration were non-plastic.

3.3 DIRECT SHEAR STRENGTH TESTS

Direct shear strength tests were performed on seven soil samples. The strength tests were performed on remolded samples which were scalped to remove material larger than 1/4 inch. The test results are presented on Plates B-4 through B-6 in Appendix B.

3.4 OPTIMUM MOISTURE/DRY DENSITY TESTS

Optimum moisture/dry density tests were performed on two soil samples from the trench explorations. The tests were performed in accordance with the Modified Proctor Method, ASTM Test Method D-1557. The test results are presented on Plates B-7 and B-8.

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3.5 LABORATORY PERMEABILITY TESTS

Laboratory permeability tests were performed on three soil samples from the trench explorations. The tests were performed by a falling head method on remolded samples scalped to remove soil larger than 1/4 inch. The test results are presented in Table No. 1 on Plate B-9.

3.6 RESISTIVITY TESTS.

Resistivity tests were performed by the Miller Soil Box Method on two soil samples from the test pits. The resistivity test results are presented in Table No. 2 on Plate B-10.

3.7 CHEMICAL ANALYSES

Eight soil samples were submitted for chemical analyses. The corrosivity tests were performed by Atlas Chemical Testing Laboratories. The test results are presented following Plate B-17 in Appendix B.

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4.0 GENERAL SITE CONDITIONS

4.1 SURFACE CONDITIONS

At the time of our exploration, the Equestrian Detention Basin site was an undeveloped, gently sloping alluvial fan. Vegetation was sparse. Surficial soils consisted of medium to coarse sand, gravel, cobbles, and some boulders up to two feet in nominal diameter. The surface materials were coated with desert varnish.

4.2 SUBSURFACE CONDITIONS

The native soil consisted of coarse grained alluvially deposited soil to the depths explored. All of the soils encountered were coarse grained and non-plastic. The alluvial detritus was volcanic in origin. The soils were generally loose at the surface and progressively more dense with depth. Very dense granular soil was encountered within three to seven feet of the present ground surface throughout the site. Partially cemented soils were encountered in one trench (T-17). Trench T-17 was one of the explorations located closest to bedrock outcrops along the interception channel/dike alignment. Numerous alluvially deposited lenses and strata of poorly graded fine sand to coarse gravel were observed throughout the soil profile at each exploration location. There was no consistent pattern to the sequence in which each soil type was encountered within each exploration or between explorations. However, the native soils generally became finer grained with decreasing elevation on the alluvial fan.

Groundwater was not encountered in any of the explorations at this site to the depth explored. Moisture content was low throughout the soil profile and throughout the site.

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5.0 GENERAL SITE GEOLOGY

5.1 GEOLOGIC SETTING

The proposed Equestrian Detention Basin site is located along the southeastern rim of the Las Vegas Valley. The Las Vegas Valley is filled with Quaternary and Tertiary age normally consolidated alluvial sediments derived from the surrounding mountains. The Valley floor sediments consist of alluvial and playa deposits surrounded by progressively more steeply sloping alluvial aprons. The major source of the alluvium at this site is the River Mountains located on the southeast side of the Valley. Generally, the sediments become progressively finer grained with increasing distance from the source area and with decreasing elevation. The alluvial and playa sediments can be several thousand feet thick in the Central Valley floor. However, bedrock outcrops at the apex of the fan along the east edge of the site. The thickness of the alluvium at this site is unknown. At this site the sediments appear to consist primarily of sand and gravel deposits of volcanic origin with trace amounts to some silt. Secondary cemented deposits of calcium carbonate (cemented sand and gravel) were encountered at one location.

5.2 TECTONIC FAULTING AND SEISMICITY

Numerous shocks of Richter magnitude 3.0 or greater have been recorded in the Las Vegas area. Most were a probable result of underground blasting (some as high as Richter magnitude 5.8) at the Nevada Test Site which remains the major source of seismic activity in the Las Vegas area. Tectonic shocks having epicenters within southern Nevada have been minimal.

5.3 NON-TECTONIC FEATURES

The Las Vegas Valley contains numerous step-like features known as "compaction faults". The origin of the compaction faults is uncertain. A currently held theory is

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that they may have originated from tectonic processes and are part of a valley wide fault system (Bell and Others, 1992). Other theories suggest that they are the result of prehistoric large scale reductions in groundwater levels within the Las Vegas Valley and/or differential consolidation of earth materials across narrow zones. It is also possible that a combination of factors could have resulted in these features. No historic earthquakes have been attributed to any compaction fault in the Las Vegas Valley (Slemmons, 1990). Gradual vertical and horizontal movement or "creep" along many of the compaction faults has historically been recognized and attributed to subsidence related to groundwater withdrawal. In addition, stresses resulting in fissures have in many cases been localized near compaction faults. This also has been attributed to subsidence related to groundwater withdrawal. The nearest mapped compaction fault is located approximately 5-1/2 miles northwest of the site (Bell and Price, 1991, Plate 2, 1:62,500).

Stress resulting in fissures has in some cases been localized near compaction faults. This also has been attributed to subsidence related to groundwater withdrawal. The nearest mapped fissure zone fault is located approximately six miles northwest of the site (Bell and Price, 1991, Plate 2, 1:62,500).

Areal subsidence continues to occur in many parts of the Las Vegas Valley. However, no indication of significant differential subsidence or ground displacement which might adversely affect the proposed development was observed at the project site.

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6.0 ENGINEERING ANALYSES AND RECOMMENDATIONS

6.1 GENERAL

Based upon the results of our field exploration and laboratory testing, no unusual difficulties are anticipated in constructing embankments or channels, or in armoring channels to resist erosion at this site. The native soils will provide suitable support for energy dissipation structures, embankments or buried pipe. Suitable support for the proposed structures may be provided by properly placed and compacted fill, undisturbed soil, or granular pipe bedding. Any areas of disturbed, loose or soft soils, if encountered, are unsuitable for support of the proposed embankments, foundations or pipe. The allowable bearing pressures, soil modulus, lateral earth pressures, and estimated settlement are based on the assumption that subgrade preparation, pipe bedding, backfill and compaction is performed in accordance with the recommendations contained in this report.

6.2 SEEPAGE ANALYSES

The results from the field infiltration test and the remolded laboratory permeability tests indicate that horizontal permeability in the native soil deposits will be on the order of two times slower than remolded soils in the embankment. However, variable lenses and intermittent strata of more and less permeable soil are anticipated. For our analyses, the undisturbed native soil was assumed to have a horizontal permeability 5 times greater than the vertical permeability of $2X10^{-5}$ cm/sec. The permeability of soil cement facing was not considered in our analyses.

Based on our analyses for the design event where the basin is filled in approximately eight hours to the spillway elevation and drained in the following 96 hours, seepage does not reach the down-stream embankment toe and therefore no toe drain, seepage cutoff wall or low permeability embankment core would be necessary. Based upon our

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analyses of the proposed embankment, a toe drain and collection gallery will not be required for the proposed embankment with a crest 15 feet or less above the existing site grade.

6.3 SLOPE STABILITY ANALYSES

Slope stability analyses were performed for the proposed embankment using the soil strength values obtained by laboratory tests. The factor of safety against slope failure for an embankment consisting of on-site granular soil constructed in accordance with recommendations provided and with side slopes of 3:1 (horizontal:vertical) was found to be greater than 2.0. During rapid drawdown from a steady state condition, the factor of safety against slope failure was greater than 1.5. An earth fill embankment using on-site soils with 3:1 or flatter slopes is considered adequate at this site.

An embankment constructed from on-site soils with a slope of 3:1 (horizontal:vertical) would provide adequate safety against rapid drawdown slope failure without the soil cement facing. However, some surface armoring would be necessary for erosion control. This could consist of a riprap or soil cement cover. The thickness of this layer would depend on weathering and erosion characteristics of the soil cement design or riprap material.

6.4 FOUNDATIONS

Conventional shallow foundations would be appropriate for the proposed energy dissipation or headwall structures bearing on medium dense to very dense alluvial sand and gravel. Foundations for the proposed structures which bear on medium dense native soils should be established at a depth of one or more feet below the lowest

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adjacent final compacted subgrade. Additional embedment may be required for erosion protection.

Foundations for the proposed structures which bear on native soil with the above referenced embedments may be proportioned for a maximum bearing pressure of 3000 pounds per square foot (psf). An additional 500 psf for each additional foot of foundation embedment greater than two feet may be utilized. However, a minimum footing width of one foot and a maximum net allowable bearing pressure of 10,000 psf should be observed. Foundations for head walls or spillway structures at the Detention Basin site established on properly placed and compacted fill as described in Sections 6.6.2 and 6.6.3 may be proportioned for a maximum net bearing pressure of 3000 psf.

Prior to placing forms or pouring concrete, the footing excavation should be observed by a representative of Kleinfelder, Inc. to establish whether suitable bearing soils have been exposed and the bottom of excavations are free of loose and disturbed soils.

6.4.1 SETTLEMENT

Settlement of properly designed and constructed footings located one foot or more below the lowest adjacent final compacted subgrade which bear on properly placed and compacted structural fill or undisturbed soil should be less than one-inch.

However, large fill embankments compacted in accordance with the recommendations provided in this report should be expected to compress approximately 0.25 percent of the fill height. This long-term compression of structural fill could be minimized by compaction to a higher standard such as 100 percent of ASTM D-1557. In addition, the embankment fills will induce some settlement in the native soil profile. Settlement due to the embankment fill at the Equestrian Detention Basin site will be minimal due

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to the presence of thick, dense alluvial beds. The estimated embankment induced settlement is 1/2 inch or less at this site.

6.4.2 SEISMIC DESIGN RECOMMENDATIONS

Based upon results of sieve analyses and Atterberg limit test results, the depth to groundwater and the extent of cemented soil deposits encountered during trenching and drilling, the subsurface soils at this site are not considered to be susceptible to liquefaction due to either man-induced or earthquake induced shaking.

For seismic design analyses a seismic lateral coefficient (K_h) of $K_h=0.08$ would be appropriate for yielding retaining walls. A seismic lateral coefficient of at least $K_h=0.2$ is recommended for non-yielding structures. Earth retaining structures should be designed to slide rather than tilt due to seismic loads, to the extent possible. The above referenced seismic lateral coefficient values (K_h) would be appropriate for analysis by the Mononobe-Okabe method (AASHTO, 1983). The values provided for bearing capacity and resistance to sliding may be increased by 1/3 for transient loads, wind and seismic loads.

6.5 RETAINING STRUCTURES & LATERAL LOADS

Cantilevered retaining walls with level backfill, no surcharge load and no seepage or groundwater should be designed to resist backfill soil pressures in the active case (i.e. where some lateral movement of the top of the wall is permitted during or after backfill placement). For design purposes a backfill soil pressure equivalent to that developed by a fluid with a density of 30 pounds per cubic foot (pcf) would be appropriate for the on-site granular soils. If the retained soil can potentially become saturated, the wall should be designed to resist the hydrostatic forces acting on the wall. Where surcharge

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loads are anticipated the horizontal load due to the surcharge may be taken as 0.3 times the surcharge load.

Non-yielding retaining walls which cannot deflect to mobilize the active soil pressure should be designed for the at-rest or K_o lateral earth pressure state. A lateral earth pressure design value of 0.55 times the moist unit weight of the retained soil would be appropriate for a clayey sand backfill. A K_o value of 0.38 would be appropriate if backfill soils consist of Clark County Type II aggregate base or equivalent coarse grained soil. A moist unit weight of 135 pcf would be appropriate for properly placed and compacted clayey sand or Clark County Type II aggregate base backfill soils. Additional testing would be required once the backfill soil is selected to establish an appropriate value for other backfill soils.

Horizontal loads acting on foundations cast in open excavations against undisturbed native soil or properly placed and compacted fill will be resisted by friction acting along the base of the footing and by passive earth pressures against the loaded side of the footing. If design makes use of passive earth pressure against backfill, it is important that a representative of Kleinfelder, Inc. be present to monitor and test backfill placement compaction.

The friction acting along the base of footings founded on suitable undisturbed foundation soils or properly placed and compacted granular structural fill may be computed by using an allowable coefficient of friction of 0.40 with the normal dead load. Footings established on cemented deposits may be designed using an allowable coefficient of friction of 0.45 with the normal dead load. The allowable passive lateral earth pressure may be computed by using an equivalent fluid with a density of 450 pcf for backfill consisting of on-site granular soil or Clark County Type II aggregate base.

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The passive case equivalent fluid density should be reduced to 350 pcf for clayey sand or equivalent backfill. Passive pressure capacity in the upper foot should be ignored unless confined by concrete slab-on-grade or pavement. The backfill material designed to resist passive pressure should extend a distance of at least two times the wall height behind the wall.

6.6 SITE PREPARATION AND GRADING

After stripping to remove all vegetation, demolition of existing pavement or structures and relocation or properly abandoning utility lines, any debris, existing uncontrolled fill or other deleterious materials should be excavated and disposed of off-site at an approved landfill. In addition, any disturbed, loose, soft or medium stiff soils should be excavated from beneath embankments, foundations or pipe subgrade and areas to receive structural fill. The excavations should extend laterally two feet beyond the proposed structure.

6.6.1 EXCAVATIONS

Based upon observations made during trench exploration, we do not anticipate difficulty will be encountered during excavation of the non-cemented granular soils. Some sloughing should be anticipated. Construction excavations slopes 1:1 or flatter should be stable. Cemented soils were encountered in one exploration. Cemented soils, if encountered, may require the use of a crane and headache ball or hydraulic hammer. Trench excavations greater than five feet deep should be sloped or properly shored.

6.6.2 EMBANKMENTS AND STRUCTURAL FILL

Structural fill for embankments should be free of vegetation and debris, and contain no

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rocks or clumps larger than four inches nominal diameter. Structural fill should be placed in six to eight inch thick loose lifts, brought to about optimum moisture content and compacted to at least 90 percent of maximum dry density.

We anticipate that most of the on-site natural soils may be reused as structural fill, although some sorting may be necessary to remove oversize material and some blending with low solubility and low plasticity imported material may be required if gypsiferous or expansive soils are encountered in excavations. Imported materials should meet the requirements for structural fill, should be free of vegetation and debris, and should not contain any rocks larger than four inches. Imported fill placed beneath soil cement or concrete slabs-on-grade should contain less than 0.2 percent sodium sulfate salts.

Imported materials should meet the requirements for structural fill, should be free of vegetation and debris, and should not contain any rocks larger than four inches. Imported structural fill material used within one foot of design subgrade in any proposed pavement areas should have a minimum R-value of 45. Any imported fill materials should be approved at the source by Kleinfelder, Inc. prior to importing.

6.6.3 FILL PLACEMENT AND COMPACTION

Structural fill required to bring the site to grade should consist of low plasticity (expansion potential less than four percent under 60 psf surcharge), low solubility (solubility less than three percent) non salt-laden granular soils (sodium sulfate less than 0.2 percent).

Structural fill should be placed in loose lifts a maximum of 8 inches thick, brought to about optimum moisture for granular soils, and compacted to at least 90 percent of maximum dry density. Structural fills containing clayey soils should be moistened to

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one to three percent above the optimum moisture content and compacted to between 88 and 92 percent of maximum dry density. All compaction recommendations presented in this report refer to procedures established by ASTM D-1557.

6.7 EROSION CONTROL

6.7.1 OVERFLOW SPILLWAY

We anticipate that a concrete slab-on-grade or soil cement overflow structure will be constructed at this site. Conventional reinforced concrete or roller compacted concrete could also be used. However, the on-site soils are reasonably well suited for use in soil cement provided the mix design properly addresses the moderately corrosive nature of the on-site soil.

The on-site granular soils would be appropriate for use in a soil cement mix design with minimal processing. A soil cement mix design with a minimum 28 day compressive strength of 750 psi and maximum permeability through a compacted lift of 1×10^{-5} cm/sec. is recommended. The mix design should be tested for durability against freeze-thaw action and for wet-dry stability. These physical properties of the mix design must be verified for the final mix design.

Soil-cement should be batched in an approved continuous flow central plant or batch-type pugmill mixer. The plant should be equipped with metering and feeding devices that will supply the soil, cement and water into the mixer in the specified quantities. If the actual quantities in the mix deviate more than three percent by weight from the specified quantities, the engineer may require such changes in the plant operation as will provide the required accuracy.

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The mixing time should be that which is required to secure an intimate uniform mixture of the soil, cement and water.

The contractor should protect the soil-cement mixture whenever it is transported during unfavorable weather.

The total elapsed time between the addition of water to the soil and cement and the start of compaction should not exceed 60 minutes.

The contractor should take all necessary precautions to avoid damage to completed soil-cement by equipment. Immediately prior to placement of the soil-cement, the receiving surface should be in a moist condition. The mixture should be placed with spreading equipment that will produce layers of such widths and thicknesses as are necessary for compaction to the specified dimensions of the completed soil-cement.

Optimum moisture and maximum density for the section being placed and compacted should be established during construction by moisture-density test ASTM D-558 on representative samples of soil-cement mixture obtained from the area being processed at the time compaction begins. At time of compaction, the moisture content should not be below optimum or less than that quantity which will cause the soil-cement to become unstable during compaction and finishing operations and should not be more than two percentage points above optimum.

Soil-cement should be placed in horizontal lifts no more than six inches in loose thickness and uniformly compacted to at least 96 percent of maximum density as established by ASTM Test Method D-558.

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At the start of compaction, the soil-cement mixture should be in a loose condition for its full depth. No section should be left undisturbed for longer than 30 minutes during compaction operations.

As compaction nears completion, the surface of the soil-cement should be shaped to the specified lines, grades and cross sections. As necessary or as required by the engineer, the surface should be lightly scarified to remove imprints left by equipment or to prevent compaction planes. During the finishing process, the surface should be kept moist by means of fog-type sprays.

Compaction and finishing should be done in such a manner as to produce, in not longer than two hours, a smooth, dense surface free of compaction planes, cracks, ridges or loose material.

After completion of final finishing the surface should be cured by application of a bituminous sealing membrane, or by being kept continuously moist for a period of seven days with a fog-type water spray that will not erode the surface of the soil-cement.

At the end of each day's work, or whenever construction operations are interrupted for more than three hours, a formed construction joint should be made. Such joints should be full-depth vertical joints full width across the fill lift.

The engineer, with the assistance of and in cooperation with the contractor, should make such inspections and tests as he deems necessary to ensure the conformance of the work to the contract plans and specifications. The inspections and tests may include, but should not be limited to (1) the close observation of the operation of all equipment

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used on the work, and (2) the taking of test samples of the soil-cement and its individual components at all stages of processing and after compaction and curing.

All testing of soil-cement or its individual components, should be in accordance with the latest applicable ASTM or AASHTO specifications.

The overflow spillway could also consist of a concrete slab-on-grade with channel training walls energy dissipaters. Recommendations for embankment construction are presented in Section 6.6. Recommendations for foundation design presented in Section 6.4 would be appropriate for a spillway structure. Recommendations for design of retaining structures to resist lateral loads are presented in Section 6.5. Special provisions provided in Section 6.7.2 to control seepage, limit hydrostatic pressure and resist erosion should be applied to design of a concrete slab-on-grade spillway.

6.7.2 CHANNEL LINING

It is our understanding that the interception channel/dike will be lined with concrete. We would recommend that the subgrade along the alignment be prepared in accordance with recommendations provided for utility trenches. The prepared subgrade should be covered with a minimum of four inches of Clark County Type II Aggregate Base Course compacted to a minimum of 90 percent of the maximum dry density (ASTM D-1557). Concrete channel liner should include a transverse cut-off wall at each panel to reduce seepage beneath the channel. In addition, weepholes should be constructed at intervals to relieve any hydrostatic pressure from behind the channel walls and channel bottom. The weepholes could be nominally two to four inches in diameter and backed by a drain gravel pocket wrapped in filter fabric to aid in pressure relief. The crest of the channel walls should be turned down or otherwise embedded to control erosion and prevent undermining along the edge of the channel.

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6.7.3 ENERGY DISSIPATERS

Foundations for energy dissipation structures should be located a minimum of one foot below the lowest adjacent final compacted subgrade or as necessary to control scour and erosion.

Horizontal loads acting on energy dissipaters will be resisted by friction acting along the base of the structure and by passive earth pressures acting against the sides of embedded walls and footings. The friction acting along the base of footings and slabs-on-grade may be computed using an allowable coefficient of friction of 0.40 with the normal dead load. An allowable lateral passive earth pressure may be computed using an equivalent fluid density of 400 pounds per cubic foot for the sides of the footing or slab placed against undisturbed soil or properly placed and compacted fill. The maximum design passive pressure for channel walls should be limited to 1200 pounds per lineal foot. Passive pressure capacity in the upper two foot should be ignored unless the material is confined by concrete slab-on-grade or otherwise protected from erosion. The above referenced lateral resistance design values may be increased by one-third for transient wind or seismic loads.

6.8 PIPE BEDDING

At least six inches of bedding material should be placed between the pipe and the subgrade soils. The bedding should surround the pipe and extend to at least 12 inches above the pipe crown. This zone is also referred to as the pipe backfill zone.

Bedding and pipe zone backfill material should consist of granular soils such as well graded clean sands or sand and gravel mixtures. A gradation similar to Clark County Type II Aggregate base would provide suitable bedding material. Based upon the field

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explorations and the results of laboratory tests, it appears that some of the native soils along the alignment will be suitable for use as bedding and pipe zone backfill material.

During placement, the bedding and pipe zone backfill should be placed in lifts with a maximum loose thickness of eight inches and compacted to a minimum of 90 percent of the maximum dry density. All compaction recommendations stated in this report refer to methods established by the ASTM D-1557 test method. The bedding should be manually placed and hand compacted under the pipe haunches to provide uniform pipe support below the spring line. Bedding material above the spring line may be compacted with hand operated power equipment. However, care should be taken to not damage the pipe during compaction of bedding.

6.9 TRENCH BACKFILL

Backfill materials with a plasticity index greater than 10, if used, should be placed at two to four percent above the optimum moisture content. In addition, these materials should be compacted to between 88 percent and 93 percent of maximum dry density. It should also be understood that overexcavation of expansive clay soils placed as trench backfill may be required when future improvements are made.

Flooding and jetting is an acceptable alternative method of compaction for some materials, provided it is performed correctly and sufficient time is allowed for drainage and settlement to occur. However, it is our experience that satisfactory results are difficult to achieve. We recommend that flooding and jetting be used only in areas where future development over the trench is not anticipated. If used, flooding and jetting should only be employed for lower lift levels. All backfill placed within three feet of final subgrade in areas of future improvements should be compacted with vibratory mechanical equipment. If flooding or jetting is utilized, we recommend that

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a granular backfill containing less than 30 percent passing the No. 50 sieve and less than 10 percent passing the No. 200 sieve be utilized. Based upon observations made during our site investigation and laboratory testing, it appears that some of the in-place natural soils at the site meet these gradational requirements.

6.10 SOIL MODULUS AND EARTH PRESSURES

A soil modulus value, E', of 2000 psi would be appropriate for the in-place native soils. A soil modulus of 1200 psi may be used for properly compacted sand and gravel materials placed as bedding and in the pipe zone. Due to the significant variation between the moduli of the native soils and the pipe zone backfill, some modification of the design modulus value may be necessary. The recommended modification will depend on the pipe diameter (O.D.) and the proposed trench width. For a minimum trench width of 1.5 times the pipe diameter, a modulus of 1500 psi may be used. The soil modulus for bedding material would be appropriate where the horizontal pipe bedding thickness exceeds one pipe diameter. The soil modulus for undisturbed native soil would be appropriate where the trench width is less than 1.2 times the pipe diameter.

Horizontal loads acting on pipe bedded in suitable soil or properly placed and compacted fill will be resisted by friction acting along the projected base of the pipe and by passive earth pressures against the loaded side projection of the pipe. If design makes use of passive earth pressure against backfill, it is important that a representative of Kleinfelder, Inc. be present to monitor and test backfill placement and compaction.

The friction acting along the base of pipe founded on suitable bedding and subgrade soils may be computed using an allowable coefficient of friction of 0.40 with the normal dead load. An allowable lateral passive earth pressure may be computed using

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an equivalent fluid weighing 400 pounds per cubic foot (pcf) for the projected sides of pipe bedded in properly placed and compacted backfill. The maximum allowable passive pressure for buried pipe should not exceed 800 pounds per square foot of projected surface. Passive pressure within one foot of finish grade should be discounted unless confined by concrete slab-on-grade or pavement. The values given above may be increased by one-third for transient wind or seismic loads.

6.11 SOIL CORROSION

Based upon the laboratory test results and previous studies in the vicinity of the site, soils on this site contain salts in sufficient concentration to be considered corrosive to metal and concrete. Therefore, all concrete in contact with the on-site soils should contain Type V, or equivalent sulfate resistant cement, and should be placed with a maximum four-inch slump. Special protection to buried metal pipes and water lines is important for long-term performance of these underground utilities. Consideration should be given to cathodic protection.

6.12 CONSTRUCTION CONSIDERATIONS

As indicated earlier, moderately hard cemented soils were encountered in one of our field explorations. We anticipate that excavations for the channel, basin and outfall pipe may encounter cemented soils which will require the use of heavy duty earthwork equipment. It is possible that some of the hard deposits may be removed by ripping. We anticipate that the use of a headache ball or a backhoe mounted hydraulic or pneumatic hammer may be required.

There will be material loss due to clearing and grubbing operations. Also, there will be shrinkage losses when excavating and compacting the on-site soils and scarifying and recompacting native soils. The shrinkage factor for the surficial, medium dense soils

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will likely be between 0 and 10 percent. A subsidence factor of 0.05 feet/foot for recompacted soil should be used in areas where the exposed surficial soils are scarified and recompacted. Some bulking may occur in those areas where cemented soils are excavated.

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7.0 CLOSURE

7.1 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory tests, and our understanding of the proposed construction. The subsurface data used in the preparation of this report were obtained from the 26 trenches and five borings drilled during the field investigation. It is anticipated that some variations in the soils and groundwater conditions will exist between the points explored. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site which are different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified. This report was prepared in accordance with generally accepted standard of practice at the time the report was written. No warranty, express or implied is made. It is the Client's responsibility to see that all parties to the project including the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on-site and off-site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report

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be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

7.2 ADDITIONAL SERVICES

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during the construction to verify compliance with these recommendations. These tests and observations should include, but not necessarily be limited to the following:

- Observations and testing during site preparation and earthwork.
- Observation and testing during embankment construction.
- Observation of pipe bedding, backfill placement and compaction.
- Observation and testing of foundation soils.
- Consultation as may be required during construction.

We also recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or wish to discuss additional services, please do not hesitate to contact us.

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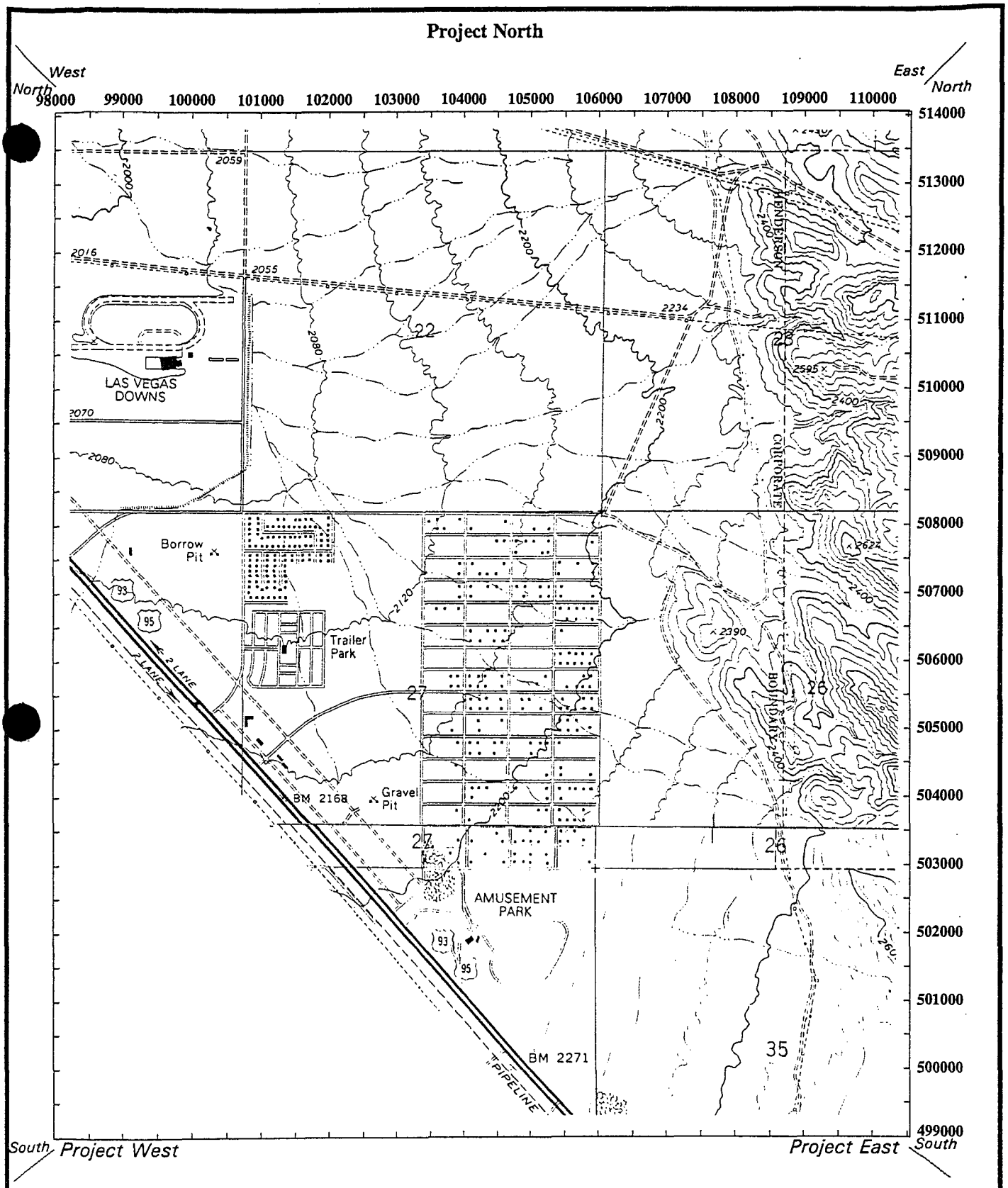

● - Approximate Exploration Location

Scale : Approximately 1" = 2000 '

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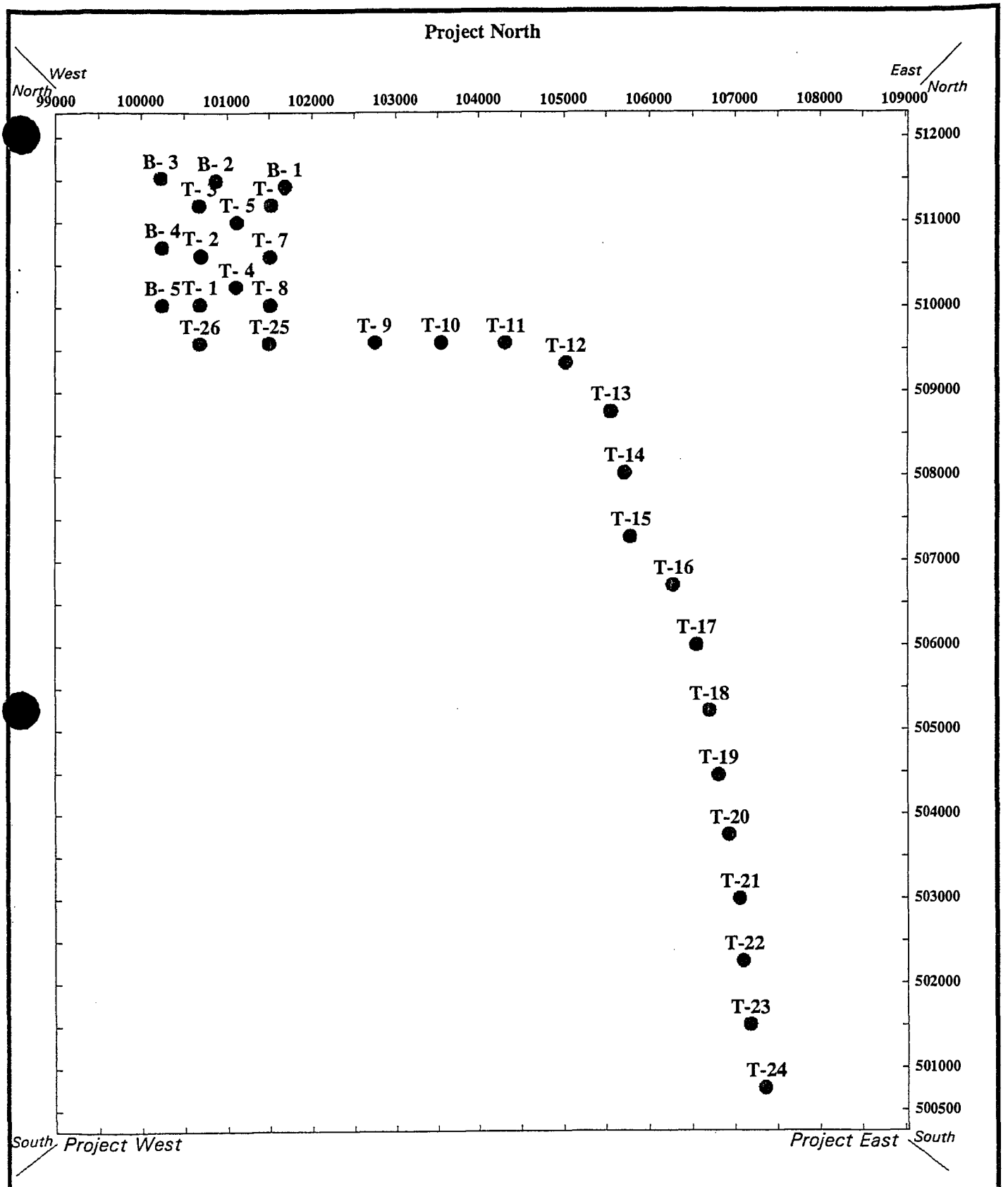
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

GENERAL SITE LOCATION MAP

PLATE
1



● - Approximate Exploration Location

Scale : Approximately 1" = 1600 '

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

LOCATION OF EXPLORATIONS

PLATE
2

DATE DRILLED: 11/9/93

LOCATION: See Plate 2

BORING NO. B- 1

ELEVATION: Approx. 2090. feet

** HAMMER WEIGHT: 350 lb.

Northing - 511420
Easting - 101680

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2090.00 / 0							**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel and cobbles, light brown matrix, gray to pink mottled volcanic stone, angular to subangular	dry to slightly moist	loose to medium dense
									medium dense
									dense
									very dense
2085.00 / 5	3	115		50/5					
								slightly moist	dense
2080.00 / 10	4	110		39/12					
							POORLY GRADED, SILTY GRAVEL (GP-GM) - angular to subangular, light brown		very dense
	3			50/6					
2075.00 / 15							Bottom at 15 feet.		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-1

DATE DRILLED: 11/9/93

LOCATION: See Plate 2

BORING NO. B- 2

ELEVATION: Approx. 2075. feet

** HAMMER WEIGHT: 350 lb.

Northing - 511490
Easting - 100870

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2075.00 / 0							POORLY GRADED, SILTY SAND (SP-SM) - some gravel, occasional cobbles approximately 3" to 5" diameter, light brown	slightly moist	loose to medium dense
								slightly moist	
							- subangular gravel and small cobbles, volcanic detritus, some alluvial sorting		medium dense to dense
							- angular to subangular volcanic stone		
2070.00 / 5				25/12			- 3 inch cobble sluff wedged in spoon shoe.		very dense
							POORLY GRADED SAND (SP) - very little fines, trace gravel, light brown		
2065.00 / 10				35/12					
							POORLY GRADED, SILTY SAND (SP-SM) - some gravel, occasional cobbles, light brown		
							- hole caving, unable to obtain representative penetration test results		
2060.00 / 15				20/12 sluff					
2055.00 / 20									

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-2a

DATE DRILLED: 11/9/93
LOCATION: See Plate 2

BORING NO. B- 2

ELEVATION: Approx. 2075. feet
** HAMMER WEIGHT: 350 lb.

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	Northing - 511490 Easting - 100870 SOIL DESCRIPTION	MOISTURE	CONSIST.
2055.00 20							- POORLY GRADED, SILTY SAND (SP-SM) - cont. - some gravel and cobbles, hole caving, no cementation	slightly moist	very dense
2050.00 25									
2045.00 30							- hole caving, unable to sample		
							Bottom at 31 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-2b

DATE DRILLED: 11/9/93

LOCATION: See Plate 2

BORING NO. B- 3

ELEVATION: Approx. 2055 feet

** HAMMER WEIGHT: 350 lb.

Northing - 511520
Easting - 100230

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2055.00 / 0							**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel, occasional cobbles to approximately 5" diameter, light brown	slightly moist	loose to medium dense
								slightly moist	
							- some alluvial sorting		medium dense to dense
2050.00 / 5				20/12 sluff			- angular to subangular volcanic stone - 3 inch cobble sluff wedged in spoon shoe.		very dense
2045.00 / 10							POORLY GRADED SAND (SP) - very little fines, trace gravel, light brown		
2040.00 / 15							POORLY GRADED, SILTY SAND (SP-SM) - some gravel, occasional cobbles, light brown - hole caving, unable to obtain representative penetration test results		
2035.00 / 20									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

KLEINFELDER

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE

A-3a

DATE DRILLED: 11/9/93
LOCATION: See Plate 2

BORING NO. B- 3

ELEVATION: Approx. 2055 feet
** HAMMER WEIGHT: 350 lb.

Northing - 511520
Easting - 100230

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2035.00 / 20							- POORLY GRADED, SILTY SAND (SP-SM) - cont. - some gravel and cobbles, hole caving, no cementation	slightly moist	very dense
2030.00 / 25									
2025.00 / 30							Bottom at 30 feet.		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-3b

DATE DRILLED: 11/9/93
LOCATION: See Plate 2

BORING NO. B- 4

ELEVATION: Approx. 2053 feet
** HAMMER WEIGHT: 350 lb.

Northing - 510700
Easting - 100250

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2053.00 / 0							**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel, occasional cobbles to approximately 5" diameter, light brown	dry to slightly moist	loose to medium dense
									medium dense
								slightly moist	dense
							- some alluvial sorting		
							- angular to subangular volcanic stone		
2048.00 / 5	5	125		7/6 38/12					
									very dense
							- partially cemented coarse sand		
2043.00 / 10	5	127		50/11					
							- some gravel		
				50/12					
2038.00 / 15	3								
2033.00 / 20									

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-4a

DATE DRILLED: 11/9/93

LOCATION: See Plate 2

BORING NO. B- 4

ELEVATION: Approx. 2053 feet

** HAMMER WEIGHT: 350 lb.

Northing - 510700
Easting - 100250

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2033.00 / 20				40/12			- POORLY GRADED, SILTY SAND (SP-SM) - cont. - some gravel and cobbles, hole caving, no cementation	slightly moist	very dense
2028.00 / 25				43/12					
2023.00 / 30							Bottom at 30 feet.		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____

BY: ____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-4b

DATE DRILLED: 11/8/93
LOCATION: See Plate 2

BORING NO. B- 5

ELEVATION: Approx. 2058 feet
** HAMMER WEIGHT: 350 lb.

Northing - 510020
Easting - 100250

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2058.00 / 0							POORLY GRADED, SILTY SAND (SP-SM) - some gravel, occasional cobbles to approximately 5" diameter, light brown	dry to slightly moist	loose to medium dense
									medium dense
								slightly moist	dense
							- some alluvial sorting		
							- angular to subangular volcanic stone		
2053.00 / 5	3	120		35/12					
									very dense
							- partially cemented coarse sand		
2048.00 / 10	4	132		50/4					
							- some gravel		
			Infil. Test						
	4	116		50/8					
2043.00 / 15							Bottom at 15 feet.		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

BORING LOG AND TEST SUMMARY

PLATE
A-5

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 1

ELEVATION: Approx. 2067 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2067.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel, occasional cobbles, desert pavement surface with dark desert varnish, light brown	dry to slightly moist	loose to medium dense	
					medium dense	
			- angular to subangular alluvium, volcanic stone		dense	S,Ch
			- alluvial sorting poorly defined	slightly moist		
			POORLY GRADED SAND (SP) - light brown		very dense	
2062.00 / 5			**POORLY GRADED, SILTY SAND (SP-SM)** - light brown			
			POORLY GRADED SAND (SP) - light brown			
			POORLY GRADED, SILTY SAND (SP-SM) - light brown			
2057.00 / 10			Bottom at 10 feet.			
2052.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-6

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 2

ELEVATION: Approx. 2063 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2063.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel, occasional cobbles, light brown	dry to slightly moist	loose to medium dense	
					medium dense	
			- angular to subangular alluvium, volcanic stone		dense	
			- alluvial sorting poorly defined	slightly moist		
			POORLY GRADED SAND (SP) - light brown		very dense	G, A
2058.00 / 5			**POORLY GRADED, SILTY SAND (SP-SM)** - light brown			
			POORLY GRADED SAND (SP) - light brown			
			POORLY GRADED, SILTY SAND (SP-SM) - light brown			
			Bottom at 9 feet.			
2053.00 / 10						
2048.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

KLEINFELDER
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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE A-7

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 3

ELEVATION: Approx. 2065 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2065.00 / 0			**POORLY GRADED, SILTY GRAVEL (GP-GM)** - some sand, occasional cobbles, light brown	dry to slightly moist	loose to medium dense	
			POORLY GRADED SAND (SP) - light brown		medium dense	
			POORLY GRADED, SILTY SAND (SP-SM) - light brown		dense	
			POORLY GRADED SAND (SP) - light brown			
			POORLY GRADED, SILTY GRAVEL (GP-GM) - light brown - angular to subangular alluvium, volcanic stone - alluvial sorting well defined	slightly moist		
			POORLY GRADED SAND (SP) - light brown		very dense	S, D1557
2060.00 / 5			**POORLY GRADED, SILTY SAND (SP-SM)** - light brown			
			POORLY GRADED SAND (SP) - light brown			
			POORLY GRADED, SILTY SAND (SP-SM) - light brown			
2055.00 / 10			Bottom at 10 feet.			
2050.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

NOTES: Groundwater not encountered during trenching.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-8

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 4

ELEVATION: Approx. 2075 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2075.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - angular to subangular volcanic stone, light pink stone with gray to light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			POORLY GRADED SAND (SP) - some gravel and cobbles, light brown	slightly moist		G,A, Ch
2070.00 / 5			- partially cemented, reddish brown, easily crumbled by hand, coarse sand matrix		very dense	
			Bottom at 9 feet.			
2065.00 / 10						
2060.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-9

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 5

ELEVATION: Approx. 2078 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2078.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - desert pavement, some desert varnish, light brown matrix	dry to slightly moist	loose to medium dense	
			- angular to subangular volcanic stone up to 5 inch diameter		medium dense	
			- frequent alluvially sorted, poorly graded sand layers to four feet		dense	
				slightly moist		
					very dense	
2073.00 / 5			- alluvial sorting less distinct, poorly sorted			
2068.00 / 10			Bottom at 10 feet.			
2063.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE WITH TIME. DATA PRESENTED IS A SIMPLIFICATION OF THIS LOCATION

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-10

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 6

ELEVATION: Approx. 2095 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2095.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel and cobbles up to 8 inch diameter, light brown	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
				slightly moist		
			POORLY GRADED SAND (SP) - light brown - alluvially sorted, coarse sand		very dense	S, G,A
2090.00 / 5			POORLY GRADED, SILTY SAND (SP-SM) - angular to subangular volcanic stone, some angular gravel to 3 inch diameter, light brown			
			SILTY SAND (SM) - some gravel, weakly cemented, light brown			
2085.00 / 10			Bottom at 10 feet.			
2080.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-11

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 7

ELEVATION: Approx. 2086 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2086.00 / 0			**POORLY GRADED, SILTY GRAVEL (GP-GM)** - some cobbles to 8 inch diameter, some sand, desert pavement on surface, light brown matrix - angular to subangular volcanic stone, mottled gray to pink stone with light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
			POORLY GRADED SAND (SP) - coarse grained, light brown - alluvially sorted		dense	
			POORLY GRADED, SILTY SAND (SP-SM) - light brown	slightly moist		
					very dense	Ch
2081.00 / 5			**POORLY GRADED, SILTY GRAVEL (GP-GM)** - some sand, light brown - occasional alluvially sorted coarse sand lenses 2 to 10 inches thick			
			Bottom at 9 feet.			
2076.00 / 10						
2071.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-12

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 8

ELEVATION: Approx. 2085 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2085.00 / 0			**POORLY GRADED, SILTY GRAVEL (GP-GM)** - angular to subangular volcanic gravel and cobble size stone, 4 inch maximum size, mottled gray to pink stone with light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	G,A
			- occasional thin alluvially sorted	slightly moist		
			POORLY GRADED SAND (SP) lenses			
			- four sorted sand horizons in upper 6 feet		very dense	
2080.00 / 5						
			POORLY GRADED, SILTY SAND (SP-SM) - some gravel, partially cemented, light brown			
			Bottom at 10 feet.			
2075.00 / 10						
2070.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-13

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T- 9

ELEVATION: Approx. 2112 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
12.00 / 0			**POORLY GRADED, SILTY GRAVEL (GP-GM)** - coarse desert pavement with heavy desert varnish, some angular to subangular cobbles to 6 inch diameter, light brown matrix	dry to slightly moist	loose to medium dense	
			- poorly graded coarse sand old alluvial surface		medium dense	
			- some caving		dense	
				slightly moist		S
2107.00 / 5					very dense	
			- no caving, partially cemented			
			POORLY GRADED, SILTY SAND (SP-SM) - partially cemented, light reddish brown			
			Bottom at 9 feet.			
2102.00 / 10						
2097.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE A-14

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T-10

ELEVATION: Approx. 2130 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2130.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some cobbles and boulders up to 18 " diameter, light brown matrix, angular to subangular volcanic stone - alluvial sorting well defined in thin lenses of poorly graded sand	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	Ch
				slightly moist		
					very dense	
2125.00 / 5			- hole walls standing with little slumping.			
2120.00 / 10			Bottom at 10 feet.			
2115.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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APPROV: BY:

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE A-15

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T-11

ELEVATION: Approx. 2147 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2147.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some cobbles up to approximately 8" diameter, increasing vegetation ground cover, light brown matrix	dry to slightly moist	loose to medium dense	
			POORLY GRADED SAND (SP) - alluvially sorted lense		medium dense	
			POORLY GRADED SAND (SP) - alluvially sorted lense		dense	
			POORLY GRADED SAND (SP) - alluvially sorted lense .m=sp - some caving above 4 feet.	slightly moist		G,A
2142.00 / 5			**POORLY GRADED SAND (SP)** - alluvially sorted lense		very dense	
			POORLY GRADED SAND (SP) - alluvially sorted lense			
2137.00 / 10			Bottom at 10 feet.			
2132.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE A-16

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T-12

ELEVATION: Approx. 2166 feet
EQUIPMENT: Case 580 Backhoe

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2166.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some cobbles and boulders to 16" diameter, angular to subangular volcanic stone, light brown fine to coarse sand matrix - braided alluvial surface	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
				slightly moist		Perm.
			- alluvial sorting poorly defined		very dense	
2161.00 / 5	S					
2156.00 / 10			Bottom at 10 feet.			
2151.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-17

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T-13

ELEVATION: Approx. 2189 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2189.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - desert pavement surface, angular to subangular gravel and cobbles up to 6" diameter, volcanic stone, light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
			- very little caving, no cementation, tight interlocking		dense	S
				slightly moist		
			- alluvial sorting on 6" to 16" poorly defined intervals		very dense	
2184.00 / 5						
2179.00 / 10			Bottom at 10 feet.			
2174.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-18

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-14

ELEVATION: Approx. 2215 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2215.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some cobbles and boulders up to 20" diameter, surface cleared of vegetation by wild fire, surface detritus sorted by windrows to ridges of very coarse angular cobbles and boulders, and braided alluvial rills of coarse sand and fine gravel with very little fines, gray-brown to mottled pink-black volcanic stone with light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	Res
				slightly moist		
			- alluvial sorting in 3" to 12" layers		very dense	
2210.00 / 5						
2205.00 / 10			Bottom at 10 feet.			
2200.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. ; Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE A-19

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-15

ELEVATION: Approx. 2219 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2219.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** some boulders to 20" diameter, surface cleared of vegetation by wild fire, angular volcanic stone, light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			- less cobbles and boulders below 3 feet.	slightly moist		
					very dense	G,A
2214.00 / 5						
2209.00 / 10			Bottom at 10 feet.			
2204.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-20

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-16

ELEVATION: Approx. 2214 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
214.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)**	dry to slightly moist	loose to medium dense	
			- vegetation cover approximately 70 percent, (Creosote bush, White Bursage and Indian rice grass, some cobbles up to approximately 8" diameter, light brown		medium dense	
			- some weak to moderately hard cementation		dense	
			- alluvial sorting poorly defined	slightly moist		
			- angular to subangular volcanic stone		very dense	D1557, Ch
2209.00 / 5			- less cementation			
			Bottom at 8 feet.			
2204.00 / 10						
2199.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-21

DATED EXCAVATED: 11/5/93 **TRENCH NO. T-17** ELEVATION: Approx. 2235 feet
LOCATION: See Plate 2 EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
235.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - angular volcanic stone up to approximately 10" diameter, light brown	dry to slightly moist	loose to medium dense	
					medium dense	
			- alluvial sorting poorly defined		dense	
			- some weak cementation in upper 3 feet	slightly moist		S
2230.00 / 5			- three well defined alluvially sorted beds approximately 6" thick between 5 and 7 feet		very dense	
			Bottom at 8 feet. Backhoe refusal in very dense, partially cemented sand and small gravel.			
2225.00 / 10						
2220.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE A-22

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-18

ELEVATION: Approx. 2261 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
261.00 / 0			**POORLY GRADED, SILTY SAND (SM)** - some gravel and cobbles up to approximately 6" diameter, angular volcanic detritus, light brown matrix - alluvial sorting in thin lenses	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			- more coarse grained below 3 feet	slightly moist		
					very dense	Res
2256.00 / 5						
			Bottom at 8 feet.			
2251.00 / 10						
2246.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-23

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-19

ELEVATION: Approx. 2287 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2287.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel and cobbles, angular volcanic stone, light brown matrix - angular cobbles up to approximately 6" diameter	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			- occasional alluvially sorted lenses of coarse sand/fine gravel	slightly moist		
					very dense	
2282.00 / 5						G,A
2277.00 / 10			Bottom at 10 feet.			
2272.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE A-24

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-20

ELEVATION: Approx. 2303 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2303.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel and cobbles up to 6" diameter, light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			- occasional 4" alluvially sorted lenses	slightly moist		
					very dense	Ch
2298.00 / 5			- some fine roots to 6 feet.			
			- more coarse grained below 5 feet.			
2293.00 / 10			Bottom at 10 feet.			
2288.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-25

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-21

ELEVATION: Approx. 2320 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2320.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - angular gravel and cobbles up to 10" diameter, light brown matrix - alluvial volcanic stone detritus	dry to slightly moist	loose to medium dense	
					medium dense	
			- poorly defined alluvial sorting		dense	
				slightly moist		
2315.00 / 5	S				very dense	Perm.
			Bottom at 9 feet.			
2310.00 / 10						
2305.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-26

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-22

ELEVATION: Approx. 2342 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2342.00 / 0			**POORLY SORTED, SILTY SAND (SP-SM)** - coarse varnished desert pavement, some gravel and cobbles up to 6" diameter, alluvial volcanic stone, light brown matrix	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			- poorly defined alluvial sorting, little change in grading with depth	slightly moist		
					very dense	Ch
2337.00 / 5						
			Bottom at 9 feet.			
2332.00 / 10						
2327.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

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APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-27

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-23

ELEVATION: Approx. 2357 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
357.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel and cobbles to 6" diameter, light brown	dry to slightly moist	loose to medium dense	
					medium dense	
			WELL GRADED, SILTY SAND (SW-SM) - some gravel and cobbles, angular volcanic stone, light brown matrix		dense	
				slightly moist		
2352.00 / 5			- frequent lenses of well sorted coarse sand & line gravel with little or no fines		very dense	G,A
			Bottom at 8 feet.			
2347.00 / 10						
2342.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-28

DATED EXCAVATED: 11/5/93
LOCATION: See Plate 2

TRENCH NO. T-24

ELEVATION: Approx. 2375 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	+ SAMPLES	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2375.00 / 0			**WELL GRADED, SILTY SAND (SW-SM)** - heavily varnished desert pavement, old alluvial surface, some cobbles and boulders up to 20" diameter, light brown matrix - angular volcanic detritus	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			indistinct alluvial sorting	slightly moist		
					very dense	
2370.00 / 5			- partially cemented, hard digging			S
			Bottom at 9 feet.			
2365.00 / 10						
2360.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-29

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T-25

ELEVATION: Approx. 2085 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2085.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel and small cobbles up to 4" diameter, light brown matrix - angular to subangular volcanic detritus	dry to slightly moist	loose to medium dense	
					medium dense	
					dense	
			WELL GRADED, SILTY SAND (SW-SM) - light brown matrix	slightly moist		
					very dense	
2080.00 / 5			- poorly defined alluvial sorting			
			WELL GRADED, SILTY SAND (SW-SM)			G,A, Ch
			Bottom at 9 feet.			
2075.00 / 10						
2070.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-30

DATED EXCAVATED: 11/4/93
LOCATION: See Plate 2

TRENCH NO. T-26

ELEVATION: Approx. 2068 feet
EQUIPMENT: Case 580 Backhoe

ELEV. MSL / DEPTH IN FEET	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.	OTHER TESTS
2068.00 / 0			**POORLY GRADED, SILTY SAND (SP-SM)** - some gravel and cobbles up to 6" diameter, light brown to mottled pink-gray angular to subangular volcanic detritus - alluvial sorting poorly defined	dry to slightly moist	loose to medium dense	
					medium dense	
			WELL GRADED, SILTY SAND (SW-SM) - mottled pink-gray to light brown, some gravel and cobbles - some roots, little caving	slightly moist	dense	
2063.00 / 5			- thin alluvially well sorted lenses 1" to 4" thick at 6" to 20" intervals		very dense	
2058.00 / 10			Bottom at 10 feet.			
2053.00 / 15						

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R=R-Value, ASTM D1557=Compaction test

NOTES: Groundwater not encountered during trenching.

+SAMPLER TYPE: Drive Sample 2.625" I.D. Bulk

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

TRENCH LOG

PLATE
A-31

Date Completed: 11/8/93

Logged By:

Total Depth: 15.00 feet

Surface Conditions:

Groundwater: Groundwater not encountered during drilling.

Elevation	Depth, ft.	FIELD: Sample Type	FIELD: Blows/inches	FIELD: Moisture (wt.%)	FIELD: Dry Density (PCF)	TEST	SYMBOL	DESCRIPTION	Well Constr.
								Approximate Surface Elevation (ft): 2058	
								POORLY GRADED, SILTY SAND (SP-SM) - some gravel, occasional cobbles to approximately 5" diameter, light brown	
								- some alluvial sorting	
								- angular to subangular volcanic stone	
2053.0			35/12	3	120				
								- partially cemented coarse sand	
2048.0			50/4	4	132				
								- some gravel	
			50/8	4	116				
2043.0								Bottom at 15 feet.	

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PROJECT NO. 31-128834-001

LOG OF INFILTRATION TEST WELL
B- 5
Equestrian Detention Basin
Henderson, Nv.

PLATE
B-32

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THE UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			Group Symbols	TYPICAL NAMES
COARSE GRAINED SOIL — More than 50% of the material is LARGER than the No. 200 Sieve.	GRAVELS — More than 50% of coarse part is LARGER than the No. 4 Sieve.	CLEAN GRAVELS — Less than 5% finer than No. 200 Sieve.	GW	Well graded gravels, gravel - sand mixtures, little or no fines, Cu > 4 & 1 < Cc > 3
			GP	Poorly graded gravels or gravel - sand mixtures, little or no fines Cu < 4 or 1 > Cc < 3
		GRAVEL with fines — More than 12% Finer than No. 200 Sieve. PI < 4	GM	Silty gravels, gravel - sand - silt mixtures
		PI > 7	GC	Clayey gravels, gravel - sand - clay mixtures
	SANDS — More than 50 % of coarse part is SMALLER than the No. 4 Sieve.	CLEAN SANDS — Less than 5% Finer than No. 200 Sieve.	SW	Well graded sands, gravelly sands, little or no fines. Cu > 6& 1 < Cc > 3
			SP	Poorly graded sands or gravelly sands, little or no fines. Cu < 6 or 1 > Cc < 3
		SAND with fines — More than 12% Finer than No. 200 Sieve. PI < 5	SM	Silty sands, sand - silt mixtures
		PI > 7	SC	Clayey sands, sand - clay mixtures
FINE GRAINED SOIL — More than 50 % of the material is SMALLER than the No. 200 Sieve	SILTS & CLAYS — Liquid Limit LESS than 50	PI - Below A - Line	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with low plasticity
		PI - Above A - Line	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic clays of low plasticity
	SILTS & CLAYS — Liquid Limit GREATER than 50	PI - Below A - line	MH	Inorganic silts, Micaceous or diatomaceous fine sands or silty soils, elastic silts
		PI - Above A - Line	CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

CLAY	SILT	SAND			GRAVEL		COBBLES	BOULDERS
		Fine	Medium	Coarse	Fine	Coarse		

0.002 mm #200 #40 #10 #4 3/4" 3" 12"

U. S. Standard Sieve Size

Descriptive Terms Used With Soils

CONSISTANCY			Moisture Content	
	SILTS & CLAYS	SANDS & GRAVELS		
Strongest ↕ Weakest	Very Stiff Stiff Medium Stiff Soft	Very Dense Dense Medium Dense Loose	Wettest ↕ Driest	Wet Very Moist Moist Slightly Moist Dry

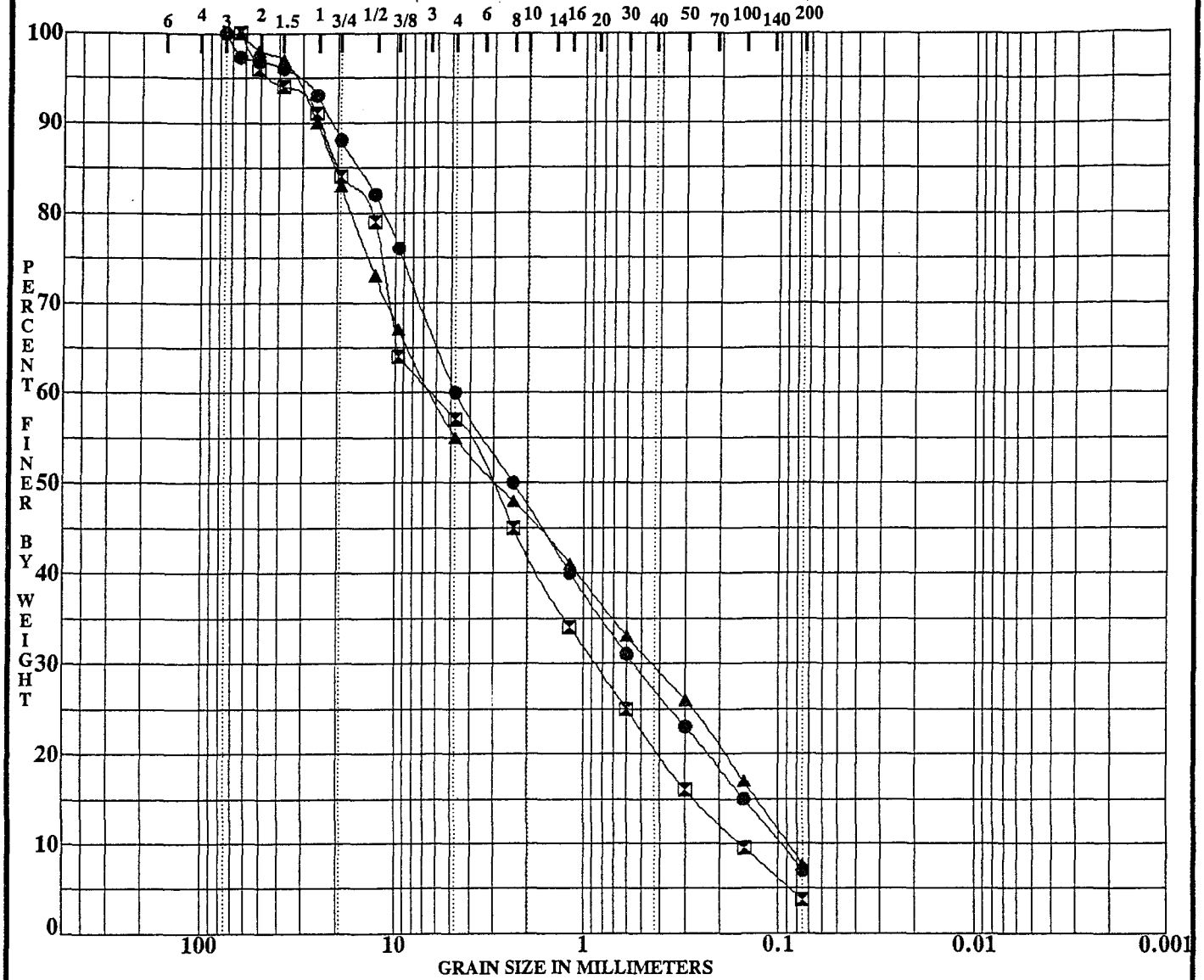
	CALICHE	Cemented Sand & Gravel	
Strongest ↕ Weakest	Very Hard	Very Hard	Difficult to scratch or break
	Hard	Hard	Scratches leave only dust, Requires many hammer blows to break
	Moderately Hard	Moderately Hard	Readily cut by knife, Crumbles with several hammer blows
	Partially cemented	Partially cemented	Gouges easily with knife, Crumbles readily with few hammer blows

KEY TO SOIL SYMBOLS AND TERMS

PROJECT : Equestrian Detention Basin

PROJECT NO: 31-128834-001

PLATE NO: A-33



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	T- 2	4.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.66	48.8
⊠	T- 4	3.0	POORLY GRADED SAND with GRAVEL (SP)	NP	NP	NP	0.75	40.5
▲	T- 6	4.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.35	70.9

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	T- 2	4.0	75.00	4.75	0.550	0.0973	40.0	53.0	7.0	
⊠	T- 4	3.0	63.50	6.40	0.874	0.1582	43.0	53.3	3.7	
▲	T- 6	4.0	63.50	6.35	0.446	0.0895	45.0	47.4	7.6	

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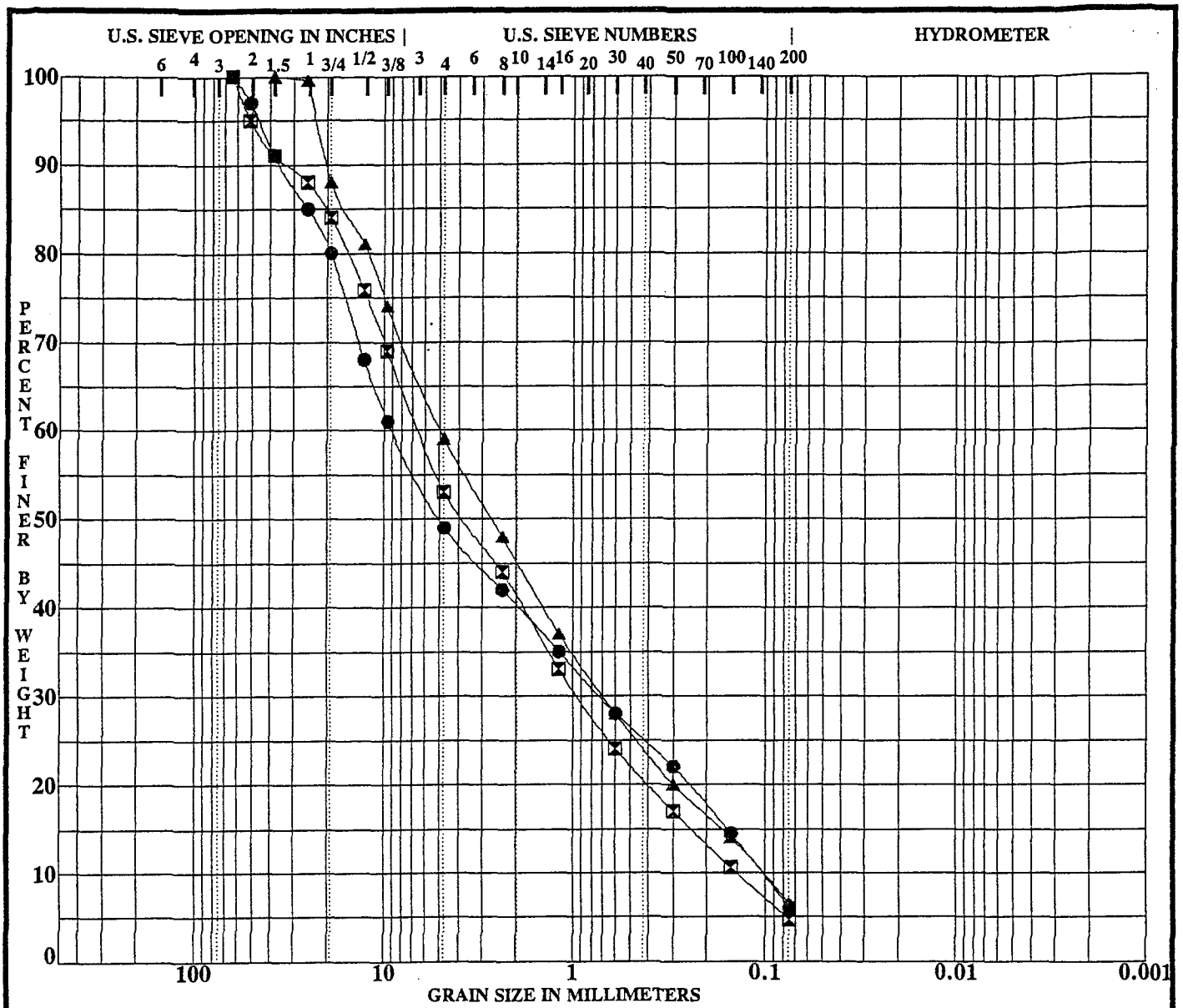
PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	T- 8	2.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	0.57	86.9
⊠	T-11	3.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.99	46.1
▲	T-15	4.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.94	48.0

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	T- 8	2.0	63.50	8.99	0.728	0.1035	51.0	42.9	6.1	
⊠	T-11	3.0	63.50	6.44	0.942	0.1398	47.0	48.3	4.7	
▲	T-15	4.0	38.10	4.98	0.697	0.1036	41.0	52.5	6.5	

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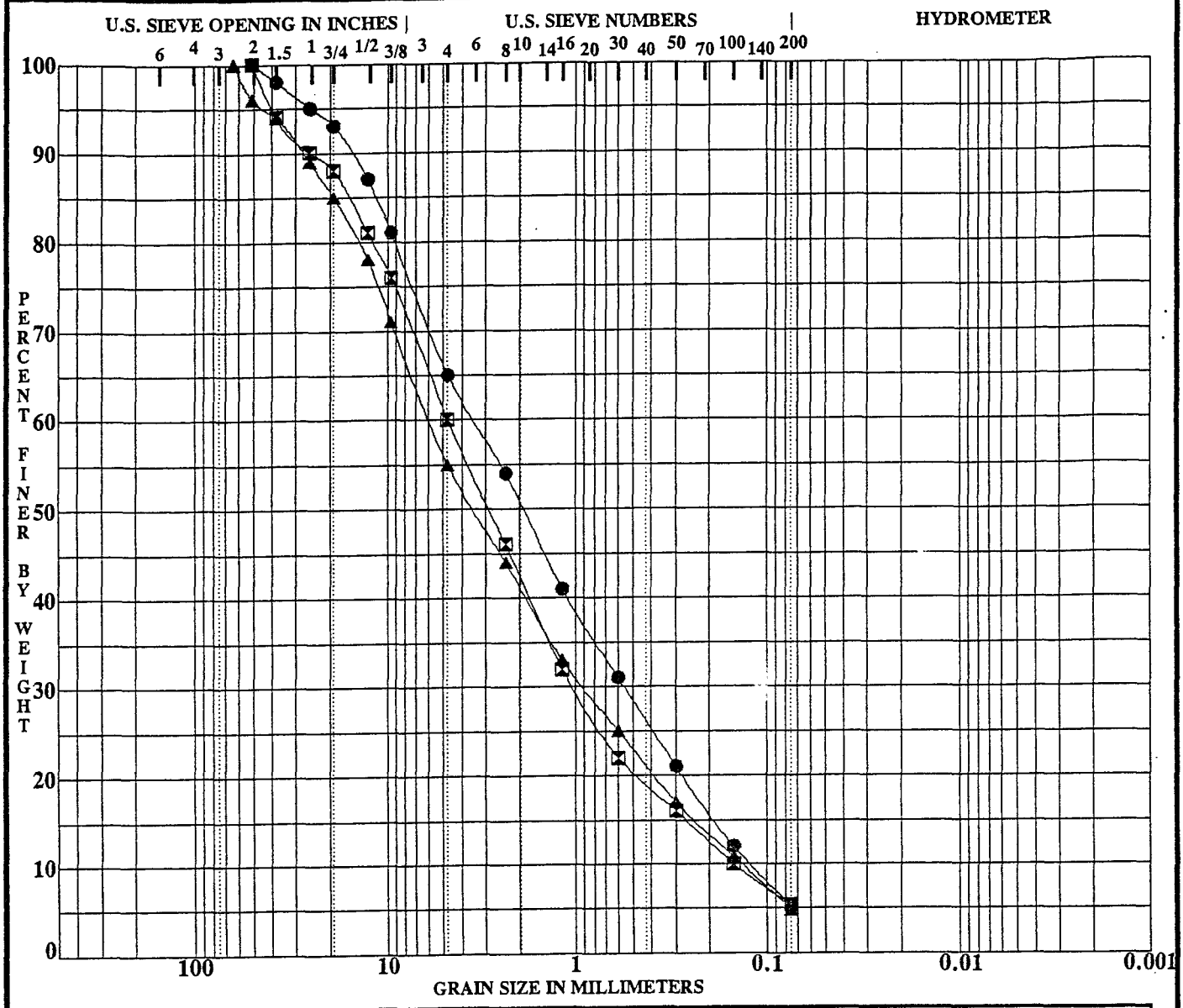
PROJECT: Equestrian Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	T-19	8.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.74	28.3
⊠	T-23	4.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.49	31.7
▲	T-25	6.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.04	43.2

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	T-19	8.0	50.80	3.46	0.560	0.1220	35.0	59.7	5.3	
⊠	T-23	4.0	50.80	4.75	1.031	0.1500	40.0	54.6	5.4	
▲	T-25	6.0	63.50	5.91	0.916	0.1365	45.0	50.1	4.9	

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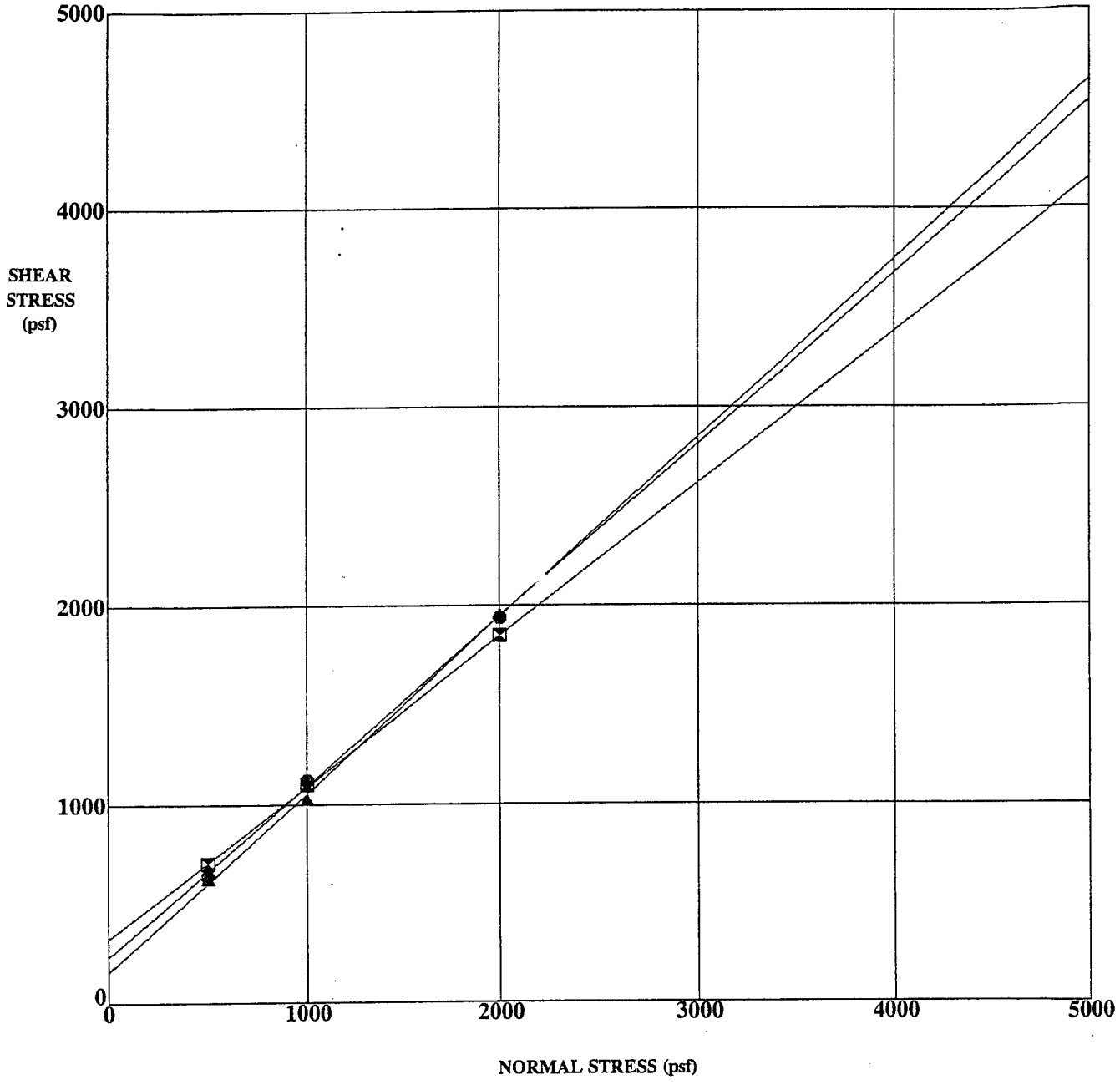
PROJECT: Equestrian Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-3



Exploration No.	Depth (ft.)	Soil Description	PHI Angle Degrees	Cohesion (psf)
● T- 1	2.0	POORLY GRADED, SILTY SAND (SP-SM) - remolded	41	230
⊠ T- 3	4.0	POORLY GRADED, SILTY SAND (SP-SM) - remolded	37	325
▲ T- 6	4.0	POORLY GRADED, SILTY SAND (SP-SM) - remolded	42	157

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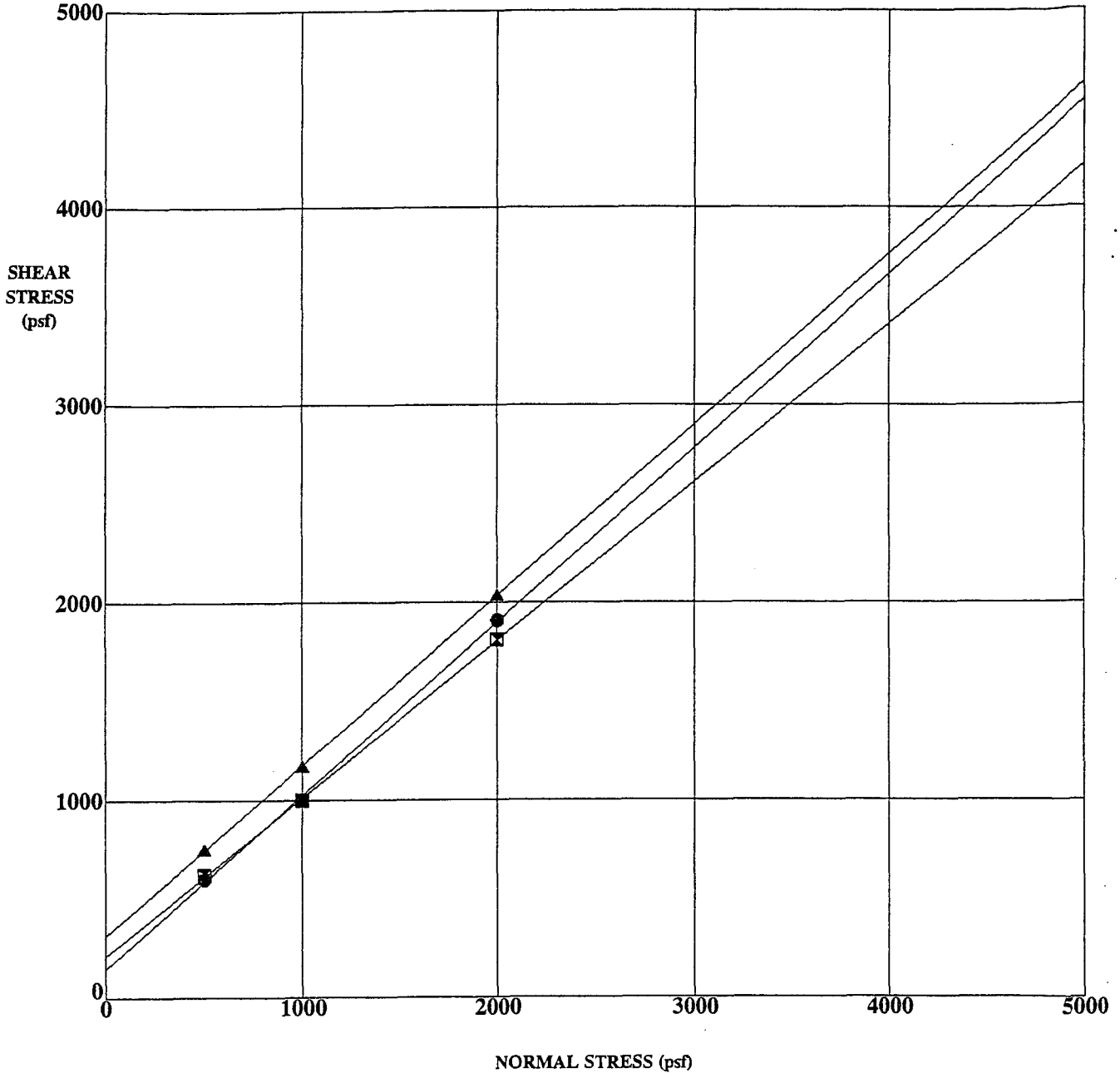
PROJECT: Equestrian Detention Basin

DIRECT SHEAR TEST RESULTS

PLATE

B-4



Exploration No.	Depth (ft.)	Soil Description	PHI Angle Degrees	Cohesion (psf)
● T- 9	3.0	POORLY GRADED, SILTY SAND (SP-SM) - remolded	41	145
⊠ T-13	2.0	POORLY GRADED, SILTY SAND (SP-SM) - remolded	39	213
▲ T-17	3.0	POORLY GRADED, SILTY SAND (SP-SM) - remolded	41	315

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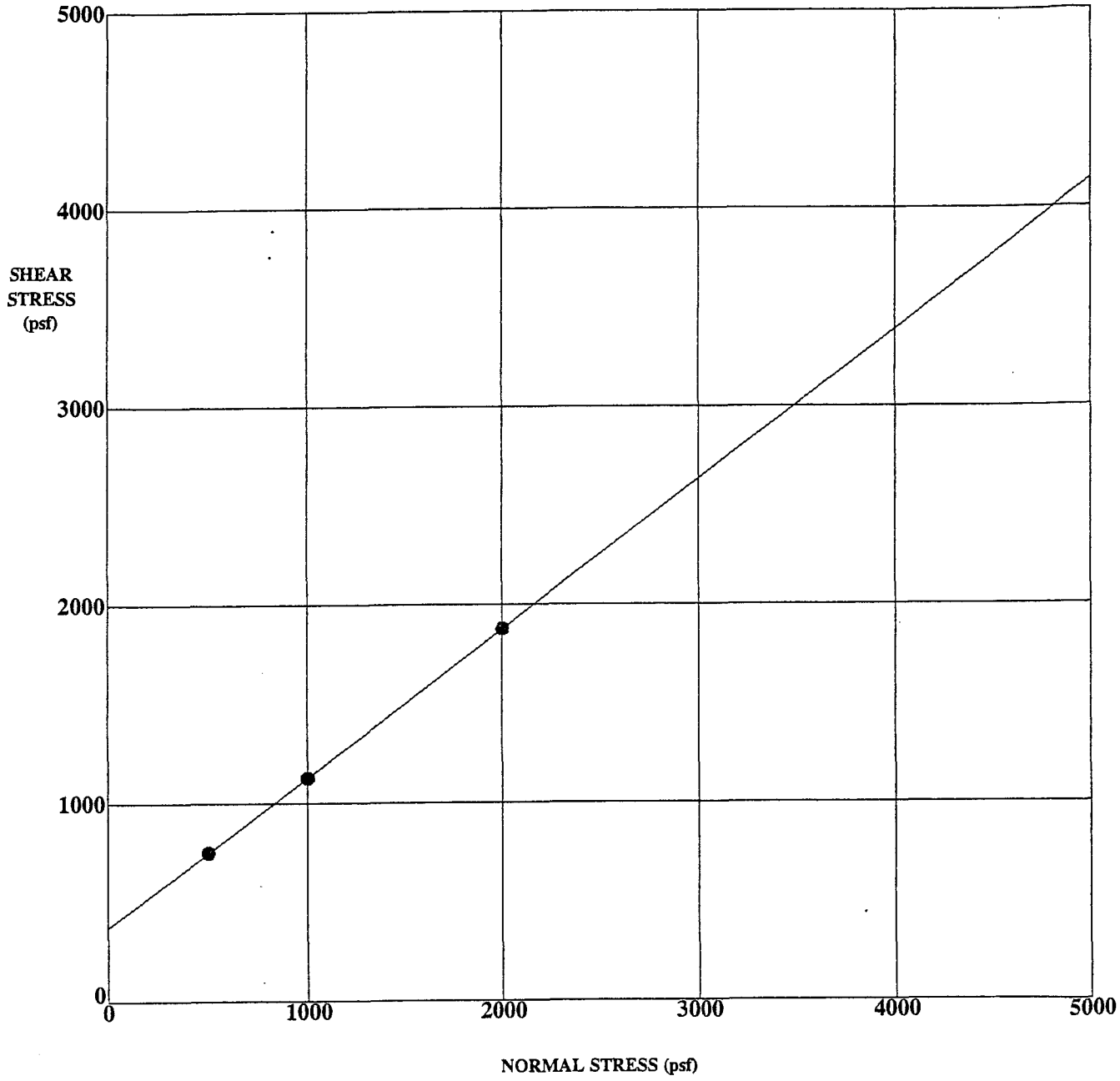
PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

DIRECT SHEAR TEST RESULTS

PLATE

B-5



Exploration No.	Depth (ft.)	Soil Description	PHI Angle Degrees	Cohesion (psf)
● T-24	5.0	POORLY GRADED, SILTY SAND (SP-SM) - remolded	37	373

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

DIRECT SHEAR TEST RESULTS

PLATE
B-6

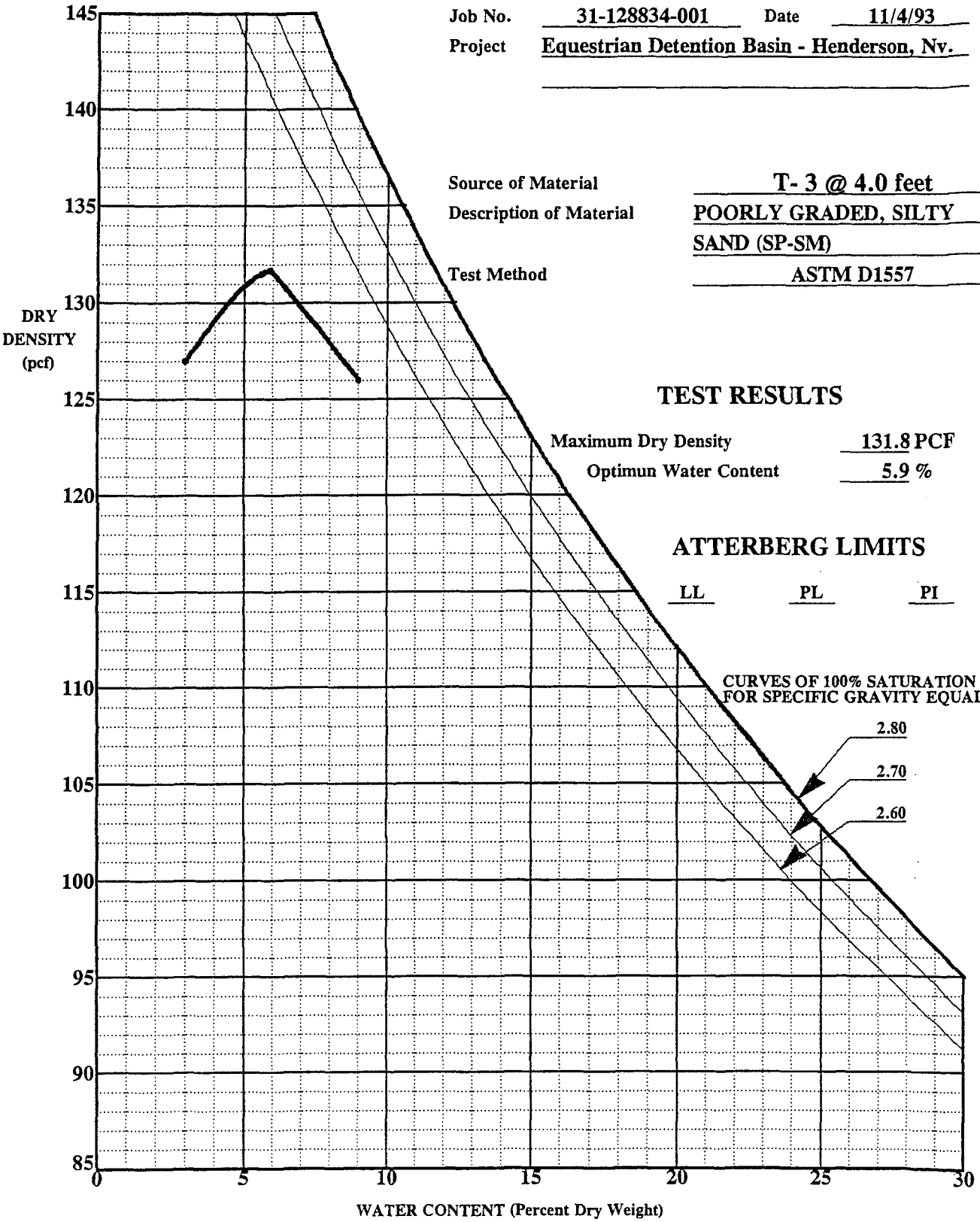
Job No. 31-128834-001 Date 11/4/93

Project Equestrian Detention Basin - Henderson, Nv.

Source of Material T- 3 @ 4.0 feet

Description of Material POORLY GRADED, SILTY SAND (SP-SM)

Test Method ASTM D1557



TEST RESULTS

Maximum Dry Density 131.8 PCF

Optimun Water Content 5.9 %

ATTERBERG LIMITS

LL PL PI

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PROJECT: Equestrian Detention Basin

MOISTURE-DENSITY RELATIONSHIP

PLATE B-7

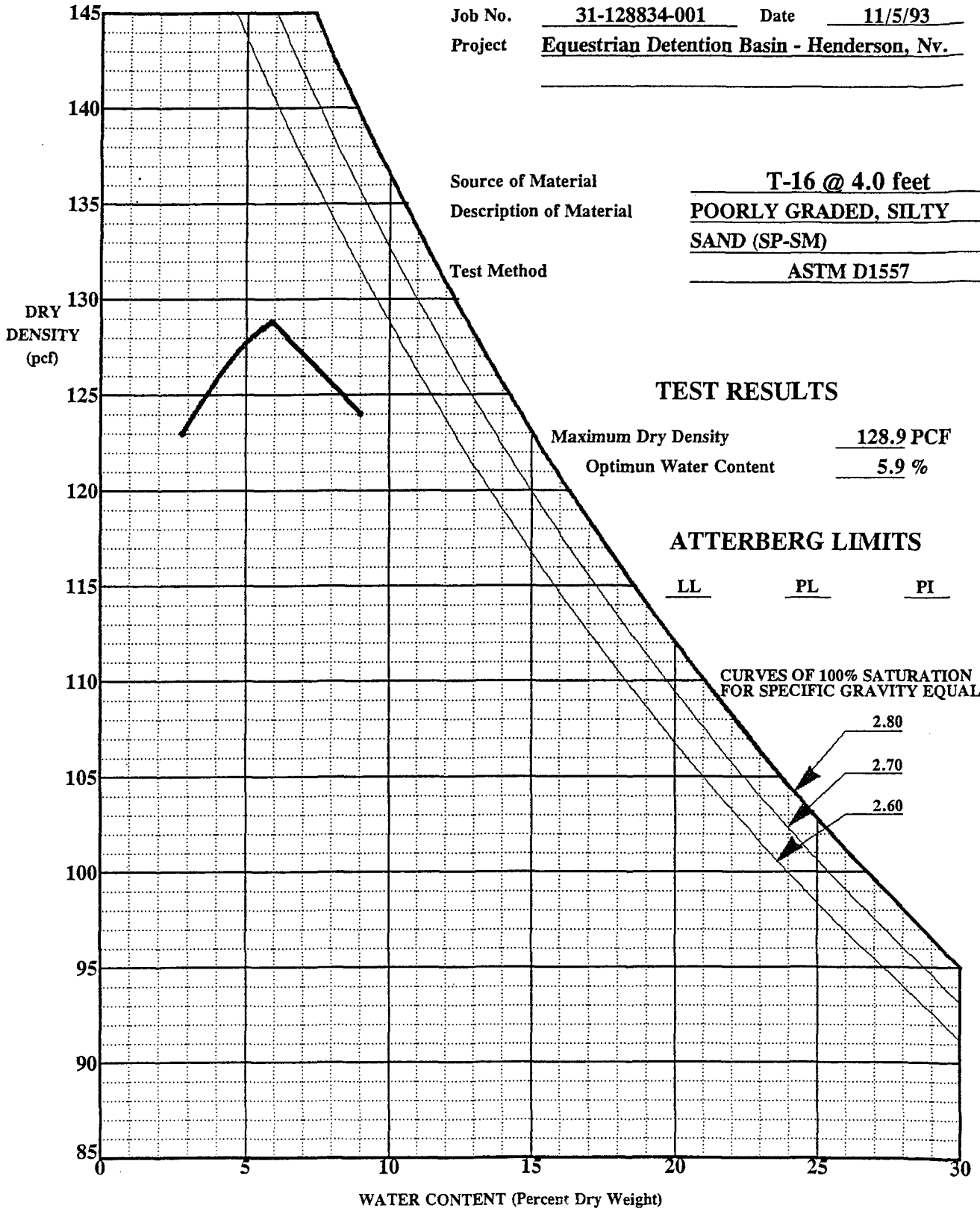
Job No. 31-128834-001 Date 11/5/93

Project Equestrian Detention Basin - Henderson, Nv.

Source of Material T-16 @ 4.0 feet

Description of Material POORLY GRADED, SILTY SAND (SP-SM)

Test Method ASTM D1557



TEST RESULTS

Maximum Dry Density 128.9 PCF

Optimun Water Content 5.9 %

ATTERBERG LIMITS

LL PL PI

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

MOISTURE-DENSITY RELATIONSHIP

PLATE B-8

Table No. : 1

PERMEABILITY TEST RESULTS

Project : Equestrian Detention Basin, Henderson, Nv.

Exploration Point	Sample Depth (ft.)	SOIL DESCRIPTION	Permeability K (cm/sec)	Moist. (%)	Density (PCF)	Sat. %	Test Head (mm)
T- 5	2.00	POORLY GRADED, SILTY SAND (SP-SM)	4.8E-5	16.5	113	98	1343
T-12	3.00	POORLY GRADED, SILTY SAND (SP-SM)	5.7E-5	15.8	115	100	1428
T-21	4.00	POORLY GRADED, SILTY SAND (SP-SM)	4.3E-5	17.7	111	99	1436

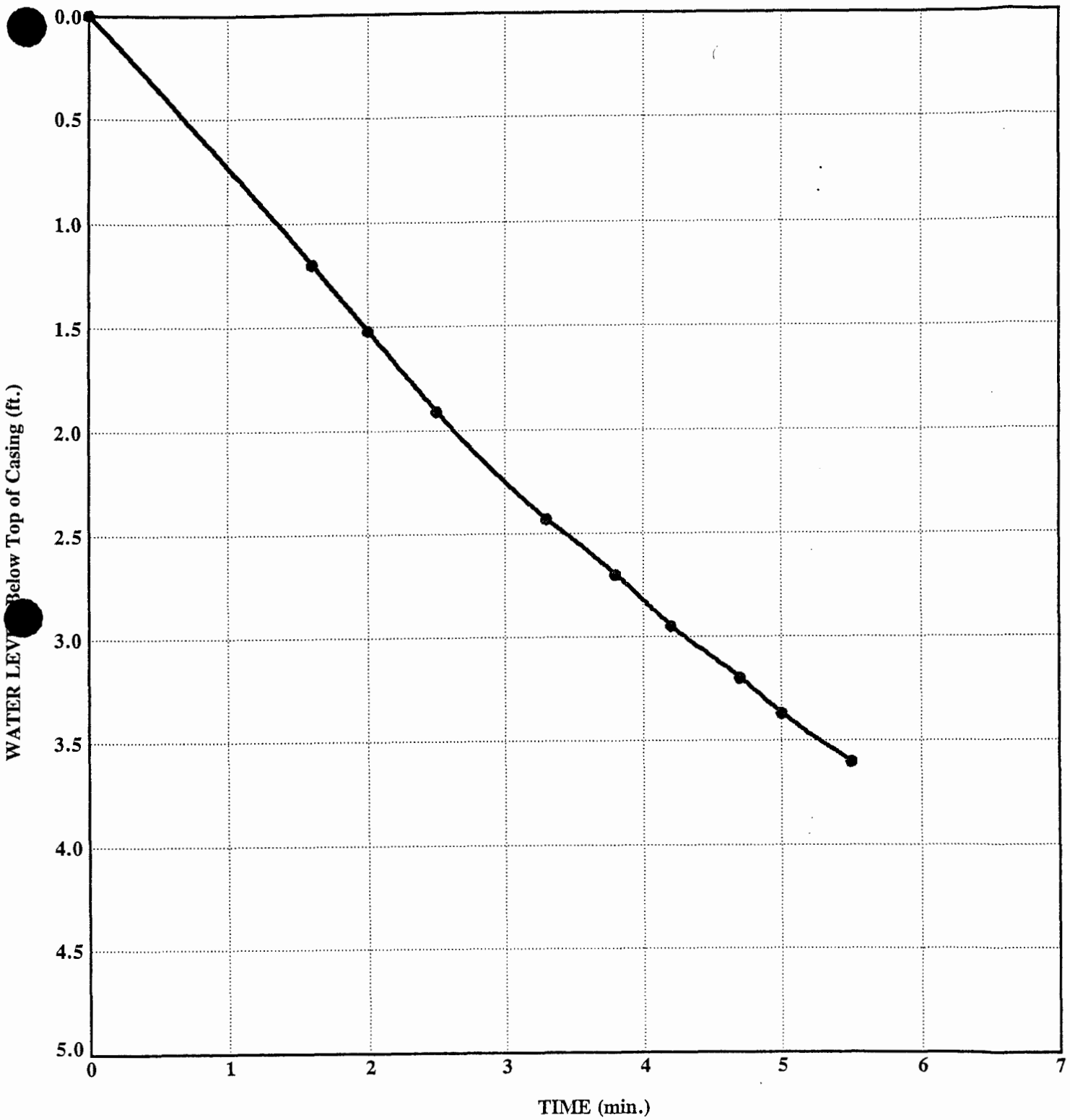
Table No. : 2

RESISTIVITY TEST RESULTS

Project : **Equestrian Detention Basin**

Exploration Point	Sample Depth (ft.)	SOIL DESCRIPTION	RESISTIVITY Nat. Moisture ohm-cm	RESISTIVITY Saturated ohm-cm
T-14	2.0	SILTY SAND (SP-SM)	583000	13970
T-18	4.0	SILTY SAND (SP-SM)	2499250	10350

BORING No. B- 5



Starting time and date: Nov. 9, 1993, 2:10 pm

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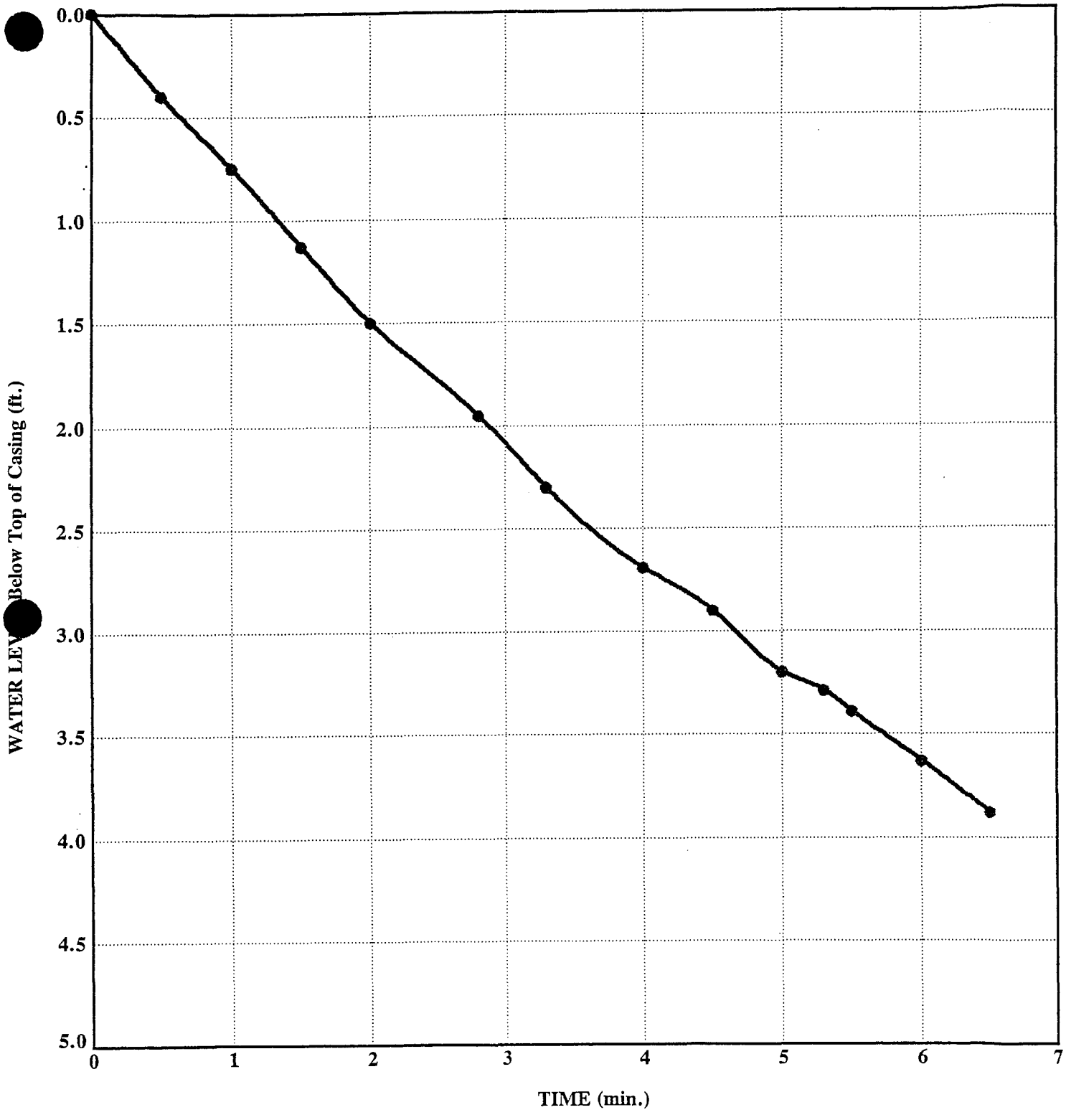
PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

FIELD INFILTRATION TEST RESULTS

PLATE
B-11

BORING No. B- 5



Starting time and date: Nov. 9, 1993, 2:16 pm

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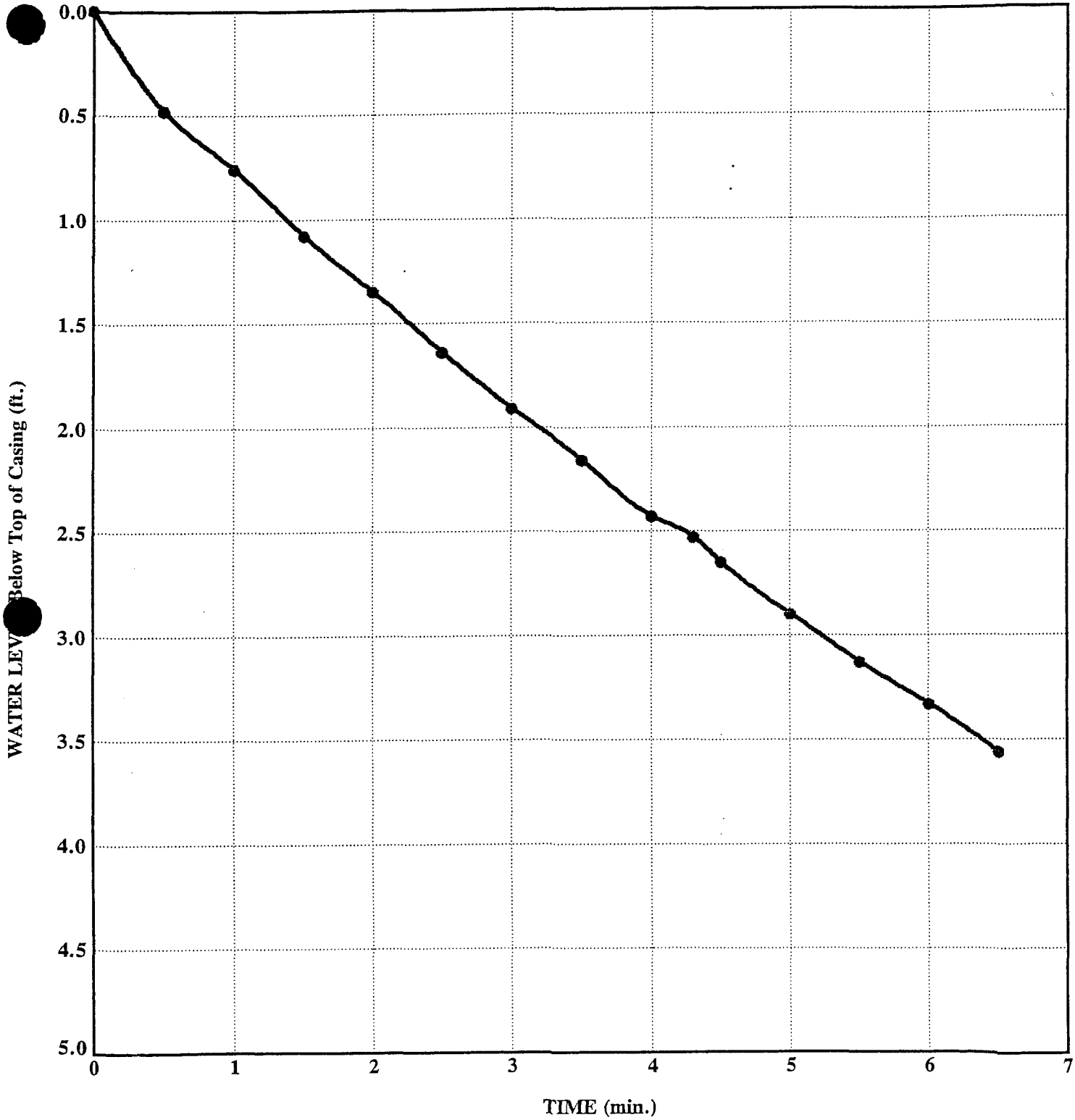
PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

FIELD INFILTRATION TEST RESULTS

PLATE
B-12

BORING No. B- 5



Starting time and date: Nov. 9, 1993, 3:05 pm

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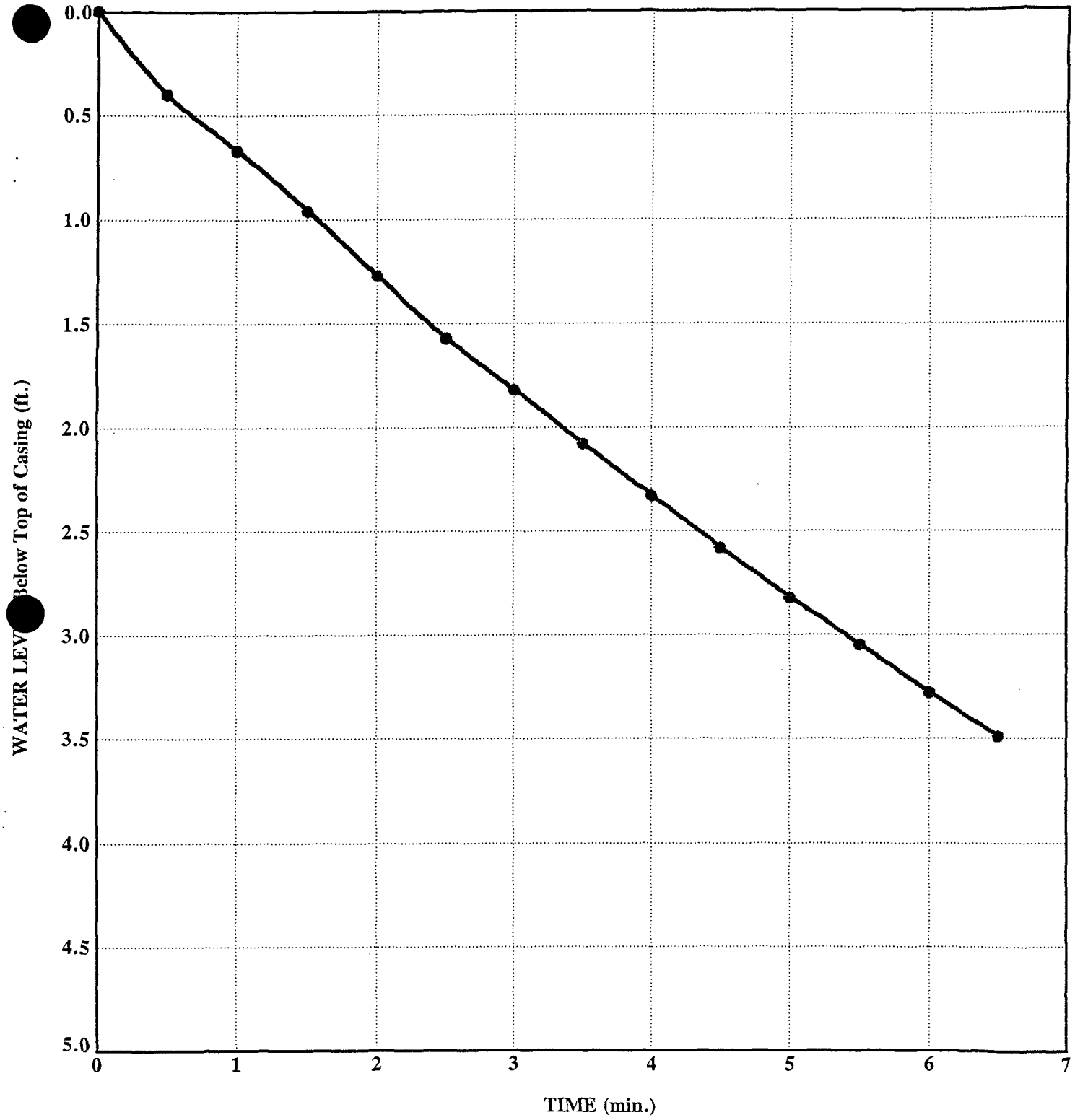
PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

FIELD INFILTRATION TEST RESULTS

PLATE
B-13

BORING No. B- 5



Starting time and date: Nov. 9, 1993, 3:13 pm

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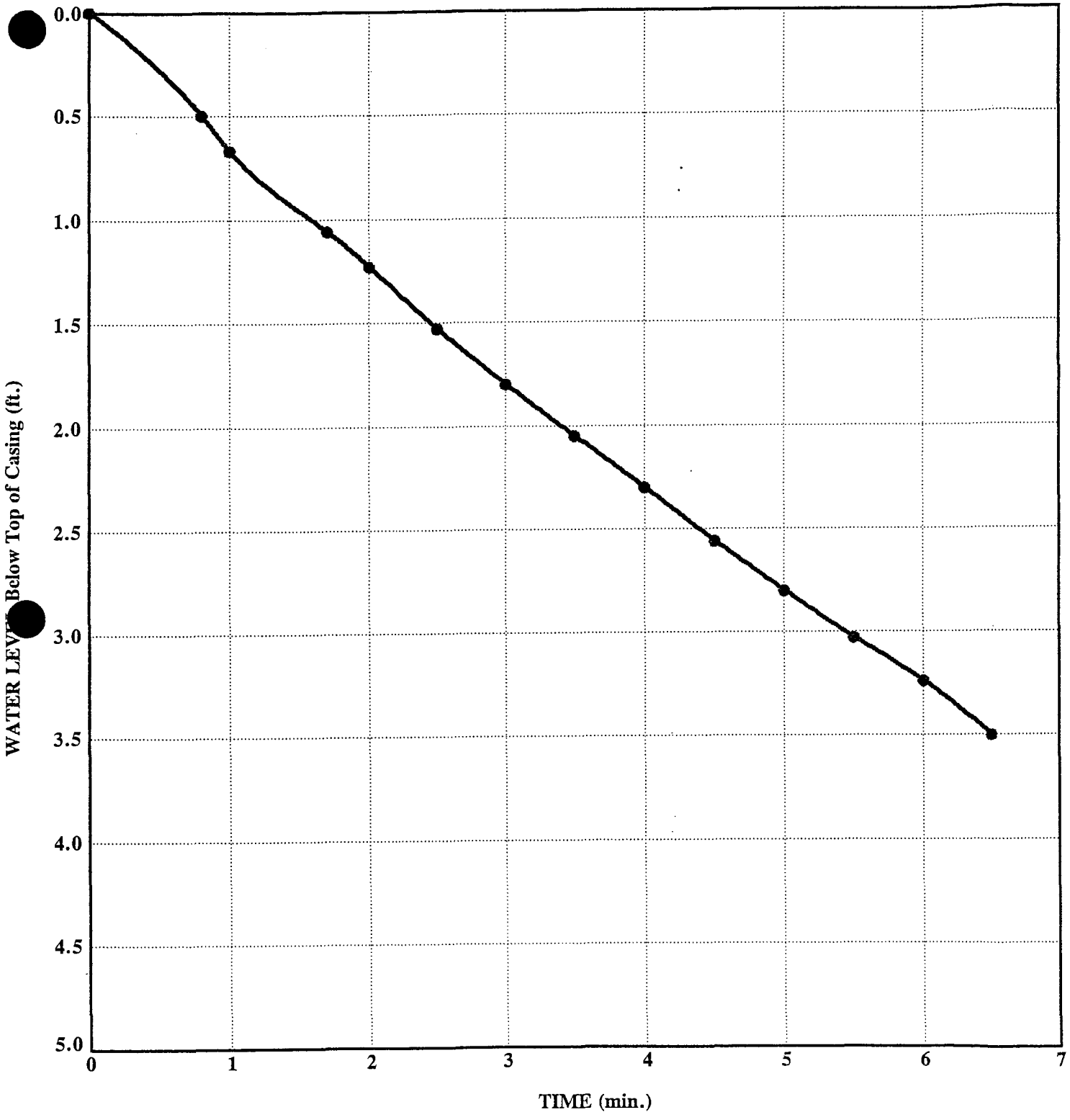
PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

FIELD INFILTRATION TEST RESULTS

PLATE
B-14

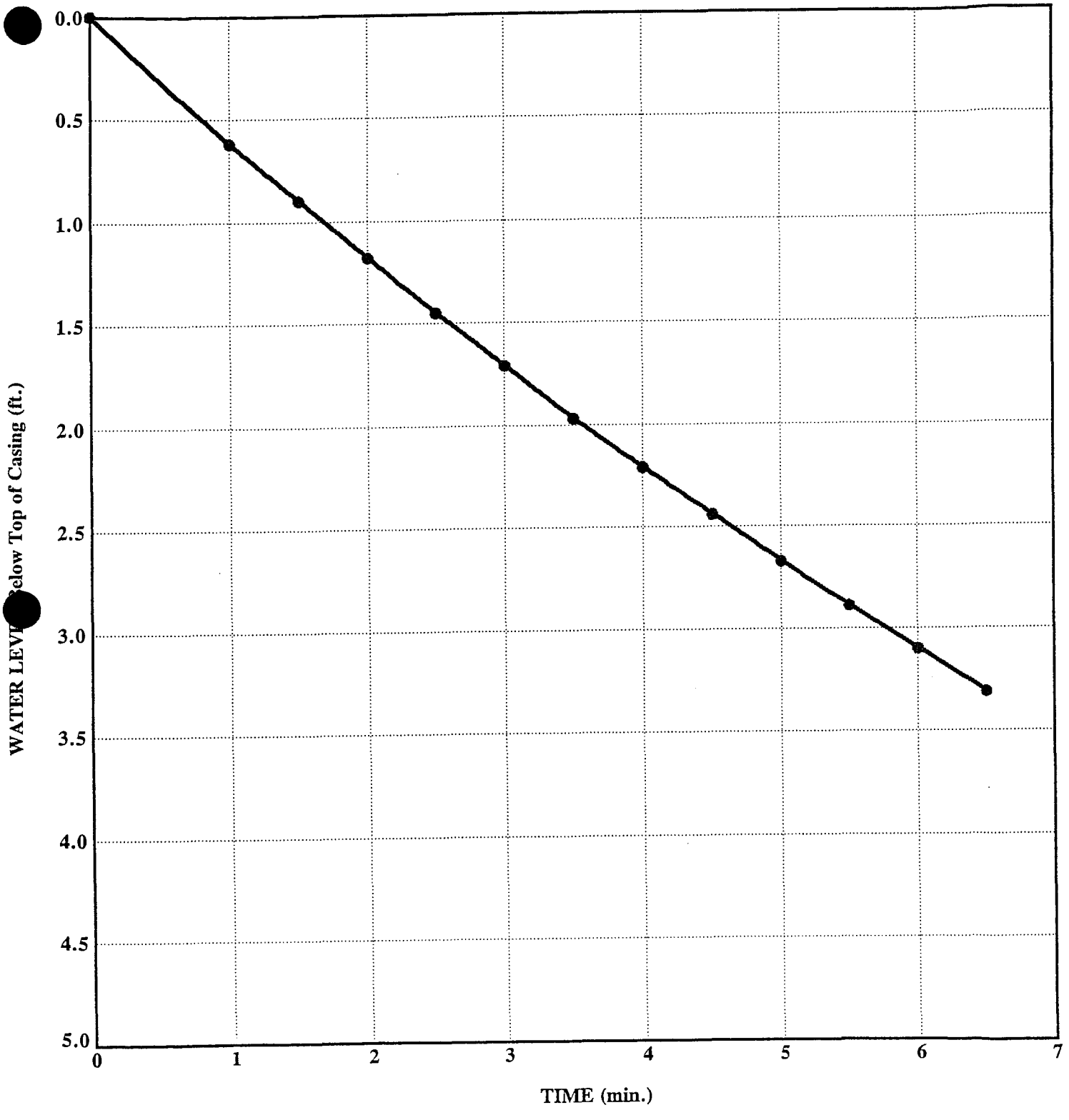
BORING No. B- 5



Starting time and date: Nov. 9, 1993, 3:21 pm

KLEINFELDER GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS SOILS AND MATERIALS TESTING PROJECT NO. 31-128834-001	PROJECT: Equestrian Detention Basin FIELD INFILTRATION TEST RESULTS	PLATE B-15

BORING No. B- 5



Starting time and date: Nov. 9, 1993, 4:03 pm

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SOILS AND MATERIALS TESTING

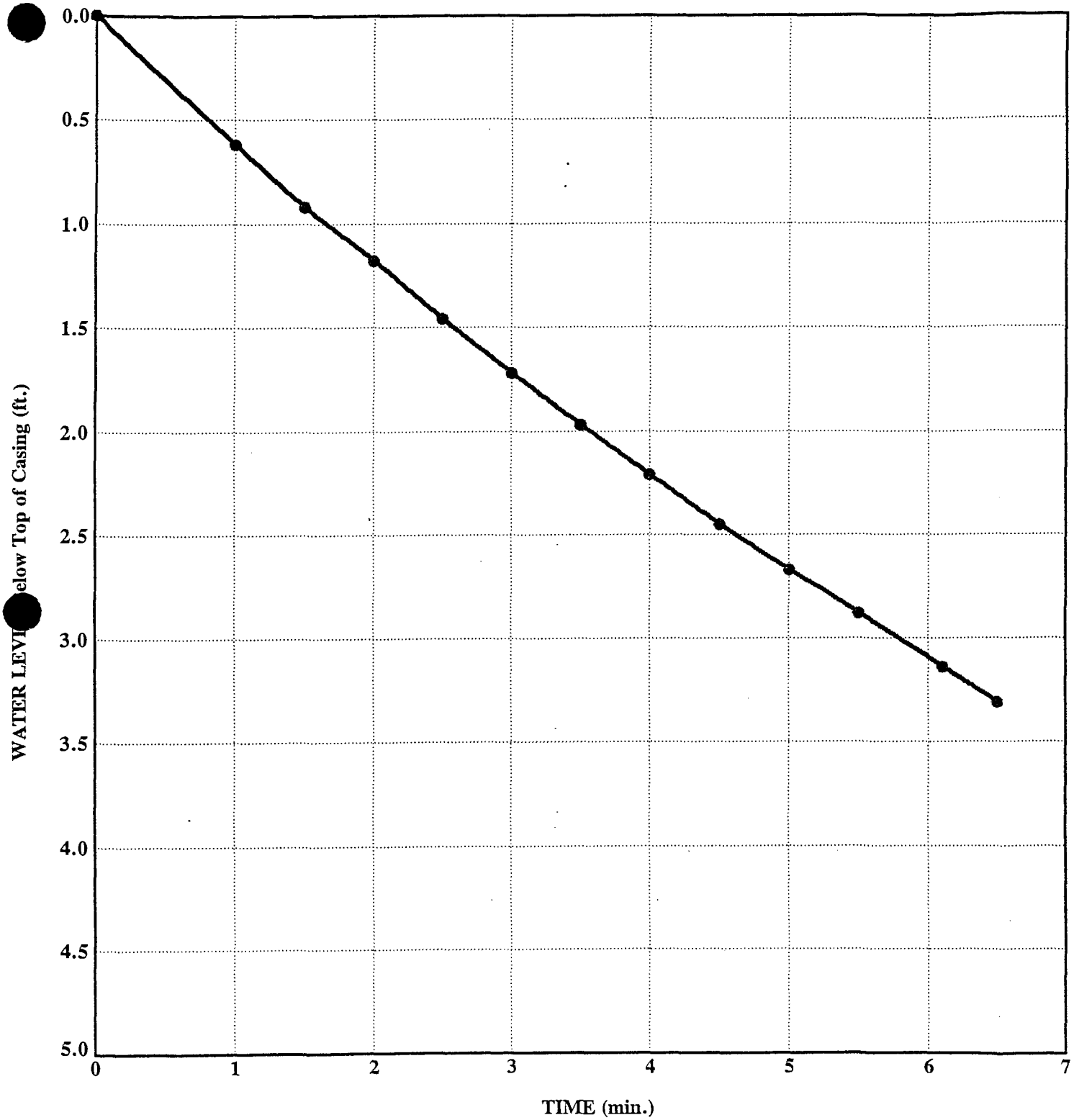
PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

FIELD INFILTRATION TEST RESULTS

PLATE
B-16

BORING No. B- 5



Starting time and date: Nov. 9, 1993, 4:10 pm

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PROJECT NO. 31-128834-001

PROJECT: Equestrian Detention Basin

FIELD INFILTRATION TEST RESULTS

PLATE
B-17

Atlas Chemical Testing Laboratories

2120 Western Avenue, Suite C-6 • Las Vegas, Nevada 89102
(702) 383-1199 • Fax (702) 383-4983

CHEMICAL
PHYSICAL
FORENSIC

member of
AMERICAN SOCIETY FOR
TESTING MATERIALS

LABORATORY NO: 5810(b) DATE: November 10, 1993

SAMPLE: Soil

MARKED: 31-128834

DATE RECEIVED: 11/9/93

SUBMITTED BY: Kleinfelder, Inc.
6850 South Paradise Rd.
Las Vegas, NV 89119

REPORT OF DETERMINATION

BORING NUMBER	T-1	T-4	T-7	T-10	T-16	T-20
DEPTH (feet)	2	4	4	2	4	4
pH VALUE	8.64	9.20	9.32	9.23	9.59	9.16
RED-OX (MV)	+454	+440	+442	+446	+431	+442
SULFATE (ppm)	75	25	10	25	100	25
SULFIDE (ppm)	Nil	Nil	Nil	Nil	Nil	Nil
TOTAL SALTS (ppm)	447	66	80	50	168	60
CHLORIDE (ppm)	80	10	10	5	15	10

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Robert L. Summers
Analytical Chemist

NOTES: 1. The soil water extract ratio was 5:1, therefore, to convert a solution ppm (or mg/l) to a soil ppm (or mg/kg) for this extract ratio multiply by five(5). To convert soil ppm to a weight percent divide by ten thousand(10,000).

2. The standard methods used for the determination above are the glass electrode/silver-silver chloride, ASTM D 1498, Turbidimetric/Std. Meth. 426C, Methylene Blue/Std. Meth. 427C, Electrical Conductivity, factor empirically determined/Std. Meth. 205 and Argentometric/Std. Meth. 407A respectively.

Atlas Chemical Testing Laboratories

2120 Western Avenue, Suite C-6 • Las Vegas, Nevada 89102
(702) 383-1199 • Fax (702) 383-4983

CHEMICAL
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AMERICAN SOCIETY FOR
TESTING MATERIALS

LABORATORY NO: 5810(b) - Continued DATE: November 10, 1993

SAMPLE: Soil

MARKED: 31-128834

DATE RECEIVED: 11/9/93

SUBMITTED BY: Kleinfelder, Inc.
6850 South Paradise Rd.
Las Vegas, NV 89119

REPORT OF DETERMINATION

BORING NUMBER	T-22	T-25				
DEPTH (feet)	4	6				
pH VALUE	8.72	8.74				
RED-OX (MV)	+457	+456				
SULFATE (ppm)	160	100				
SULFIDE (ppm)	Nil	Nil				
TOTAL SALTS (ppm)	248	186				
CHLORIDE (ppm)	15	15				

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Robert L. Summers
Analytical Chemist

NOTES: 1. The soil water extract ratio was 5:1, therefore, to convert a solution ppm (or mg/l) to a soil ppm (or mg/kg) for this extract ratio multiply by five(5). To convert soil ppm to a weight percent divide by ten thousand(10,000).

2. The standard methods used for the determination above are the glass electrode/silver-silver chloride, ASTM D 1498, Turbidimetric/Std. Meth. 426C, Methylene Blue/Std. Meth. 427C, Electrical Conductivity, factor empirically determined/Std. Meth. 205 and Argentometric/Std. Meth. 407A respectively.

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DEPTH (feet)	2	4	4	2	4	4
pH VALUE	8.64	9.20	9.32	9.23	9.59	9.16
RED-OX (MV)	+454	+440	+442	+446	+431	+442
SULFATE (ppm)	75	25	10	25	100	25
SULFIDE (ppm)	Nil	Nil	Nil	Nil	Nil	Nil
TOTAL SALTS (ppm)	447	66	80	50	168	60
CHLORIDE (ppm)	80	10	10	5	15	10

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Robert L. Summers
Analytical Chemist

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Respectfully submitted,
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IMPORTANT INFORMATION
ABOUT YOUR
GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include: the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots, and underground utilities; and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership, or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their geotechnical consultants through the construction stage,* to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly-changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

BORING LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final boring logs customarily are included in geotechnical engineering reports. *These logs should not under any circumstances be redrawn* for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, *give contractors ready access to the complete geotechnical engineering report* prepared or authorized for their use. Those who do not provide such access may proceed under the *mistaken* impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical consultants. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are *not* exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather, they are definitive clauses which identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report, and you are encouraged to read them closely. Your geotechnical engineer will be pleased to give full and frank answers to your questions.

OTHER STEPS YOU CAN TAKE TO REDUCE RISK

Your consulting geotechnical engineer will be pleased to discuss other techniques which can be employed to mitigate risk. In addition, ASFE has developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

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APPENDIX L

APPENDIX L

LEVEE CONSTRUCTION

SPECIFICATIONS

SECTION 203

EXCAVATION AND EMBANKMENT

DESCRIPTION

203.01.01 GENERAL

Add the following paragraph:

All mineral resources (including all soil) that are within Bureau of Land Management (BLM) parcels are owned by the BLM and shall be disposed of in accordance with BLM requirements and shall not become the property of the contractor unless the contractor acquires them in accordance with BLM procedures.

This work shall consist of grading and excavating within the slope lines of the berm embankment. Exceptions are structure excavation, or other separately designated pay items of work which are made a part of the contract. All work shall be in conformity with the alignment, grades, and cross sections shown on the plans or established by the ENGINEER.

203.01.02 GRADE TOLERANCE

(1) The actual grade shall not vary more than zero (0) inches below or two (2) inches above the grade shown on the plans or established by the ENGINEER for all completed berm.

(2) The actual thickness of the berm lining shall not vary more than 0.15 feet from the specified thickness. The actual thickness of the drain blanket shall not vary more than the specified thickness of the drain blanket minus zero (0) inches to plus two (2) inches.

MATERIALS

203.02.01 FILL FOR THE BERM EMBANKMENTS

A. Material

The fill for the berm core at the Basin and Foothill Channel Embankment shall consist of selected on-site soil from the excavation or approved imported soils that shall include poorly graded or well graded sand or silty sand with gravel or well graded sand with silt and gravel or properly sized fragments of partially cemented sand and gravel. The percent passing No. 4 sieve, i.e., the sand and silt size fraction, shall be between 45 and 90. The percent passing No. 200 Sieve, i.e., the silt size fraction, shall be between 0 and 30 percent.

All materials placed in fills shall be free from particles larger than 8 inches in size, vegetation, debris, and other delirious materials.

The soils shall be low plasticity and free of leaves, grass, roots, logs, stumps, brush or other

organic materials and shall conform to the following requirements: 1) soils with less than 2% solubility, 2) soils which have a clay swell less than 8%, and 3) soils which have less than 1% sulfates.

The berm lining shall consist of a two (2) foot thick blanket on the upstream slope as noted on the drawings. The materials used for the berm lining shall meet the following gradation requirements:

Sieve Sizes	Percent of Weight Passing
4"	100
3"	75-100
1"	50-80
No. 4	20-50
No. 200	0-20

The soils shall be low plasticity and free of leaves, grass, roots, logs, stumps, brush or other organic materials and shall conform to the following requirements: 1) soils with less than 2% solubility, 2) soils which have a clay swell less than 8%, and 3) soils which have less than 1% sulfates.

B. Placement and Compaction: The fill for the berm core shall be constructed in layers. The placement of the fill for the berm core shall begin at the lowest point of fill, unless otherwise approved by the ENGINEER. Individual layers shall be spread evenly to uniform thickness throughout and approximately horizontal. If the soil is placed against slopes that are steeper than 5:1 (5 horizontal to 1 vertical) the fill shall be benched into component material. The height of the benches shall not exceed 2 feet. The thickness of the layer shall be as necessary to secure the required compaction with an 8 inch maximum thickness before compaction, unless otherwise approved by the ENGINEER. All fill for the berm core shall be compacted to 90% relative density per ASTM D1557.

The fill shall be moisture-conditioned to obtain a soil moisture content at or above optimum moisture content and within 3 percent of optimum moisture content. The specified compaction shall be accomplished by mechanical means that has been approved by the ENGINEER. Each layer shall be compacted to the required density before placing the succeeding layer. If any portion of the compacted fill does not meet or exceed the required density during the construction of the dam, the contractor shall immediately make all necessary adjustments to insure that all of the berm core material will comply with the specified density. This shall include any compacted material that has become saturated and swelled or for any other reason does meet or exceed the required density at or before the time of completion of the berm.

Hauling and leveling equipment shall be routed and distributed over the full width of each layer in such a manner as to uniformly distribute the compaction afforded thereby. The approved compaction equipment shall work continuously with the hauling and grading equipment so that the major compacting effort on all portions of the berm is done by the approved compaction equipment.

The berm lining shall be compacted to 95% relative density per ASTM D1557. The berm lining and does not need to be benched into the berm core.

C. Drainage

The CONTRACTOR shall protect the fill materials from saturation and erosion during all phases of the construction.

D. Testing

Testing of the material in the berm shall be done in accordance with Subsection 111.03, "Field Density".

CONSTRUCTION

203.03.02 UNSUITABLE MATERIAL

Add the following paragraph:

Excavated materials which do not conform to the following requirements shall also be considered to be unsuitable materials: 1) soils with greater than 3% solubility, 2) soils which have a clay swell greater than 4%, and 3) soils which have greater than 0.2% sulfates.

203.03.03 ADDITIONAL EXCAVATION AND BACKFILL

Add the following subsection:

Where excavation to the required depth, as shown on the plans or as required by the specifications, encounters unsuitable material, or uncompacted fill (fill material that is not compacted to 90% relative density for fine grain material and 95% relative density for coarse grain material as determined by the engineer will be considered uncompacted fill) the CONTRACTOR shall remove the unsuitable materials or uncompacted fill and backfill to the finished graded section with material approved by the ENGINEER. The CONTRACTOR shall conduct operations in such a way that the necessary cross sectional measurements can be taken before the backfill is placed. This item is applicable to all excavation.

203.03.04 HAUL (EXCESS MATERIAL)

Insert the following section for an additive-deductive item:

Excess material not incorporporated into the project as surplus material and as directed by the ENGINEER, shall be removed from the project to a site designated by the City of Henderson.

METHOD OF MEASUREMENT

203.04.01 MEASUREMENT

Measurement for payment of the various items of excavation and embankment, will be measured by the cubic yard in the original space occupied and the volume of material removed and placed will be computed in cubic yards by the average end area method. final volumes are derived from the lines, grades, slopes and thicknesses shown on the plans. The CONTRACTOR may submit revisions to the contract quantities. The revised quantities must be accompanied by surveying notes and calculation sheets showing how the revised quantities were determined. The calculations shall be made using the average end area method or other acceptable methods as determined by the ENGINEER. If upon verification by the ENGINEER, it is determined that the actual in place quantities do not exceed the contract quantities, the CONTRACTOR shall be liable for the expense incurred by the ENGINEER in verifying the quantities and the cost will be deducted from the subsequent payment to the CONTRACTOR. No allowance will be made in measurement for payment of settlement, shrinkage, or consolidation of the foundation or embankment material. No allowance will be made for scarified and recompacted material in this item.

When changes are made during construction such as widening cuts, changing grades, disposing of unsuitable material, and other changes resulting in increases or decreases in quantities, then additional measurements for payment will be made by the ENGINEER as hereinafter outlined:

a. Unsuitable Material - When the removal and disposal of unsuitable material is shown in the contract documents, such material will be measured for payment as excavation for the related item.

   Removal and disposal of unsuitable material, not shown on the plans, will be measured and paid for using the applicable bid item. However, if removal and disposal of unsuitable material not shown on the plans required special equipment or unusual operations, it may be paid for as extra work according to the provisions of Subsection 104.03, "Extra Work".

   No measurement will be made of suitable material temporarily removed and replaced to facilitate compaction of material.

b. Over break - All side slope Over break as defined in Subsection 203.03.05, "Over break", shall not be paid for.

   Rock removed to a maximum depth of six (6) inches (15 centimeters) below subgrade will be measured for payment provided the rock has been removed sufficiently to permit accurate cross sectioning. Replacement to this depth shall be with material designated on the plans approved by the ENGINEER and will be measured and paid for at the contract unit price for the material used.

   Rock loosened or removed in excess of six (6) inches (15 centimeters) below subgrade will not be measured nor paid for. When ordered by the ENGINEER, the loosened material will be removed and the resultant space refilled with approved material at the expense of the CONTRACTOR.

c. Widening Cuts - If the ENGINEER directs the CONTRACTOR to excavate beyond the limits described in the plans and specifications and before the excavation is substantially completed, the material shall be classified and shall be paid for at the contract bid price. However, widening cuts requires special equipment, or unusual and extra expense may be paid for as extra work according to the provisions of Subsection 104.03, "Extra Work".

d. Surplus Material - Surplus excavated material will be measured for payment as excavation and no further compensation will be allowed by virtue of the method of disposing, placing, or widening embankments caused from such surplus material.

e. Slides and Slipouts - In the event of slides and slipouts, the ENGINEER and CONTRACTOR shall negotiate in each case and decide the relative difficulty of performing the work. The cost of pioneering work necessary to make slide or slipout areas accessible to normal excavation equipment and the cost of necessary clearing and grubbing will be paid for as extra work as provided in Subsection 104.03, "Extra Work".

Only those quantities of slide or slipout material which are authorized and actually removed will be measured for payment.

Excavation in excess of the staked or authorized cross section will not be measured for payment, except as outlined above.

Earthwork quantities within the limits of "Slope Rounding" will not be measured for payment.

V-type ditches will be measured parallel to the ground and each one hundred (100) linear feet (30 meters) shall constitute a unit of measure. The cross section of the ditches shall be approximately 2 ft. deep by 4 ft. wide. The volume of excavation for such ditches will not be measured for payment.

f. Additive-deductive excess material shall be measured for payment as excavation.

BASIS OF PAYMENT

203.05.01 PAYMENT

Delete this subsection and insert the following:

203.05.01 Payment: The accepted quantities of excavation measured as specified in Subsection 203.04.01, "Measurement", will be paid for at the contract unit price bid for each of the pay items listed in the bid schedule. Such price shall include excavating and loading.

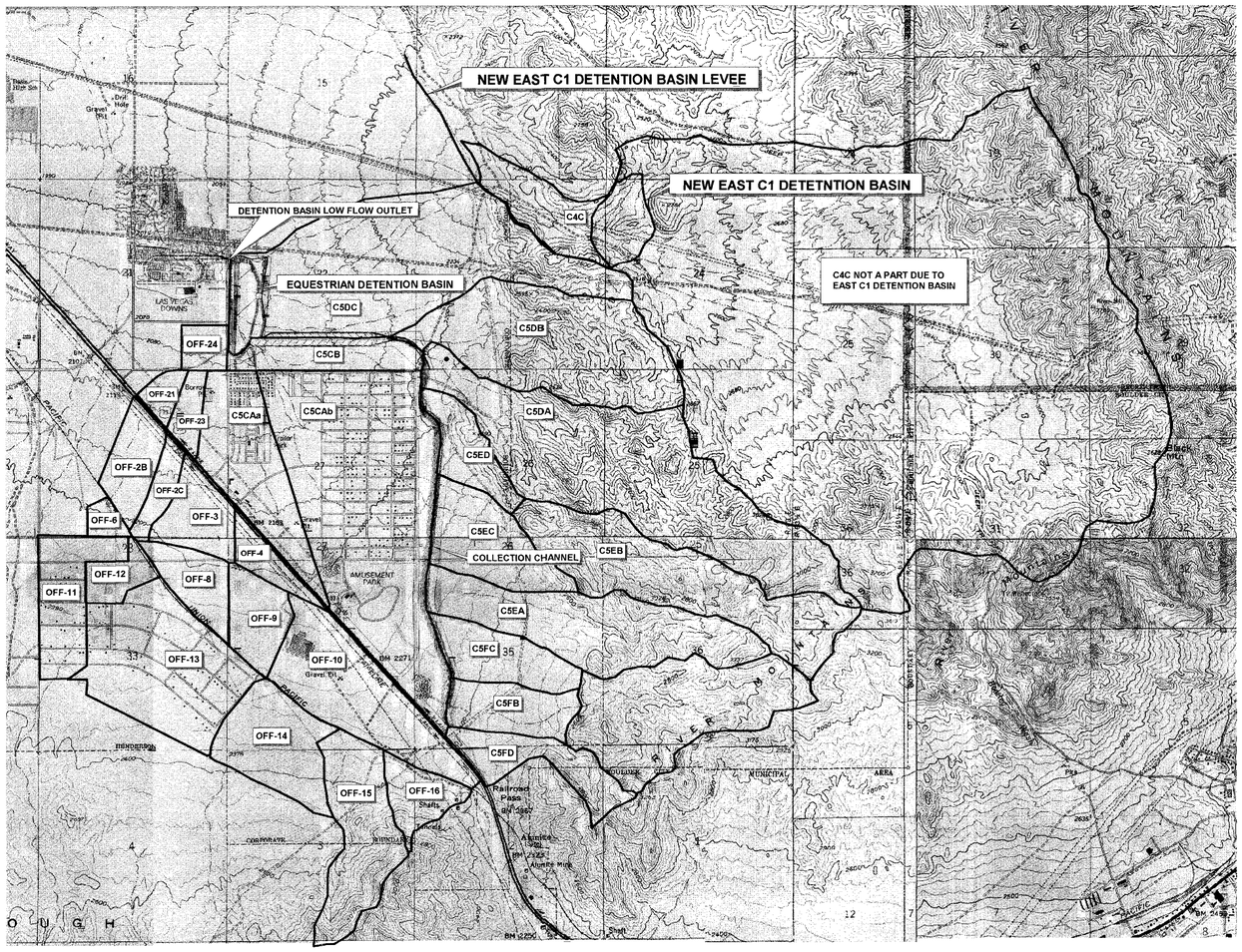
Only original excavation will be considered for payment. Temporary stockpiling, screening, hauling, watering, compacting, testing, mixing, benching, and all other activities required to excavate and place the excavate material shall be considered to be a part of the unit price per cubic yard for excavation. No allowance will be made for scarified and recompacted material for this item. Changes to the bid amount due to revision of the quantities will be based on the unit bid price.

The accepted quantities of embankment measured as specified in Subsection 203.04.01, "Measurement" will be paid for at the contract unit price bid for each of the pay items listed in the bid schedule. Such price shall include temporary stockpiling; re-excavation, hauling, depositing spreading, compacting screening, watering and all other work necessary to place, compact, test and maintain the material complete and in place. All payments will be made in accordance with Subsection 109.02, "Scope of Payment".

Payment will be made under:

PAY ITEM	PAY UNIT
Channel Excavation	Cubic Yard
Basin Excavation	Cubic Yard
General Fill Embankment	Cubic Yard
Channel Embankment	Cubic Yard
Additive-deductive Item:	
Haul (Excess Material)	Cubic Yard/Mile

END OF SECTION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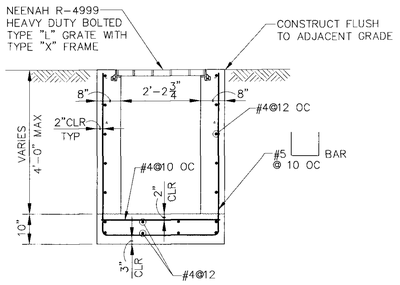

SHALLOW INLET BOX SECTION (1)

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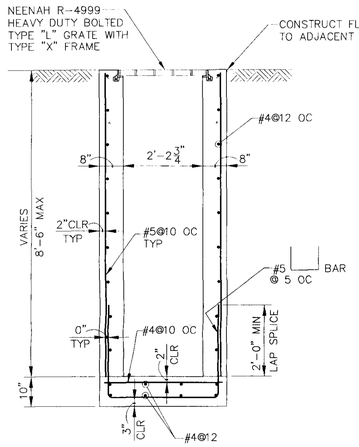

DEEP INLET BOX SECTION (2)

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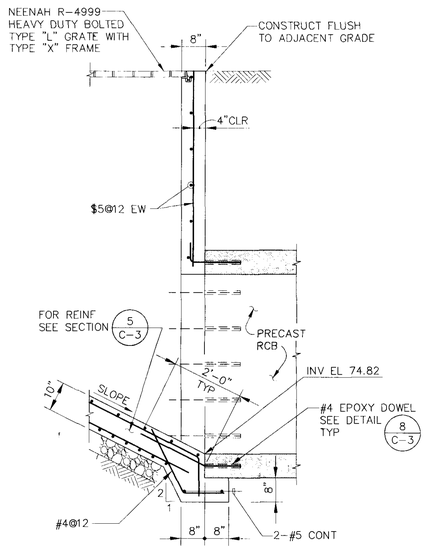

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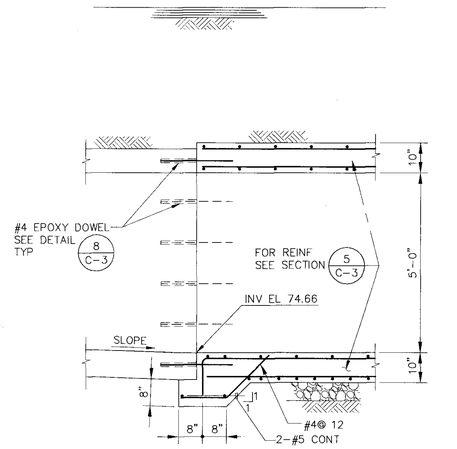
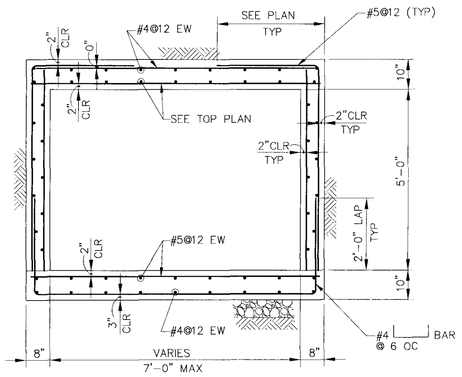


SECTION (4)

SCALE 1/2" = 1'-0"



SECTION (5)

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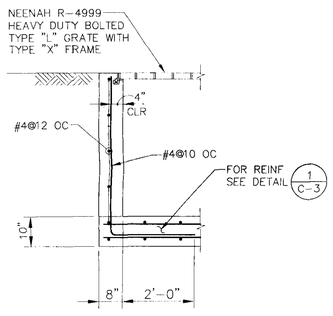
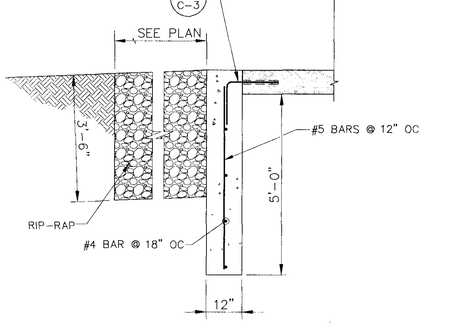


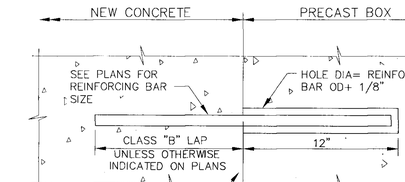
SECTION (6)

SCALE 1/2" = 1'-0"



CUTOFF WALL DETAIL (7)

SCALE 1/2" = 1'-0"

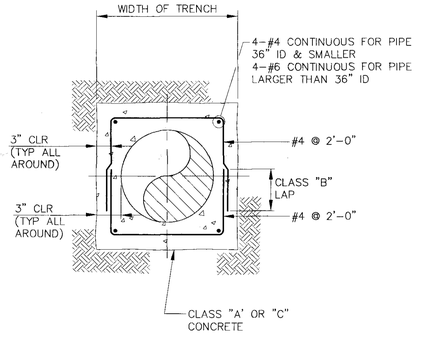


NOTES:

1. DRILL THE HOLE WITH AN IMPACT DRILL TO OBTAIN A ROUGH HOLE SURFACE. THE HOLE SHALL BE FREE OF DUST AND SHALL BE CLEAN AND DRY.
2. THE REINFORCING BAR SHALL BE FREE OF OIL, PAINT, DIRT, OR OTHER COATINGS THAT WILL REDUCE BOND.
3. DO NOT DAMAGE OR CUT EXISTING REINFORCING BARS, ELECTRICAL CONDUITS, OR OTHER ITEMS EMBEDDED IN THE EXISTING CONCRETE. THE LOCATION OF REINFORCING BARS, OR OTHER OBSTRUCTIONS SHALL BE DETERMINED WITH A NONDESTRUCTIVE INDICATOR DEVICE.
4. IF THE DRILL HITS AN EXISTING REINFORCING BAR OR OTHER OBSTRUCTION, STOP DRILLING AND FILL THE HOLE WITH DRY PACK MORTAR. RELOCATE THE HOLE TO MISS THE OBSTRUCTION AND DRILL ANOTHER HOLE. REPEAT THE ABOVE UNTIL THE HOLE HAS BEEN DRILLED TO THE REQUIRED DEPTH.
5. FILL THE HOLE TO 1/2" DEPTH WITH EPOXY GEL BEFORE INSERTING THE REINFORCING BAR.

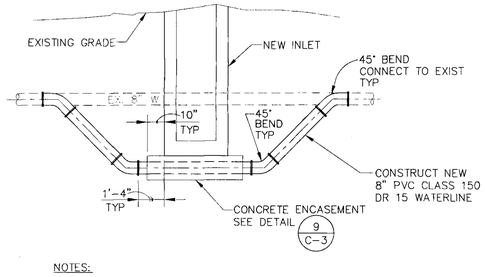
EPOXY BONDED REINFORCING BARS (8)

NO SCALE



CONCRETE ENCASEMENT OF PIPE (9)

NO SCALE

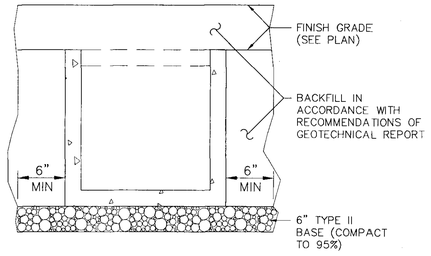


NOTES:

1. INSTALL THRUST BLOCKS IN ACCORDANCE WITH UDS PLATE NO. 5 OR APPROVED MECHANICAL JOINT RESTRAINT AND DRY.
2. PIPE BEDDING AND BACKFILL PER UNIFORM STANDARD DRAWINGS

WATER LINE ADJUSTMENT (10)

SCALE 1/4" = 1'-0"



BASE AND BACKFILL DETAIL (11)

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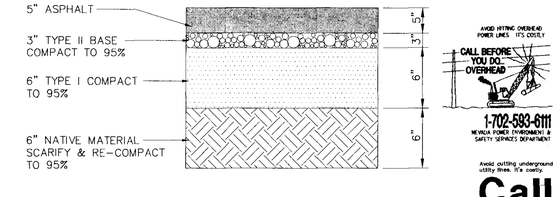

PAVEMENT SECTION (12)

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STATE OF NEVADA — PROFESSIONAL ENGINEER — MARK STEELE — No. 8307 — 2-12-98

MAGIC WAY INLET

MAGIC WAY INLET
CITY OF HENDERSON
PUBLIC WORKS

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CHECKED BY	TEP
DATE	01.27.98
SHEET NUMBER	C-3
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PUBLIC WORKS

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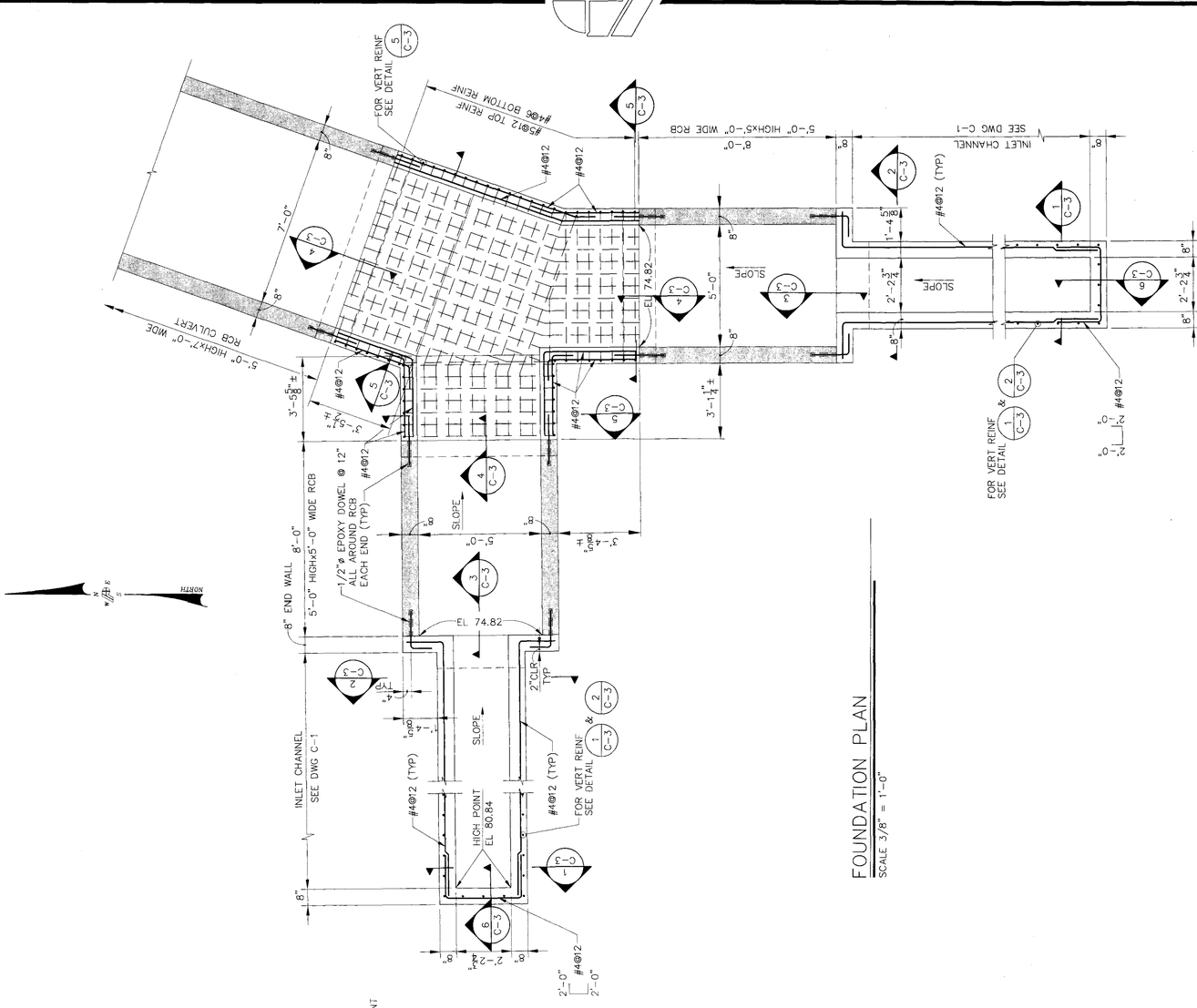
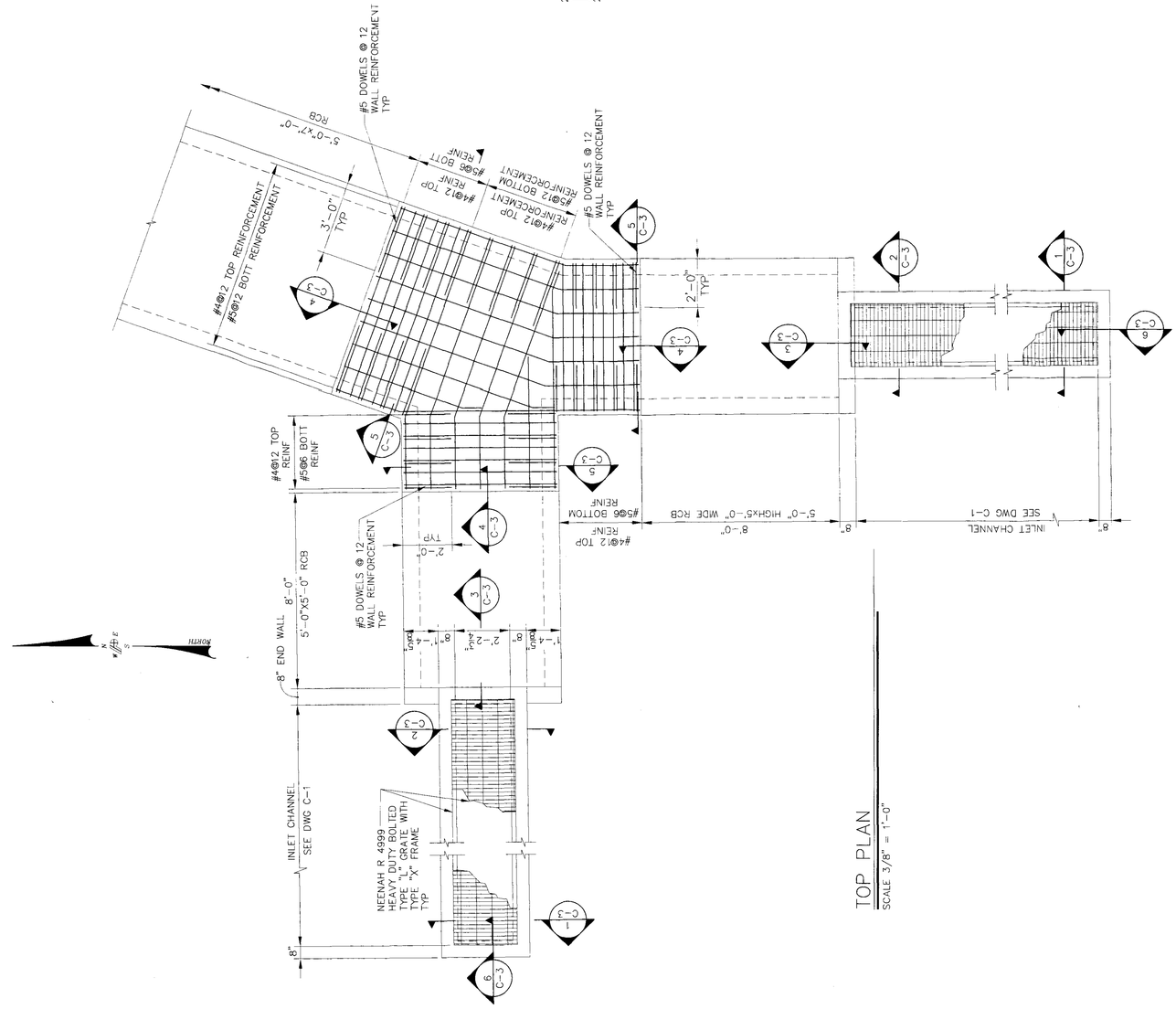
DATE	01.27.98
SHEET NUMBER	C-2 of 3



FOUNDATION PLAN
SCALE 3/8" = 1'-0"



TOP PLAN
SCALE 3/8" = 1'-0"

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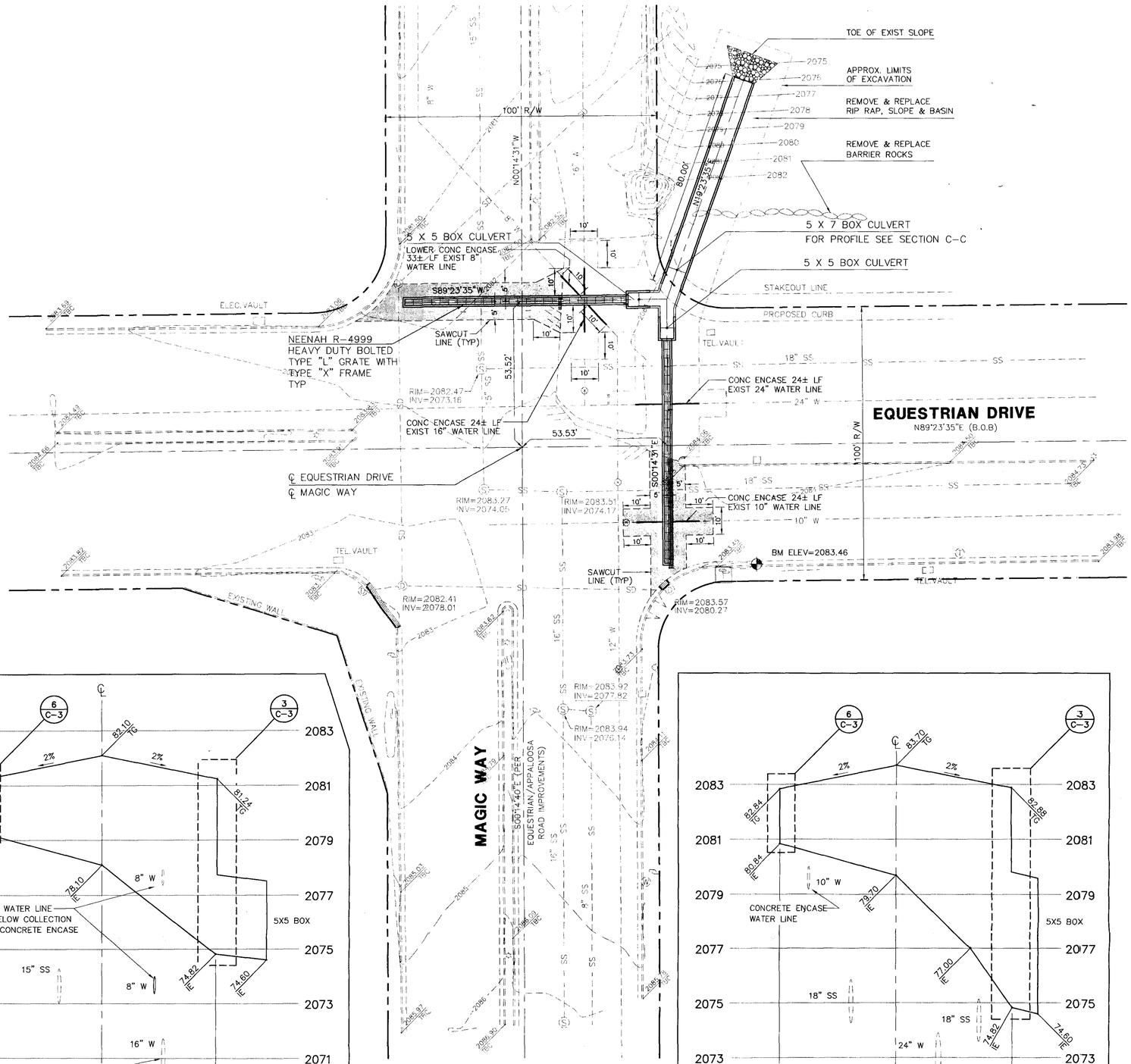
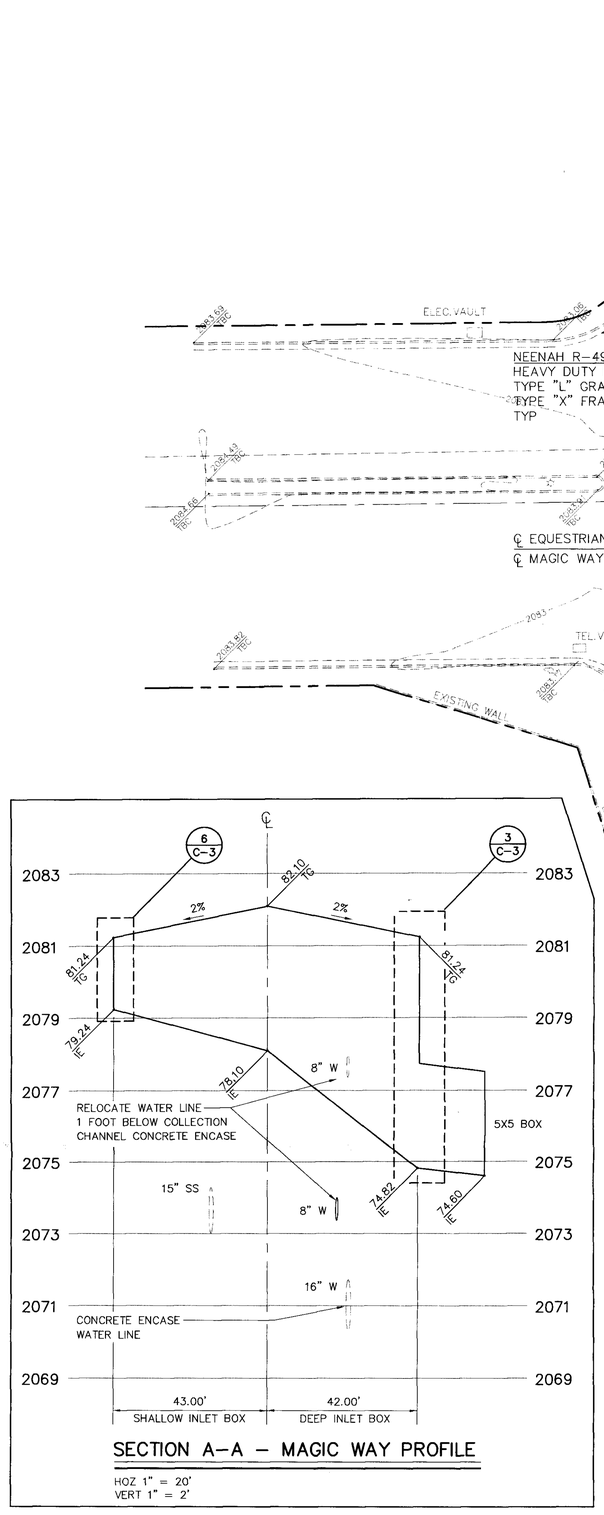
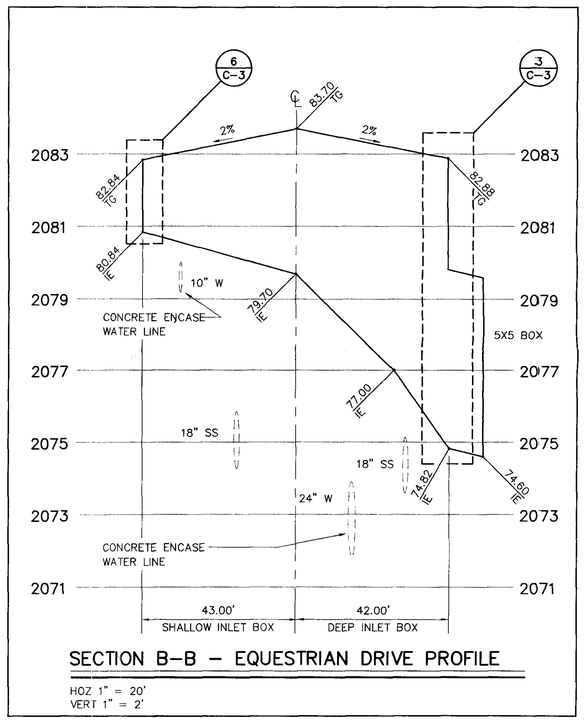




SECTION A–A – MAGIC WAY PROFILE

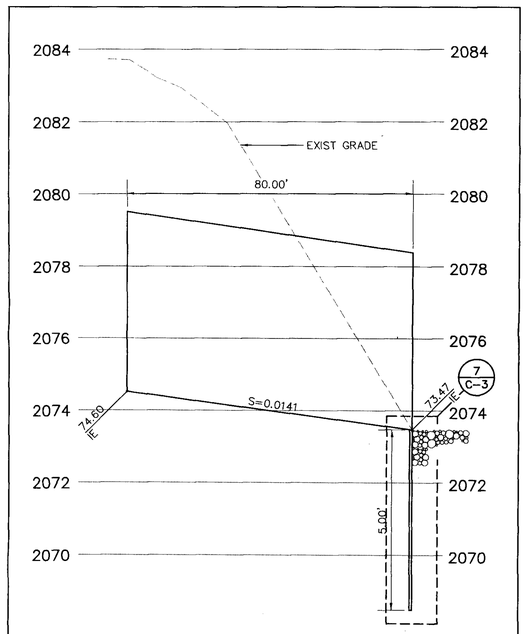
HOZ 1" = 20'
VERT 1" = 2'

NOTE:
PROPERTY LINE INFORMATION, SHOWN HEREON, PER EQUESTRIAN/APPALOOSA ROAD IMPROVEMENTS CONTRACT NO. 96-97.04



SECTION B–B – EQUESTRIAN DRIVE PROFILE

HOZ 1" = 20'
VERT 1" = 2'



SECTION C–C – 5' x 7' BOX CULVERT

HOZ 1" = 20'
VERT 1" = 2'

BASIS OF BEARINGS

BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 22, TOWNSHIP 22 SOUTH, RANGE 63 EAST M.D.M. TAKEN AS NORTH 89°23'35" EAST, PER PLAT BOOK 55, PAGE 28 OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

BENCH MARK: CITY OF HENDERSON DATUM

CITY OF HENDERSON BENCH MARK NO. 100 BEING DESCRIBED AS A BRASS CAP IN THE TOP THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DRIVE AND LONGMEADOW STREET.

ELEVATION = 2,091.675' (637.544 METERS)

AVOID HITTING OVERHEAD POWER LINES. IT'S COOL!
CALL BEFORE YOU DO OVERHEAD
1-702-593-6111
NEVADA POWER ENVIRONMENT & SAFETY SERVICES DEPARTMENT
Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600

GRAPHIC SCALE

20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

REVISION	DATE

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MAGIC WAY INLET

MAGIC WAY INLET
CITY OF HENDERSON
PUBLIC WORKS

JOB NUMBER	1002005
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LAST PLOTTED:

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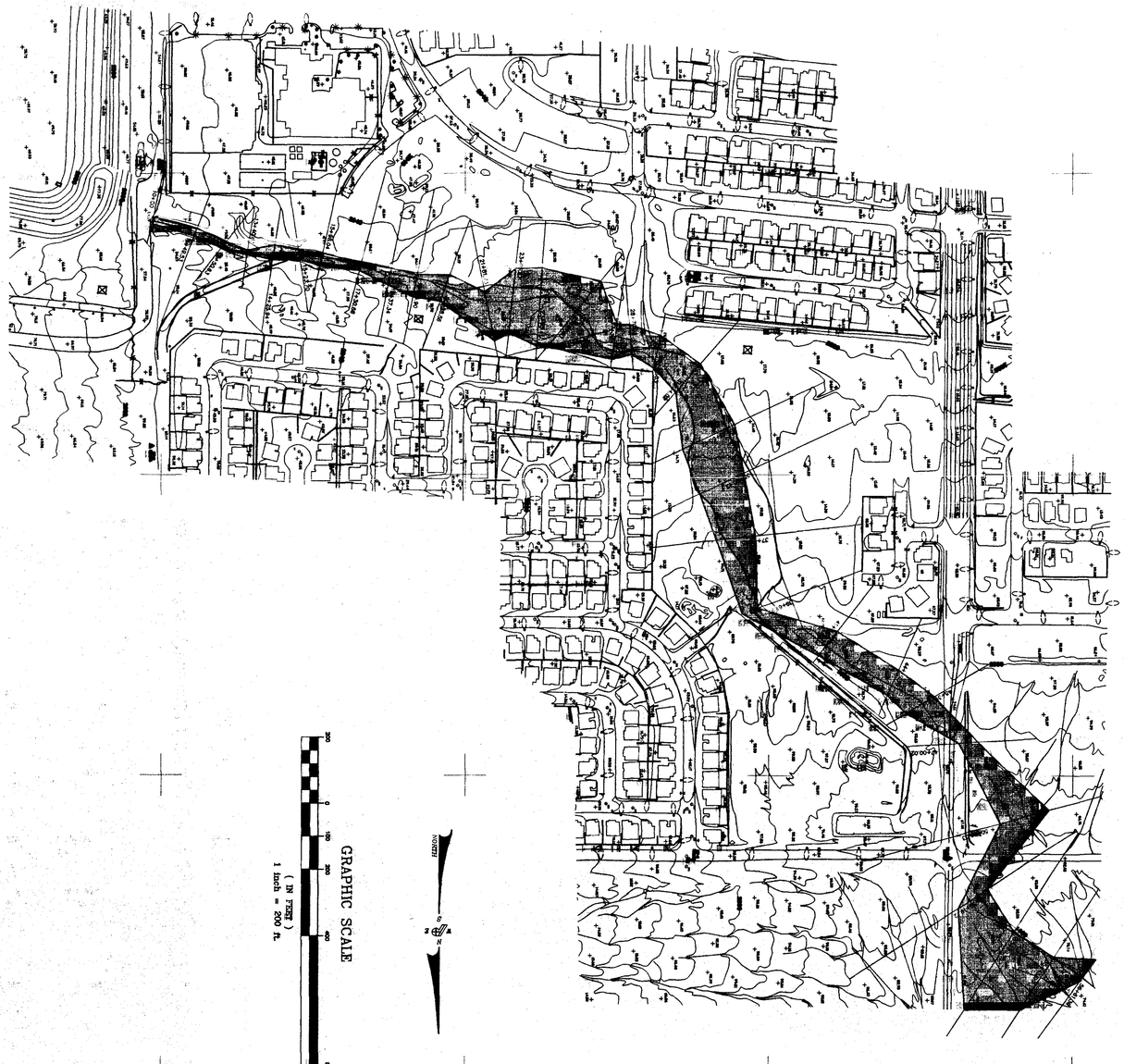

OUTLET TOPOGRAPHY

EQUESTRIAN DETENTION BASIN
LETTER OF MAP REVISION
CITY OF HENDERSON

STAMP

STEPHEN L. WEATHERMAN
PROFESSIONAL ENGINEER STATE OF NEVADA
CIVIL
No. 9266
12/21/98

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
LANDSCAPE ARCHITECTS
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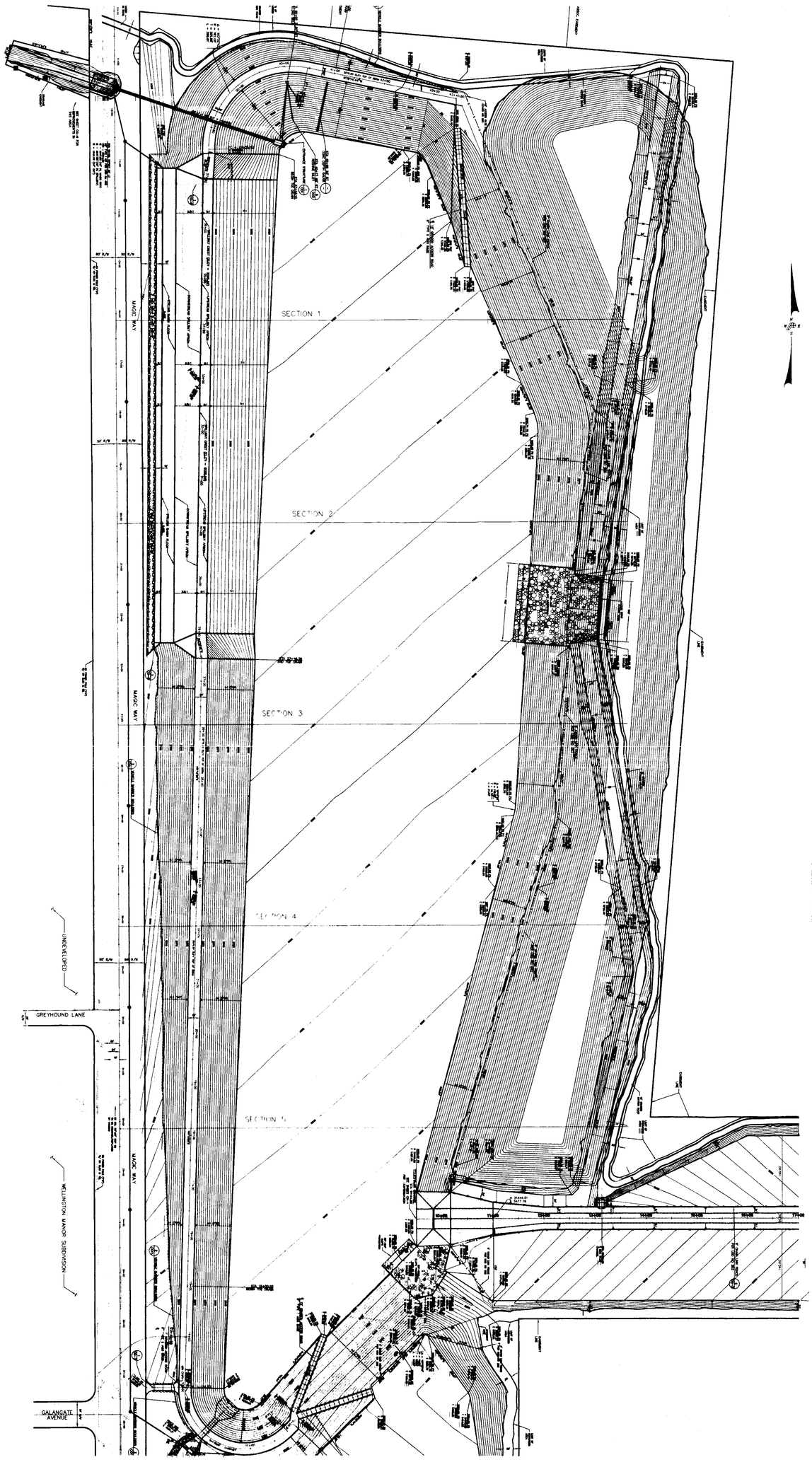

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

STEPHEN L. WISSMAN
No. 9583
PROFESSIONAL ENGINEER
STATE OF NEVADA

SEDIMENT DEPOSITION

CITY OF HENDERSON
EQUESTRIAN DETENTION BASIN
LOMR APPLICATION

SHEET NUMBER 1 of 1
DATE 12/21/98
DESIGNED BY SLW
DRAWN BY SLW
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JOB NUMBER 1002005

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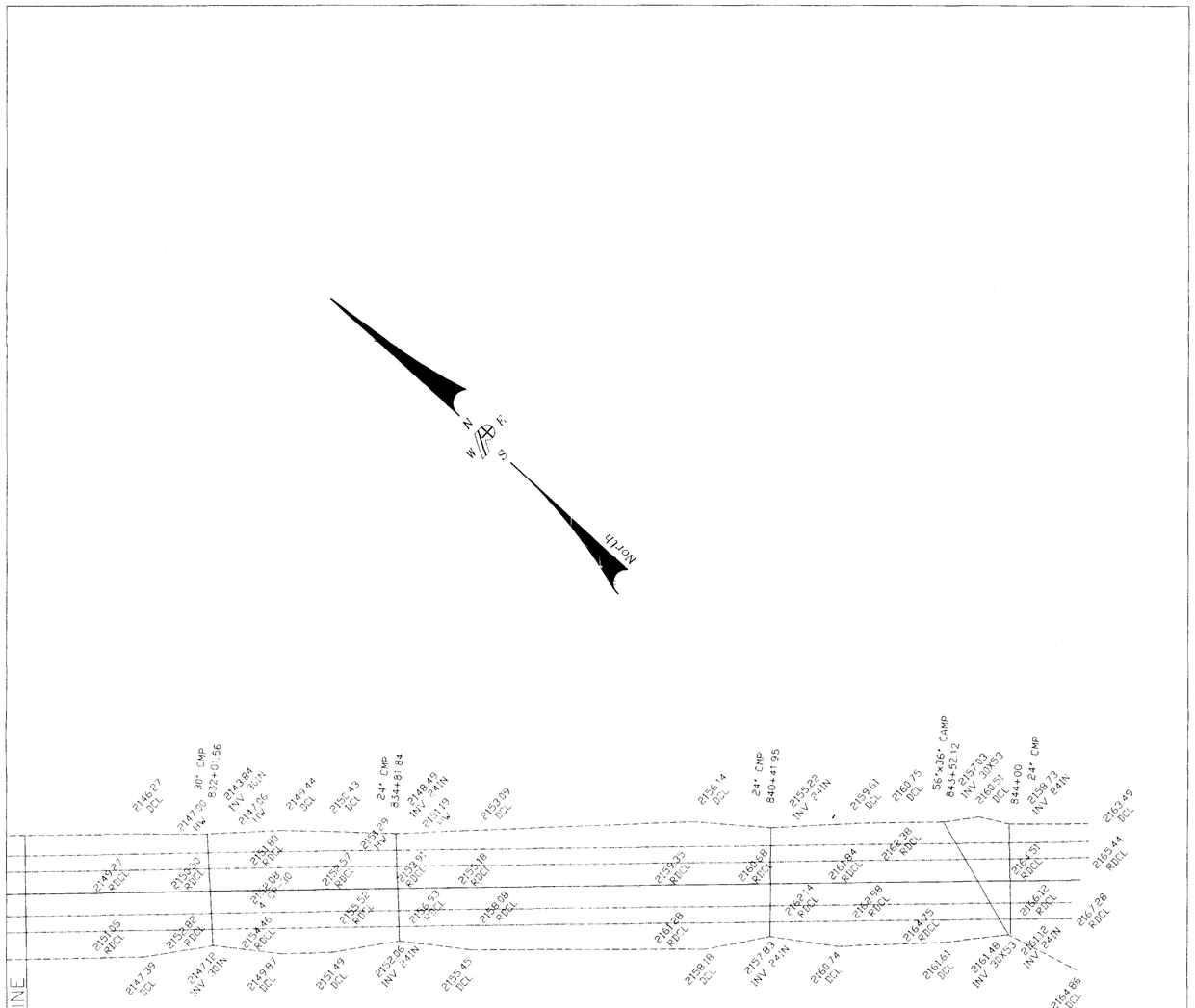

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(IN FEET)

1 inch = 100 ft

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POGGEMEYER DESIGN GROUP

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BOULDER HIGHWAY CULVERTS

CITY OF HENDERSON
EQUESTRIAN DETENTION BASIN
LOMR APPLICATION

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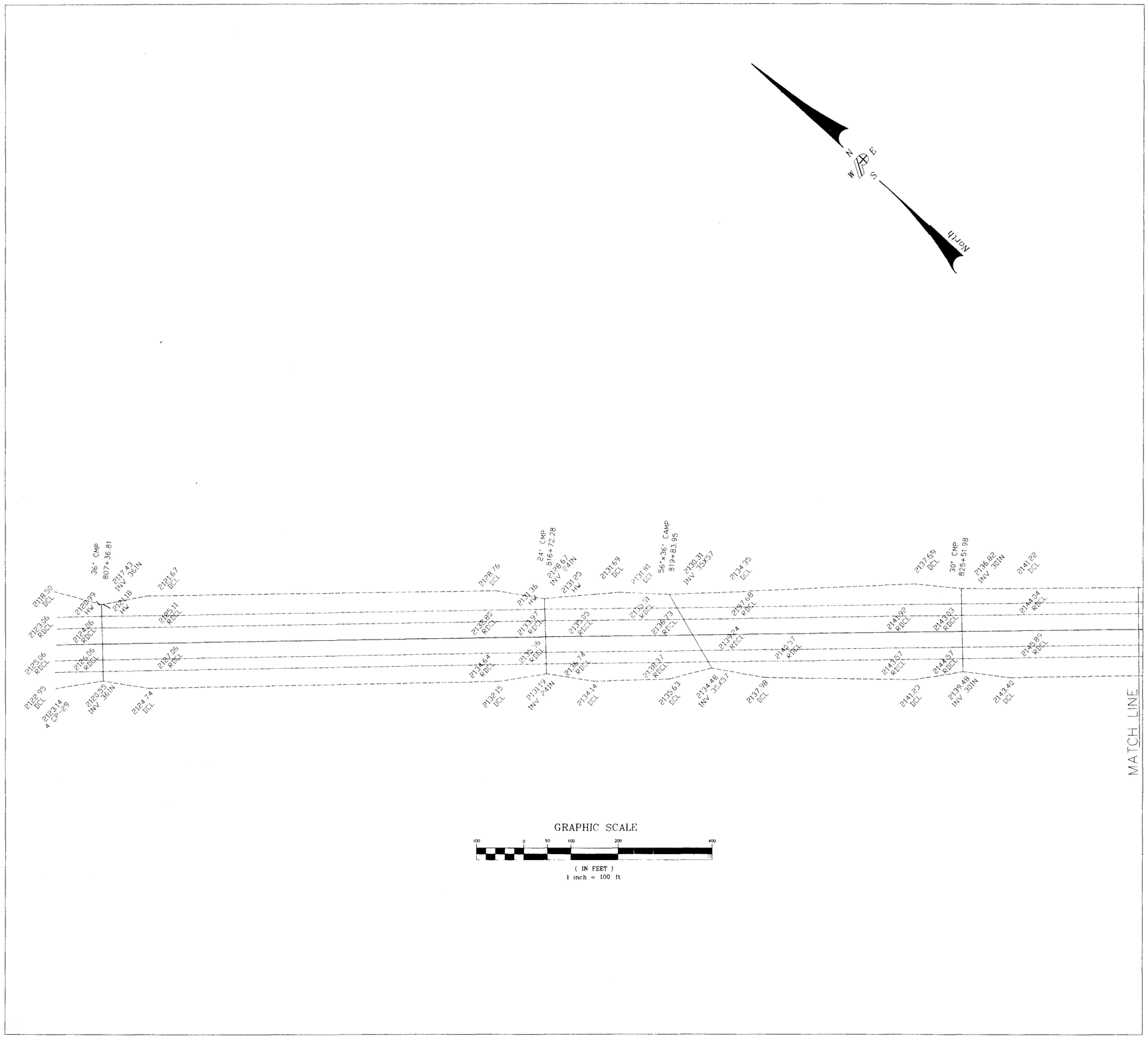
CHECKED BY	SLW
DATE	12/15/98

SHEET NUMBER
DB-1
Sheet 1 of 2

PROFESSIONAL ENGINEER STATE OF NEVADA
STEPHEN L. WEATHERMAN
CIVIL
No. 9266

12/21/98



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(IN FEET)
1 inch = 100 ft

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PROFESSIONAL ENGINEER-STATE OF NEVADA
STEPHEN L WEATHERMAN
CIVIL
No. 9266
12/7/98

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CITY OF HENDERSON
EQUESTRIAN DETENTION BASIN
LOMR APPLICATION

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Sheet 2 of 2

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PW
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DRT_KEY
LAST_REV_DATE

TECHNICAL DRAINAGE STUDY

LETTER OF MAP REVISION
FOR
EQUESTRIAN DETENTION BASIN

PDG PROJECT #1002005

BOOK 2
FINAL DRAINAGE REPORT:
BOULDER HIGHWAY / WAGONWHEEL
INTERCHANGE AREA

PREPARED FOR:
THE CITY OF HENDERSON
DRAFT
DECEMBER 18, 1998
PREPARED BY:

POGGEMEYER DESIGN GROUP, INC.
ENGINEERS – PLANNERS – SURVEYORS – LANDSCAPE ARCHITECTS
2601 NORTH TENAYA WAY
LAS VEGAS, NEVADA 89128
(702) 255-8100 FAX (702) 255-8375
pdg-lv@pdg-lv.com

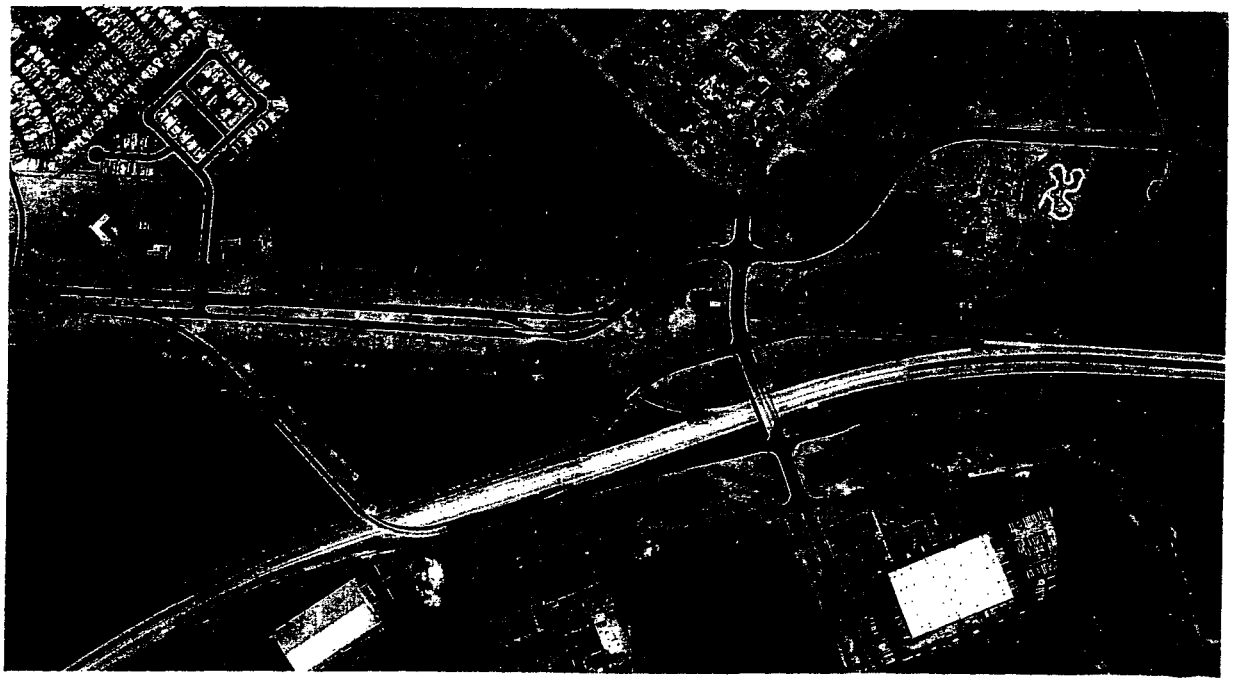
APPENDIX M

WAGON WHEEL INTERCHANGE

FINAL DRAINAGE REPORT
BOULDER HIGHWAY/WAGONWHEEL INTERCHANGE AREA

P052-94-010
TASK ORDER NO.1

NEVADA
DEPARTMENT OF TRANSPORTATION



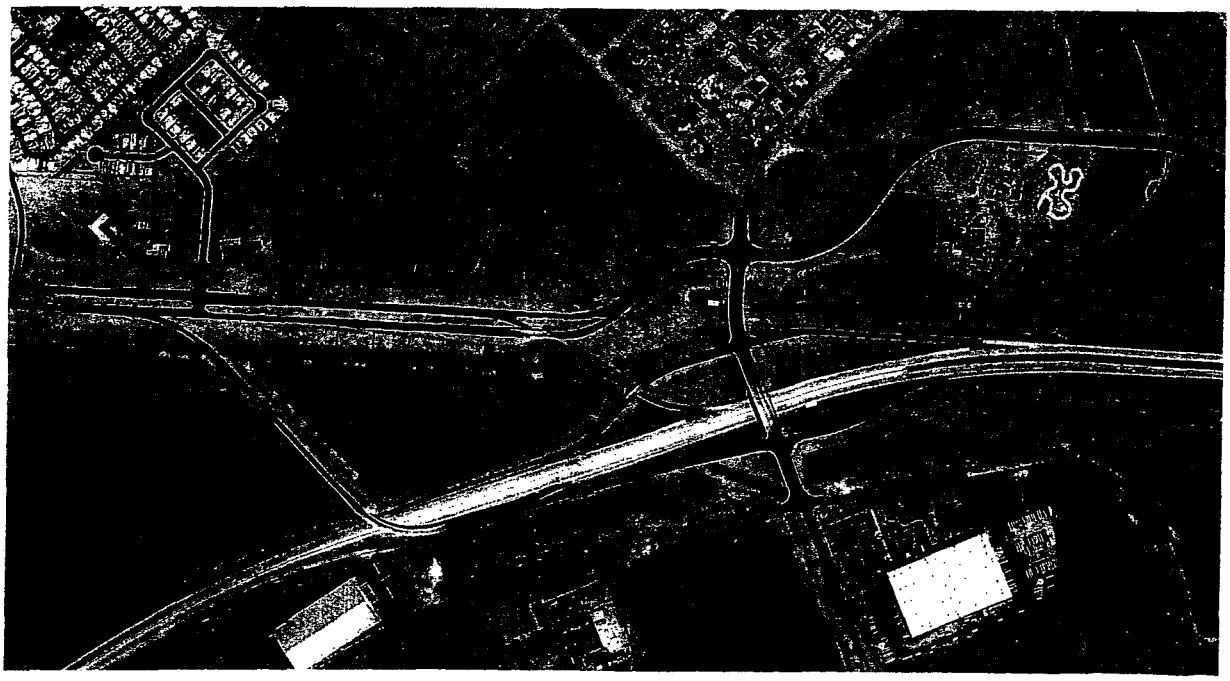
WRC NEVADA, INC.

FINAL DRAINAGE REPORT
BOULDER HIGHWAY/WAGONWHEEL INTERCHANGE AREA

P052-94-010

TASK ORDER NO.1

NEVADA DEPARTMENT OF TRANSPORTATION



WRC NEVADA, INC.

CURT CHANDLER, P.E.
LAND DEVELOPMENT MANAGER

PUBLIC WORKS DEPARTMENT
240 WATER STREET
HENDERSON, NV 89015
702·565·2329
FAX 702·565·5687

FINAL DRAINAGE REPORT
BOULDER HIGHWAY/WAGONW
INTERCHANGE AREA

P052-94-010

TASK ORDER NO. 1

Prepared For:

NEVADA DEPARTMENT OF TRANSPORTATION
1263 STEWART STREET
CARSON CITY, NEVADA 89712

Prepared By:

WRC NEVADA, INC.
3340 SOUTH TOPAZ STREET, SUITE 170
LAS VEGAS, NEVADA 89121

(702) 893-6266

WRC FILE: 1883/2

APRIL 1995

WRC ENGINEERING, INC.

May 2, 1995

Mr. Amir M. Soltani, P.E.
Senior Hydraulic Engineer
Nevada Department of Transportation
1263 South Stewart Street
Carson City, Nevada 89712

NDOT: P052-94-010
WRC File: 1883/2

Dear Mr. Soltani:

Transmitted herewith is the Final Drainage Report for the Boulder Highway/Wagonwheel Interchange Area. This work was performed in accordance with the terms and conditions of the agreement No. P052-94-010, and covers the work outlined in task order No. 1 issued to us by the Nevada Department of Transportation. Comments on the Preliminary Drainage Report dated February 21, 1995, and our responses are included in Appendix F. Since no adverse impacts were identified by this study, this report concludes our work under Task Order 1.

We would like to thank you and the other staff of NDOT, for your cooperation, timely response, and help in providing us with the information needed to complete this report.

Very truly yours,

WRC NEVADA, INC.

Alan J. Leak, P.E.
Project Manager

AJL/mag

Enclosure

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FIGURE - 7 EXISTING/FUTURE FLOWS DIAGRAM

I. INTRODUCTION

A. Authorization

The Boulder Highway/Wagonwheel Interchange Area Drainage Study was prepared under Nevada Department of Transportation (NDOT) Agreement No. P052-94-010 as part of the on-call program for drainage services provided by WRC Nevada, Inc. (WRC). Starting date of the project was December 2, 1994 and the contract time for completion of the task order was 180 calendar days.

B. Project Description

The scope of this study includes the hydrologic and hydraulic evaluation of storm runoff patterns and magnitudes in the vicinity of the Interstate 515 Wagonwheel Interchange with the Boulder Highway (US 95) at Henderson, Nevada.

The project area is located in Sections 2, 3, 4, 9, and 10, Township 23 South, and Sections 27, 28, 33, 34, and 35, Township 22 South, Range 63 East of the Mount Diablo Principal Meridian, Clark County, Nevada. (Figure-1) At present, the area is sparsely developed and sparsely vegetated with desert scrub. Field investigations indicated that various additional residential and possibly commercial/industrial developments will be established in the area in the near future.

At the Wagonwheel Interchange, drainage patterns were historically influenced by US 95. During 1991-92, I-515 was extended through the area. The highway project included construction of the interchange and other improvements. The new highway and interchange structures modified historic local drainage patterns through the placement of embankments, channels and drainage crossing structures.

The I-515 drainage facilities were designed to convey 50-year storm runoff and to carry 100-year flows as necessary to prevent overtopping of the I-515 roadway as defined in the roadway design standards. This study provides further analysis of the area and presents recommendations for the conveyance of flows from the downstream limit of the Wagonwheel Interchange project to a suitable outfall at a regional flood control structure (per the Clark County Regional Flood Control District Master Plan). The hydrologic analysis used and improvements proposed herein conform with the regional Master Plan.

II. PREVIOUS STUDIES

Several drainage studies had been performed for the subject area prior to this report. Most notable are the Clark County Regional Flood Control District (CCRFCD) Master Plan Update and C-1 Channel Supplemental Study, and the drainage study performed by Sverdrup Corporation for the design of the I-515 improvements. Also, related to the present study are the Mission Hills and Equestrian Detention Basin design reports. A brief description of these reports is presented below.

A. Clark County Regional Flood Control District Master Plan

The CCRFCD "Master Plan Update of the Las Vegas Valley" (Master Plan), August 1991, presents proposed regional flood control facilities for the subject study area. The study area is situated at the upstream most portion of the "C1 Channel" basin. As shown in Figure-2, the Mission Hills dike and detention basin intercept flows from the upper drainage area. As a result, with the master plan facilities in place, only the area below the Mission Hills dike and detention basin remains tributary to the project area.

The Mission Hills dike, detention basin, storm sewer and channel up to I-515 were completed about mid-1994. On Figure-2, these structures are identified by numbers 0737, 0707 and 0660. The detention basins at I-515, structures 0658 and 0656, were constructed at the time of I-515 construction. Thus, at the present time it appears that all master-planned facilities directly upstream of the project site are in place.

Downstream of the project site master planned facilities have not yet been constructed. The Equestrian detention basin and related facilities, structures 0400, 0352, and 0297, are presently being designed. Downstream of the Equestrian detention basin no regional facilities are currently being designed and the time of construction of such facilities is presently unknown.

In 1992, a supplemental study for the C-1 Channel System was performed (VTN, 1992). The intent of this study was to further refine the previous analysis with respect to runoff estimates, existing and proposed hydraulic structures, sediment control and construction phasing and costs. The study represents the current "Master Plan" hydrology for the study area. The study was used by WRC as a basis of comparison for verifying conformance of the present study with the Master Plan analysis. The study indicates that all runoff from areas south of the Boulder Highway and upstream of the C-1

Channel will be routed to the C-1 Channel at the Boulder Highway crossing, and no flows are considered to overtop Boulder Highway at or near the project area of the present report. The study makes no mention of the "secondary facilities" that appear to be shown in the 1991 Master Plan as crossing US 95 near Magic Way (see Figure-2).

B. **I-515 Drainage Study**

The "I-515 Boulder Highway to Lake Mead Drive Drainage Study", February 1991, was prepared by Sverdrup Corporation for the design of I-515. The report describes the hydrologic and hydraulic methodology used, and presents design flows and recommended sizes for the various highway hydraulic structures. A companion report, entitled "Hydrology Study for I-515/Wagonwheel Drive Interchange" (Civiltec, 1990), presents the hydrologic/hydraulic analysis for the area tributary to the Wagonwheel Interchange. It appears that the I-515 drainage facilities were sized based on the development conditions that existed at the time of the study.

C. **Mission Hills Detention Basin**

The "Design Calculation Notebook for the Mission Hills Detention Basin" (VTN, 1993) presents technical information concerning the hydrologic design of the Mission Hills Detention Basin and related facilities. The report does not include analysis of areas tributary to the study area of the present report. However, the Mission Hills report was used as a basis for comparison of hydrologic parameters used in the present study.

D. **Equestrian Detention Basin**

The "Design Memorandum for the Equestrian Detention Basin" (Poggemeyer, 1994) presents the hydrologic, hydraulic and sediment transport analysis used for the design of the Equestrian detention basin and related facilities. The report indicates that all tributary area to the Equestrian detention basin lies to the north of Boulder Highway, and all flows originating from south of the highway are to be conveyed northwest along the south side of the highway apparently to the C-1 Channel as described in the C-1 Channel supplemental study (VTN, 1992).

E. Summary of Previous Studies

Per the studies described above, it was determined that the current tributary area to the Wagonwheel Interchange consists of areas downstream of the Mission Hills diversion dike and south of the Boulder Highway. Although numerous culverts exist under the Boulder Highway, such flow contributions are not included in the hydraulic analysis of basins north of the highway. The Master Plan Update does indicate a "secondary facility" apparently draining across the highway at Magic Way. However, subsequent reports do not identify flows crossing the Boulder Highway (Figure-2, VTN 1992, Poggemeyer 1994). Nevertheless, WRC has assumed that the Boulder Highway culvert flows will continue in the future as the culverts constitute an existing condition and no plans are presently under consideration for eliminating the structures.

The most current Master Plan report (VTN, 1992) also indicates that runoff from the area tributary to the Wagonwheel Interchange will be directed along the south side of the highway to the C-1 Channel. WRC therefore considers that the outfall from the subject drainage area should, at ultimate buildout, be directed along this route to conform with the Master Plan. Other outfall alignments may be considered, however such routing may require that adjustments be made to the design of Master Plan facilities.

III. DATA SOURCES

Topographic data used for this study was obtained from USGS quadrangle sheets at a scale of 1:24,000 with 40-foot contour intervals, topographic mapping of the I-515 alignment prepared by NDOT showing pre-construction conditions at a scale of 1"=50' and 2-foot contour intervals, and construction drawings for I-515 indicating proposed grading along I-515. A field survey to obtain cross-section data for the roadside channel west of US 95 and downstream of the Wagonwheel Interchange was performed by NDOT in September 1994, and this information was provided to WRC. Construction drawings for the original US 95 project, NDOT Contract No. 727, were also provided to WRC by NDOT. Field observations were performed by WRC on December 23, 1994 to verify mapping and to obtain additional information.

Aerial orthophotographs of the subject area were provided by NDOT. Dates of the photos were January 26, 1988; March 12, 1994; and October 12, 1994. These photographs showed drainage patterns and structural improvements for pre-, during- and post-construction conditions.

Hydrologic soil groups were determined using the Master Plan which was based on the Soil Conservation Service (SCS) Soil Survey for Las Vegas Valley (1985). Where not indicated in the Master Plan, soil types were estimated based on topography and adjacent soil types.

Land use was defined in accordance with the Master Plan. SCS Curve numbers for the various land use/soil types were obtained from the CCRFCD Hydrologic Criteria and Drainage Design Manual (MANUAL). Curve numbers calculated by WRC were compared to those used for the Master Plan and the I-515 study by Sverdrup to verify consistency and reasonableness.

Drainage structure information was obtained from NDOT US 95 construction drawings, I-515 construction drawings, the Master Plan, conversations with the CCRFCD, and field investigations.

Rainfall depths and adjustment factors were obtained from the MANUAL. In the MANUAL, rainfall depths were derived from adjusted NOAA Atlas 2, Volume VII Nevada, 1973 values.

IV. STUDY METHODOLOGY

A. Hydrology

The hydrologic analysis was performed using the U.S. Army Corp of Engineers' (USACE) HEC-1 Flood Hydrograph Package. HEC-1 is a computer-based computational procedure for estimating basin runoff and hydrograph attenuation resulting from channel routing. The SCS Curve Number method for estimating losses and the SCS Dimensionless Unit Hydrograph method for runoff distribution were used within the HEC-1 model.

The design rainfall distribution used was the 6-hour SDN 3 storm recommended in the MANUAL (see Appendix A). Rainfall depths were calculated from isohyetal maps using the procedure and maps presented in the MANUAL. Precipitation adjustment ratios and depth-area-reduction factors presented in the MANUAL were used as appropriate. The 50- and 100-year precipitation depths used for the runoff analysis were 2.86 and 3.29 inches, respectively. These values were further adjusted with depth-area-reduction (DAR) factors as appropriate.

A tabulation of the hydrologic parameters used is presented in Table-1. Hydrologic parameters are discussed in Chapter V and calculations are presented in Appendix B. The TLAG hydrograph

parameter was calculated using the method described in the MANUAL. Basin areas and lengths were delineated and measured on USGS quadrangle sheets. The flow routing parameters were defined based on field observations and NDOT construction drawings where applicable. It was assumed that little change in roughness coefficients between existing and future development would occur as the flow routing structures are currently in a near fully-developed condition. The hydrologic and routing parameter calculations are presented in Appendix B.

TABLE - 1

SUB-BASIN HYDROLOGIC PARAMETERS

DEVELOPMENT CONDITION	SUB-BASIN ID	AREA (sq. mi.)	CN	TLAG (hr)	DAR FACTOR
HISTORIC	H1	1.50	74	0.29	0.95
	H2	0.70	86	0.32	0.98
	H3	0.20	84	0.20	1.0
	H4	0.62	82	0.75	0.98
	H5	0.38	72	0.68	0.98
	H6	0.14	72	0.54	1.0
	H7	0.22	77	0.54	1.0
EXISTING	X1	0.49	69	0.20	0.98
	X2	0.50	69	0.41	0.98
	X3	0.44	82	0.62	0.98
	X4	0.30	84	0.59	0.99
	X5	0.12	84	0.27	1.0
	X6	0.07	65	0.37	1.0
FUTURE	F1	0.49	75	0.14	0.98
	F2	0.50	85	0.23	0.98
	F3	0.44	88	0.34	0.98
	F4	0.30	85	0.35	0.99
	F5	0.12	84	0.27	1.0
	F6	0.07	85	0.20	1.0

Summaries of the HEC-1 model outputs are presented in Appendix C.

B. Hydraulics

The flow capacity of both existing and proposed drainage structures was estimated through the procedures and charts recommended in the MANUAL. All culverts were assumed to flow under inlet control and available headwater was estimated from construction drawings or field observations.

With the exception of inlet-control culverts, flow capacities were typically estimated using Manning's equation. For open channels in natural or assumed unmaintained drainageways, a Manning's "n" value of 0.035 was used. For assumed maintained roadside ditches and channels, an "n" value of 0.030 was used. For concrete, an "n" value of 0.015 was used.

Much of the study area is located over alluvial fan formations and exhibits the somewhat random drainage patterns characteristic of flooding on alluvial fans. It is presumed that under such conditions, the location of flow concentrations will vary over time and runoff may be distributed over a wide area during one period and concentrated at a point during another. This study has assumed that runoff will be generally distributed along downstream basin boundaries in cases where no diversion structures exist. This assumption produces somewhat of an "average" drainage pattern for the estimation of impacts of major storm runoff.

The USACE HEC-2 computer-based water surface profile model was used to estimate channel capacities along the west side of US 95 and downstream of Roberts Road. Topographic information obtained from NDOT mapping and field surveys was used as model input. These data provided a description of both historic and existing conditions along the subject channel reach.

For the US 95 overtopping analysis, it was determined from the NDOT mapping that two general areas of US 95 overtopping would adequately characterize historic and existing highway overtopping. These areas included a 400-foot highway segment near Magic Way and an 800-foot segment near Roberts Road. Overtopping of these segments was estimated through a weir approximation.

The capacity of the channel on the west side of US 95 was determined both without highway overtopping and with consideration given to the additional depth of channel flow made available through the backwater required to produce weir flow over the highway. In the discussion of the analysis results presented in the following chapter, the total channel

capacity including this weir backwater depth is referred to as "surcharge capacity". The channel surcharge capacity is therefore greater than the channel capacity without highway overtopping. The surcharge capacity was computed using the HEC-2 models for both historic and existing conditions by determining the depth of surcharge for various flow rates (i.e. for a given flow rate, the depth of flow above the elevation of the highway, indicated by an "extended section" in the HEC-2 output, was considered the surcharge flow depth. The surcharge flow depth was then used as the weir flow depth to determine the highway overtopping flow for this channel flow rate). Results of the surcharge HEC-2 runs and weir calculations are included in Appendix D of this report. Sample HEC-2 model inputs and outputs are presented in Appendix E.

V. HYDROLOGIC/HYDRAULIC ANALYSIS

A. Historic Conditions

The historic drainage analysis evaluated runoff magnitudes and flow patterns as they were assumed to have existed prior to construction of I-515. The historic drainage area tributary to the project site is delineated in Figure-3.

Two major structures were considered to affect drainage patterns under historic conditions - the Boulder Highway and the Union Pacific Railroad. The Boulder Highway from Railroad Pass to Magic Way forms the northeastern boundary of the historic tributary drainage basin. The USGS topographic maps indicate that surface grades upstream of Old Vegas will direct runoff across the highway from east to west. However, based on field investigations and review of the US 95 construction drawings it was estimated that such runoff will be intercepted by the road prism and will not cross the highway. This relatively small drainage area is tributary to the east side of the highway and available information indicates that only one east-to-west drainage crossing structure exists, an 18-inch corrugated metal pipe (CMP) located just upstream of Old Vegas. The US 95 construction drawings indicate that between Old Vegas and Magic Way nine culverts, from 24 to 36 inches in diameter, drain under the highway from west to east. Between Old Vegas and Wagonwheel Drive, total capacity of these culverts is estimated to be 148 cfs, and between Wagonwheel Drive and Magic Way 130 cfs.

The Union Pacific Railroad is located on an embankment throughout most of the subject area. Field observations revealed that between Railroad Pass and I-515 seven culverts, from approximately 24 to 60 inches in diameter, and one bridge provide for cross-drainage. In various locations on the upstream side of the embankment dikes have been constructed to direct runoff to the culverts.

During the field investigation it was also noted that a channel exists along the downstream side of the railroad tracks approximately as shown on Figure-3. It appeared that this channel may have been constructed to collect outflows from the railroad culverts and may have discharged near the extension of Dawson Road. The time of construction of this channel is unknown, however it appeared to be at least several years old.

As shown in Figure-3, the historic tributary area was divided into seven sub-basins for modelling purposes. These basins were labeled H1 through H7. At four locations of interest, design points were designated and were labeled DP 20, 30, 40 and 50. These design points were located on the west side of US 95 at the downstream end of sub-basins H1, H7 and H6, and also at a location downstream of Magic Way at the estimated downstream limit of flows passing through the railroad bridge (see Figure 3).

TABLE - 2

RUNOFF SUMMARY - HISTORIC BASINS

SUB-BASINS/ DESIGN POINTS	50-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)
H1	720	980
H2	650	810
H3	210	260
H4	290	370
H5	100	140
H6	50	60
H7	100	130
H3+H5+H7	340	440
H2+H4+H6	440	550
DP 20	300	430
DP 30	360	410
DP 40	440	490

The sub-basin flows in Table-2 represent individual sub-basin runoff estimated through the HEC-1 modelling. In Table-2, runoff values for "H3+H5+H7" and "H2+H4+H6" are the estimated combined flows at US 95 from these basins, and include flood peak attenuation due to flow routing through conveyance structures and flow splits as described in the following paragraphs. Design Point flows are flow estimates which represent the estimated flows that would have occurred on the west side of US 95 during the design storm events under historic drainage conditions after deduction of culvert and overtopping flows across US 95 to the east. A description of the method used for the Design Point flow calculations is presented along with the HEC-1 schematic diagram for historic conditions in Appendix C.1. The estimated 50- and 100-year runoff for the various basins and selected design points are presented in Table-2.

The estimated 50-and 100-year runoff from sub-basin H1 was 720 and 980 cfs, respectively. With an estimated culvert capacity of 120 cfs for the culverts upstream of Wagonwheel Drive draining across US 95 from west to east, the 50- and 100-year flows just upstream of Wagonwheel Drive were 600 and 860 cfs, respectively (see Figure-5). It was estimated that due to historic surface grades at the US 95-Wagonwheel Drive intersection, Design Point 20 (DP 20), approximately 50 percent of

the major storm runoff would continue north along the west side of the highway, while the remaining 50 percent would overtop the highway and flow to the east. Thus, just downstream of Wagonwheel Drive, the 50- and 100-year flows on the west side of US 95 were 300 and 430 cfs, respectively.

Under historic conditions, runoff from sub-basin H3, H5 and H7 routed to US 95 was computed to be 340 and 440 cfs for the 50- and 100-year storms. Between Wagonwheel Drive and Roberts Road (DP 30), the channel on the west side of US 95 had an estimated capacity of 960 cfs at Wagonwheel Drive decreasing to about 300 cfs at Roberts Road without surcharge due to road overtopping. Culverts in this area were estimated to convey 100 cfs across US 95 from west to east. Including runoff from sub-basin H1, the total flow incident to this area was computed to be 580 and 800 cfs for the two events. However, due to the culverts and the low capacity of the west-side channel of US 95 between Wagonwheel Drive and Roberts Road, only about 360 and 410 cfs would remain in the channel at Roberts Road, and 120 and 290 cfs would have overtopped US 95 between the two streets for the two runoff events.

Historic runoff from sub-basins H2 and H4 was computed to be 827 and 1025 cfs for the 50- and 100-year events. It was estimated that this flow would have been mostly concentrated at the railroad bridge. Aerial photographs indicated that flows through the bridge may have impacted US 95 at various locations between Roberts Road and approximately 1000 feet north of Magic Way (see Figure - 4) For this analysis it was estimated that one-half of these flows would have intercepted the highway between Magic Way (DP 40) and Roberts Road. Total flow incident to this stretch of highway, including the flow remaining after overtopping at DP 30, was 790 and 950 cfs for the two events. However, at Magic Way, roadside channel capacity downstream of Magic Way would have reduced flows on the west side of US 95 to 440 and 490 cfs for the two design storms. Thus, approximately 350 and 460 cfs, respectively, would have overtopped US 95 between DP 30 and DP 40.

In conclusion, the historic drainage analysis indicates that extensive overtopping of US 95 would have occurred as a result of low capacity of the upstream roadside channel. The overtopping would likely have occurred primarily at a few locations, the most prominent of which would be the point where flows from the railroad bridge at the west boundary of sub-basin H4 would have intercepted US 95. Based on review of aerial photographs, this location would have been between Roberts Road and Magic Way and also within 1000 feet downstream of Magic Way. Heavy overtopping would have also occurred at Wagonwheel Drive. The final results of this analysis indicates that, by DP 40, 50-

year flows of 990 cfs would have crossed US 95, through culverts and by overtopping, with 440 cfs remaining on the west side of US 95. For the 100-year analysis, these values were 1400 cfs and 490 cfs, respectively.

B. Existing Conditions

The existing conditions analysis provided estimates of runoff patterns and magnitudes resulting from conditions existing at the time of this study (January 1995). These conditions included sparse development in the tributary basins as well at the existence of I-515 and regional flood control facilities.

The construction of both local and regional drainage facilities in the tributary basins has markedly reduced flood flows along US 95. The greatest flow reductions result from the construction of the Mission Hills regional detention facilities (see Figure-2). These structures have reduced the tributary area by greater than 50 percent compared to historic conditions.

To accommodate existing conditions, sub-basin boundaries were delineated as shown in Figure-6. The upstream drainage boundary is the Mission Hills diversion dike and the downstream boundary is considered to be the historic US 95 alignment. A summary of the runoff analysis for existing conditions is presented in Table-3.

The downstream boundary of sub-basin X1 was estimated to be the existing railroad embankment. This was based on field observations which revealed that a channel has recently been constructed along the upstream side of the railroad with an outfall to the channel at the southwest corner of the Dawson Avenue - Conestoga Way intersection. This outfall point is the inlet to a triple 8' x 4' box culvert, I-515 structure number B-1911, at the upstream end of the I-515/Dawson Channel identified as DP 20 on Figure-6 and constructed as part of the Wagonwheel Interchange contract. A second channel parallel to and downstream of the railroad outfalls to this same location. Runoff from sub-basin X1 to the I-515/Dawson Channel was computed to be 200 and 290 cfs under existing conditions for the 50- and 100-year events (Table-3).

TABLE-3

RUNOFF SUMMARY

EXISTING AND FUTURE BASINS

SUB-BASINS/DESIGN POINTS	50-YEAR FLOW (cfs)		100-YEAR FLOW (cfs)	
	EXISTING	FUTURE	EXISTING	FUTURE
X1/F1	200	360	290	480
X2/F2	150	520	220	640
X3/F3	240	430	300	530
X4/F4	180	260	230	320
X5/F5	110	110	140	140
X6/F6	20	80	30	100
DP 20	310	830	450	1060
DP 30	570	1300	770	1620
DP 40	710	1540	960	1930

Sub-basin X2 includes the area east of the railroad and Dawson Avenue. Runoff from this area will be intercepted by the RW4 ramp embankment and releases will be through 36-, 24-, and 48-inch culverts as well as ramp overtopping. For analysis purposes the 36-inch culvert, with a design discharge of 35 cfs to the east side of US 95, was not included in the HEC-1 model as it was noted that flows through the interchange drainage structures would not be significantly affected by diversions to this culvert. Estimated runoff at DP 20, the combining point for sub-basins X1 and X2, was 310 and 450 cfs for the two design storms.

Sub-basin X3 was assumed to have an upper-basin concentration point at the double 60-inch CMP culverts under the railroad and a basin outfall point at the inlet to I-515 structure number C-1914. This structure is a double 8' x 4' box culvert. Sub-basin X5 includes the area of the Wagonwheel Interchange itself. Sub-basins X1, X2, X3 and X5 were considered to represent all the area tributary to the downstream end of the Wagonwheel interchange drainage structures (DP 30). Total flow at this point was estimated to be 570 and 770 cfs for the 50- and 100-year events, respectively.

Sub-basin X4 includes the area tributary to the railroad bridge located approximately 1200 feet southeast of I-515. Flows from the bridge continue through the triple 7' x 6' box culvert under I-515

(structure number B-1916) and thence northeastward to intercept US 95 between Roberts Road and just downstream of Magic Way. Flows from sub-basin X6 also intercept US 95 in this area. The combined runoff from sub-basins X4 and X6 was approximately 200 and 260 cfs for the 50- and 100-year storms. The total runoff at US 95 and Magic Way (DP 40) from all basins was estimated to be 710 and 960 cfs for the two design storms.

As discussed above and presented in Tables-2 and 3, the modelled runoff tributary to US 95 near Magic Way (DP 40) was reduced under existing conditions as compared to historic conditions. This was primarily due to the regional flood control facilities that have been constructed in the upper basins. However, under historic conditions extensive overtopping of US 95 would have occurred upstream of Roberts Road as well as between Roberts Road and Magic Way. With the I-515 structures now in place, flows will be concentrated near Magic Way and US 95 overtopping will not occur except from this location and further downstream.

HEC-2 modelling performed for existing conditions produced an estimated capacity in excess of 2800 cfs for the recently regraded channel reach just downstream of the I-515/Dawson Channel outfall (see Figure-7). However, at sections 84300 (Magic Way) and 84100, partial regrading produced channel capacities of 650 and 450 cfs, respectively. At section 83900 the channel remains in its historic condition with a capacity of 320 cfs before overtopping of US 95.

The existing conditions runoff near Magic Way was estimated to be 710 and 960 cfs for the two design storms (Table-3, DP 40). Due to low channel capacity near Magic Way (Section 83900), 290 and 460 cfs would overtop US 95 near this location for the two events. This was slightly less than the 350 and 460 cfs overtopping estimated in this area under historic conditions.

The results described above indicate that the combination of regional flood control facilities and I-515 structures has produced relatively little change in total flow or overtopping of US 95 near Magic Way. Although it was estimated that US 95 overtopping is less under existing conditions as compared to historic, such differences are considered to be within the error of the analysis. It was therefore assumed that no significant change in runoff flows near Magic Way has occurred between historic and existing conditions. Further upstream, it was apparent that the I-515 structures have eliminated the historic overtopping of US 95 and thus provide significant benefits to the previous flood-prone areas east of US 95 in this area.

C. Future Conditions

The modelling of future conditions maintains the same sub-basin and routing configurations as the existing conditions analysis, and the only change between the two scenarios is the degree of development (Figure-6). The future condition assumes that all developable land is built out to its full development capacity, with land uses in conformance with those presented in the Master Plan.

The future conditions runoff modelling results are presented in Table-3. It is shown that compared to existing conditions, runoff will markedly increase. The I-515/Dawson Channel discharge was estimated to be 1300 and 1620 cfs for the 50- and 100-year events. This represents an increase of more than double the existing conditions runoff. However, these flows are still well below the estimated outfall channel capacity of 2800 cfs.

Further downstream at DP 40, future flows were estimated to be 1540 and 1930 cfs for the two design storms. With the existing channel configuration (historic) maintained at section 83900, flows overtopping US 95 in this area will be 890 and 1180 cfs for the 50- and 100-year events. This compares with an existing conditions overtopping of 290 and 460 cfs for the same general area.

D. Discussion of Runoff Results

As presented above, the construction of I-515 and regional detention facilities in the subject area have resulted in no significant change in modelled major storm runoff overtopping of US 95 near Magic Way. The I-515 structures have eliminated overtopping of US 95 upstream of Roberts Road. Downstream of Roberts Road, overtopping of US 95 will continue in a pattern similar to that of historic conditions. Historic runoff characteristics appear to have been those of the somewhat random pattern of flooding on alluvial fans, while the existing drainage patterns will be more controlled due to the drainage structures associated with I-515 and other development further up-basin.

Under future development conditions, the same problems noted for existing conditions are expected, although with greater flow magnitudes. Detention within sub-basin F2 will need to be implemented to maintain runoff at pre-development rates. Also, without local detention implemented to maintain runoff at historic rates, future development will increase US 95 overtopping and associated flooding near Magic Way.

VI. RECOMMENDATIONS

Based on the results of this analysis, it is clear that the construction of the I-515 and Regional Drainage Facilities have significantly reduced the potential for flooding of areas east of US 95 upstream of Magic Way from sources west of US 95. In addition, runoff from the study area to US 95 north of Magic Way has not significantly changed between historic and existing conditions. It is expected that overtopping of US 95 north of Magic Way will continue in the future (as it has historically) until an outfall channel is constructed to convey runoff northwest from said location to the proposed C-1 channel crossing of US 95.

Based upon this analysis, we recommend the following:

1. Coordination between Clark County, the City of Henderson and NDOT should be pursued to assure that development in Basin X2/F2 properly detains runoff such that the capacity of NDOT's culverts at the Wagonwheel interchange will not be exceeded.

2. Coordination between Clark County, the City of Henderson and NDOT should be pursued for the planning of future local drainage facilities downstream of Magic Way. Such planning could include detention and/or an outfall channel which could potentially parallel US 95 from Magic Way northwest to the proposed C-1 channel crossing of US 95. Such a channel could be constructed in phases as long as the channel's capacity is maintained along the entire length in each phase. Construction of only a partial segment of such a channel would create more of a problem since runoff would be conveyed partially downstream and then would overtop US 95 at a location possibly not subject to historic flooding. If the channel is not constructed, additional upstream detention will be required in order to avoid future overtopping flows in excess of historic and existing overtopping.

3. The existing drainage ditch on the west side of US 95 northwest of Magic Way does not have capacity to carry the existing 50-year flows without overtopping of US 95. Although this is similar to historic conditions, NDOT may want to consider improvements in the future to reduce or alleviate this condition. Additional hydrologic analysis of the area tributary to US 95 between Magic Way and the proposed C-1 channel crossing of US 95 will be necessary to properly size alternatives to resolve this problem.

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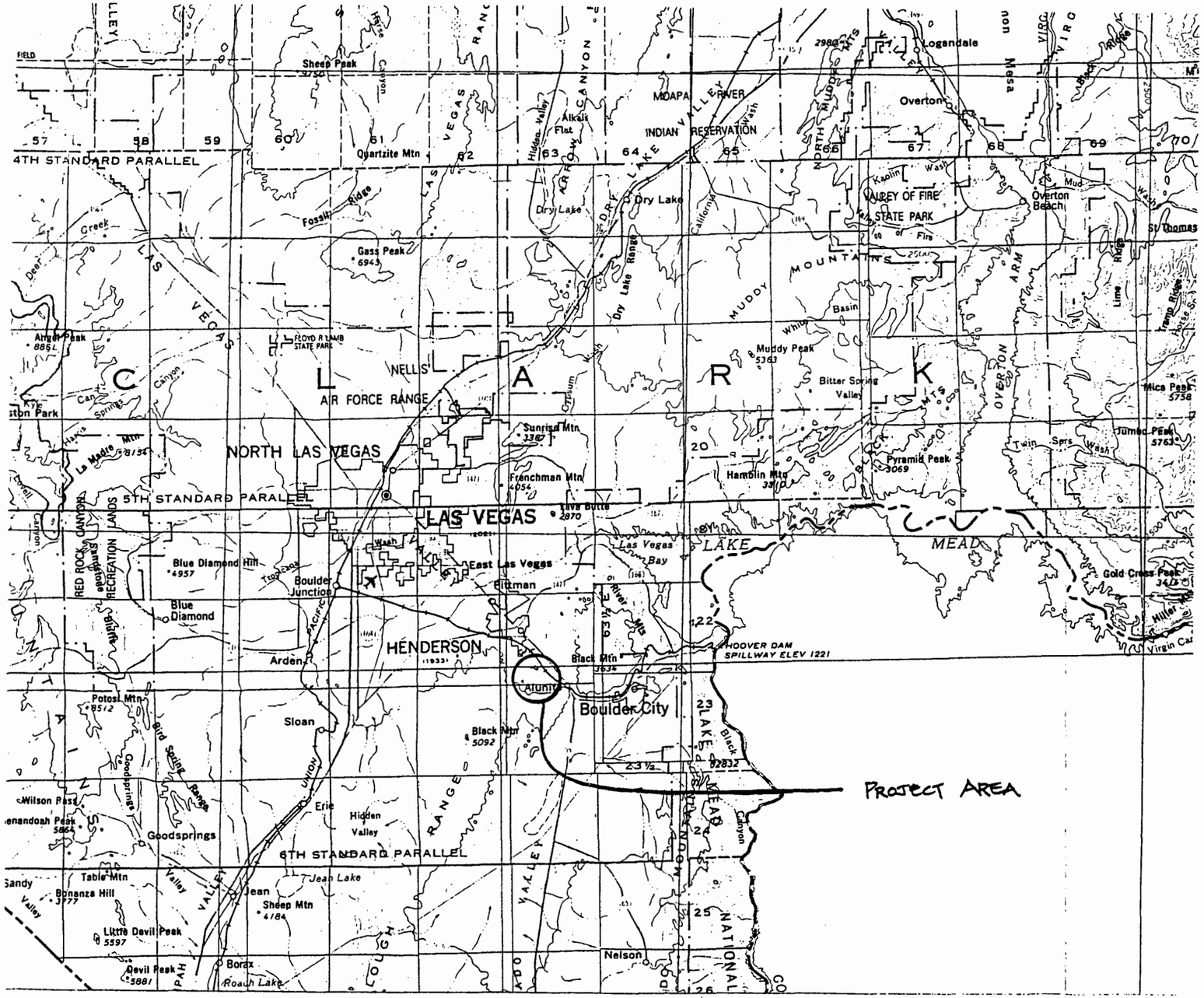
FIGURES



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WRC NEVADA, INC.
LAS VEGAS, NEVADA

JANUARY
1995

BOULDER HIGHWAY / WAGONWHEEL INTERCHANGE AREA DRAINAGE ANALYSIS

FIGURE - 1
VICINITY MAP

REGIONAL FLOOD CONTROL DISTRICT

1991 FLOOD CONTROL MASTER PLAN UPDATE LAS VEGAS VALLEY

LEGEND

- EXISTING MASTER PLAN FACILITIES
- LOCAL OR UNSTUDIED FACILITIES
- BRIDGE
- CULVERT
- DEBRIS BASIN
- DETENTION BASIN
- DIKE / LEVEE
- PIPELINE
- NATURAL WASH
- FLOODWAY
- UNLINED IMPROVED CHANNEL
- LINED CHANNEL
- DROP STRUCTURE
- SECONDARY FACILITY
- ENVIRONMENTAL AREAS

WRC FIGURE-2

N

0 1500 3000 4500

(APPROXIMATE)

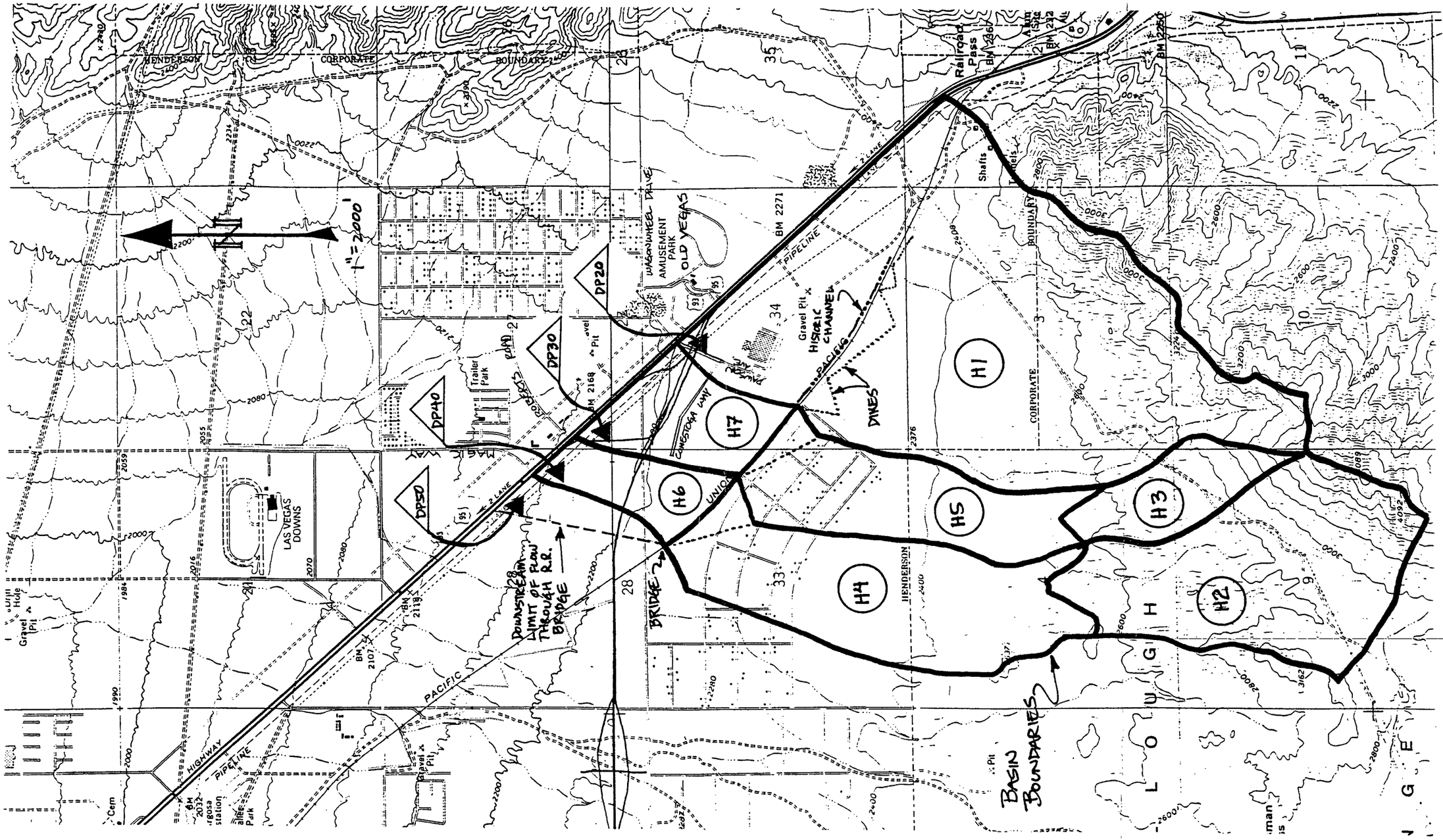
FLOOD CONTROL FACILITIES AND ENVIRONMENTAL AREAS

FIGURE F-24

JMM James M. Montgomery Consulting Engineers, Inc.

Las Vegas, Nevada

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
	25	26	



1883.– 188301.DWG 1-31-95 EJM

WRC NEVADA, INC.
LAS VEGAS, NEVADA

JANUARY
1995

BOULDER HIGHWAY / WAGONWHEEL INTERCHANGE AREA
DRAINAGE ANALYSIS

FIGURE-3
HISTORIC DRAINAGE SUB-BASINS

BASE MAP: NDOT AERIAL PHOTOGRAPH 10/12/94

1883.– 188301.DWG 1-31-95 EJM

WRC NEVADA, INC. LAS VEGAS, NEVADA

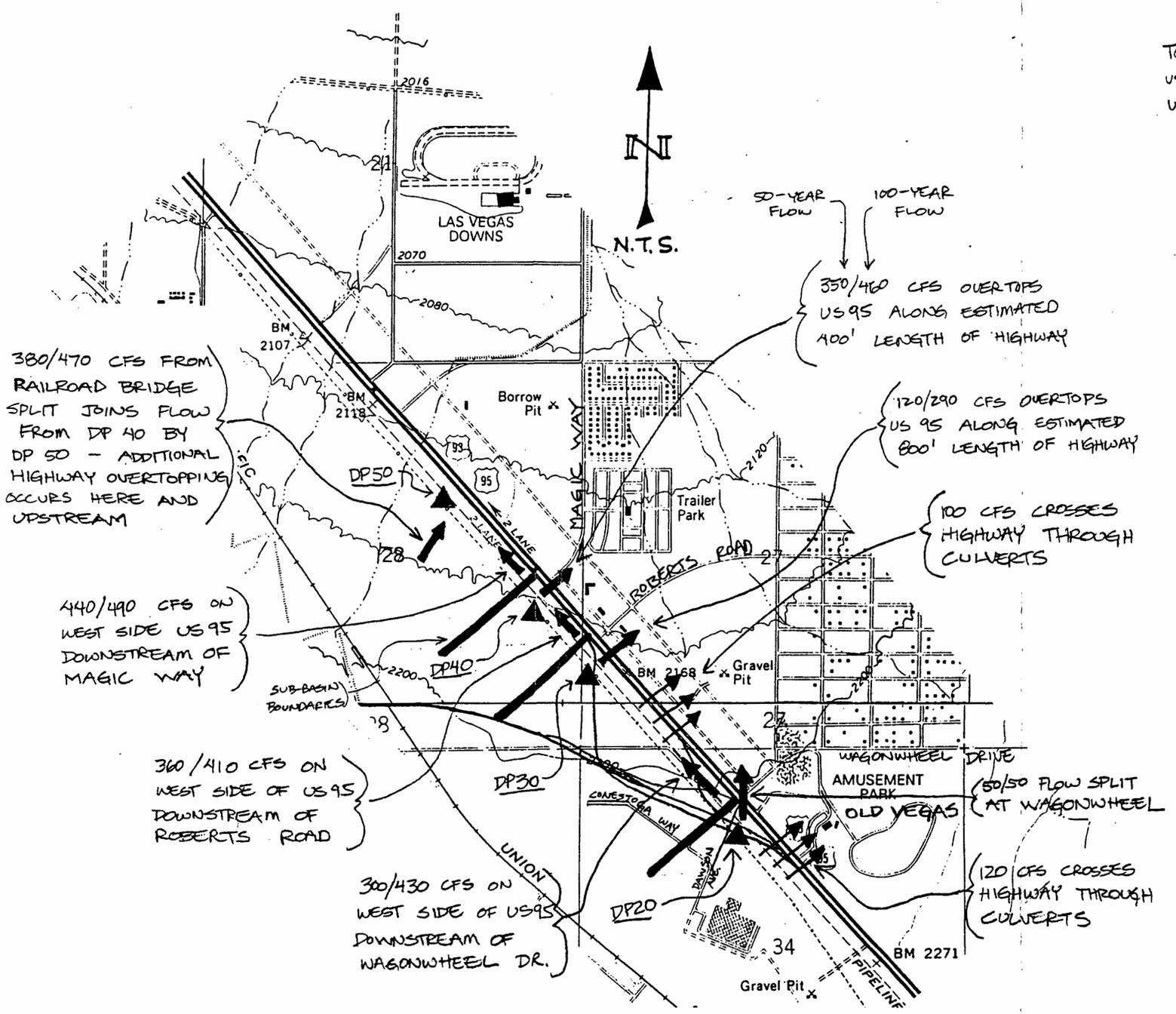
JANUARY 1995

BOULDER HIGHWAY / WAGONWHEEL INTERCHANGE AREA DRAINAGE ANALYSIS

FIGURE-4 ESTIMATED DRAINAGE PATTERNS - HISTORIC CONDITIONS

TOTAL FLOW OVERTOPPING US 95 IN STUDY AREA UPSTREAM OF DP 40:

HISTORIC = 1040/1460 CFS



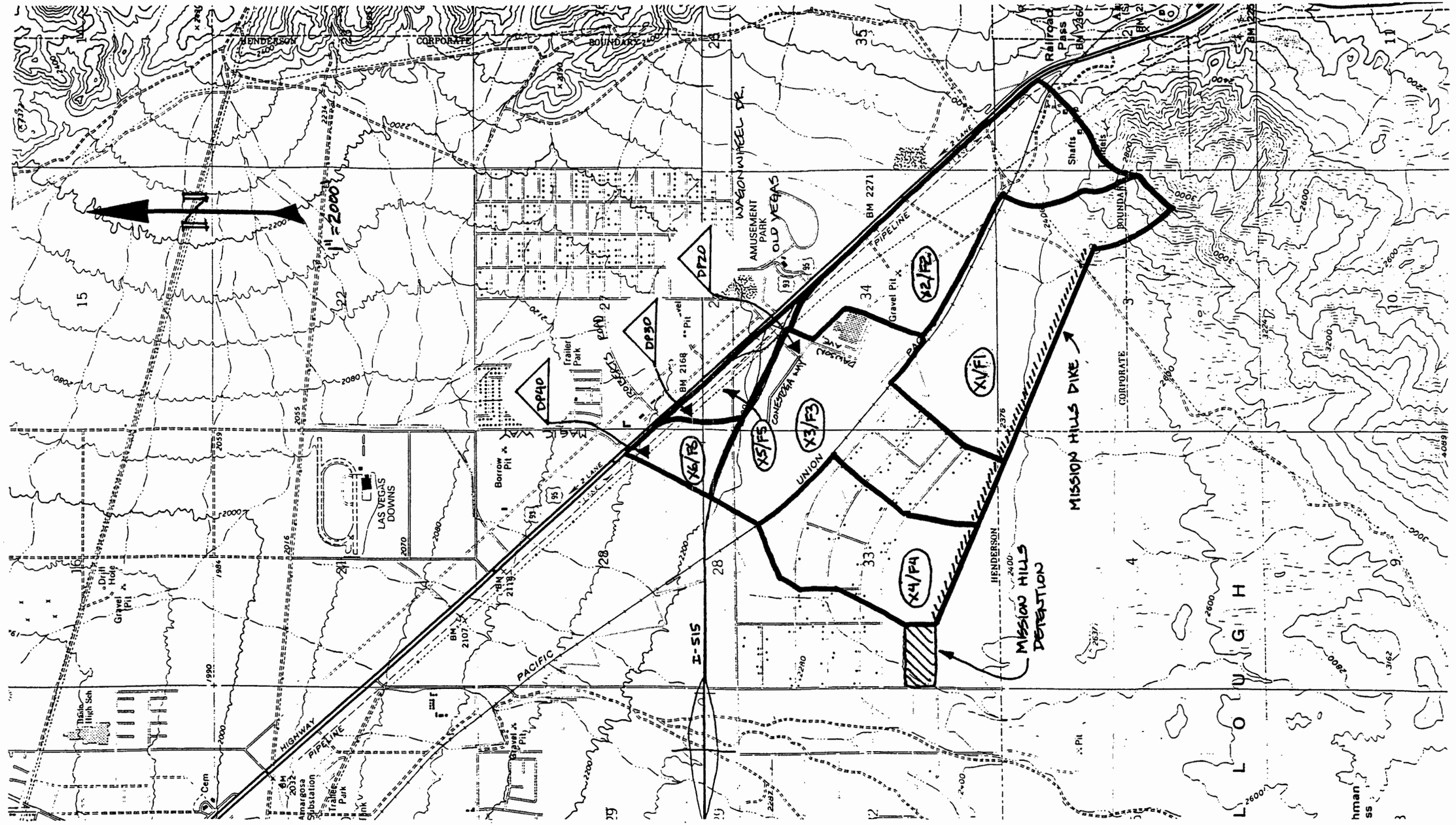
1883.- 188301.DWG 1-31-95 EJM

WRC NEVADA, INC.
LAS VEGAS, NEVADA

JANUARY 1995

BOULDER HIGHWAY / WAGONWHEEL INTERCHANGE AREA DRAINAGE ANALYSIS

FIGURE-5
HISTORIC FLOWS DIAGRAM



1883,- 188301.DWG 1-31-95 EJM

WRC NEVADA, INC.
LAS VEGAS, NEVADA

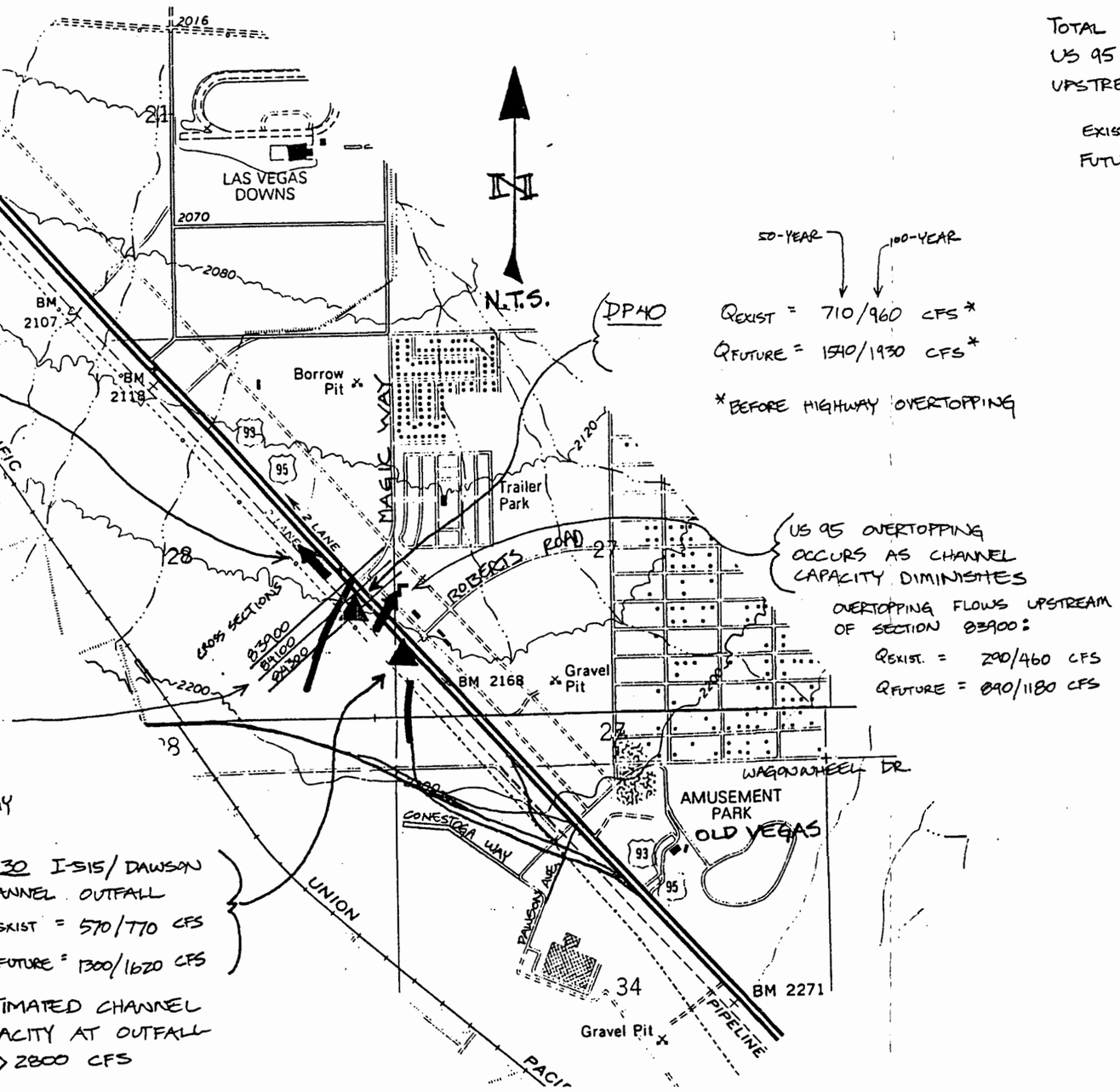
JANUARY
1995

BOULDER HIGHWAY / WAGONWHEEL INTERCHANGE AREA
DRAINAGE ANALYSIS

FIGURE-6 EXISTING/FUTURE
DRAINAGE SUB-BASINS

TOTAL FLOW OVERTOPPING US 95 IN STUDY AREA UPSTREAM OF DP 40:

EXISTING = 290/460 CFS
FUTURE = 890/1180 CFS



420/500 CFS EXISTING
650/750 CFS FUTURE
ON WEST SIDE OF US 95
DOWNSTREAM OF
MAGIC WAY

50-YEAR → Q_{EXIST} = 710/960 CFS*
100-YEAR → Q_{FUTURE} = 1540/1930 CFS*

*BEFORE HIGHWAY OVERTOPPING

US 95 OVERTOPPING OCCURS AS CHANNEL CAPACITY DIMINISHES

OVERTOPPING FLOWS UPSTREAM OF SECTION 83900:

$Q_{EXIST.}$ = 290/460 CFS
Q_{FUTURE} = 890/1180 CFS

*ESTIMATED CHANNEL CAPACITIES:

SECTION	CAPACITY (CFS)
83900	320
84100	450
84300	650

*BEFORE OVERTOPPING HIGHWAY

DP 30 I-515/DAWSON CHANNEL OUTFALL
Q_{EXIST} = 570/770 CFS
Q_{FUTURE} = 1300/1620 CFS

ESTIMATED CHANNEL CAPACITY AT OUTFALL IS > 2800 CFS

1883.- 188301.DWG 1-31-95 EJM

WRC NEVADA, INC.
LAS VEGAS, NEVADA

JANUARY 1995

BOULDER HIGHWAY / WAGONWHEEL INTERCHANGE AREA DRAINAGE ANALYSIS

FIGURE-7
EXISTING/FUTURE FLOWS DIAGRAM

APPENDIX A

RAINFALL CALCULATIONS

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 1 OF 6
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 12/29/94
CHKD. BY: AJL DATE 4/10/95
REV. BY: _____ DATE __/__/__

SUBJECT: RAINFALL CALCS.

(1) NOAA RAINFALL
FROM CCRFCD CRITERIA FIGS 501-6

SIX-HOUR STORM DEPTHS

FREQUENCY (yr)	Depth (in)
2	1.00
5	1.25
10	1.50
25	1.84
50	2.08
100	2.30

FROM STADD. FORM 3

i_{50}	= 2.06	* 1.39 ✓ =	2.86
i_{100}	= 2.3	* 1.43 ✓ =	3.29

(2) Precip Adj Ratio (Table 501)

R_{50} = 1.39

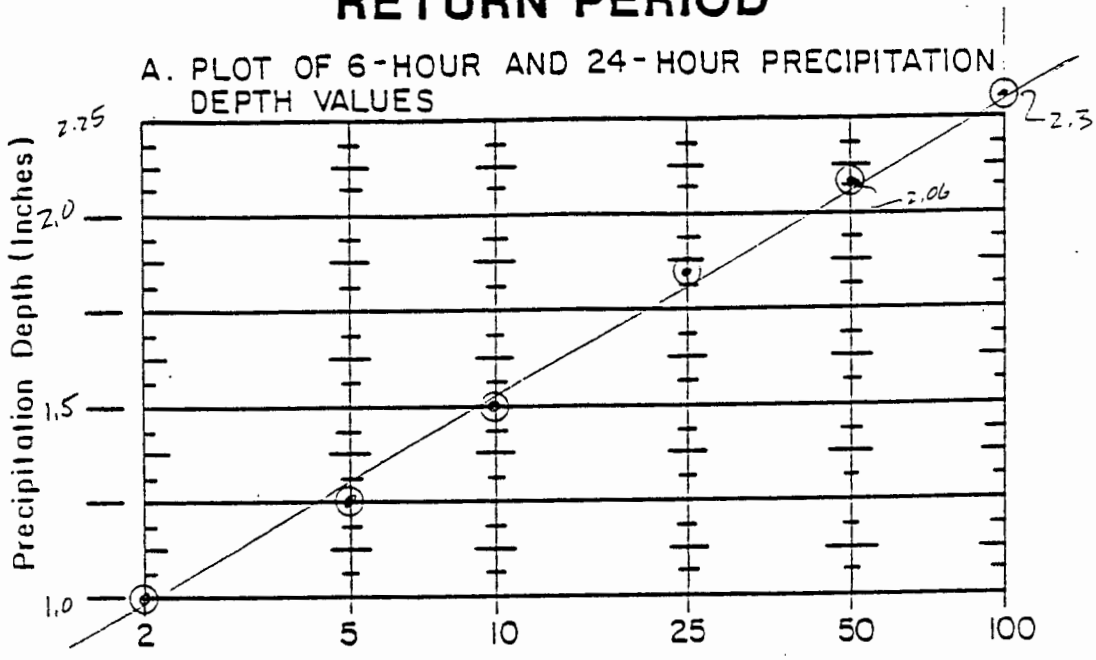
R_{100} = 1.43

(3) Depth-Area Reduction Factors
Use Table 502

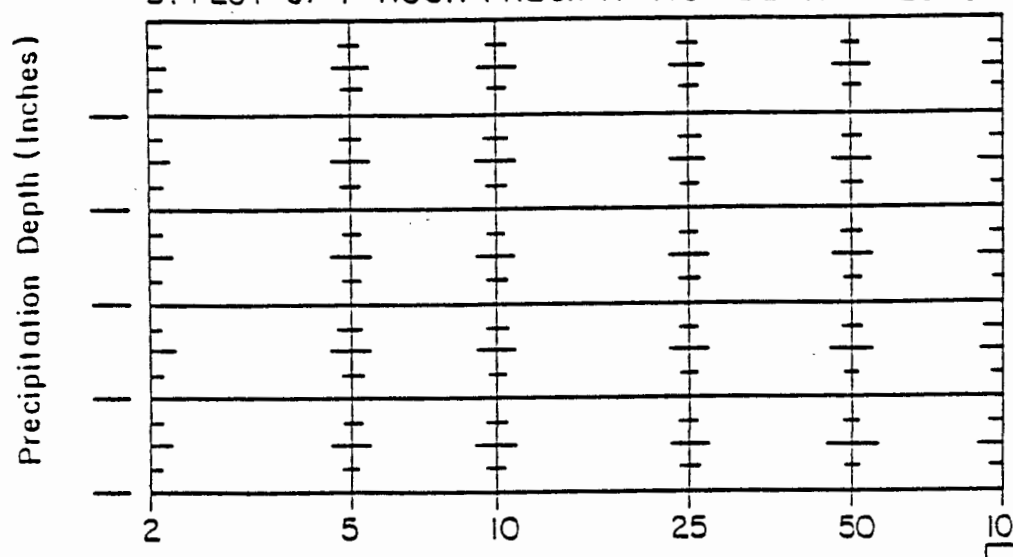
(4) Use SDN 3 Distribution ✓

PRECIPITATION DEPTH VERSUS RETURN PERIOD

A. PLOT OF 6-HOUR AND 24-HOUR PRECIPITATION DEPTH VALUES



B. PLOT OF 1-HOUR PRECIPITATION DEPTH VALUES



Revision	Date

REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973

STANDARD FORM 3

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
3. Tables 505 and 506 require no adjustments.

Revision	Date

SIX HOUR DEPTH-AREA REDUCTION FACTORS

Drainage Area (Square Miles)	Six-Hour Depth-Area Reduction Factor
0.0	1.00
0.5	0.98
1.0	0.97
2.0	0.93
4.0	0.91
6.0	0.90
8.0	0.88
10.0	0.86
20.0	0.79
30.0	0.74
50.0	0.68
100.0	0.60
150.0	0.55
200.0	0.51
300.0	0.46
400.0	0.42
500.0	0.39

NOTES: 1. A graphical representation of these factors is presented in Figure 514.

2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

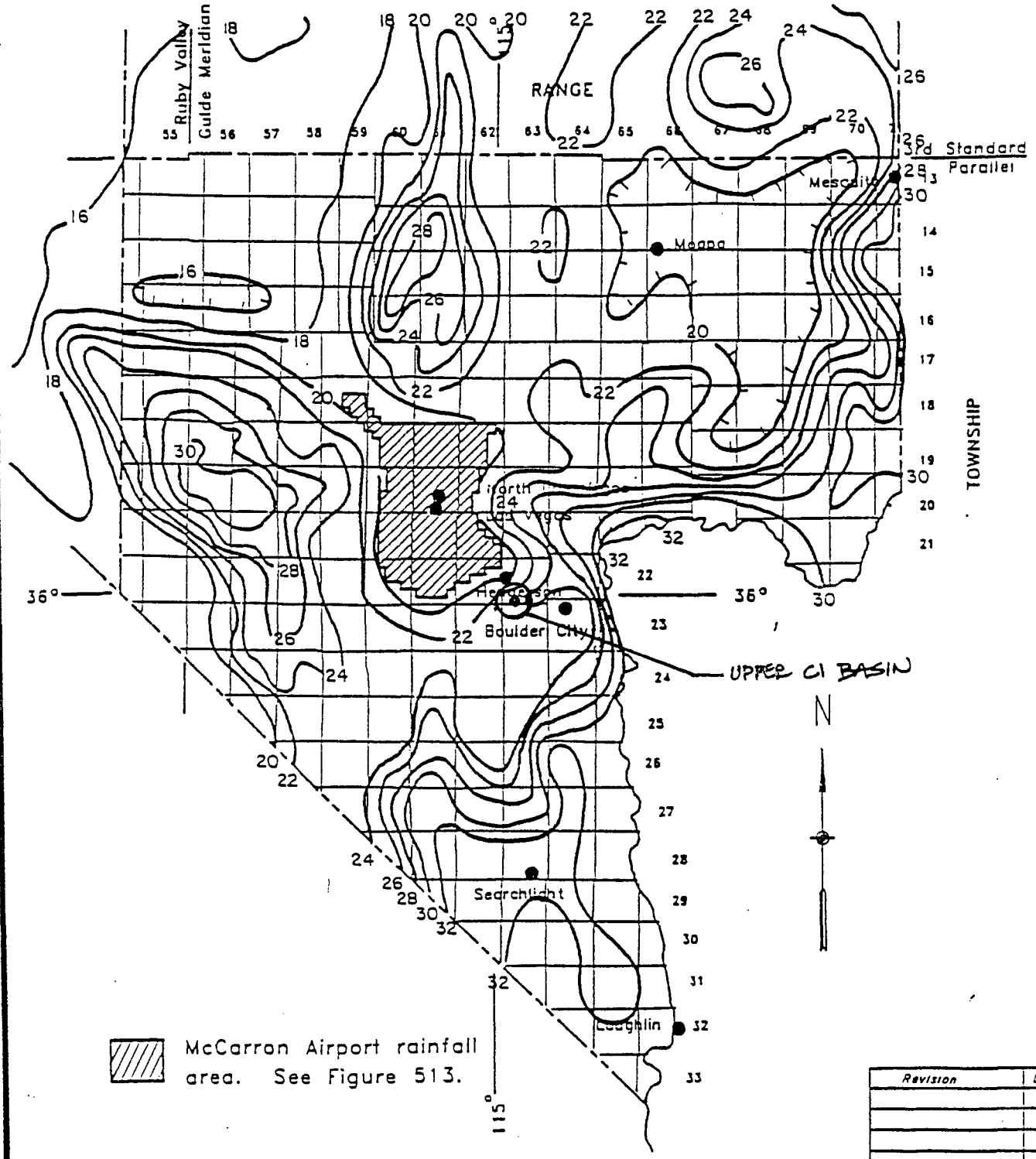
Storm Time (In Minutes)	Percent of Total Storm Depth SDN 3	SDN 5	Storm Time (In Minutes)	Percent of Total Storm Depth SDN 3	SDN 5
0	0.00	0.00	185	32.20	43.00
5	2.00	2.00	190	35.20	47.70
10	5.70	5.90	195	40.90	51.40
15	7.00	8.00	200	49.90	56.10
20	8.70	11.00	205	59.00	63.00
25	10.80	14.40	210	71.00	71.00
30	12.40	15.00	215	74.40	72.00
35	13.00	16.00	220	78.10	73.10
40	13.00	16.80	225	81.20	75.20
45	13.00	17.10	230	81.90	77.90
50	13.00	18.00	235	83.50	79.00
55	13.00	18.20	240	85.10	79.50
60	13.00	18.70	245	85.60	80.40
65	13.30	19.00	250	86.00	81.00
70	14.00	19.70	255	86.80	82.00
75	14.20	20.20	260	87.60	82.60
80	14.80	21.00	265	88.80	84.00
85	15.80	22.00	270	91.00	85.90
90	17.20	23.00	275	92.60	88.90
95	18.10	24.10	280	93.70	91.00
100	19.00	25.00	285	95.00	93.80
105	19.70	25.90	290	97.00	96.60
110	19.90	26.50	295	97.60	97.00
115	20.00	28.00	300	98.20	97.40
120	20.10	29.00	305	98.50	97.90
125	20.40	30.00	310	98.70	98.10
130	21.40	30.50	315	98.90	98.30
135	22.90	30.90	320	99.00	98.50
140	24.10	31.00	325	99.30	98.90
145	24.90	31.70	330	99.30	99.00
150	25.10	32.10	335	99.40	99.20
155	25.60	32.70	340	99.50	99.30
160	27.00	33.30	345	99.80	99.60
165	27.80	34.60	350	99.80	99.70
170	28.10	36.10	355	99.90	99.90
175	28.30	38.10	360	100.00	100.00
180	29.50	40.80			

Notes:
1. For drainage areas less than 10 square miles in size, use SDN 3.
2. For drainage areas equal to or greater than 10 square miles in size, use SDN 5.
3. A graphical representation of these values is presented on Figure 515.

Revision	Date

WRC ENGINEERING	REFERENCE: USACE, Los Angeles District, 1988	TABLE 503

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

APPENDIX B

HYDROLOGIC CALCULATIONS

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD—SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

JOB NUMBER: 1883 SHEET 1 OF ___
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 1/10/95
CHKD. BY: AR DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: BASIN PARAMETERS - HISTORIC CONDITIONS

BASIN AREAS

1"=2000'

BASIN	Area (in^2)	Area (mi^2)
H1	10.45	1.50
H2	4.9	0.70
H3	1.4	0.20
H4	4.35	0.62
H5	2.65	0.38
H6	1.00	0.14
H7	1.50	0.22

CURVE NOS.

Basin H1

Soils		Land Use		CN
		I	O	
33%	A		100%	55
34%	C		100%	81
33%	D		100%	86

$CN = .33(55) + .34(81) + .33(86)$

$\boxed{CN = 74}$ ✓

I = industrial
O = open - Fair Desert Shrub
L = Low Dens. Resid ⇒ 1/4 Lots

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 2 OF ____
JOB NAME: Bldr. Hwy
CALC. BY: RJV DATE 1/10/95
CHKD. BY: AAL DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Basin H2

Soil		Land Use	CN
~10%	C	100% open	81
~90%	D		86

$CN = 0.1(81) + 0.9(86)$

$\boxed{CN = 86.0}$ ✓

Basin H3

~30%	C	Adl' open	81
~70%	D		86

$CN = 0.3(81) + 0.7(86)$

$\boxed{CN = 84.5}$ ✓

Basin H4

		L	D	L	D
100%	C	~25%	~75%	84	81

$CN = 0.25(84) + 0.75(81)$

$\boxed{CN = 82}$ ✓

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD—SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

JOB NUMBER: 1883 SHEET 3 OF ____
JOB NAME: Bldr. Hwy
CALC. BY: RJV DATE 1/10/95
CHKD. BY: AR DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Basin #5

Soil		Land Use		CN	
		L	O	L	O
~40%	A		100%		55
~60%	C	60%	40%	85	81

$CN = .4(55) + .6(.6(85) + .4(81))$

$\boxed{CN = 72}$ ✓

Basin #6

~33%	A	100%	O	55
~67%	C			81

$CN = .33(55) + .67(81)$

$\boxed{CN = 72}$ ✓

Basin #7

		O	O
~15%	A	100%	55
~85%	C	100%	81

$CN = .15(55) + .85(81)$

$\boxed{CN = 77}$ ✓

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 4 OF ___
JOB NAME: Bldr Hwy
CALC. BY: RJV DATE 1/10/95
CHKD. BY: AR DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: Parameters – Historic

Rainfall

$I_{50} = 2.86$

$I_{100} = 3.29$

Basin	Area	DAR	
H1	1.5	0.95	
H2	0.7	0.98	
H3	0.2	1.0	
H4	0.62	0.98	
H5	0.38	0.98	
H6	0.14	1.0	
H7	0.22	1.0	
Comb 1	0.58	0.98	H3+H5
2	0.80	0.97	H3+H5+H7
3	2.3	0.93	H1+H3+H5+H7
4	1.32	0.96	H2+H4
5	1.46	0.95	H2+H4+H6
TLAG 6	3.76	0.91	ALL

Basin H1

$K_n = 0.035$

$L = 1.98$ mi

$L_c = 0.85$ mi

$\Delta Z = 3264 - 2240 = 1000$

$S \simeq 1000 / 1.98 = 505$ ft/mi

* $T_{LAG} = 20 K_n (L L_c / \sqrt{S})^{0.33}$

$= 20(.035)(1.98(0.85)/\sqrt{505})^{0.33}$

$T_{LAG} = 0.293$

(* CCRFCD Manual Eqn. 63)

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 5 OF ___
JOB NAME: Blue Hwy
CALC. BY: RJV DATE 11/10/95
CHKD. BY: ATL DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: ___

TLAG (Via CCRFCD Manual, eqns 601, 602, 612)

Basin	CN	K	L_o (ft)	S (%)	t_i (min)	L (ft)	t_t ** velocity (fps)	t_t (min)	t_c	TLAG (HR)
H2	86	0.75	300	20	4.0	7600	4.5	28.1	32	.32
H3	84	0.72	300	24	4.1	4700	5.0	15.7	20	.20
H4	82	0.69	300	4.3	7.9	8400	2.1	66.7	75	.75
H5	72	0.56	300	3.9	10.7	6900	2.0	57.5	68	.68
H6	72	0.56	300	2.2	12.9	3700	1.5	41.1	54	.54
H7	77	0.63	300	2.6	10.7	4200	1.6	43.8	54	.54

Basin	Elev. up	Elev. down	ΔZ
H2	4080	2520	1560
H3	3720	2530	1190
H4	2600	2230	370
H5	2530	2250	280
H6	2250	2160	90
H7	2280	2165	115

$K = .032\,CN - 0.39$

** Per Figure 602

$t_i = 1.8(111 - K)\sqrt{L} / \sqrt[3]{S}$

$TLAG = 0.6\,t_c$

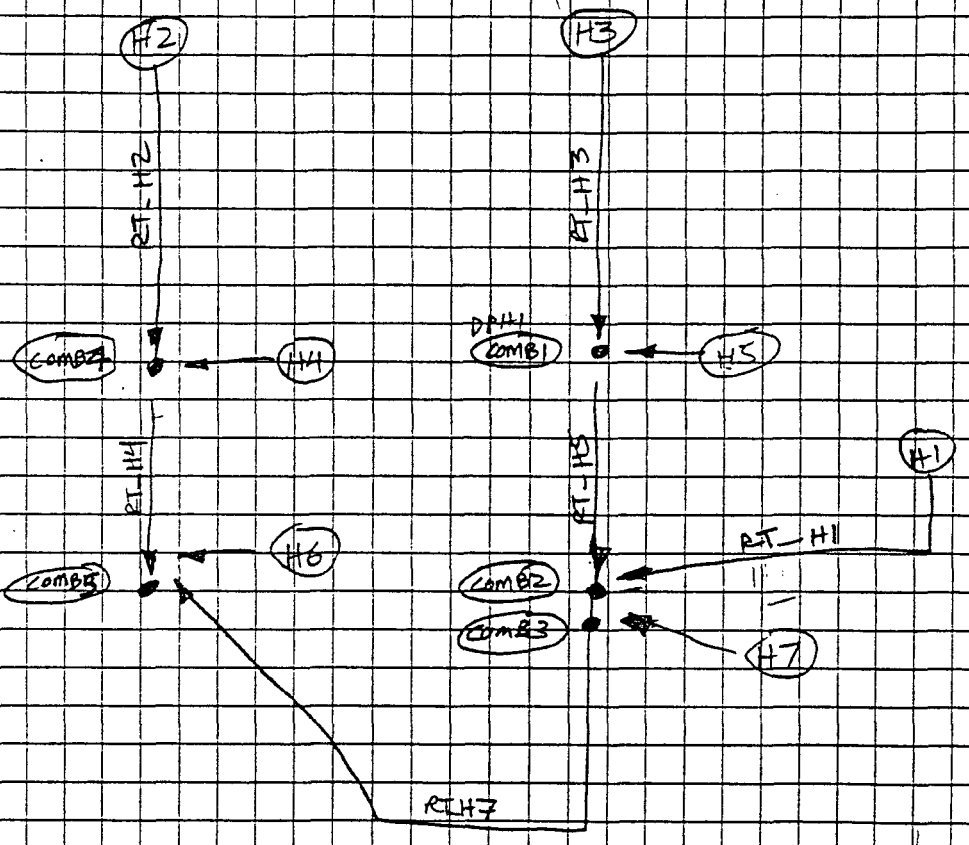
$t_c = t_i + t_t$

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 7883 SHEET 6 OF ___
JOB NAME: Bldr. Hwy
CALC. BY: RJC DATE 1/10/95
CHKD. BY: AQ DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: Parameters – ~~Existing~~ Historic

Routing



Element	L	n	S (ft/ft)	Shape	B	SS
RTH3	6500	.035	.042	TRAP	20	6
RT-H1	2800	.035	.014			
RT_H5	3300	.035	.027			
RT-H7	1100	.035	.027			
RT_H2	7500	.035	.039			
RT_H4	3000	.035	.026			

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 1 OF ____
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 1/4/95
CHKD. BY: AJL DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: BASIN PARAMETERS – Existing Conditions

Curve #'s

Basin X1

Soils		Land Use	CN
		O	
~50%	A	100%	55
~30%	C	100%	81
~20%	D	100%	96

$CN = .5(55) + .3(81) + .2(96)$

CN = 69

Basin X2

Soils		Land Use		CN	
		I	O	I	O
~50%	A		100%	81	55
~30%	C	10%	90%	91	81
~20%	D		100%	93	86

$CN = .5(55) + .3(.1(91) + .9(81)) + 0.2(86)$

CN = 69.3

Basin X3

		Land Use		CN	
		L	O	L	O
~5%	A		100%	64	55
~95%	C	50%	50%	85	81

$CN = .05(55) + .95(.5(85) + .5(81))$

CN = 81.6

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 2 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJU DATE 1/4/94
CHKD. BY: AR DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: Parameters – Existing conds.

Basin X4

~ 100 % C

Land use		CN	
2	0	4	0
70 %	30 %	85	81

$CN = .7(85) + .3(81)$

$\boxed{CN = 84}$

Basin X5

		Land use	CN
~25%	A	~40% Paved	72
~75%	C	~60% desert	88

$CN = .25(72) + .75(88)$

$\boxed{CN = 84}$

Basin X6

			CN
~60 %	A	100% open	55
~40 %	C		81

$CN = .6(55) + .4(81)$

$\boxed{CN = 65}$

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

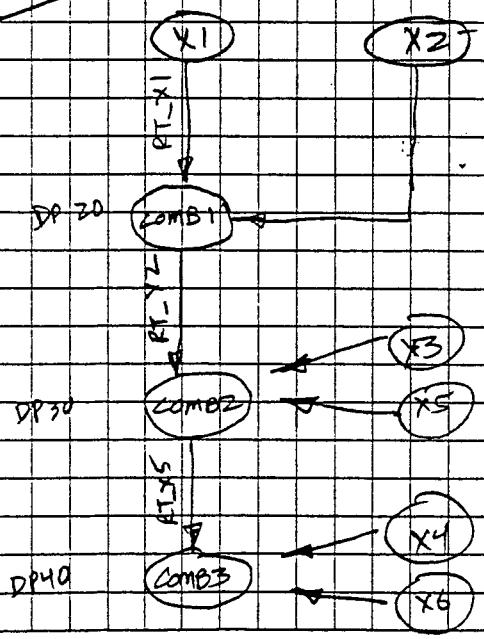
JOB NUMBER: 1883 SHEET 3 OF ____
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 1/4/95
CHKD. BY: [illegible] DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Rainfall

BASIN	Area (mi^2)	Precip Adj.	NOAA Rain	Adj Rain	DAR
X1	0.49				0.98
X2	0.50				.98
X3	0.44	1.39	2.06	2.86	.98
X4	0.30				.99
X5	0.12				1.0
X6	0.07	1.43	2.30	3.29	1.0
X1+X2	0.99				0.97
X1+X2+X5+X3	1.55				0.95
All Basins	1.92				0.93

Routing



WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD—SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

JOB NUMBER: 883 SHEET 4 OF ____
JOB NAME: Boulder Heavy
CALC. BY: ATV DATE 1/5/95
CHKD. BY: AR DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: PARAMETERS - EXIST.

TLAG calcs. via Time of Concentration
(Per CCRFCD criteria)

$$T_{LAG} = 0.6\, t_c \qquad \text{(eq. 612)}$$

$$t_c = t_i + t_x \qquad \text{(eq. 601)}$$

$$t_i = \frac{1.8(1.1-K)\sqrt{L}}{\sqrt[3]{S}} \qquad \text{(eq. 602)}$$

where, $K = .0132\, CN - 0.39$ (eq. 603)

L_o = overland flow length

S = avg. basin slope (%)

CN = curve #

t_x ⇒ from hydraulic flow analysis (see Eq. 602)

BASIN	CN	K	L_o (ft)	S (%)	t_i (min)	L (ft)	t_x velocity (fps)	t_x (min)	t_c (min)	T_{LAG} (hr)
X1	69	0.52	300	12	6.5	3700	4.7	13.1	19.6	0.20
X2	69	0.52	300	10	8.4	6200	3.2	32.3	40.7	0.41
X3	82	0.69	300	3.1	8.8	5700	1.8	52.7	61.5	0.62
X4	84	0.72	300	2.0	9.4	4200	1.4	50.0	59.4	0.59
X5	84	0.72	200	1.6	8.3	2800	2.5	18.7	27.0	0.27
X6	65	0.47	200	1.8	13.2	2060	1.4	23.8	37.0	0.37

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PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1083 SHEET 1 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/9/95
CHKD. BY: AJL DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: BASIN PARAMETERS - FUTURE DEVELOPMENT

AREAS

1" = 200'

BASIN	AREA (in²)	(mi²)
F1		0.49
F2		0.50
F3		0.44
F4	2.1	0.30
F5		0.12
F6	.50	0.07

CURVE NOs.

Basin F1

Soils:			Land Use L	Land Use O	CN L	CN O
	~50%	A	100%		64	
	~30%	C	100%		85	
	~20%	D		100%		86

CN = .5(64) + .3(85) + .2(86)

CN = 75

Basin F2

Soils:			Land Use I	Land Use O	CN I	CN O
	~50%	A	100%		81	
	~30%	C	100%		91	
	~20%	D		100%		86

CN = .5(81) + .3(91) + .2(86)

CN = 85

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FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 2 OF ___
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/9/95
CHKD. BY: ATL DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: Parameter — Future Cond.

CN's (cont)

Basin F3

Soil			Land use		CN	
			L	I	L	I
	25%	A		100%		81
	295%	C	50%	50%	85	91

$CN = .05(81) + .95(.5(85) + .5(91))$

$\boxed{CN = 88}$

Basin F4

40% Type C soil 100% Land Use L

$\boxed{CN = 85}$

Basin F5

				CN
25%	A	100% Highway interchange	use 40% Paved	(.4)98 + .6(55)
75%	C		60% Desert	.4(98) + .6(81)

A = 72
C = 88

$CN = .25(72) + .75(88)$

$\boxed{CN = 84}$

Basin F6

			CN
60%	A	100% I	81
40%	C		91

$CN = .6(81) + .4(91)$

$\boxed{CN = 85}$

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FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 3 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/9/95
CHKD. BY: ATR DATE 1/10/95
REV. BY: ____ DATE ___/___/___

SUBJECT: Parameters – Future Conds.

RAINFALL

BASIN	AREA (mi²)	Prec. adj	24HR Rain (in)	Adj Rain (in)	DAR
F1	0.49	50-yr			0.98
F2	0.50	1.39	2.06	2.86	0.98
F3	0.44	100-yr			0.98
F4	0.30				0.99
F5	0.12	1.43	2.30	3.29	1.00
F6	0.07				1.00
F1+F5	0.61				0.98
F1+F5+F3+F2	1.55				0.95
F4+F6	0.37				0.99
F1+F3+F4+F5+F6+F2	1.92				0.93 (0.95 ?)

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PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

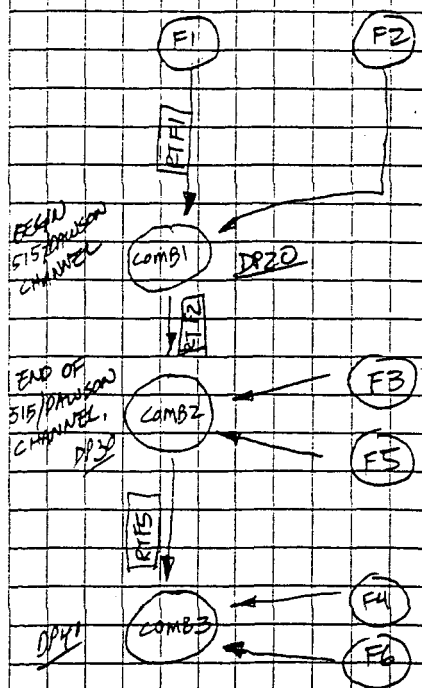
JOB NUMBER: 1803 SHEET 4 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/9/95
CHKD. BY: AJL DATE 4/11/95
REV. BY: ____ DATE __/__/__

SUBJECT: Parameters - Future Conditions

FLAG

BASIN	CN	K	Lo (ft)	S (%)	t_i (min)	L (ft)	t_{travel} (fps)	t_c (min)	t_L	TLAG (hr)
F1	75	0.6	300	22	5.6	3700	7.0	8.8	14	0.14
F2	85	0.73	300	10	5.4	6200	6.0	17.2	22.6	0.23
F3	88	0.77	300	3.1	7.1	5700	3.6	26.4	33.5	0.34
F4	85	0.73	300	2.0	9.2	4200	2.7	25.9	35.1	0.35
F5	84	0.72	200	1.6	8.3	2800	2.5	18.7	27.0	0.27
F6	85	0.73	200	1.8	7.7	2000	2.7	12.3	29.0	0.2

RATINGS



Route Params

	L	S	n	Shp.	B	SD
RTF1	2200	.027	.035	Trap	10	3
RTF2	3200	.005	.030	Trap	45	2
RTF5	1000	.01	.030	Trap	30	3

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
→ 1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
1 ACRE ADJ. FOR DESERT LANDSCAPE	20	64	78	85	87
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 603
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figure 603 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 603 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Revision	Date

RUNOFF CURVE NUMBERS
(SEMIARID RANGELANDS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition[2]	A[3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* < 30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.

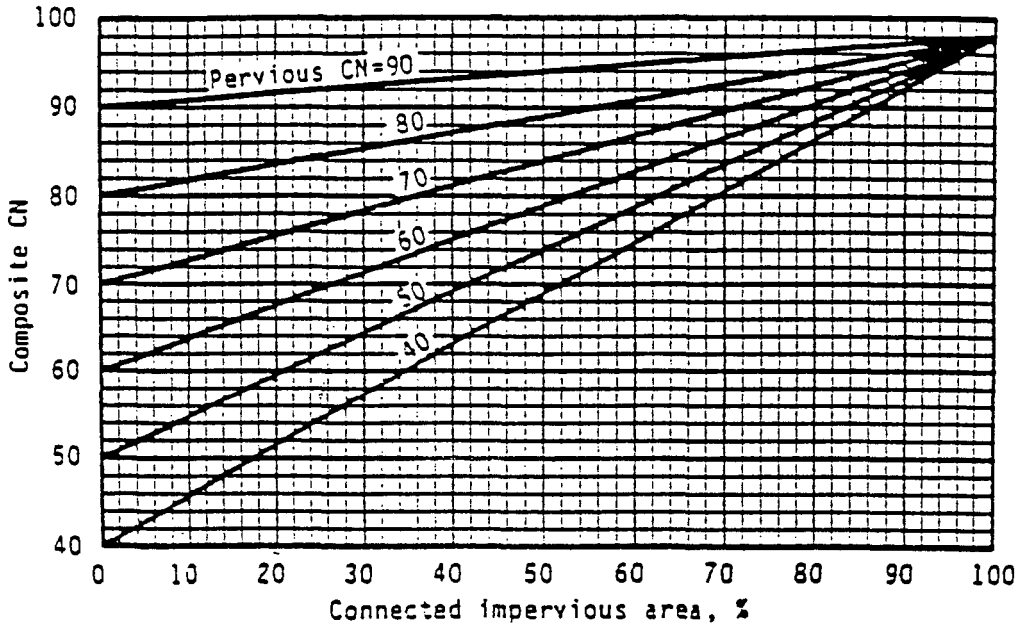
[3]Curve numbers for group A have been developed only for desert shrub.

Revision	Date

WRC ENGINEERING

REFERENCE: SCS TR-55, USDA, June 1986.

PERCENTAGE OF IMPERVIOUS AREA VS. COMPOSITE CN'S FOR GIVEN PERVIOUS AREA CN'S

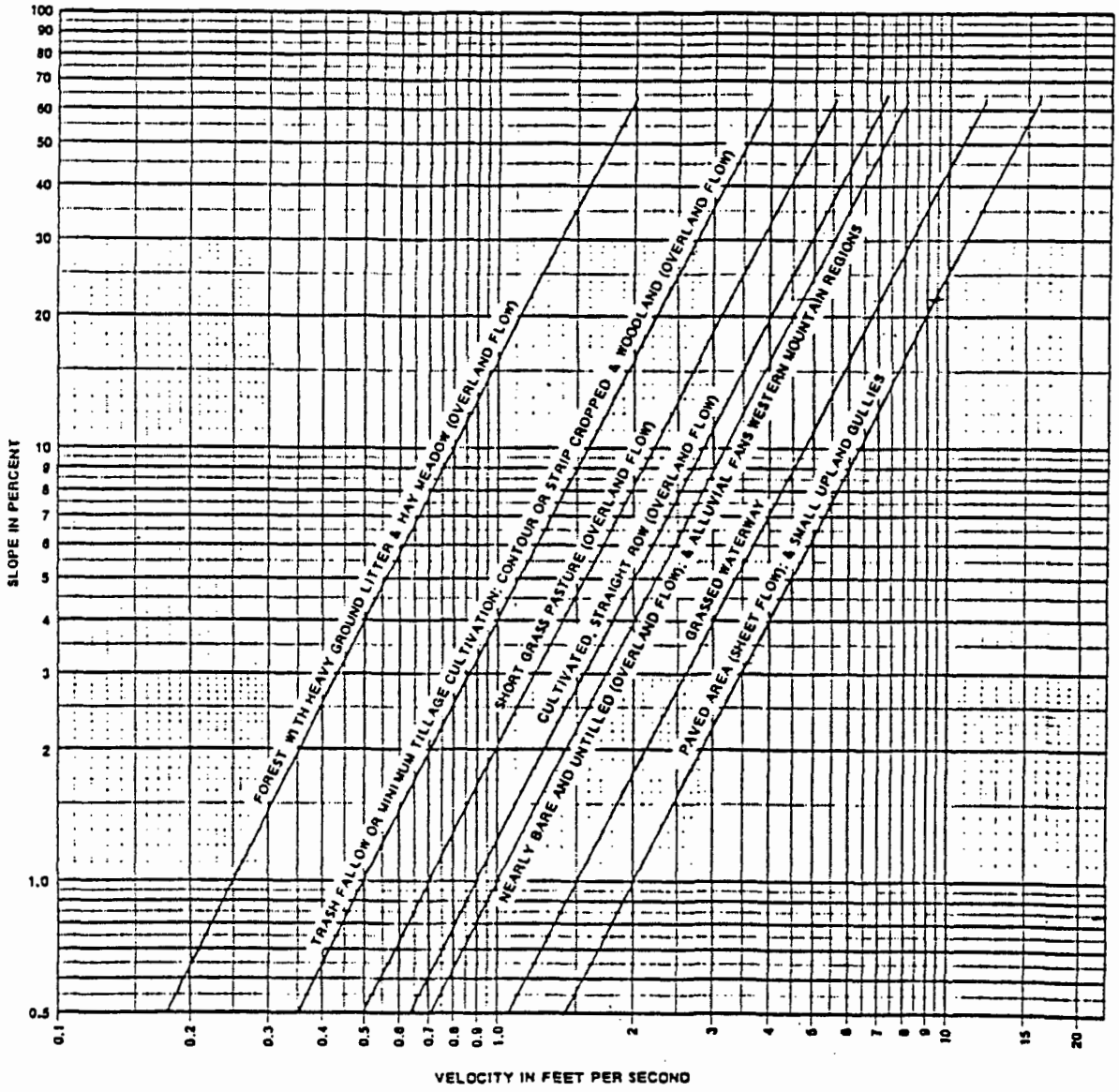


NOTE: 1. Refer to Table 602 for CN values for various land use conditions.

Revision	Date

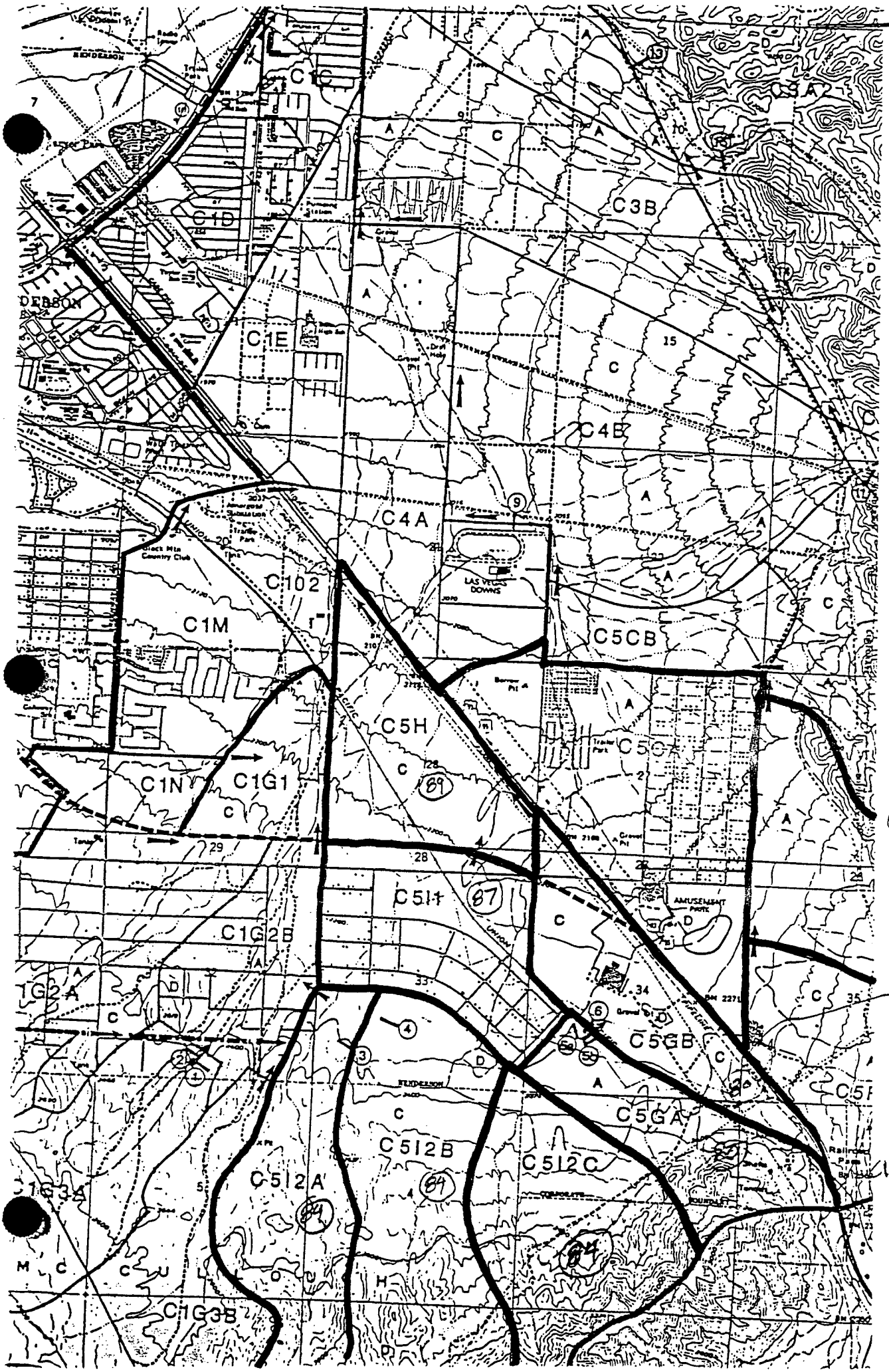
WRC ENGINEERING	REFERENCE: SCS TR-55, USDA, June 1986.	FIGURE 603

TRAVEL TIME VELOCITY



Revision	Date

WRC ENGINEERING	REFERENCE: SCS National Engineering Handbook Section 4, Hydrology, March, 1985	FIGURE 602



CCRFCD Master Plan Update Restudy

(same #'s (ULTIMATE))

VTN 1992 channel system

Channel characteristics that are important to the hydrologic response of the watershed include: the main channel length, the length along the main channel to each subbasin centroid, the main channel slope, and the main channel width. Table A.2 summarizes these characteristics for the subbasins used in the design hydrology.

TABLE A.2 BASIN LAG TIME CHARACTERISTICS WATERSHEDS GREATER THAN 1.0 SQ.MI.

From HEC-1

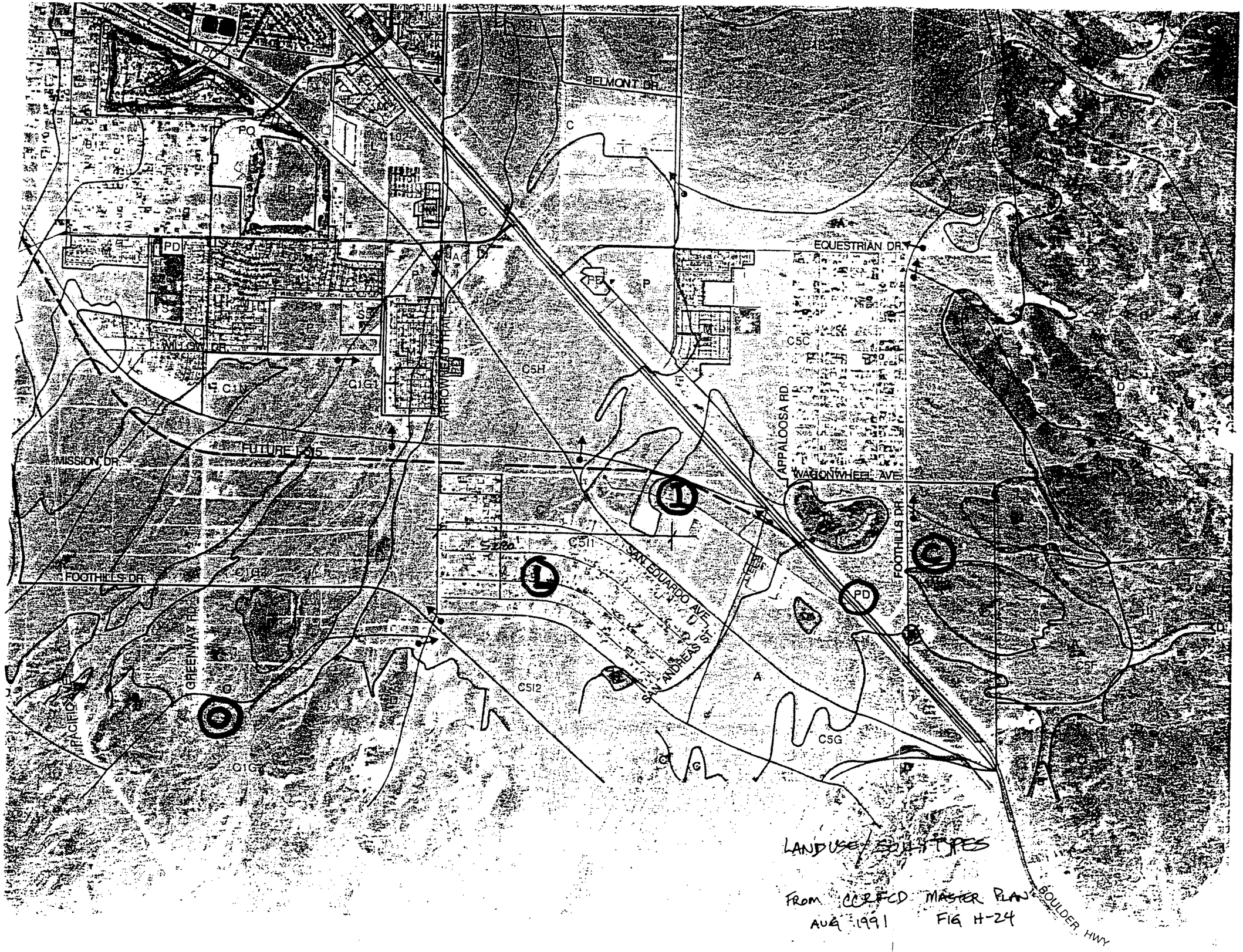
BASIN ID	LENGTH (miles)	Lc (miles)	DELTA H (ft)	SLOPE (ft/mi)	Kn	LAG TIME (hours)	CN	AR
C1H	3.18	1.33	705	256	0.05	0.64		
C1G2A	1.99	1.04	280	166	0.03	0.33		
C5I2A	2.84	1.23	920	381	0.05	0.57	84	0.9
C5I2B	2.84	1.23	920	381	0.05	0.57	84	1.52
C5F	2.25	0.95	635	336	0.05	0.49		
C5E	3.31	1.70	815	289	0.05	0.69		
C5CA	1.99	0.71	875	440	0.05	0.41		
C4A	2.41	1.14	240	100	0.03	0.39		
C4B	2.56	1.47	381	149	0.03	0.41		
C3B	3.31	1.80	480	145	0.03	0.47		
C3A1	2.37	1.14	350	148	0.03	0.37		
C3A2	2.46	1.14	440	210	0.05	0.58		
C3B3A	4.64	2.75	900	228	0.05	0.95		
C5D	2.84	1.04	720	298	0.05	0.56		

TABLE A.3 BASIN LAG TIME CHARACTERISTICS
WATERSHEDS LESS THAN 1.0 SQ.MI.

Rain	BASIN ID	Lo (feet)	Lc (feet)	Tl (min)	Vc (fps)	LAG TIME (hours)	CN	AREA
	C1G2B	200	7,800	7.0	4.3	0.37		
	C1G2C	200	8,500	5.6	5.9	0.30		
	C1G3A	200	8,050	5.4	5.0	0.32		
	C1G3B	200	12,550	6.0	4.5	0.53		
3.36	C5I1	200	3,550	8.0	3.7	0.24	87	.78
3.36	C5I2C	200	9,300	5.1	5.0	0.37	84	0.95
3.43	C5GA	200	4,800	9.4	4.3	0.28	80	.59
3.43	C5GB	200	11,200	13.0	2.8	0.80	80	.64
	C5CB	200	6,500	10.0	3.0	0.46		
	C3B3B	200	7,750	7.0	3.7	0.42		
3.29	C5H	200	5,500	6.0	3.2	0.35	89	.74

TABLE A.4 BASIN LAG TIMES
No Change from Master Plan Update

BASIN ID	LAG TIME (hr)
C1E	0.38
C1D	0.34
C1C	0.37
C4C	0.89
C1M	0.27
C1N	0.28
C1G1	0.18
C1O2	0.18


BELMONT DR.
EQUESTRIAN DR.
MISSION DR
FUTURE LOS
FOOTHILLS DR
MU-GW DR
WAGONWHEEL AVE
APPALOOSA RD
SAN EDUARDO AVE
SAN ANDREAS ST
FOOTHILLS DR
GREENWAY RD
PACIFIC
BOULDER HWY
ARROWHEAD RD
C5H
C5C
C5G
C5I1
C5I2
C1G1
C1G2
C1G
C1M
PD
PQ
P
C
A
RE
S
I = industrial
L = Low Dens. Resid.
O = open Space
C = Commercial
= Low Runoff
= High
LAND USE/SOIL TYPES
FROM CCRFCD MASTER PLAN
AUG 1991 FIG H-24

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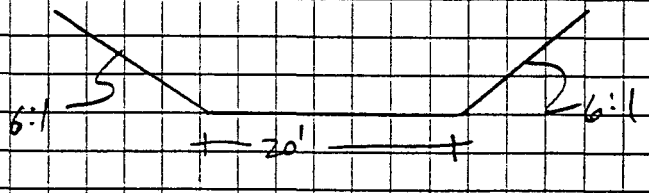
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1893 SHEET 1 OF 4
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 3/22/95
CHKD. BY: AJL DATE 4/10/95
REV. BY: _____ DATE __/__/__

SUBJECT: HEC-1 ROUTING PARAMETERS

HISTORIC

For the historic flows routing a representative channel configuration was assumed as shown:



- Channel slopes were determined from 1:24000 USGS Topo Maps (CI = 40')
- "n"-values estimated at 0.035 for mildly vegetated, unmaintained drainageways.

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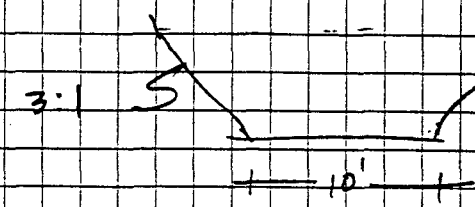
JOB NUMBER: 1883 SHEET 2 OF 4
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 3/22/95
CHKD. BY: AR DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: HEC-1 Routing Parameters

EXISTING / FUTURE

RT_X1
RT_F1 – Basin X1 Routing

Based on field observations of existing rock-lined channel along railroad



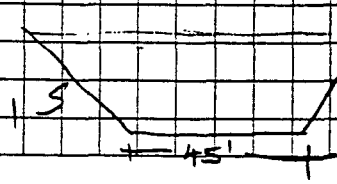
$S \pm .027$ per USGS maps

"n" $\pm$ 0.035

RT_X2
RT_F2 – Dawson channel per NDOT constr. Dwgs for Wagonwheel Interchange

The section used represents an approximate average of the 2 sections shown on the constr. Dwgs. (sheet 108) – Conestoga/RW3, A/RW2 and A1 channels

section used:



S = 0.005
n = 0.030

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1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

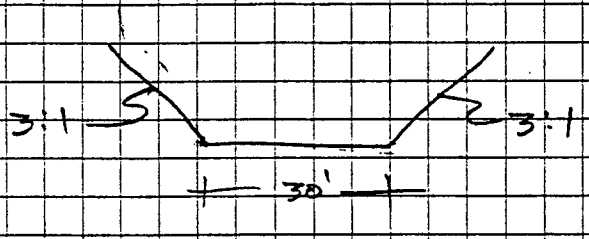
JOB NUMBER: 1883 SHEET 3 OF 4
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 3/22/95
CHKD. BY: AR DATE 4/10/95
REV. BY: _____ DATE __/__/__

SUBJECT: HEC-1 Routing Parameters

RT_X3 – wagonwheel outfall channel, A1 channel,
RT_F3 and transition to existing roadside ditch.

Representative section per NDOT const. dwg. 108 & field observations of existing roadside ditch

Section used:



$n = .030$

$S = .01$

APPENDIX C

HEC-1 SUMMARY OUTPUTS

1. 50-YEAR RUNOFF

```
*DIAGRAM
ID     BOULDER HIGHWAY RUNOFF ANALYSIS - HISTORIC CONDITIONS (PRE-PROJECT)
ID     50-YEAR 6-HOUR STORM
ID     THE ONLY US 95 CROSS-FLOW MODELLED IS THE 50/50 FLOW
ID     SPLIT ASSUMED TO OCCUR AT WAGONWHEEL DRIVE/US 995 INTERSECTION
IT     5              0     300
IO     3
JR  PREC    1.00    0.98    0.97    0.96    0.95    0.93    0.91
KK    H3   BASIN H3 RUNOFF
BA  0.20
PB  2.86
PC   0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
PC  13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
PC  19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
PC  25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
PC  49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
PC  86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
PC  98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
PC  99.8    99.9   100.0
LS     0      84
UD   .20
KK RT_H3    ROUTE RUNOFF FROM H3 TO H5
RK  6500    .042    .035            TRAP      20       6
KK    H5    RUNOFF FROM BASIN H5
BA  0.38
LS     0      72
UD  0.68
KK COMB1    COMBINE H3 AND H5
HC     2
KK RT_H5    ROUTE RUNOFF FROM H5 TO H7
RK  3300    .027    .035            TRAP      20       6
KK    H7    RUNOFF FROM BASIN H7
BA  0.22
LS     0      77
UD  0.54
KK COMB2    COMBINE H3, H5, H7
HC     2
KK    H1    RUNOFF FROM BASIN H1
BA  1.50
LS     0      74
UD   .29
KKH1_REM    FLOW AT H1 AFTER 50 PERCENT OVERTOPS US 95
KM          DESIGN POINT 20
DTDIV_H1       0   10000
DI     0      10     100    1000   10000
DQ     0       5      50     500    5000
KK RT_H1    ROUTE RUNOFF FROM H1 TO H7
RK  2800    .014    .035            TRAP      20       6
KK COMB3    COMBINE H3, H5, H1, H7
KM          DESIGN POINT 30
HC     2
KK RT_H7    ROUTE RUNOFF FROM H7 TO H6
RK  1100    .027    .035            TRAP      20       6
KK    H2    RUNOFF FROM BASIN H2
```

```
BA  0.70
LS     0      86
UD  0.32
KK RT_H2    ROUTE RUNOFF FROM H2 TO H4
RK  7500    .039    .035            TRAP      20       6
KK    H4    RUNOFF FROM BASIN H4
BA  0.62
LS     0      82
UD  0.75
KK COMB4    COMBINE BASINS H2, H4
HC     2
KKC4_REM    FLOW AT COMB 4 REMAINING AFTER 50 PERCENT DIVERSION NORTH
KM          FLOWS SPLITS 50/50 TO NORTH AND SOUTH OF APPROX MAGIC WAY
DTDIV_C4       0   10000
DI     0      10     100    1000   10000
DQ     0       5      50     500    5000
KK RT_H4    ROUTE RUNOFF FROM H4 TO H6
RK  3000    .026    .035            TRAP      20       6
KK    H6    RUNOFF FROM BASIN H6
BA  0.14
LS     0      72
UD  0.54
KK COMB5    COMBINE H2, H4, H6
HC     2
KK COMB6    COMBINE ALL BASINS EXCEPT DIV_C4
KM          DESIGN POINT 40
HC     2
KKGET_C4    RETRIEVE FLOW DIVERTED FROM COMB4
DRDIV_C4
KK COMB7    COMBINE ALL BASINS
KM          DESIGN POINT 50
HC     2
ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

```
 8        H3
           V
           V
21       RT_H3
           .
           .
23         .          H5
           .           .
           .           .
27       COMB1.....
           V
           V
29       RT_H5
           .
           .
31         .          H7
           .           .
           .           .
35       COMB2.....
           .
           .
37         .          H1
           .           .
           .           .
43         .           .-------> DIV_H1
41         .      H1_REM
           .           V
           .           V
46         .       RT_H1
           .           .
           .           .
48       COMB3.....
           V
           V
51       RT_H7
           .
           .
53         .          H2
           .           V
           .           V
57         .       RT_H2
           .           .
           .           .
59         .           .        H4
           .           ..        .
           .           .         .
63         .      COMB4.....
```

(NOTE: (COMB2 + ½H1) ≠ COMB3 DUE TO FLOW ROUTING & DIFFERENT DAR FACTOR)

* CULVERT FLOWS AND US 95 OVERTOPPING WERE NOT INCLUDED IN THE HEC-1 MODEL, EXCEPT FOR A 50/50 DIVERSION AT US95/WAGONWHEEL DRIVE (DIV_H1).

* THE CALCULATION METHODS FOR FLOWS DESCRIBED IN THE REPORT TEXT ARE SHOWN BELOW.

H1 IS LOCATED AT DP 20

COMB2 = UPSTREAM OF DP 30

DP 20 OUTFLOW = $\frac{1}{2}(H1 - 120)$ (120 = US95 CROSS-CULVERT FLOW U/S OF WAGONWHL)

$= \frac{1}{2}H1 - 60 = \frac{1}{2}(720) - 60 = 300$

DIV_H1 = 50% DIVERSION OF H1 RUNOFF AT US95/WAGONWHEEL DRIVE

COMB 3 IS LOCATED AT DP 30 (US 95 AT ROBERTS RD.)

DP30 FLOW = COMB2 + $\frac{1}{2}(H1 - 120)$

(BEFORE OVERTOPPING & CULVERT FLOW BET. DP 20 & DP 30)

WHERE, 120 = CULVERT FLOWS ACROSS US 95 UPSTRM OF WAGONWHEEL (DP20)

$= (COMB2 + \frac{1}{2}H1) - 60$

$= COMB3 - 60$

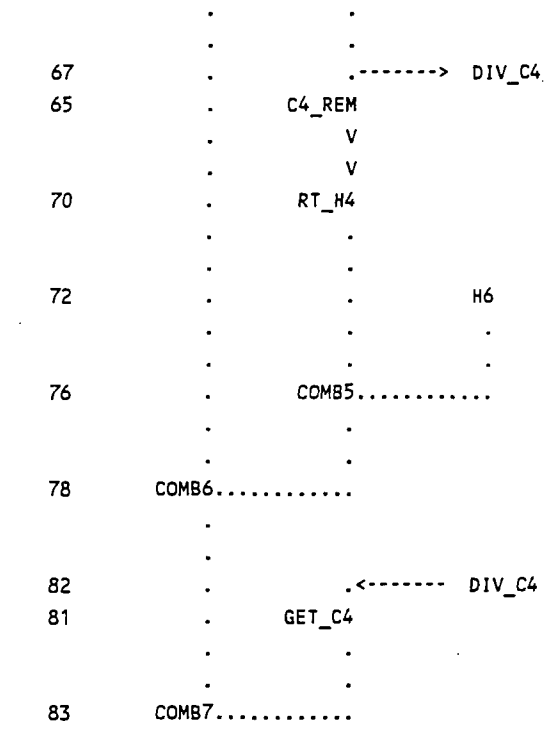
$= 640 - 60$

$= 580$ CFS.

CULVERT FLOW = 100 CFS

OVERTOPPING = 120 CFS (PER CHANNEL CAPAC CALCS)

DP 30 OUTFLOW = 580 − 100 − 120 = 360 CFS



COMB 6 IS LOCATED AT DP 40

DP 40 FLOW = DP 30 OUTFLOW + $\frac{1}{2}$(H2+H4)+ H6

= 360 + COMB5

= 360 + 430

= 790 CFS

DP 40 OUTFLOW = CHANNEL CAPAC. AT MAGIC WAY ≈ 350 CFS (PER CAPAC. CALCS.)

OVERTOPPING FLOW = 790 - 350

= 440 CFS

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	RATIO 4	RATIO 5	RATIO 6	RATIO 7
					1.00	.98	.97	.96	.95	.93	.91
HYDROGRAPH AT											
+	H3	.20	1	FLOW	211	204.	201.	197.	194.	187.	181.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RT_H3	.20	1	FLOW	210	203.	199.	197.	194.	186.	180.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	H5	.38	1	FLOW	109.	104	101.	99.	96.	91.	86.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT											
+	COMB1	.58	1	FLOW	263.	254	248.	244.	239.	230.	220.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RT_H5	.58	1	FLOW	261.	252.	246.	242.	238.	227.	218.

				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT												
+	H7	.22	1	FLOW	101.	97.	95.	93.	91.	87.	83.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT												
+	COMB2	.80	1	FLOW	356.	343.	336.	329.	322.	310.	297.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	H1	1.50	1	FLOW	805.	769.	751.	734.	716.	681.	647.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DIV_H1	1.50	1	FLOW	402.	385.	376.	367.	358.	341.	323.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	H1_REM	1.50	1	FLOW	402.	385.	376.	367.	358.	341.	323.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RT_H1	1.50	1	FLOW	398.	380.	371.	363.	355.	338.	321.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	COMB3	2.30	1	FLOW	746.	716.	698.	685.	670.	639.	609.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RT_H7	2.30	1	FLOW	735.	705.	689.	674.	659.	631.	603.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	H2	.70	1	FLOW	674.	654.	644.	633.	623.	603.	583.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RT_H2	.70	1	FLOW	668.	644.	637.	622.	611.	592.	573.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	H4	.62	1	FLOW	302.	291.	286.	281.	276.	266.	255.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT												
+	COMB4	1.32	1	FLOW	880.	856.	839.	827.	814.	786.	758.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	DIV_C4	1.32	1	FLOW	440.	428.	419.	413.	407.	393.	379.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

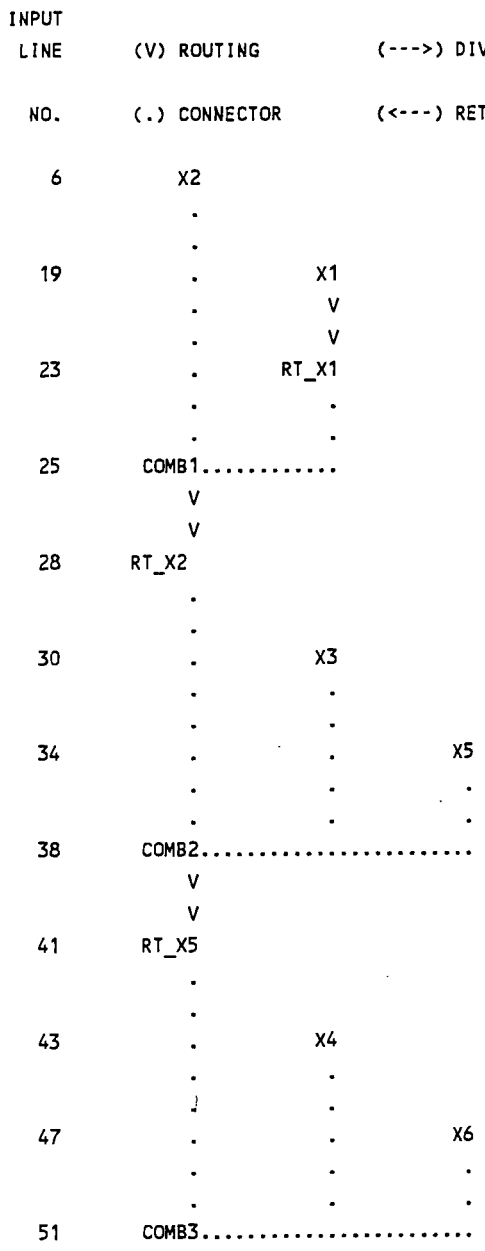
HYDROGRAPH AT											
+	C4_REM	1.32	1	FLOW	440.	428.	419.	413.	407.	393.	379.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RT_H4	1.32	1	FLOW	435.	422.	414.	408.	401.	388.	375.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT											
+	H6	.14	1	FLOW	47.	45.	43.	42.	41.	39.	37.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT											
+	COMB5	1.46	1	FLOW	480.	466.	457.	450.	442.	427.	411.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT											
+	COMB6	3.76	1	FLOW	1210.	1166.	1143.	1119.	1096.	1052.	1008.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	GET_C4	.00	1	FLOW	440.	428.	419.	413.	407.	393.	379.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT											
+	COMB7	3.76	1	FLOW	1650.	1594.	1562.	1533.	1503.	1445.	1387.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

```
*DIAGRAM
ID     BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
ID     50-YEAR 6-HOUR STORM
IT     5              0     300
IO     3
JR  PREC     1.0     .99     .98     .97     .95     .93
KK    X2   BASIN X2 RUNOFF
BA  0.50
PB  2.86
PC   0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
PC  13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
PC  19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
PC  25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
PC  49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
PC  86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
PC  98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
PC  99.8    99.9   100.0
LS     0      69
UD   .41
KK    X1   BASIN X1 RUNOFF
BA  0.49
LS     0      69
UD  0.20
KK RT_X1   ROUTE RUNOFF FROM X1 TO X2
RK  2200    .027    .035            TRAP      10       3
KK COMB1   COMBINE X1 WITH [redacted] X2
KM   COMBINATION POINT 1
HC     2
KKRT_X2    ROUTE FROM DP20 TO DP30
RK  3200    .005    .030            TRAP      45       2
KK    X3   BASIN X3 RUNOFF
BA  0.44
LS     0      82
UD  0.62
KK    X5   BASIN X5 RUNOFF
BA  0.12
LS     0      84
UD  0.27
KK COMB2   COMBINE X1, X2, X3, X5 RUNOFFS
KM    COMBINATION POINT 2
HC     3
KK RT_X5   ROUTE FROM DP30 TO DP40
RK  1000     .01    .030            TRAP      30       3
KK    X4   BASIN X4 RUNOFF
BA  0.30
LS     0      84
UD  0.59
KK    X6   BASIN X6 RUNOFF
BA  0.07
LS     0      65
UD  0.37
KK COMB3   COMBINE ALL BASINS
```

```
KM    COMBINATION POINT 3
HC     3
ZZ
```

BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
50-YEAR 6-HOUR STORM

SCHEMATIC DIAGRAM OF STREAM NETWORK



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

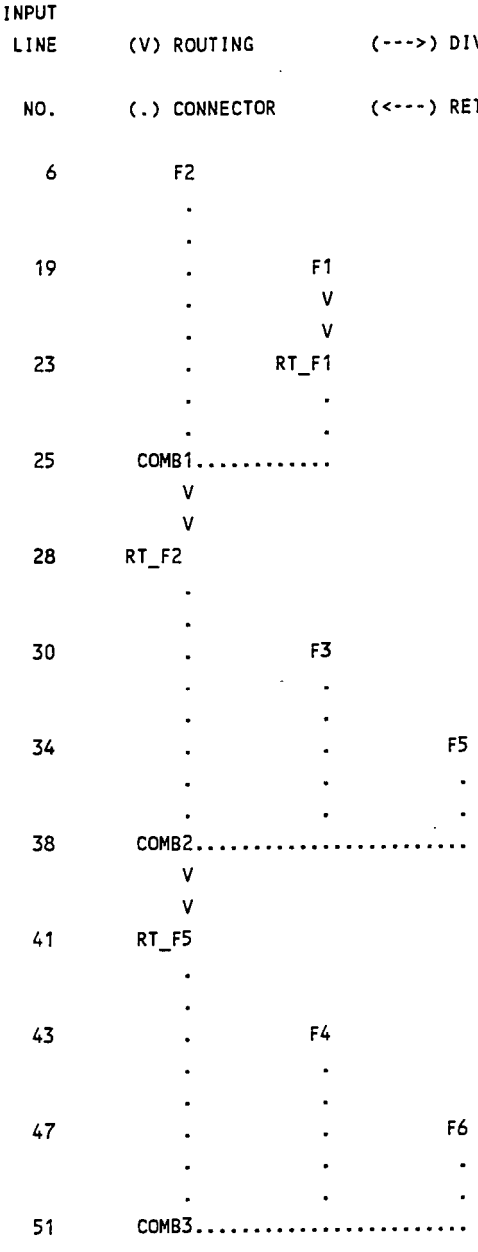
OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .99	RATIO 3 .98	RATIO 4 .97	RATIO 5 .95	RATIO 6 .93
HYDROGRAPH AT										
+	X2	.50	1	FLOW	158.	153.	149.	145.	137.	129.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X1	.49	1	FLOW	216.	210.	204.	198.	187.	176.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_X1	.49	1	FLOW	208.	203.	197.	192.	182.	171.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	COMB1	.99	1	FLOW	339.	329.	320.	311.	293.	276.
				TIME	3.75	3.75	3.75	3.75	3.75	3.83
ROUTED TO										
+	RT_X2	.99	1	FLOW	335.	325.	316.	309.	291.	274.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X3	.44	1	FLOW	243.	239.	235.	231.	222.	214.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	X5	.12	1	FLOW	113.	111.	109.	108.	104.	100.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	637.	623.	609.	597.	568.	541.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO										
+	RT_X5	1.55	1	FLOW	635.	620.	606.	594.	566.	538.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X4	.30	1	FLOW	188.	185.	182.	179.	173.	167.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	X6	.07	1	FLOW	16.	16.	15.	15.	14.	13.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT										
+	COMB3	1.92	1	FLOW	829.	811.	793.	778.	742.	709.
				TIME	3.92	3.92	3.92	3.92	3.92	4.00

```
*DIAGRAM
ID     BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
ID     50-YEAR 6-HOUR STORM
IT     5              0     300
IO     3
JR  PREC     1.0     .99     .98     .97     .95     .93
KK    F2   BASIN F2 RUNOFF
BA  0.50
PB  2.86
PC   0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
PC  13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
PC  19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
PC  25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
PC  49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
PC  86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
PC  98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
PC  99.8    99.9   100.0
LS     0      85
UD   .23
KK    F1   BASIN F1 RUNOFF
BA  0.49
LS     0      75
UD  0.14
KK RT_F1   ROUTE RUNOFF FROM F1 TO F2
RK  2200    .027    .035            TRAP      10       3
KK COMB1   COMBINE F1 WITH [illegible] F2
KM   DESIGN POINT 1
HC     2
KKRT_F2    ROUTE FROM DP20 TO DP 30
RK  3200    .005    .030            TRAP      45       2
KK    F3   BASIN F3 RUNOFF
BA  0.44
LS     0      88
UD  0.34
KK    F5   BASIN F5 RUNOFF
BA  0.12
LS     0      84
UD  0.27
KK COMB2   COMBINE F1, F2, F3, F5 RUNOFFS
KM    DESIGN POINT 2
HC     3
KK RT_F5   ROUTE FROM DP30 TO DP40
RK  1000     .01    .030            TRAP      30       3
KK    F4   BASIN F4 RUNOFF
BA  0.30
LS     0      85
UD  0.35
KK    F6   BASIN F6 RUNOFF
BA  0.07
LS     0      85
UD  0.20
KK COMB3   COMBINE ALL BASINS
```

```
KM   DESIGN POINT 3
HC    3
ZZ
```

BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
50-YEAR 6-HOUR STORM

SCHEMATIC DIAGRAM OF STREAM NETWORK



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 1.00	RATIO 2 .99	RATIO 3 .98	RATIO 4 .97	RATIO 5 .95	RATIO 6 .93
HYDROGRAPH AT										
+	F2	.50	1	FLOW	532.	524.	516.	507.	491.	474.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	F1	.49	1	FLOW	379.	371.	363.	355.	339.	323.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	RT_F1	.49	1	FLOW	352.	344.	337.	329.	313.	298.
				TIME	3.58	3.58	3.58	3.58	3.58	3.67
2 COMBINED AT										
+	COMB1	.99	1	FLOW	879.	864.	849.	833.	803.	773.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_F2	.99	1	FLOW	853.	840.	825.	811.	781.	754.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F3	.44	1	FLOW	447.	441.	434.	428.	415.	402.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F5	.12	1	FLOW	113.	111.	109.	108.	104.	100.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	1412.	1388.	1368.	1345.	1300.	1256.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RT_F5	1.55	1	FLOW	1407.	1383.	1362.	1339.	1294.	1249.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F4	.30	1	FLOW	262.	258.	254.	250.	242.	233.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F6	.07	1	FLOW	77.	76.	75.	73.	71.	69.
				TIME	3.58	3.58	3.58	3.58	3.67	3.67
3 COMBINED AT										
+	COMB3	1.92	1	FLOW	1736.	1707.	1680.	1653.	1597.	1542.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75

APPENDIX C

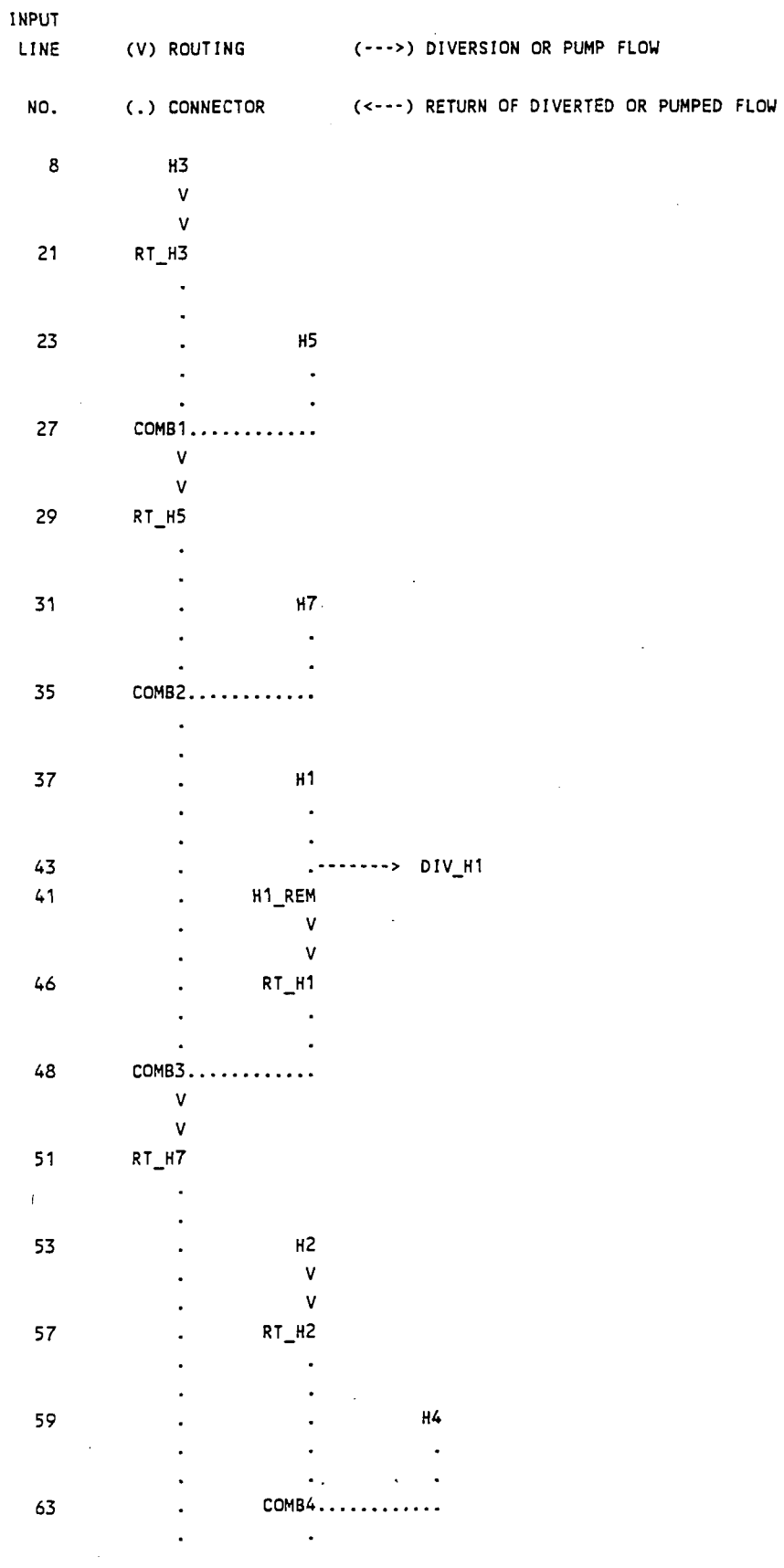
HEC-1 SUMMARY OUTPUTS

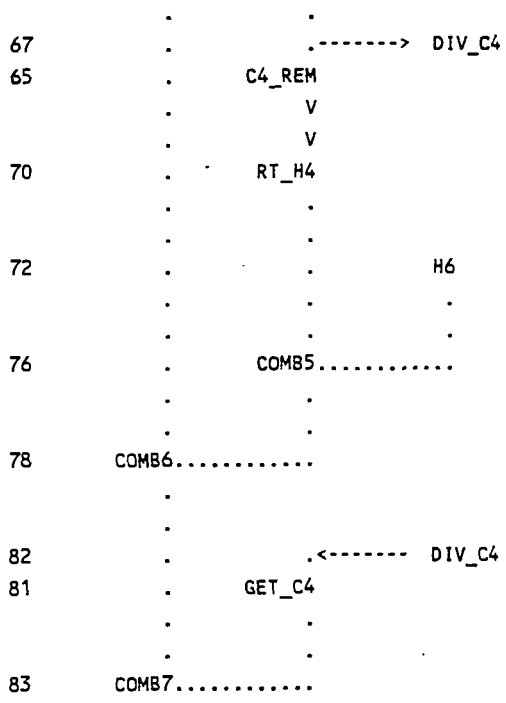
2. 100-YEAR RUNOFF

```
*DIAGRAM
ID     BOULDER HIGHWAY RUNOFF ANALYSIS - HISTORIC CONDITIONS (PRE-PROJECT)
ID     100-YEAR 6-HOUR STORM
ID     THE  ONLY US 95 CROSS-FLOW MODELLED IS THE 50/50 FLOW
ID     SPLIT ASSUMED TO UCCUR AT THE WAGONWHEEL DRIVE/US 95 INTERSECTION
IT     5            0     300
IO     3
JR  PREC    1.00    0.98    0.97    0.96    0.95    0.93    0.91
KK    H3   BASIN H3 RUNOFF
BA  0.20
PB  3.29
PC   0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
PC  13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
PC  19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
PC  25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
PC  49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
PC  86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
PC  98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
PC  99.8    99.9   100.0
LS     0      84
UD   .20
KK RT_H3    ROUTE RUNOFF FROM H3 TO H5
RK  6500    .042    .035            TRAP      20       6
KK    H5    RUNOFF FROM BASIN H5
BA  0.38
LS     0      72
UD  0.68
KK COMB1    COMBINE H3 AND H5
HC     2
KK RT_H5    ROUTE RUNOFF FROM H5 TO H7
RK  3300    .027    .035            TRAP      20       6
KK    H7    RUNOFF FROM BASIN H7
BA  0.22
LS     0      77
UD  0.54
KK COMB2    COMBINE H3, H5, H7
HC     2
KK    H1    RUNOFF FROM BASIN H1
BA  1.50
LS     0      74
UD   .29
KKH1_REM    FLOW AT H1 AFTER 50 PERCENT OVERTOPS US 95
KM          DESIGN POINT 20
DTDIV_H1       0   10000
DI     0      10     100    1000   10000
DQ     0       5      50     500    5000
KK RT_H1    ROUTE RUNOFF FROM H1 TO H7
RK  2800    .014    .035            TRAP      20       6
KK COMB3    COMBINE H3, H5, H1, H7
KM          DESIGN POINT 30
HC     2
KK RT_H7    ROUTE RUNOFF FROM H7 TO H6
RK  1100    .027    .035            TRAP      20       6
KK    H2    RUNOFF FROM BASIN H2
```

```
BA  0.70
LS     0      86
UD  0.32
KK RT_H2    ROUTE RUNOFF FROM H2 TO H4
RK  7500    .039    .035            TRAP      20       6
KK    H4    RUNOFF FROM BASIN H4
BA  0.62
LS     0      82
UD  0.75
KK COMB4    COMBINE BASINS H2, H4
HC     2
KKC4_REM    FLOW AT COMB_4 REMAINING AFTER 50 PERCENT DIVERSION
KM          FLOW SPLIT 50/50 TO NORTH AND SOUTH OF MAGIC WAY
DTDIV_C4       0   10000
DI     0      10     100    1000   10000
DQ     0       5      50     500    5000
KK RT_H4    ROUTE RUNOFF FROM H4 TO H6
RK  3000    .026    .035            TRAP      20       6
KK    H6    RUNOFF FROM BASIN H6
BA  0.14
LS     0      72
UD  0.54
KK COMB5    COMBINE H2, H4, H6
HC     2
KK COMB6    COMBINE ALL BASINS EXCEPT DIV_C4
KM          DESIGN POINT 40
HC     2
KKGET_C4    RETRIEVE FLOW DIVERTED FROM COMB4
DRDIV_C4
KK COMB7   COMBINE ALL BASINS
KM         DESIGN POINT 50
HC     2
ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK





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	RATIO 7
					1.00	.98	.97	.96	.95	.93	.91
HYDROGRAPH AT											
+	H3	.20	1	FLOW	263.	255.	251.	246.	242.	234.	226.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	RT_H3	.20	1	FLOW	261.	253.	249.	245.	241.	233.	226.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	H5	.38	1	FLOW	151.	144	141.	138.	135.	128.	122.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT											
+	COMB1	.58	1	FLOW	337.	326	319.	314.	308.	297.	286.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RT_H5	.58	1	FLOW	337.	326	319.	313.	308.	296.	285.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83

HYDROGRAPH AT

+ H7	.22	1	FLOW	133.	128.	126.	123.	121.	116.	111.
			TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT										
+ COMB2	.80	1	FLOW	460.	444.	435.	428.	420.	404.	389.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+ H1	1.50	1	FLOW	1086.	1042.	1020.	998.	976.	933.	890.
			TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+ DIV_H1	1.50	1	FLOW	543.	521.	510.	499.	488.	467.	445.
			TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+ H1_REM	1.50	1	FLOW	543.	521.	510.	499.	488.	467.	445.
			TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+ RT_H1	1.50	.1	FLOW	533.	512.	501.	491.	480.	459.	439.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT										
+ COMB3	2.30	1	FLOW	987.	950.	930.	912.	893.	856.	820.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO										
+ RT_H7	2.30	1	FLOW	977.	940.	920.	901.	883.	845.	809.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+ H2	.70	1	FLOW	830.	806.	794.	782.	770.	746.	723.
			TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+ RT_H2	.70	1	FLOW	822.	794.	787.	771.	758.	739.	716.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+ H4	.62	1	FLOW	382.	369.	363.	357.	351.	339.	326.
			TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT										
+ COMB4	1.32	1	FLOW	1090.	1059.	1043.	1025.	1009.	977.	947.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO										
+ DIV_C4	1.32	1	FLOW	545.	529.	521.	513.	505.	488.	473.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+ C4_REM	1.32	1	FLOW	545.	529.	521.	513.	505.	488.	473.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

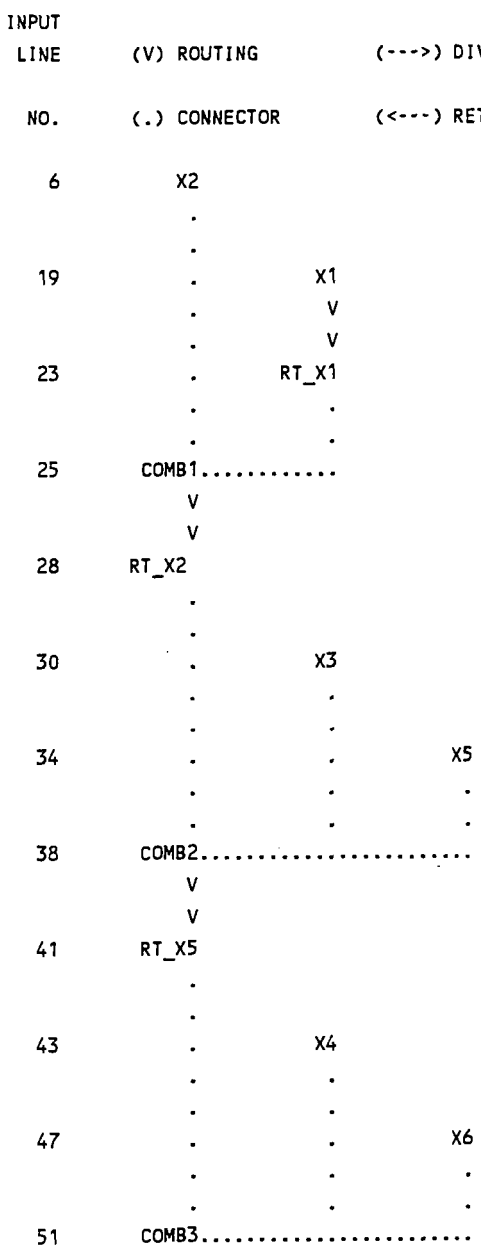
ROUTED TO											
+	RT_H4	1.32	1	FLOW	541.	523.	516.	507.	499.	483.	468.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	H6	.14	1	FLOW	64	62.	60.	59.	57.	55.	52.
				TIME	4.00	4.00	4.00	4.00	4.00	4.08	4.08
2 COMBINED AT											
+	COMB5	1.46	1	FLOW	602.	582.	574.	563.	554.	535.	518.
				TIME	3.92	4.00	3.92	4.00	4.00	4.00	4.00
2 COMBINED AT											
+	COMB6	3.76	1	FLOW	1561.	1505.	1479.	1451.	1424.	1371.	1319.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	GET_C4	.00	1	FLOW	545.	529.	521.	513.	505.	488.	473.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT											
+	COMB7	3.76	1	FLOW	2106.	2035.	2000.	1963.	1928.	1860.	1793.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

```
*DIAGRAM
ID     BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
ID     100-YEAR 6-HOUR STORM
IT     5              0     300
IO     3
JR  PREC     1.0     .99     .98     .97     .95     .93
KK    X2   BASIN X2 RUNOFF
BA  0.50
PB  3.29
PC   0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
PC  13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
PC  19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
PC  25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
PC  49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
PC  86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
PC  98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
PC  99.8    99.9   100.0
LS     0      69
UD   .41
KK    X1   BASIN X1 RUNOFF
BA  0.49
LS     0      69
UD  0.20
KK RT_X1   ROUTE RUNOFF FROM X1 TO X2
RK  2200    .027    .035            TRAP      10       3
KK COMB1   COMBINE X1 WITH ~~100 CFS FROM~~ X2
KM   COMBINATION POINT 1
HC     2
KKRT_X2    ROUTE FROM DP20 TO DP30
RK  3200    .005    .030            TRAP      45       2
KK    X3   BASIN X3 RUNOFF
BA  0.44
LS     0      82
UD  0.62
KK    X5   BASIN X5 RUNOFF
BA  0.12
LS     0      84
UD  0.27
KK COMB2   COMBINE X1, X2, X3, X5 RUNOFFS
KM    COMBINATION POINT 2
HC     3
KK RT_X5   ROUTE FROM DP30 TO DP40
RK  1000     .01    .030            TRAP      30       3
KK    X4   BASIN X4 RUNOFF
BA  0.30
LS     0      84
UD  0.59
KK    X6   BASIN X6 RUNOFF
BA  0.07
LS     0      65
UD  0.37
KK COMB3   COMBINE ALL BASINS
```

KM COMBINATION POINT 3
HC 3
ZZ

BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
100-YEAR 6-HOUR STORM

SCHEMATIC DIAGRAM OF STREAM NETWORK



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	RATIO 4	RATIO 5	RATIO 6
					1.00	.99	.98	.97	.95	.93
HYDROGRAPH AT										
+	X2	.50	1	FLOW	225.	220.	215.	209.	199.	188.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X1	.49	1	FLOW	308.	300.	293.	286.	271.	257.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_X1	.49	1	FLOW	299.	291.	284.	277.	262.	248.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	COMB1	.99	1	FLOW	487.	475.	464.	452.	429.	406.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RT_X2	.99	1	FLOW	484.	470.	461.	451.	424.	405.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+	X3	.44	1	FLOW	308.	303.	298.	293.	283.	273.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	X5	.12	1	FLOW	141.	139.	137.	135.	130.	126.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	855.	836.	821.	804.	768.	737.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92
ROUTED TO										
+	RT_X5	1.55	1	FLOW	854.	835.	819.	804.	768.	737.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X4	.30	1	FLOW	234.	231.	227.	223.	216.	209.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	X6	.07	1	FLOW	25.	24.	23.	23.	21.	20.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT										
+	COMB3	1.92	1	FLOW	1102.	1078.	1059.	1039.	994.	955.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92

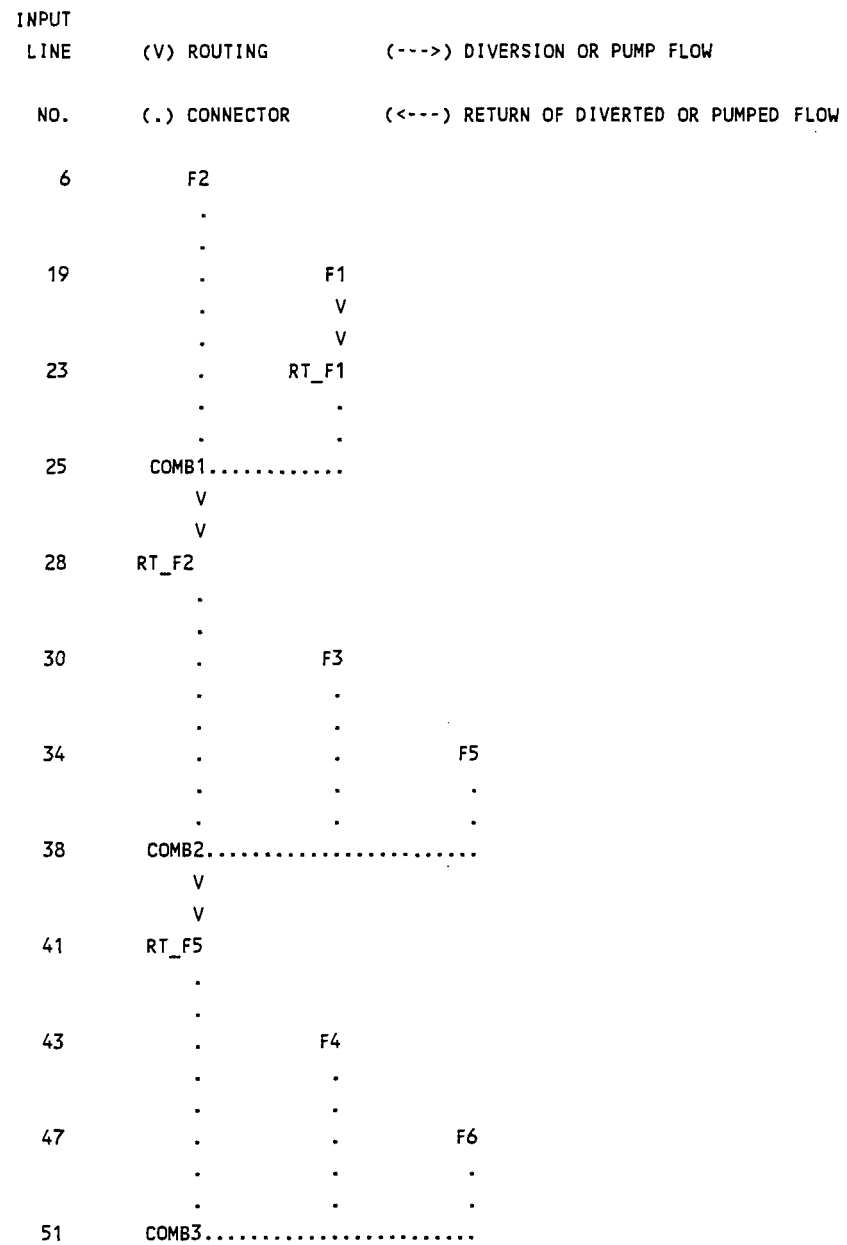
1

```
*DIAGRAM
ID     BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
ID     100-YEAR 6-HOUR STORM
IT     5              0     300
IO     3
JR  PREC     1.0     .99     .98     .97     .95     .93
KK    F2   BASIN F2 RUNOFF
BA  0.50
PB  3.29
PC   0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
PC  13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
PC  19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
PC  25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
PC  49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
PC  86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
PC  98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
PC  99.8    99.9   100.0
LS     0      85
UD   .23
KK    F1   BASIN F1 RUNOFF
BA  0.49
LS     0      75
UD  0.14
KK RT_F1   ROUTE RUNOFF FROM F1 TO F2
RK  2200    .027    .035            TRAP      10       3
KK COMB1   COMBINE F1 WITH [illegible] F2
KM   DESIGN POINT 1
HC     2
KKRT_F2    ROUTE FROM DP20 TO DP 30
RK  3200    .005    .030            TRAP      45       2
KK    F3   BASIN F3 RUNOFF
BA  0.44
LS     0      88
UD  0.34
KK    F5   BASIN F5 RUNOFF
BA  0.12
LS     0      84
UD  0.27
KK COMB2   COMBINE F1, F2, F3, F5 RUNOFFS
KM    DESIGN POINT 2
HC     3
KK RT_F5   ROUTE FROM DDP30 TO DP40
RK  1000     .01    .030            TRAP      30       3
KK    F4   BASIN F4 RUNOFF
BA  0.30
LS     0      85
UD  0.35
KK    F6   BASIN F6 RUNOFF
BA  0.07
LS     0      85
UD  0.20
KK COMB3   COMBINE ALL BASINS
```

KM DESIGN POINT 3
HC 3
ZZ

BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
100-YEAR 6-HOUR STORM

SCHEMATIC DIAGRAM OF STREAM NETWORK



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	.99	.98	.97	.95	.93
HYDROGRAPH AT										
+	F2	.50	1	FLOW	658.	648.	639.	629.	610.	590.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	F1	.49	1	FLOW	503.	494.	484.	474.	455.	436.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	RT_F1	.49	1	FLOW	475.	465.	456.	446.	427.	408.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	COMB1	.99	1	FLOW	1114.	1096.	1078.	1060.	1023.	987.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_F2	.99	1	FLOW	1100.	1081.	1062.	1042.	1005.	968.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	F3	.44	1	FLOW	544.	537.	529.	522.	507.	492.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F5	.12	1	FLOW	141.	139.	137.	135.	130.	126.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	1754.	1727.	1701.	1674.	1621.	1570.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RT_F5	1.55	1	FLOW	1752.	1726.	1699.	1672.	1619.	1567.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F4	.30	1	FLOW	326.	321.	316.	311.	301.	292.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F6	.07	1	FLOW	96.	94.	93.	91.	89.	86.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	COMB3	1.92	1	FLOW	2160.	2127.	2095.	2061.	1996.	1932.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75

APPENDIX D

HYDRAULIC CALCULATIONS

1. CULVERT CAPACITIES

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 1 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 12/30/94
CHKD. BY: AGL DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: CULVERT CAPACITIES

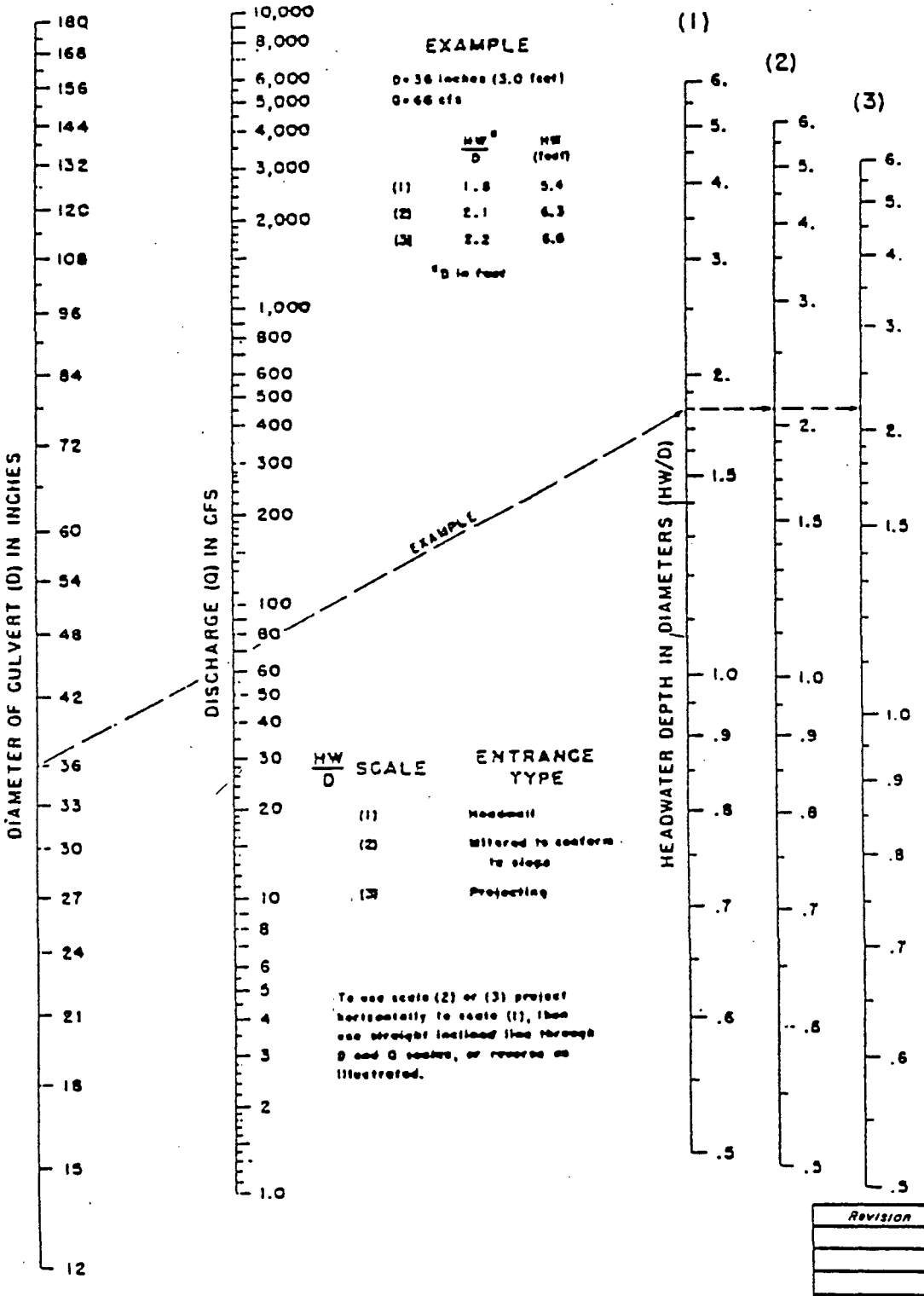
CULVERTS ALONG RAILROAD -

ID.	TYPE	HW/D HISTORIC	HW/D EXIST.	Q HIST	Q EXIST
A	24" CMP	3.0		35	
B	36" CMP	2.5		80	
C	48" CMP	1.50	1.25	110	95
D	2-60" CMP	1.5	1.2	2x 200	2x 150?
E	36" CMP	2.0		70	
	48" CMP	2.0		140	
G	2-60" CMP	1.8		2x230	
H	TRESTLE - 60'x4'	1.25		1800	
I	48" CMP	1.8		130	

E Capacities A thru E = 835 ✓

G thru I = 2390 ✓

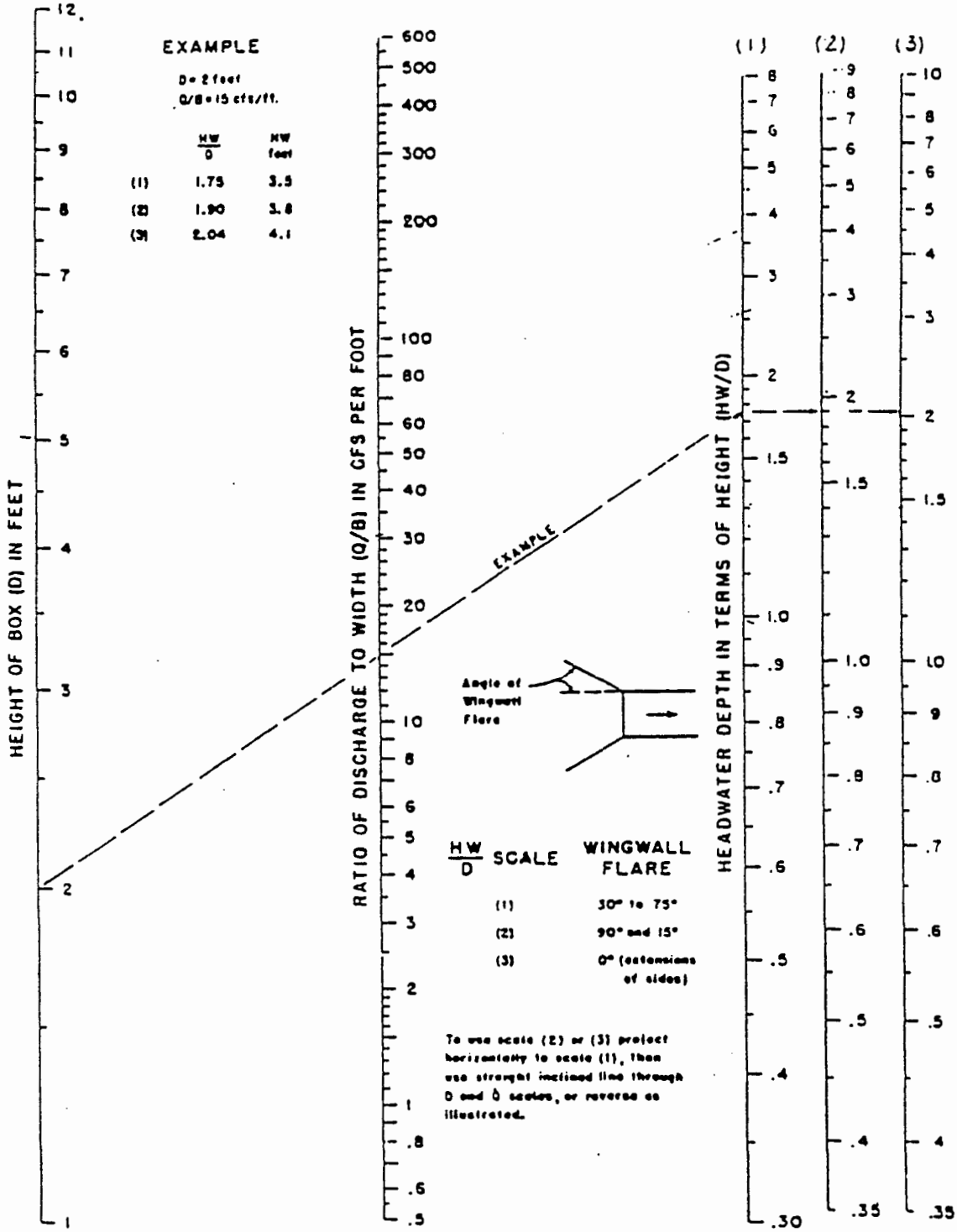
NOMOGRAPH - INLET CONTROL CMP



Revision	Date

WRC ENGINEERING	REFERENCE: USDOT, FHWA, HDS No. 5, 1985	FIGURE 1007

NOMOGRAPH - INLET CONTROL BOX CULVERT



Revision	Date

WRC ENGINEERING	REFERENCE: USDOT, FHWA, HDS No.5, 1985	FIGURE 1004

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1803 SHEET 1 OF 3
JOB NAME: Boulder Hwy
CALC. BY: RTJ DATE 12/23/94
CHKD. BY: MR DATE 4/10/95
REV. BY: _____ DATE __/__/__

SUBJECT: FIELD NOTES

DRAINAGE STRUCTURES REFERENCED BY LETTER – SEE ATTCHD MAP FOR LOCATIONS

A = 24" CMP HW/D = 3

B = 36" CMP HW/D = 2.5

C = 48" CMP HW/D = 5/4
U.S. of Drop/overflow

D = 2 – 60" CMP HW/D ≈ 1.2
U.S. of Drop/overflow

E = 1 – 36" CMP
48" CMP HW/D ≈ 2

F = Triple 4' x 5.5' RCBC HW/D = 1.3

G = 2 – 60" CMP HW/D ≈ 1.8
D.S. chan. photo 17

H = Trestle ≈60' long ≈ 4' to B.C.

I = 48" CMP HW/D ≈ 1.0

J = ≈2' x 3' HELCMP } HW ≈ H
or 24" CMP }

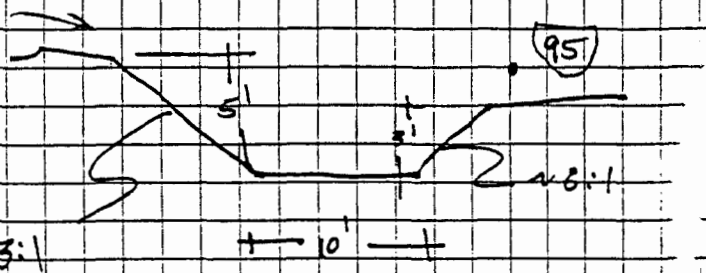
WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 2 OF 3
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 12/23/94
CHKD. BY: DRC DATE 4/10/95
REV. BY: _____ DATE __/__/__

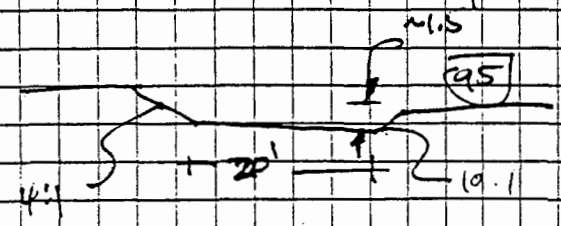
SUBJECT: Field Notes

K = 24" CMP Hw/D ≤ 2.0

LL – Trap. Ditch
See photo 35



mm – Dike in Ditch



N – 24" Cmp under both Lanes

O – ~48" Wide HECMP Hw = 4'

P – 24" CMP Hw = 4'

Q – 24" CMP Hw = 4.5'

R – 24" Hw = 4

Area Map

12/3/04

Las Vegas Blvd

33 sec. down to 100 scale

3004 Right of Sch. plan, 1st Sept 1 S of Sch. & Mead, 1st Sept Ban. S.

876 1270

Copyright U.S. Geological Survey

Magic

MENDENHALL

CORPORATE BOUNDARY

BOULDER CITY

"A" LINE

Railroad Pass

BM 2367

Akunite (Stel.)

BM 2323

Akunite Mine

UNION

Shaft

BM 2316

Tunnels

Shaft

BM 2061

BOULDE

Shafts

Tunnels

BOUNDARY

HENDERSON

STA. 88+20

CULV. CAP = 48 @

USE 120

AMUSEMENT PARK

TOT. CULVERT

BM 2271

PIPELINE

Gravel Pit

Trailer Park

TOT. CULVERT

CAP = Ø36

H1

Gravel Pit

PACIFIC

TOT. CULVERT

CAP = 2390

H2

LAS VEGAS DOWNS

BOOSTER

Borrow Pit

BM 2118

Drill Hole

Gravel Pit

Tarr High Sch

Park

HIGHWAY

PIPELINE

PACIFIC

Pit

24" , HW/D = 2.0 ⇒ Q = 26 cfs

36" , HW/D = 2.0 ⇒ Q = 70 cfs

BASED ON INLET CONTROL

SUMMARY OF CULVERTS

HWY 95

CULVERT DATA FROM CONSTRUCTION PLANS

AND FIELD OBSERVATIONS

4/18/95

LOUGH ENGINEERING

"An" 831+60 – New 30"x66' C.M.P. Paved dike Rt. as shown. (See sheet No 29).

"An" 834+43 – New 24"x58' C.M.P. Paved dike Rt. as shown. (See sheet No 29).

"An" 831+04± to "An" 831+45± – Fill F.B. ditch Rt. (Roadway Excavation).

"An" 833+90± to "An" 834+98± – Fill F.B. ditch Rt. (Roadway Excavation).

"An" 839+68± – Construct paved crossover Rt. as shown. (See sheet No 29).

"An" 840+05 – New 24"x 58' C.M.P. Paved dike Rt. as shown. (See sheet No 29).

T. 22 S., R. 63 E. M.D.B. & M.

SEC. 28 SEC. 27

"An" 843+63 – New 24"x60' C.M.P. Paved dike Rt. as shown. (See sheet No 29).

842+90 ~ 58"x36"x76' C.M.P.

U.S. Government

"An" 853+35 – New 24"x58' C.M.P. Paved dike Rt. as shown. (See sheet No 29

Edge of oil 0' Rt

24" C.M.P.

24" F.B. DITCH

S. 42°23'20" E. – 27,215.19'

36"x46' C.M.P.

36"x46' C.M.P.

4' F.B. DITCH

24"x42' C.M.P.

4' F.B. DITCH

S. 42°23'20" E. – 17,250.01'

"On" LINE – NOT STAKED IN FIELD – ADOPTED

18"x42' C.M.P.

"A" LINE – AS CONSTRUCTED – TO BE ABANDONED

4' F.B. DITCH

S. 42°23'20" E. – 45,122.36'

36"x46' C.M.P.

4' F.B. DITCH

every 200'

Truck weighing stations constructed lt. of "An" 847± to "An" 853± and Rt. of "As" 847± to "As" 853±
Job authorization No. 10495

843+61 ~ 58"x36"x62' C.M.P.

200' to Edge of oil

START CROSS SECTION

approximate "AS"

Take Cross Sections Perpendicular to roadway

Lt. & Rt.

6:1 – 12' ditch – 4:1 back slope Lt. ~ 6:1 – 12' ditch – 4:1 back slope Rt.

See Preceding Sheet

"An" LINE

"On" LINE

"As" 847+88 – Elev. 6154.69'
Elev. water in ground 120' Lt. Sta. "As" 850+00

"As" 851+88 – Elev. 6157.82'
Elev. water in ground 120' Lt. Sta. "As" 850+00

"An" 863+35 ~ New 24"x58' C.M.P. Paved dike Rt. as shown. (See sheet Nº 29).

"An" 870+40± ~ Construct paved crossover Rt. as shown. (See sheet Nº 29).

"An" 870+77 ~ New 24"x58' C.M.P. Paved dike Rt. as shown. (See sheet Nº 29).

"An" 875+60 ~ New 24"x58' C.M.P. Paved dike Rt. as shown. (See sheet Nº 29).

"An" 882+91± ~ New 24"x58' C.M.P. Paved dike Rt. as shown. (See sheet Nº 29).

"An" 886+94 ~ New 24"x60' C.M.P. Pav dike Rt. as shown. (See sheet Nº 29

L.A. +66 ~ U.S.C.&G.S. B.M. Z-51-1934 Rt. Do not disturb.

U.S. Government

859+25 ~ 58"X36"X82'CMAP

U.S. Government

"An" 882+56± to "An" 882+82± ~ Fill F.B. ditch Rt. Use dike material. (Roadway Excavation).

Wagon Wheel Rd

MAINT. RD.

"An" 886+20± to "An" 886+42± ~ Fill F.B. ditch Rt. Use dike material. (Roadway Exc

859+73 ~ 53"X36"X64'CMAP.

U.S. Government

T.22S. R.63E. M.D.B. & M. SEC 27 SEC 34

1/4 Sec. Line

"An" Line

"Os" LINE ~ NOT STAKED IN FIELD ~ ADOPTED

"A" LINE ~ AS CONSTRUCTED ~ TO BE ABANDONED

S. 42°23'20" E. ~ 27,219.19'

S. 42°23'20" E. ~ 27,268.01'

6' F.B. DITCH

8' F.B. DITCH

4' F.B. DITCH

24"x 42' C.M.P.

18"x 42' C.M.P.

CENTER DIKE

Northbound Lane Lt. & Rt.

6:1~15' ditch ~ 4:1 back slope Lt. ~ 6:1~15' ditch ~ 4:1 back slope Rt.

← See Next Sheet

"An" LINE

"Os" LINE

+0.96%

+1.402%

+1.817%

+1.817%

+2.817%

2170

2180

2190

2200

2210

2220

"An" B.M. #86 ~ Elev. 2165.62'
Iron spike in ground 100' Lt. Sta. "An" 860+00

"An" B.M. #87 ~ Elev. 2179.62'
Iron spike in ground 100' Lt. Sta. "An" 870+00

"An" B.M. #88 ~ Elev. 2199.94'
Iron spike in ground 100' Lt. Sta. "An" 880+00

858 9 860 1 2 3 4 5 6 7 8 9 870 1 2 3 4 5 6 7 8 9 880 1 2 3 4 5 6 7 8 9 88

"An" 889+60± to "An" 890+88± - Fill F.B. ditch
Use dike material. (Roadway Excavation)

"An" 897+10 - New 24"x24' C.M.P. Paved
Rt. as shown. (See sheet Nº 29).

"An" 897+22± - Construct paved crossover
Rt. as shown. (See sheet Nº 29).

"An" 897+59 - New 36"x24' C.M.P. Paved
dike Rt. as shown. (See sheet Nº 29).

"An" 908+50± - Construct paved crossover
Rt. as shown. Relay 24"x38' C.M.P. in V ditch
under crossover. No headwalls. (See sheet Nº 29).

"An" 920+00± - Construct paved crossover
Rt. as shown. Relay 18"x38' C.M.P. in V ditch
under crossover. No headwalls. (See sheet N

SEC. 34 T.22S. R.63E. M.D.B. & M.

U.S. Government

1/4 Sec. Line

10'x3'x4800' F.B. ditch and dike

24'

"An" Line

6' F.B. DITCH

555' V ditch

S. 42°23'20"E. - 27,219.19'

390' V ditch

S. 42°23'20"E. - 27,268.01'

"V" DITCH

"Os" LINE - NOT STAKED IN FIELD - ADOPTED

"A" LINE - AS CONSTRUCTED - TO BE ABANDONED

15'x2' GROUTED HAND-LAID RIP-RAP

"V" DITCH

V ditch

36"x44' C.M.P.

30"x42' C.M.P.

4' F.B. DITCH

NEW 20' F.B. DITCH

3'x3'x560' F.B. ditch

850'

18"x42' C.M.P.

4' F.B. DITCH

U.S.C. & G.S. B.M. J-166-1933

Path

"Os" 897+59 - 24"x44' C.M.P. Remove.
New 36"x60' C.M.P.

"Os" 900+61 - 30"x42' C.M.P. Abandon.
Fill inlet ditch Lt. & Rt. Use dike
material. (Roadway Excavation).

"Os" 908+50± - Construct 20' paved
approach Rt. (See sheet Nº 29).

"Os" 920+00± - Construct 20' paved
approach Rt. (See sheet Nº 29).

1/4 Sec. Line

U.S. Government

+60

North Bound Lane Lt. & Rt.

6:1 - 1' ditch - 4:1 back slope Lt.
6:1 - 1' ditch - 4:1 back slope Rt.

6:1 - 1' ditch - 4:1 back slope Lt. & Rt.

Exc.	12011 cu yd
Borr.	0 cu yd
Emb.	11085 cu yd
O.H.	36659 cu sta
O.H.	4321 cu mile

"An" LINE

2449.00' 400' V.C.

+3.31%

+2.81%

2240

2230

2220

2210

2260

2250

2270

2280

2290

"Os" LINE

"An" B.M. #89 - Elev. 2216.49'
Iron spike in ground 100' Lt. Sta. "An" 890+00

"An" B.M. #90 - Elev. 2237.63'
Iron spike in ground 100' Lt. Sta. "An" 900+00

"An" B.M. #91 - Elev. 2267.73'
Iron spike in ground 100' Lt. Sta. "An" 910+00

U.S.C. & G.S. B.M. J-166 - 1933 - Elev. 2270.957'
Conc. mon. with Standard disk 137 Rt. Sta. An 911+84. Iron spike in ground 100' Lt. Sta. 921+00

"An" B.M. #92 - Elev. 2305.13

889 890 1 2 3 4 5 6 7 8 9 900 1 2 3 4 5 6 7 8 9 910 1 2 3 4 5 6 7 8 9 920 92

Conta # 727

"An" 800+39 – New 24"x60' C.M.P.
Paved dike Rt. as shown. (See sheet No 29).

"An" 806+01 – Construct paved crossover Rt. as shown. (See sheet No 29).

"An" 806+98 – New 30"x62' C.M.P.
Paved dike Rt. as shown. (See sheet No 29).

"An" 816+33 – New 24"x60' C.M.P.
Paved dike Rt. as shown. (See sheet No 29).

"An" 824+50± to "An" 824+60± – Fill E.B. ditch Rt. (Roadway Excavation).

"An" 825+13 – New 30"x58' C.M.P.
Paved dike Rt. as shown. (See sheet No 29).

799+20 – 58"x36"x72' CMAP.

819+20 – 58"x36"x76' CMAP.

800+02 – 58"x36"x62' CMAP

819+72 – 58"x36"x62' CMAP.

LAST CROSS SECTION

M3

U.S. Government

U.S. Government

Rock Track

Horizon Dr

Equestrian Dr

Thunderbird Dr

SEC 21
SEC 28

T. 22 S., R. 63 E. 6th P.M.

100' Approach

10" Water Main Crossing

24"

36"

30"

38"x76"

"An" Line

Crossover

"Os" LINE – NOT STAKED IN FIELD – ADOPTED

"A" LINE – AS CONSTRUCTED – TO BE ABANDONED

S. 42° 23' 25" E. – 27,219.19'

S. 42° 23' 25" E. – 771,258.61'

E.B. DITCH

4' E.B. DITCH

C-1/4 Sec. Line

USC & GS BM No 66

North Bound Lane Lt. & Rt. — 6:1-12' ditch – 4:1 back slope Lt. ~ 6:1-12' ditch – 4:1 back slope Rt.

← See Preceding Sheet

05-800+35 – 10" Water Main Crossing, Installed by City of Henderson, A Body Politic, Under R.E. dated 1-31-69

"An" 806+98 – 100' Approach Lt. and Crossover, Installed by City of Henderson Under R.E. dated 1-31-69.

+1.00%

"An" LINE

"Os" LINE

2180

2130

"An" B.M. #80 – Elev. 2101.81'
Iron spike in ground 100' Lt. Sta. An" 800+00

USC & GS B.M. H+1644 1944 – Elev. 2117.342'
Cone monument with bronze disk set at Sta. An" 808+24

"An" B.M. #81 – Elev. 2114.35'
Iron spike in ground 100' Lt. Sta. An" 810+00

"An" B.M. #82 – Elev. 2129.207'
Iron spike in ground 100' Lt. Sta. An" 820+00

EXHIBIT 1

NDOT AERIAL SURVEY

(HISTORIC CONDITIONS)

APPENDIX D

HYDRAULIC CALCULATIONS

2. SPLIT FLOWS

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 1 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 3/22/95
CHKD. BY: AJL DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: SPLIT FLOW CALCS.

(1) US95 @ Wagonwheel Drive.

Based on NDOT Aerial survey data @ 1"=50' scale w/ 2' contour intervals, overtopping of the road by flows from the South/Southeast will occur approx. 50% to the NW (to roadside ditch) and 50% to N. across US 95.

⇒ use 50/50 diversion of flows at this location (see Exhibit 1 – NDOT Survey and attached excerpt)

(2) Flow split at RR Bridge was estimated as 50/50 based on analysis of total flow spread shown on NDOT Aerial Photo, 10/12/94. See Report Figure 4

UTL

POST

6-2

G G G G G G G G G G G G G G G

04.9

ASSUME 50/50 SPLIT @ ROAD INTERSECTION - DL&W (COLLECTS BOTH DIRECTIONS) EQUAL OVERTOPPING

03.4

W

S

2200

98.4

n = .03
S = 1.2%
Q = 960
@ n = .035 Q =

180

3'

17:1

10:1

01.9

2200

02.9

05.4

45

1.0'

n = 0.030
S = 2%
Q = 990
@ n = .035 Q = 850

01.3

99.9

01.1

04.

03.1

01.6

94.9

01.2

01.8

96.6

94.8

96.1

2200

93.1

98.8

PAVED PARKING

DRIVE

AGONWHEEL

FH

2190

97.7

CONTROL POINT DATA

LATION · NORTHING · EASTING · ELEV

APPENDIX D

HYDRAULIC CALCULATIONS

3. CHANNEL CAPACITIES

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1083 SHEET 1 OF ___
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 3/22/95
CHKD. BY: AJL DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: Channel Capacity Calcs.

Two Types of Channel Capacities were determined

① Normal Flow - capacity prior to highway overtopping

② Surcharged Flows - capacity of channel with water surface higher than road surface.

① Normal Flow -

capacity was estimated with Manning's Equation. Parameters were scaled from NDOT aerial survey (Exhibit 1) See Exhibit 1 for locations of sections sampled, calculations & results. A Manning's "n" - value of 0.030 was assumed for this sparsely vegetated roadside ditch.

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1003 SHEET 2 OF ___
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 3/22/95
CHKD. BY: AGL DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: ___

(2) Surcharged Flow

Surcharged flow capacity of the roadside ditch was determined iteratively using HEC-2. The HEC-2 input files were made using information from the NDOT Aerial Survey (Exhibit 1) and the ground survey data obtained by NDOT for this project (attached survey field notes).

The HEC-2 was run iteratively with different flow rates to determine the amount of surcharge (extended section) for each flow rate modelled. Results are attached.

HEC-2 output [illegible]
Q was input and surcharge depth (Extended section) was output

HISTORIC

EXTENDED (Surcharge)

Q	Sect. 85800	85035	84500	85100	83700
400	.19	.22	—	.31	—
300	(.01)	— (○)	—	—	—
375 / 350	.11	ave. 0.16 .10	—	.19	—
320	.04	.05	—	(—) ✓	—
330	.07	.06	—	.06	—
900	X	X	—	X	.39
700	X	✓	✓	✓	.09
650					.03
600	—			.70 —	—
630	—			—	(—)
2000	—		1.7	—	
1500	—		.47	—	
1200	—		.08	—	
1100	—		(—) ✓	—	
500		.42		.52	
550		.50		.64	
450		.33		.41	
360		.12			
410		.24			

~~Ext.~~ 4/10/95 AOL 2/3

EXISTING

Q Extended Sect

Q	83900	84100	84300	84500	84700	84900
500	.52	0.1	—	—	—	—
~~500~~ 320	—	—				
400	.31	—				
350	.19	—				
450	.41	.01				
2000			1.22	—	—	—
1500			~~1.22~~ .87	—	—	—
1000	1.31	.86	.45			
600	.70	.26	—	—	—	—
~~900~~	.89	.41	.06			
650	.79	.34	—			
625	.74			.60	.20	.03
~~4000~~						
3000				.08	—	—
2800				—	—	—
3500				—	—	—
570	.67					
550	.64	.16				
1050	1.38	.92	.50			
1100	1.44	1.27	.57			
1150	1.51	1.46	.62			
1200	1.57	1.54	.66			
750	.96	.49	.12			
800	1.03	.57	.18			
850	1.11	.64	.24			
900	1.18	.71	.31			
950	1.23	.79	.37			

CRIT. DEPTH = TOP OF ROAD
⇒ FLOW IS SUPERCRIT. & ACT. CAPAC. EXCEEDS THIS.

85100 > 4000

EXISTING CONDITIONS
CAPACITY SUMMARY

ckd. 4/10/95

Comb 5 = 840 ℓ

630 — 83700

Qcap

320 — 83980

360'

450 — 84100

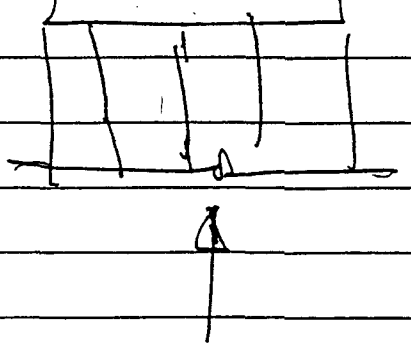
650 — 84300

>2800 — 84500

>3500 — 84700

4000 — 84900

>4000 — 85100



WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD—SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

JOB NUMBER: 1803 SHEET 1 OF ____
JOB NAME: Boulder Highway
CALC. BY: RTV DATE 1/13/95
CHKD. BY: AM DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: Historic Sections in Project Area HEC-2

Data from NDOT Aerial Survey Hardcopy

Sect # 84500

Sta.	
100	58.8
112	58
120	56
130	54
135	53.7
139	54
152	56
170	57.1
185	57.9

X1 84500 9 100 185

Sect 85035

Elev.	Sta.
63.0	100
62.1	140
60	159
61.8	175
62.1	210

X1 85035 5 100 210 5335 535 535

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1183 SHEET 2 OF ____
JOB NAME: Boulder Hwy.
CALC. BY: RJV DATE 1/13/95
CHKD. BY: ATL DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Suit B5B00

Elev.	Sta
71.0	100
68	123
66.5	135
68	160
68.5	170
68.8	185

X	B5B00	6	100	185	765	765	765

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 1 OF ____
JOB NAME: Boulder Hwy.
CALC. BY: RJV DATE 1/12/95
CHKD. BY: AR DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Data From NDOT ground survey 9/30/94

STA 82500

SURVEY STA.	ELEV.	TRANSPOSE STATION (200 - STA)	
20	2134.3	193	RIGHT BANK
19	2134.1	181	
37	32.2	163	
65	32.9	155	
96	35.7	104	
112	34.6	88	
132	34.8	68	
138	36.1	62	
184	36.7	16	
189	37.9	11	↑ LEFT BANK
200	37.2	0	

X1 82500 11 0 193

STA 82700

SURV.	ELEV.	USE
7	2136.5	193
19	36.3	181
30	34.5	170
57	33.8	143
77	38.3	123
128	39.4	72
183	39.9	17
186	40.9	14
200	40.6	0

X1 82700 9 0 193 200 200 200

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1803 SHEET 2 OF ____
JOB NAME: Boulder Hwy.
CALC. BY: RJV DATE 1 / 12 / 95
CHKD. BY: AJT DATE 4 / 10 / 95
REV. BY: ____ DATE __ / __ / __

SUBJECT: ____

STA 82900

Surv.	Elev.	Use
7	2139.0	193
19	38.8	181
38	37.1	162
56	36.2	144
84	41.5	116
98	41.6	102
106	39.8	94
182	40.6	18
189	42.4	11
200	41.2	0

X1	82900	10	0	193	200	200	200

STA 83100

Surv.	Elev.	Use
7	41.8	193
19	41.6	181
40	38.4	160
58	37.8	142
82	43.8	118
95	44.6	105
107	42.6	93
182	43.9	18
185	44.8	15
200	44.1	0

X1	83100	10	0	193	200	200	200

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD—SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

JOB NUMBER: 1803 SHEET 3 OF ____
JOB NAME: Boulder Highway
CALC. BY: RJV DATE 1/12/95
CHKD. BY: ATL DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

STA 83300

Survey	Elev.	Use
7	44.7	193
19	44.5	181
41	40.9	159
60	41.8	140
85	45.5	115
96	42.9	104
155	46.2	45
181	45.9	19
186	47.0	14
200	46.6	0

X1 83300 10 0 193 200 200 200

STA 83500

Survey	Elev.	Use
7	2147.3	193
19	47.1	181
39	44.4	161
50	44.3	150
70	45.2	130
78	44.2	122
100	48.0	100
180	49.4	20
185	51.0	15
200	49.2	0

X1 83500 10 0 193 200 200 200

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 883 SHEET 4 OF ____
JOB NAME: Boulder Hwy.
CALC. BY: RDV DATE 1 / 12 / 95
CHKD. BY: AR DATE 4 / 10 / 95
REV. BY: ____ DATE ___ / ___ / ___

SUBJECT: ____

STA 83700

Survey	Elev.	Use
7	49.4	193
19	49.2	181
39	46.9	161
57	46.6	143
77	51.9	123
101	52.3	99
108	51.5	92
178	52.5	22
185	54.2	15
200	53.5	0

XI	83700	10	0	193	200	200	200

~~Sta~~ 83900

7	50.7	193
19	50.9	181
34	49.1	166
55	48.6	145
81	51.0	119
98	53.6	102
119	52.4	81
147	56.3	53
180	57.0	20
188	53.9	12
200	54.3	0

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1893 SHEET 5 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/12/95
CHKD. BY: AAL DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Sta 84100

Survey	Elev.	Use
7	52.8	193
19	52.6	181
33	51.0	167
58	50.5	142
72	53.8	128
136	54.3	64
183	58.2	17
188	55.6	12
200	55.5	0

X1 84100 9 0 193 200 200 200

Sta 84300

7	55.2	193
19	55.0	181
42	51.9	158
55	57.8	145
62	54.2	138
163	55.0	37
183	60.4	17
188	60.9	12
190	57.7	10
200	57.8	0

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 6 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/12/95
CHKD. BY: AJL DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Sta 84500

Survey	Elev.	Use
7	58.1	193
19	57.9	181
53	54.6	147
138	55.7	62
169	63.4	31
185	63.8	15
191	60.7	9
200	61.1	0

X1 84500 B 0 193 200 200 200

Sta 84700

12	60.3	188					
24	60.1	176					
57	59.0	149					
69	55.5	131					
132	56.1	68					
147	61.8	53					
182	62.8	18					
184	63.4	16					
200	63.1	0					

X1 84700 9 0 188 200 200 200

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD—SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

JOB NUMBER: 1883 SHEET 2 OF ____
JOB NAME: Boulder Hwy.
CALC. BY: RJV DATE 1/12/95
CHKD. BY: ATL DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ____

Sta 84900

	Survey	Elev.	Use			
	1.7	62.3	183			
	29	62.1	171			
	46	61.1	154			
	70	57.3	130			
	141	57.4	59			
	170	64.5	30			
	190	64.5	10			
	194	65.0	6			
	200	64.9	0			
X1	84900	9	0	183	200	200	200

Sta 85100

	7	64.1	193				
	19	63.9	181				
	40	61.8	160				
	51	64.1	149				
	83	63.5	117				
	96	62.2	104				
	98	59.9	102				
	108	56.7	92				
	110	56.6	90				
	153	56.5	47				
	192	66.5	8				
	200	67.0	0				
X1	85100	12	0	193	200	200	200

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
123 E. WASHINGTON AVENUE
LAS VEGAS, NEVADA 89101

FAX COVER SHEET

DATE: 9-30-94

TO: JANET BENDER

AGENCY: NDOT HYDRAULICS

FAX NUMBER: 687-4846

PHONE NUMBER: 687-3799

Number of Pages Transmitting (including Cover Sheet): 3

COMMENTS:

SECTIONS USED FOR HEC-2

SENT
SEP 30 PM 3:16
STATE OF NEVADA DEPARTMENT OF TRANSPORTATION CARSON CITY, NEVADA

SENDER:

NAME: TOMMY M. BURROUGHS

AGENCY: Transportation

FAX NUMBER: (702) 385-6500 6544

PHONE NUMBER: (702) 385-6500 or 6596
(For transmission problems - call (702) 385-6596)

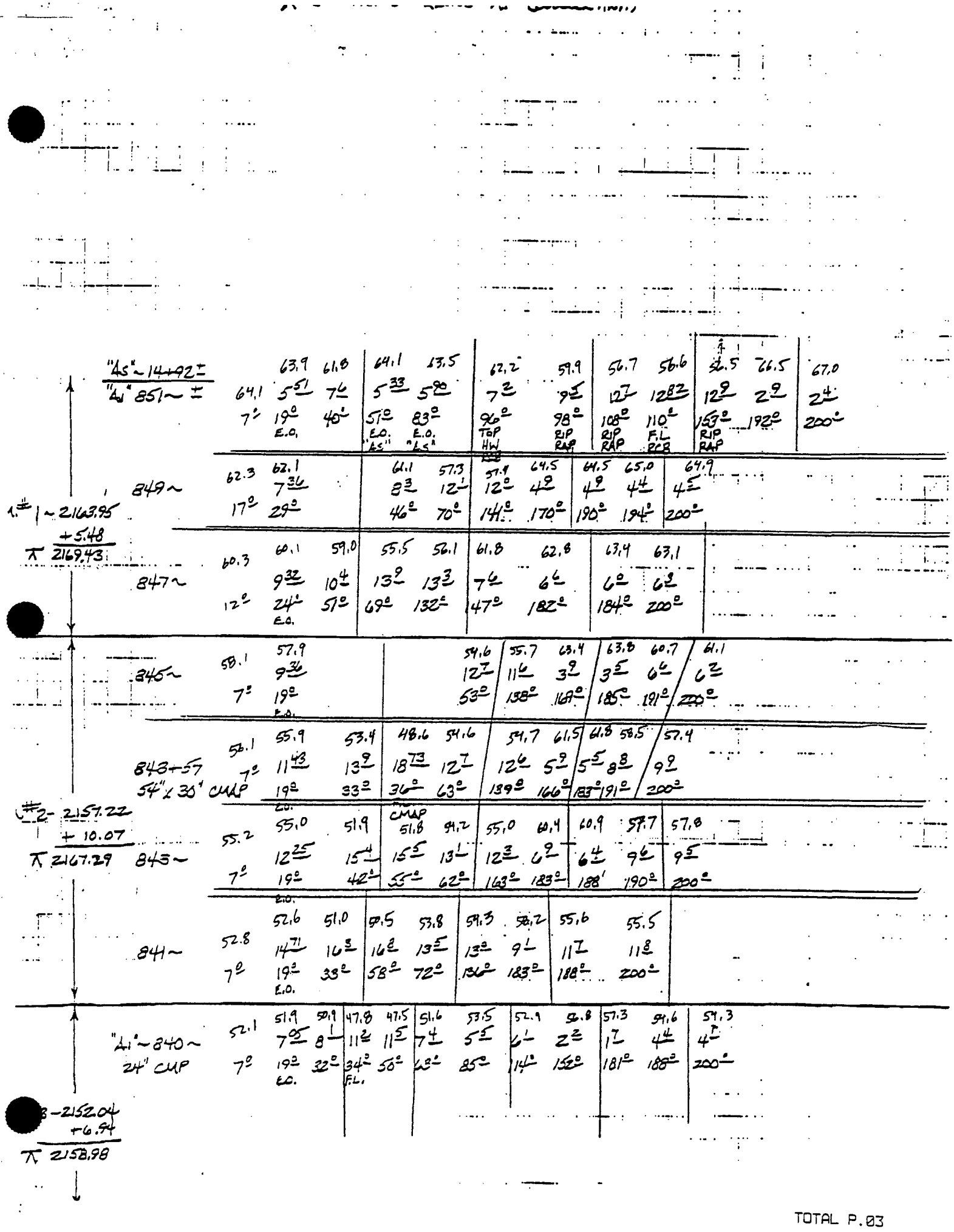
DOES SENDER WANT DOCUMENTS RETURNED TO THEM?

YES _____ NO ✓

NDOT
0070-002
7/93

~~X-SECTIONS~~ ALONG "A1" (BOULDER HWY)

	50.7	50.9	49.1	48.6	54.0	53.6	52.4	52.3	57.0	53.9	54.3
"A1" ~ 839 ~	8 3/12	8 12/12	9 9/12	10 4/12	5 0/12	5 4/12	6 0/12	2 7/12	2 0/12	5 1/12	4 7/12
	7°	19° E.O.	34°	55°	81°	98°	119°	147°	180°	188°	200°
BM #3 ~ 2152.04 + 6.94 = 2158.98											
	49.4	49.2	46.9	46.6	51.9	52.3	51.5	52.5	51.2	53.5	
837 ~		9 83/12	12 1/12	12 4/12	7 1/12	6 7/12	7 5/12	6 5/12	4 8/12	5 5/12	
	7°	19° E.O.	39°	57°	77°	101°	108°	178°	185°	200°	
1.76											
	47.3	47.1	44.9	44.3	45.2	44.2	48.0	49.4	51	49.2	
835 ~		4 65/12	7 4/12	7 5/12	6 6/12	7 6/12	3 8/12	2 4/12	0 8/12	2 6/12	
	7°	19° E.O.	39°	50°	70°	78°	100°	180°	185°	200°	
	46.6	46.4	44.9	42.0	42.0	46.7	47.8	48.1	49.3	49.3	
834 + 47		5 36/12	6 9/12	9 84/12	9 8/12	5 1/12	4 0/12	3 7/12	2 5/12	2 5/12	
24" CMP	7°	19° E.O.	32°	34° F.L. CMP	53°	66°	80°	181°	186°	200°	
BM #4 ~ 2144.29 + 7.48 = 2151.77											
	44.7	44.5	40.9	41.8	45.5	42.9	46.2	45.9	47.0	46.6	
833 ~		7 29/12	10 9/12	10°	6 3/12	8 9/12	5 6/12	5 9/12	4 8/12	5 2/12	
	7°	19° E.O.	41°	60°	85°	96°	155°	181°	186°	200°	
	42.6	42.4	40.2	37.2	38.9	42.7		45.0	46.5	45.3	
831 + 64		9 37/12	11 6/12	14 45/12	12 9/12	9 1/12		6 8/12	5 3/12	6 2/12	
30" CMP	7°	19° E.O.	33°	57° F.L. CMP	64°	90°		183°	187°	200°	
	41.8	41.6	38.4	37.8	43.8	44.6	42.6	43.9	44.8	44.1	
831 ~		10 22/12	13 4/12	14°	8°	7 2/12	9 2/12	7 9/12	7°	7 7/12	
	7°	19° E.O.	40°	58°	82°	95°	107°	182°	185°	200°	
	39.0	38.8		36.1	36.2	41.5	41.6	39.8	40.6	42.4	41.2
829 ~		6 96/12		9 7/12	9 6/12	4 3/12	4 2/12	6°	5 2/12	3 4/12	4 6/12
	7°	19° E.O.		38°	56°	84°	98°	106°	182°	189°	200°
	36.5	36.3	34.5	33.8	38.3	39.4	39.9	40.9	40.6		
827 ~		9 48/12	11 3/12	12°	7 5/12	6 4/12	5 9/12	4 9/12	5 2/12		
	7°	19° E.O.	30°	57°	77°	128°	185°	186°	200°		
BM #5 ~ 2138.84 + 6.92 = 2145.76											
	34.4	34.2	32.6	29.5	31.0	34.5	35.6	34.7	31.6	35.9	36.7	38.1	37.1
825 + 11		11 52/12	13 2/12	16 25/12	16 8/12	11 3/12	10 5/12	11 1/12	11 2/12	9 2/12	9 1/12	7 7/12	8 7/12
30" CMP	7°	19° E.O.	37°	40° F.L. CMP	60°	77°	100°	111°	132°	140°	183°	188°	200°
	34.3	34.1		32.2	32.9	35.7	34.6	34.8	36.1	36.7	37.9	37.2
"A1" ~ 825 ~		11 43/12		13 6/12	12 2/12	10 1/12	11 2/12	11 0/12	9 7/12	9 1/12	7 9/12	8 6/12
	7°	19° E.O.		37°	64°	96°	112°	132°	138°	184°	189°	200°


"As" ~ 1492±
"A" 851 ~ ±
849 ~
#1 ~ 2163.95
+5.48
T 2169.43
847 ~
846 ~
848+57
54" x 30" CMP
#2 ~ 2157.22
+10.07
T 2167.29
845 ~
841 ~
"A" ~ 840 ~
24" CMP
#3 ~ 2152.04
+6.94
T 2158.98
E.O.
E.O. "As"
E.O. "As"
TOP HW
RIP RAP
RIP RAP
F.L.
RIP RAP
RIP RAP
CMAP
E.O.
F.L.
E.O.
TOTAL P.03

APPENDIX D

HYDRAULIC CALCULATIONS

4. U.S. 95 OVERTOPPING (WEIR FLOWS)

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 1 OF ____
JOB NAME: Boulder Hwy
CALC. BY: ATV DATE 1/13/95
CHKD. BY: AJC DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: Road Overtopping Calcs – Historic

		50-YR		100-YR
DP20:	Total Flow = H1 Flow =	716	(DAR=0.95)	976
	– culvert losses " =	120		120
		596		856
	50/50 Split @ DP20 ⇒ 596/2 =	(298)		= 428
	⇒ 300/430 cfs flows out of DP20, W. of US95			
DP30: (Sect. 85035)	Flow at DP30 w/ interbasin flow split (comb3) =	690	(DAR=.93)	860
	Culverts U/S interbasin =	–5(120)=601		– 60
	Tot. =	580		800
	Culvert Flow	– 100		– 100
	U.S. of DP30 =	480		700
	Road overtopping =	–120		– 290
	D.S. of DP30, W. of US95 =	(360)		(410)
DP40: (Sect 85100)	From DP30	360		410
	From Comb-5	+ 430	(DAR=.93)	+ 535
	U.S. DP40 Tot. Flow	790		950
	Road Overtop	– 350		– 460
	D.S. of DP40, W. of US95 =	(440)		(490)
DP50	(w/out addit. overtopping)	440 + 379 =	(820)	490 + 473 = (960)
	(DP40 + DV_CH = DP50)			

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD—SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893-6266
FAX NO. (702) 893-6269

JOB NUMBER: 1883 SHEET 2 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/13/95
CHKD. BY: AJC DATE 1/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ROAD OVERTOP CALCS. - HISTORIC COND.

LOCATION	EST. CHAN. CAPAC.	50-YR TOT. FLOW	50-YR OVERFLOW SHEET (approx.)	CHAN. CAP w/ SURCH.	AVG. WEIR LENGTH (approx.)	OVERTOPPING FLOW	COMP.* RCT.
SET BD+34	300	400	0.12	360	800	(100)	170
839+00	320	800	0.41	450	400	(315)	350
		100-YR					
850+35	370	700	.24	410	800	(280)	290
839+00	320	960	0.52	500	400	(499)	460

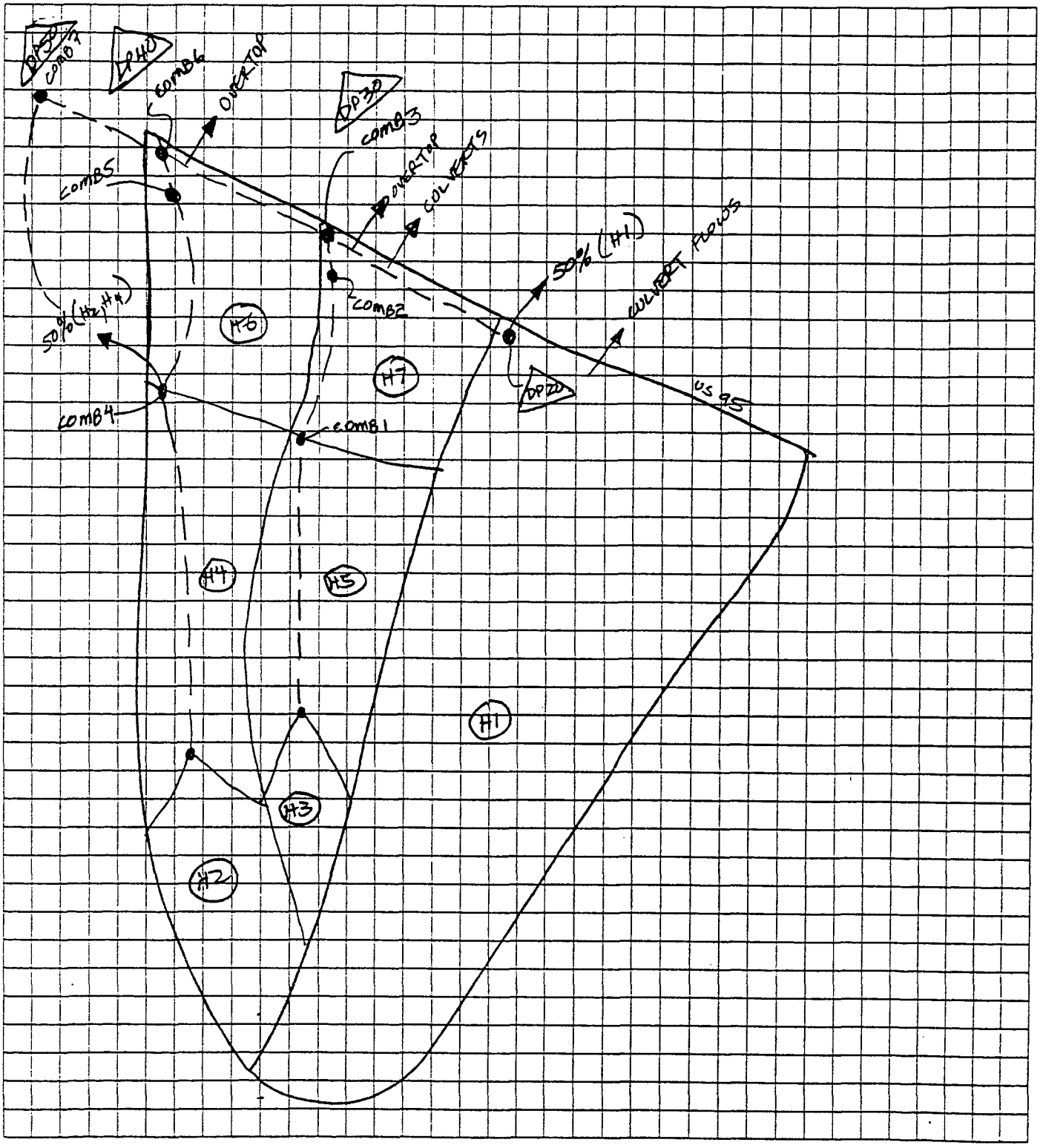
* Overtop flow per weir eqn.: $Q = CLH^{3/2}$

C = 3.0
L = length
H = depth

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 3 OF ___
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/12/99
CHKD. BY: ARL DATE 4/10/95
REV. BY: ___ DATE __/__/__

SUBJECT: HISTORIC BASINS SCHEMATIC



WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1883 SHEET 1 OF ____
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/16/95
CHKD. BY: ADL DATE 4/10/95
REV. BY: ____ DATE __/__/__

SUBJECT: ROAD OVERTOP CALCS. – EXIST. CONDS. / FUTURE CONDS

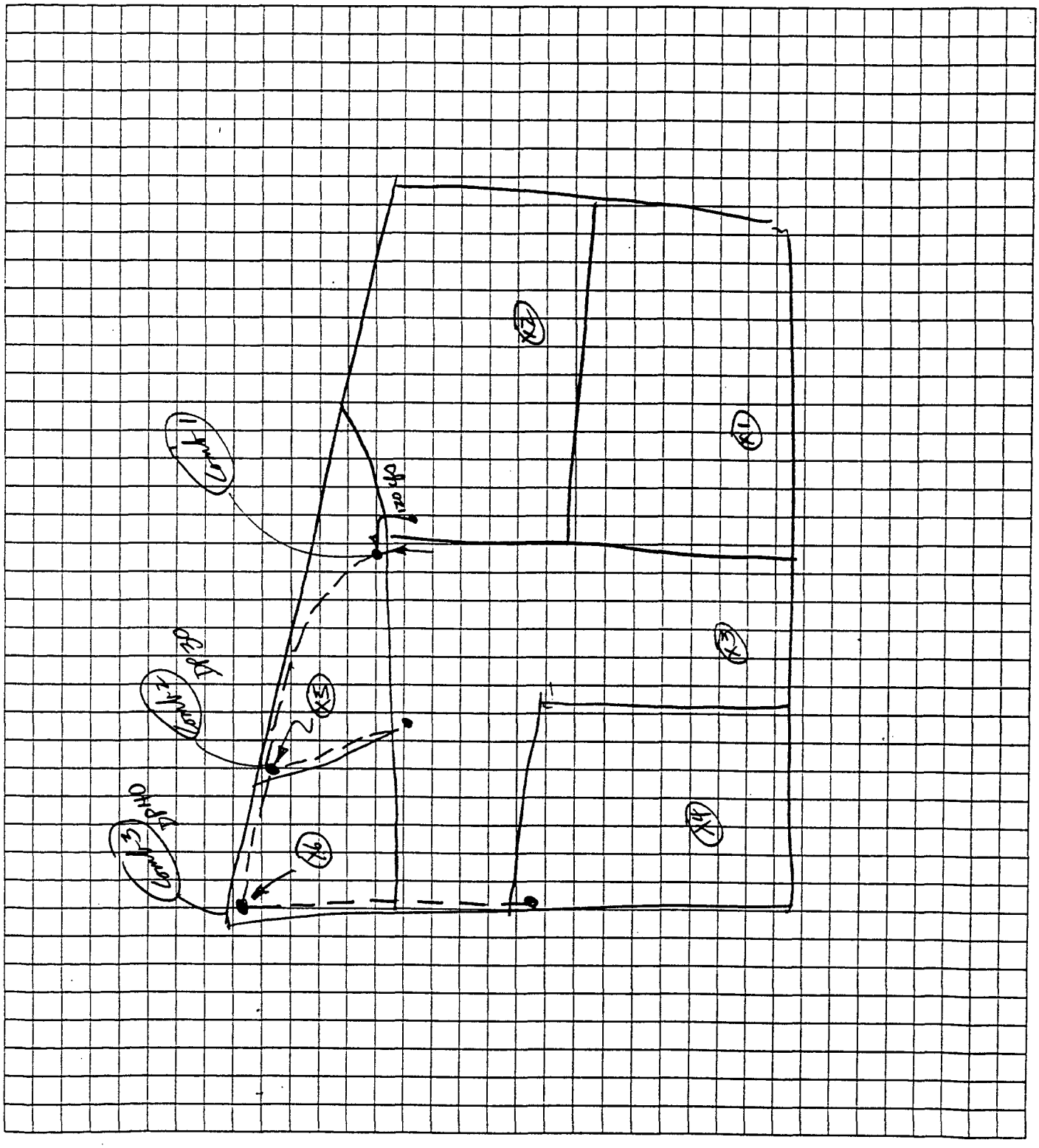
Location	Ext. Chan. Capacity	Tot. Flows	Overflow (cfs) (approx.)	Chan. Cap w/ Sand	Min Length	Overlapping Flows	* Adj
50-Year Ext.	EXISTING						
	82900	320	36	410	400	(260)	290
	FUTURE						
	83900	320	79	650	700	(840)	890
100-Year	EXISTING						
	83900	320	52	500	400	(450)	460
	FUTURE						
	83900	320	96	750	400	(1130)	1160

* Comp = computed min length, C=3
Q= CLIMB

WRC NEVADA, INC.
CENTURY PARK
1771 EAST FLAMINGO ROAD–SUITE 200A
LAS VEGAS, NEVADA 89119
PHONE NO. (702) 893–6266
FAX NO. (702) 893–6269

JOB NUMBER: 1003 SHEET 2 OF ___
JOB NAME: Boulder Hwy
CALC. BY: RJV DATE 1/13/95
CHKD. BY: AJL DATE 4/10/95
REV. BY: ___ DATE ___/___/___

SUBJECT: EXISTING/FUTURE BASINS



APPENDIX E

HEC-2 INPUT/OUTPUT

```
T1   US95 ROADSIDE CHANNEL CAPACITY ANALYSIS - HISTORIC CONDITIONS
T2   ANALYSIS BY WRC NEVADA, INC.   1-12-95    RJU
T2   SURVEY DATA FROM NDOT SURVEY 9-30-94 AND AERIAL TOPO DRAWINGS

J1                                                          330    35.2
J2                  -1                                                  15
J3    38     55     26     56      8      1      3      4
J3   150

NC  .030   .030   .030    .1     .3

X1 82500     11      0    193
GR  37.2      0   37.9      1   36.7      6   36.1     62   34.8     68
GR  34.6     88   35.7    104   32.9    155   32.2    163   34.1    181
GR  34.3    193

X1 82700      9      0    193    200    200    200
GR  40.6      0   40.9     14   39.9     17   39.4     72   38.3    123
GR  33.8    143   34.5    170   36.3    181   36.5    193

X1 82900     10      0    193    200    200    200
GR  44.2      0   42.4     11   40.6     18   39.8     94   41.6    102
GR  41.5    116   36.2    144   36.1    162   38.8    181   39.0    193

X1 83100     10      0    193    200    200    200
GR  44.1      0   44.8     15   43.9     18   42.6     93   44.6    105
GR  43.8    118   37.8    142   38.4    160   41.6    181   41.8    193

X1 83300     10      0    193    200    200    200
GR  46.6      0   47.0     14   45.9     19   46.2     45   42.9    104
GR  45.5    115   41.8    140   40.9    159   44.5    181   44.7    193

X1 83500     10      0    193    200    200    200
GR  49.2      0   51.0     15   49.4     20   48.0    100   44.2    122
GR  45.2    130   44.3    150   44.4    161   47.1    181   47.3    193

X1 83700     10      0    193    200    200    200
GR  53.5      0   54.2     15   52.5     22   51.5     92   52.3     99
GR  51.9    123   46.6    143   46.9    161   49.2    181   49.4    193

X1 83900     11      0    193    200    200    200
GR  54.3      0   53.9     12   57.0     20   56.3     53   52.4     81
GR  53.6    102   54.0    119   48.6    145   49.1    166   50.9    181
GR  50.7    193

X1 84500      9    100    185    600    600    600
GR  58.8    100     58    112     56    120     54    130   53.7    135
GR    54    139     56    152   57.1    170   57.9    185

X1 85035      5    100    210    535    535    535
GR  63.0    100   62.0    140     60    159   61.8    195   62.1    210
```

```
X1 85800       6     100     185     765     765     765
GR  71.0     100    68.0     123    66.5     135      68     160    68.5     170
GR  68.8     185

EJ
ER
```

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1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    31MAR95    TIME   16:46:41  *
 *******************************************
```


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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
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1

THIS RUN EXECUTED 31MAR95 16:46:41

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************
```

T1 US95 ROADSIDE CHANNEL CAPACITY ANALYSIS - HISTORIC CONDITIONS
T2 ANALYSIS BY WRC NEVADA, INC. 1-12-95 RJU
T2 SURVEY DATA FROM NDOT SURVEY 9-30-94 AND AERIAL TOPO DRAWINGS

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
								330	35.2	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
			-1							15

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38	55	26	56	8	1	3	4

150

NC	.030	.030	.030	.1	.3					
X1	82500	11	0	193						
GR	37.2	0	37.9	1	36.7	6	36.1	62	34.8	68
GR	34.6	88	35.7	104	32.9	155	32.2	163	34.1	181
GR	34.3	193								
X1	82700	9	0	193	200	200	200			
GR	40.6	0	40.9	14	39.9	17	39.4	72	38.3	123
GR	33.8	143	34.5	170	36.3	181	36.5	193		
X1	82900	10	0	193	200	200	200			
GR	44.2	0	42.4	11	40.6	18	39.8	94	41.6	102
GR	41.5	116	36.2	144	36.1	162	38.8	181	39.0	193
X1	83100	10	0	193	200	200	200			
GR	44.1	0	44.8	15	43.9	18	42.6	93	44.6	105
GR	43.8	118	37.8	142	38.4	160	41.6	181	41.8	193

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X1	83300	10	0	193	200	200	200			
GR	46.6	0	47.0	14	45.9	19	46.2	45	42.9	104
GR	45.5	115	41.8	140	40.9	159	44.5	181	44.7	193
X1	83500	10	0	193	200	200	200			
GR	49.2	0	51.0	15	49.4	20	48.0	100	44.2	122
GR	45.2	130	44.3	150	44.4	161	47.1	181	47.3	193
X1	83700	10	0	193	200	200	200			
GR	53.5	0	54.2	15	52.5	22	51.5	92	52.3	99
GR	51.9	123	46.6	143	46.9	161	49.2	181	49.4	193
X1	83900	11	0	193	200	200	200			
GR	54.3	0	53.9	12	57.0	20	56.3	53	52.4	81
GR	53.6	102	54.0	119	48.6	145	49.1	166	50.9	181
GR	50.7	193								
X1	84500	9	100	185	600	600	600			

```
GR     58.8       100        58       112        56       120        54       130      53.7       135
GR       54       139        56       152      57.1       170      57.9       185

X1    85035         5       100       210       535       535       535
GR     63.0       100      62.0       140        60       159      61.8       195      62.1       210

X1    85800         6       100       185       765       765       765
GR     71.0       100      68.0       123      66.5       135        68       160      68.5       170
GR     68.8       185

1
   31MAR95      16:46:41                                                                    PAGE    3

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       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 82500.000

 3265 DIVIDED FLOW

 3280 CROSS SECTION  82500.00 EXTENDED       .90 FEET

  82500.000      3.00     35.20       .00     35.20     35.30       .10       .00       .00     37.20
      330.0        .0     330.0        .0        .0     131.3        .0        .0        .0     34.30
        .00       .00      2.51       .00      .000      .030      .000      .000     32.20     66.15
    .002075        0.        0.        0.         0         0         0       .00    110.47    193.00


 FLOW DISTRIBUTION FOR SECNO=  82500.00          CWSEL=     35.20

 STA=      66.     193.
   PER Q=    100.0
    AREA=    131.3
     VEL=      2.5
   DEPTH=      1.2

 *SECNO 82700.000

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .42
```

82700.000	1.87	35.67	35.64	.00	36.27	.60	.82	.15	40.60
330.0	.0	330.0	.0	.0	53.1	.0	.4	.4	36.50
.01	.00	6.21	.00	.000	.030	.000	.000	33.80	134.67
.011779	200.	200.	200.	4	14	0	.00	42.50	177.17

FLOW DISTRIBUTION FOR SECNO= 82700.00 CWSEL= 35.67

STA= 135. 193.
PER Q= 100.0
AREA= 53.1
VEL= 6.2
DEPTH= 1.3

1
31MAR95 16:46:41 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

*SECNO 82900.000

82900.000	1.86	37.96	.00	.00	38.57	.60	2.30	.00	44.20
330.0	.0	330.0	.0	.0	52.9	.0	.7	.5	39.00
.02	.00	6.24	.00	.000	.030	.000	.000	36.10	134.71
.011190	200.	200.	200.	4	0	0	.00	40.37	175.08

FLOW DISTRIBUTION FOR SECNO= 82900.00 CWSEL= 37.96

STA= 135. 193.
PER Q= 100.0
AREA= 52.9
VEL= 6.2
DEPTH= 1.3

*SECNO 83100.000

83100.000	2.25	40.05	.00	.00	40.63	.57	2.05	.00	44.10
330.0	.0	330.0	.0	.0	54.3	.0	.9	.7	41.80
.03	.00	6.08	.00	.000	.030	.000	.000	37.80	132.99
.009454	200.	200.	200.	2	0	0	.00	37.86	170.85

FLOW DISTRIBUTION FOR SECNO= 83100.00 CWSEL= 40.05

STA= 133. 193.
PER Q= 100.0
AREA= 54.3

VEL= 6.1
DEPTH= 1.4

*SECNO 83300.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

83300.000	2.18	43.08	43.08	.00	43.68	.60	2.17	.01	46.60
330.0	.0	330.0	.0	.0	53.3	.0	1.2	.9	44.70
.04	.00	6.19	.00	.000	.030	.000	.000	40.90	100.77
.012567	200.	200.	200.	6	8	0	.00	44.97	172.33

1
31MAR95 16:46:41 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

FLOW DISTRIBUTION FOR SECNO= 83300.00 CWSEL= 43.08

STA= 101. 193.
PER Q= 100.0
AREA= 53.3
VEL= 6.2
DEPTH= 1.2

*SECNO 83500.000

83500.000	1.56	45.76	45.75	.00	46.26	.50	2.58	.01	49.20
330.0	.0	330.0	.0	.0	58.2	.0	1.4	1.1	47.30
.05	.00	5.67	.00	.000	.030	.000	.000	44.20	112.96
.013206	200.	200.	200.	5	19	0	.00	58.12	171.08

FLOW DISTRIBUTION FOR SECNO= 83500.00 CWSEL= 45.76

STA= 113. 193.
PER Q= 100.0
AREA= 58.2
VEL= 5.7
DEPTH= 1.0

*SECNO 83700.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

83700.000	1.94	48.54	48.54	.00	49.19	.65	2.56	.05	53.50

330.0	.0	330.0	.0	.0	50.8	.0	1.7	1.4	49.40
.05	.00	6.49	.00	.000	.030	.000	.000	46.60	135.70
.012432	200.	200.	200.	2	11	0	.00	39.52	175.22

FLOW DISTRIBUTION FOR SECNO= 83700.00 CWSEL= 48.54

STA= 136. 193.
PER Q= 100.0
AREA= 50.8
VEL= 6.5
DEPTH= 1.3

1
31MAR95 16:46:41 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 83900.000

3265 DIVIDED FLOW

3280 CROSS SECTION 83900.00 EXTENDED .06 FEET

83900.000	2.17	50.77	.00	.00	51.19	.43	1.98	.02	54.30
330.0	.0	330.0	.0	.0	63.0	.0	1.9	1.6	50.70
.06	.00	5.24	.00	.000	.030	.000	.000	48.60	134.60
.008072	200.	200.	200.	2	0	0	.00	48.89	193.00

FLOW DISTRIBUTION FOR SECNO= 83900.00 CWSEL= 50.77

STA= 135. 193.
PER Q= 100.0
AREA= 63.0
VEL= 5.2
DEPTH= 1.3

*SECNO 84500.000

84500.000	2.56	56.26	.00	.00	56.90	.64	5.64	.06	58.80
330.0	.0	330.0	.0	.0	51.4	.0	2.7	2.2	57.90
.09	.00	6.42	.00	.000	.030	.000	.000	53.70	118.95
.011104	600.	600.	600.	4	0	0	.00	37.34	156.29

FLOW DISTRIBUTION FOR SECNO= 84500.00 CWSEL= 56.26

STA= 119. 185.
PER Q= 100.0
AREA= 51.4
VEL= 6.4
DEPTH= 1.4

*SECNO 85035.000
3280 CROSS SECTION 85035.00 EXTENDED .06 FEET

85035.000	2.16	62.16	.00	.00	62.49	.34	5.56	.03	63.00
330.0	.0	330.0	.0	.0	71.0	.0	3.5	2.9	62.10
.12	.00	4.65	.00	.000	.030	.000	.000	60.00	133.65
.009752	535.	535.	535.	3	0	0	.00	76.35	210.00

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31MAR95 16:46:41 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

FLOW DISTRIBUTION FOR SECNO= 85035.00 CWSEL= 62.16

STA= 134. 210.
PER Q= 100.0
AREA= 71.0
VEL= 4.7
DEPTH= .9

*SECNO 85800.000
3280 CROSS SECTION 85800.00 EXTENDED .07 FEET

85800.000	2.37	68.87	.00	.00	69.19	.32	6.70	.00	71.00
330.0	.0	330.0	.0	.0	72.5	.0	4.7	4.1	68.80
.17	.00	4.55	.00	.000	.030	.000	.000	66.50	116.31
.007904	765.	765.	765.	5	0	0	.00	68.69	185.00

FLOW DISTRIBUTION FOR SECNO= 85800.00 CWSEL= 68.87

STA= 116. 185.
PER Q= 100.0
AREA= 72.5
VEL= 4.6
DEPTH= 1.1

1
31MAR95 16:46:41 PAGE 8

THIS RUN EXECUTED 31MAR95 16:46:41

****
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

SUMMARY PRINTOUT

	SECNO	VLOB	VCH	VROB	DEPTH	CWSEL	EG	TOPWID
	82500.000	.00	2.51	.00	3.00	35.20	35.30	110.47
*	82700.000	.00	6.21	.00	1.87	35.67	36.27	42.50
	82900.000	.00	6.24	.00	1.86	37.96	38.57	40.37
	83100.000	.00	6.08	.00	2.25	40.05	40.63	37.86
*	83300.000	.00	6.19	.00	2.18	43.08	43.68	44.97
	83500.000	.00	5.67	.00	1.56	45.76	46.26	58.12
*	83700.000	.00	6.49	.00	1.94	48.54	49.19	39.52
	83900.000	.00	5.24	.00	2.17	50.77	51.19	48.89
	84500.000	.00	6.42	.00	2.56	56.26	56.90	37.34
	85035.000	.00	4.65	.00	2.16	62.16	62.49	76.35
	85800.000	.00	4.55	.00	2.37	68.87	69.19	68.69

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.C
	82500.000	.00	.00	.00	32.20	330.00	35.20	.00	35.30	20.75	2.51	131.26	72
•	82700.000	200.00	.00	.00	33.80	330.00	35.67	35.64	36.27	117.79	6.21	53.14	30
	82900.000	200.00	.00	.00	36.10	330.00	37.96	.00	38.57	111.90	6.24	52.87	31
	83100.000	200.00	.00	.00	37.80	330.00	40.05	.00	40.63	94.54	6.08	54.28	33
*	83300.000	200.00	.00	.00	40.90	330.00	43.08	43.08	43.68	125.67	6.19	53.31	29
	83500.000	200.00	.00	.00	44.20	330.00	45.76	45.75	46.26	132.06	5.67	58.16	28
*	83700.000	200.00	.00	.00	46.60	330.00	48.54	48.54	49.19	124.32	6.49	50.82	29
	83900.000	200.00	.00	.00	48.60	330.00	50.77	.00	51.19	80.72	5.24	62.97	36
	84500.000	600.00	.00	.00	53.70	330.00	56.26	.00	56.90	111.04	6.42	51.44	31
	85035.000	535.00	.00	.00	60.00	330.00	62.16	.00	62.49	97.52	4.65	70.97	33
	85800.000	765.00	.00	.00	66.50	330.00	68.87	.00	69.19	79.04	4.55	72.49	37

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SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	82500.000	330.00	35.20	.00	.00	.00	110.47	.00
*	82700.000	330.00	35.67	.00	.47	.00	42.50	200.00
	82900.000	330.00	37.96	.00	2.29	.00	40.37	200.00
	83100.000	330.00	40.05	.00	2.09	.00	37.86	200.00
*	83300.000	330.00	43.08	.00	3.03	.00	44.97	200.00
	83500.000	330.00	45.76	.00	2.68	.00	58.12	200.00
*	83700.000	330.00	48.54	.00	2.77	.00	39.52	200.00
	83900.000	330.00	50.77	.00	2.23	.00	48.89	200.00

84500.000	330.00	56.26	.00	5.50	.00	37.34	600.00
85035.000	330.00	62.16	.00	5.90	.00	76.35	535.00
85800.000	330.00	68.87	.00	6.71	.00	68.69	765.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 82700.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 83300.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 83300.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 83700.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 83700.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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T1   US95 ROADSIDE CHANNEL CAPACITY ANALYSIS - EXISTING CONDITIONS
T2   ANALYSIS BY WRC NEVADA, INC.   1-12-95    RJU
T2   SURVEY DATA FROM NDOT CROSS SECTION SURVEY, 9-30-94

J1                                                          4000    35.2
J2                  -1                                                  15
J3    38     55     26     56      8      1      3      4
J3   150

NC  .030   .030   .030    .1     .3

X1 82500     11      0    193
GR  37.2      0   37.9      1   36.7      6   36.1     62   34.8     68
GR  34.6     88   35.7    104   32.9    155   32.2    163   34.1    181
GR  34.3    193

X1 82700      9      0    193    200    200    200
GR  40.6      0   40.9     14   39.9     17   39.4     72   38.3    123
GR  33.8    143   34.5    170   36.3    181   36.5    193

X1 82900     10      0    193    200    200    200
GR  44.2      0   42.4     11   40.6     18   39.8     94   41.6    102
GR  41.5    116   36.2    144   36.1    162   38.8    181   39.0    193

X1 83100     10      0    193    200    200    200
GR  44.1      0   44.8     15   43.9     18   42.6     93   44.6    105
GR  43.8    118   37.8    142   38.4    160   41.6    181   41.8    193

X1 83300     10      0    193    200    200    200
GR  46.6      0   47.0     14   45.9     19   46.2     45   42.9    104
GR  45.5    115   41.8    140   40.9    159   44.5    181   44.7    193

X1 83500     10      0    193    200    200    200
GR  49.2      0   51.0     15   49.4     20   48.0    100   44.2    122
GR  45.2    130   44.3    150   44.4    161   47.1    181   47.3    193

X1 83700     10      0    193    200    200    200
GR  53.5      0   54.2     15   52.5     22   51.5     92   52.3     99
GR  51.9    123   46.6    143   46.9    161   49.2    181   49.4    193

X1 83900     11      0    193    200    200    200
GR  54.3      0   53.9     12   57.0     20   56.3     53   52.4     81
GR  53.6    102   54.0    119   48.6    145   49.1    166   50.9    181
GR  50.7    193

X1 84100      9      0    193    200    200    200
GR  55.5      0   55.6     12   58.2     17   54.3     64   53.8    128
GR  50.5    142   51.0    167   52.6    181   52.8    193

X1 84300     10      0    193    200    200    200
GR  57.8      0   57.7     10   60.9     12   60.4     17   55.0     37
GR  54.2    138   51.8    145   51.9    158   55.0    181   55.2    193
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X1 84500       8       0     193     200     200     200
GR  61.1       0    60.7       9   63.8      15    63.4      31    55.7      62
GR  54.6     147    57.9     181    58.1     193

X1 84700       9       0     188     200     200     200
GR  63.1       0    63.4      16    62.8      18    61.8      53    56.1      68
GR  55.5     131    59.0     149    60.1     176    60.3     188

X1 84900       9       0     183     200     200     200
GR  64.9       0    65.0       6    64.5      10    64.5      30    57.4      59
GR  57.3     130    61.1     154    62.1     171    62.3     183

X1 85100      12       0     193     200     200     200
GR  67.0       0    66.5       8    56.5      47    56.6      90    56.7      92
GR  59.9     102    62.2     104    63.5     117    64.1     149    61.8     160
GR  63.9     181    64.1     193

EJ
ER
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1*******************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    31MAR95    TIME   16:34:11  *
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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
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THIS RUN EXECUTED 31MAR95 16:34:11

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**************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
**************************************
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T1 US95 ROADSIDE CHANNEL CAPACITY ANALYSIS - EXISTING CONDITIONS
T2 ANALYSIS BY WRC NEVADA, INC. 1-12-95 RJU
T2 SURVEY DATA FROM NDOT CROSS SECTION SURVEY, 9-30-94

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
								4000	35.2	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
			-1							15

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38	55	26	56	8	1	3	4

150

NC	.030	.030	.030	.1	.3					
X1	82500	11	0	193						
GR	37.2	0	37.9	1	36.7	6	36.1	62	34.8	68
GR	34.6	88	35.7	104	32.9	155	32.2	163	34.1	181
GR	34.3	193								
X1	82700	9	0	193	200	200	200			
GR	40.6	0	40.9	14	39.9	17	39.4	72	38.3	123
GR	33.8	143	34.5	170	36.3	181	36.5	193		
X1	82900	10	0	193	200	200	200			
GR	44.2	0	42.4	11	40.6	18	39.8	94	41.6	102
GR	41.5	116	36.2	144	36.1	162	38.8	181	39.0	193
X1	83100	10	0	193	200	200	200			
GR	44.1	0	44.8	15	43.9	18	42.6	93	44.6	105
GR	43.8	118	37.8	142	38.4	160	41.6	181	41.8	193

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X1	83300	10	0	193	200	200	200			
GR	46.6	0	47.0	14	45.9	19	46.2	45	42.9	1[illegible]
GR	45.5	115	41.8	140	40.9	159	44.5	181	44.7	193
X1	83500	10	0	193	200	200	200			
GR	49.2	0	51.0	15	49.4	20	48.0	100	44.2	122
GR	45.2	130	44.3	150	44.4	161	47.1	181	47.3	193
X1	83700	10	0	193	200	200	200			
GR	53.5	0	54.2	15	52.5	22	51.5	92	52.3	99
GR	51.9	123	46.6	143	46.9	161	49.2	181	49.4	193
X1	83900	11	0	193	200	200	200			
GR	54.3	0	53.9	12	57.0	20	56.3	53	52.4	81
GR	53.6	102	54.0	119	48.6	145	49.1	166	50.9	181
GR	50.7	193								
X1	84100	9	0	193	200	200	200			

```
 GR     55.5        0      55.6       12      58.2       17      54.3       64      53.8      128
 GR     50.5      142      51.0      167      52.6      181      52.8      193

 X1    84300       10         0      193       200       200       200
 GR     57.8        0      57.7       10      60.9       12      60.4       17      55.0       37
 GR     54.2      138      51.8      145      51.9      158      55.0      181      55.2      193

 X1    84500        8         0      193       200       200       200
 GR     61.1        0      60.7        9      63.8       15      63.4       31      55.7       62
 GR     54.6      147      57.9      181      58.1      193

 X1    84700        9         0      188       200       200       200
 GR     63.1        0      63.4       16      62.8       18      61.8       53      56.1       68
 GR     55.5      131      59.0      149      60.1      176      60.3      188

 X1    84900        9         0      183       200       200       200
 GR     64.9        0      65.0        6      64.5       10      64.5       30      57.4       59
 GR     57.3      130      61.1      154      62.1      171      62.3      183

 X1    85100       12         0      193       200       200       200
 GR     67.0        0      66.5        8      56.5       47      56.6       90      56.7       92
 GR     59.9      102      62.2      104      63.5      117      64.1      149      61.8      160
 GR     63.9      181      64.1      193
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
0

 CCHV=     .100 CEHV=     .300
 *SECNO 82500.000

 3265 DIVIDED FLOW

 3280 CROSS SECTION  82500.00 EXTENDED      2.98 FEET

 3720 CRITICAL DEPTH ASSUMED
  82500.000      5.08     37.28     37.28     35.20     38.52      1.24       .00       .00     37.20
     4000.0        .0    4000.0        .0        .0     447.0        .0        .0        .0     34.30
```

.00	.00	8.95	.00	.000	.030	.000	.000	32.20	.00
.010653	0.	0.	0.	0	16	0	.00	189.51	193.00

FLOW DISTRIBUTION FOR SECNO= 82500.00 CWSEL= 37.28

STA= 0. 193.
PER Q= 100.0
AREA= 447.0
VEL= 8.9
DEPTH= 2.4

*SECNO 82700.000
3280 CROSS SECTION 82700.00 EXTENDED 3.62 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

82700.000	6.32	40.12	40.12	.00	41.46	1.35	2.18	.03	40.60
4000.0	.0	4000.0	.0	.0	429.4	.0	2.0	.8	36.50
.01	.00	9.32	.00	.000	.030	.000	.000	33.80	16.35
.011176	200.	200.	200.	20	11	0	.00	176.65	193.00

FLOW DISTRIBUTION FOR SECNO= 82700.00 CWSEL= 40.12

STA= 16. 193.
PER Q= 100.0
AREA= 429.4
VEL= 9.3
DEPTH= 2.4

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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	ENDST

*SECNO 82900.000
3280 CROSS SECTION 82900.00 EXTENDED 3.22 FEET

82900.000	6.12	42.22	.00	.00	43.16	.94	1.65	.04	44.20
4000.0	.0	4000.0	.0	.0	513.7	.0	4.2	1.7	39.00
.01	.00	7.79	.00	.000	.030	.000	.000	36.10	11.71
.006360	200.	200.	200.	2	0	0	.00	181.29	193.00

FLOW DISTRIBUTION FOR SECNO= 82900.00 CWSEL= 42.22

STA= 12. 193.
PER Q= 100.0
AREA= 513.7
VEL= 7.8
DEPTH= 2.8

*SECNO 83100.000

3265 DIVIDED FLOW

3280 CROSS SECTION 83100.00 EXTENDED 2.73 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

83100.000	6.73	44.53	44.53	.00	45.77	1.24	1.60	.09	44.10
4000.0	.0	4000.0	.0	.0	447.8	.0	6.4	2.5	41.80
.02	.00	8.93	.00	.000	.030	.000	.000	37.80	.00
.010297	200.	200.	200.	20	8	0	.00	184.58	193.00

FLOW DISTRIBUTION FOR SECNO= 83100.00 CWSEL= 44.53

STA= 0. 193.
PER Q= 100.0
AREA= 447.8
VEL= 8.9
DEPTH= 2.4

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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	ENDST

*SECNO 83300.000
3280 CROSS SECTION 83300.00 EXTENDED 1.89 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

83300.000	5.69	46.59	46.59	.00	47.85	1.26	2.02	.01	46.60
4000.0	.0	4000.0	.0	.0	444.2	.0	8.4	3.3	44.70
.03	.00	9.01	.00	.000	.030	.000	.000	40.90	15.87
.009920	200.	200.	200.	1	12	0	.00	177.13	193.00

FLOW DISTRIBUTION FOR SECNO= 83300.00 CWSEL= 46.59

STA= 16. 193.
PER Q= 100.0
AREA= 444.2
VEL= 9.0
DEPTH= 2.5

*SECNO 83500.000

3265 DIVIDED FLOW

3280 CROSS SECTION 83500.00 EXTENDED 2.27 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

83500.000	5.37	49.57	49.57	.00	50.83	1.26	1.98	.00	49.20
4000.0	.0	4000.0	.0	.0	444.7	.0	10.5	4.1	47.30
.03	.00	8.99	.00	.000	.030	.000	.000	44.20	.00
.009866	200.	200.	200.	20	12	0	.00	176.65	193.00

FLOW DISTRIBUTION FOR SECNO= 83500.00 CWSEL= 49.57

STA= 0. 193.
PER Q= 100.0
AREA= 444.7
VEL= 9.0
DEPTH= 2.5

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 83700.000
3280 CROSS SECTION 83700.00 EXTENDED 3.72 FEET

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

83700.000	6.52	53.12	53.12	.00	54.34	1.22	1.92	.00	53.50
4000.0	.0	4000.0	.0	.0	450.7	.0	12.5	4.9	49.40
.04	.00	8.87	.00	.000	.030	.000	.000	46.60	19.47
.009316	200.	200.	200.	20	9	0	.00	173.53	193.00

FLOW DISTRIBUTION FOR SECNO= 83700.00 CWSEL= 53.12

STA= 19. 193.
PER Q= 100.0
AREA= 450.7
VEL= 8.9
DEPTH= 2.6

*SECNO 83900.000

3265 DIVIDED FLOW

3280 CROSS SECTION 83900.00 EXTENDED 4.13 FEET

83900.000	6.23	54.83	.00	.00	56.20	1.37	1.82	.04	54.30
4000.0	.0	4000.0	.0	.0	425.9	.0	14.5	5.7	50.70
.04	.00	9.39	.00	.000	.030	.000	.000	48.60	.00
.008911	200.	200.	200.	2	0	0	.00	143.89	193.00

FLOW DISTRIBUTION FOR SECNO= 83900.00 CWSEL= 54.83

STA= 0. 193.
PER Q= 100.0
AREA= 425.9
VEL= 9.4
DEPTH= 3.0

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 84100.000

3265 DIVIDED FLOW

3280 CROSS SECTION 84100.00 EXTENDED 3.91 FEET

3301 HV CHANGED MORE THAN HVINS

84100.000	6.21	56.71	.00	.00	57.53	.82	1.27	.06	55.50
4000.0	.0	4000.0	.0	.0	550.7	.0	16.8	6.4	52.80
.05	.00	7.26	.00	.000	.030	.000	.000	50.50	.00
.004776	200.	200.	200.	2	0	0	.00	172.23	193.00

FLOW DISTRIBUTION FOR SECNO= 84100.00 CWSEL= 56.71

STA= 0. 193.
PER Q= 100.0
AREA= 550.7
VEL= 7.3
DEPTH= 3.2

*SECNO 84300.000
3280 CROSS SECTION 84300.00 EXTENDED 2.43 FEET

84300.000	5.84	57.64	.00	.00	58.45	.81	.92	.00	57.80
4000.0	.0	4000.0	.0	.0	552.8	.0	19.3	7.2	55.20
.06	.00	7.24	.00	.000	.030	.000	.000	51.80	27.26
.004400	200.	200.	200.	3	0	0	.00	165.74	193.00

FLOW DISTRIBUTION FOR SECNO= 84300.00 CWSEL= 57.64

STA= 27. 193.
PER Q= 100.0
AREA= 552.8
VEL= 7.2
DEPTH= 3.3

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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

*SECNO 84500.000
3280 CROSS SECTION 84500.00 EXTENDED .60 FEET

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

84500.000	4.10	58.70	58.70	.00	60.17	1.47	1.25	.20	61.10
4000.0	.0	4000.0	.0	.0	411.2	.0	21.5	7.9	58.10
.06	.00	9.73	.00	.000	.030	.000	.000	54.60	49.93
.009535	200.	200.	200.	3	19	0	.00	143.07	193.00

FLOW DISTRIBUTION FOR SECNO= 84500.00 CWSEL= 58.70

STA= 50. 193.
PER Q= 100.0
AREA= 411.2
VEL= 9.7
DEPTH= 2.9

*SECNO 84700.000
3280 CROSS SECTION 84700.00 EXTENDED .20 FEET

84700.000	5.01	60.51	60.42	.00	61.99	1.48	1.82	.00	63.10
4000.0	.0	4000.0	.0	.0	409.8	.0	23.4	8.5	60.30
.07	.00	9.76	.00	.000	.030	.000	.000	55.50	56.41
.008659	200.	200.	200.	4	11	0	.00	131.59	188.00

FLOW DISTRIBUTION FOR SECNO= 84700.00 CWSEL= 60.51

STA= 56. 188.
PER Q= 100.0
AREA= 409.8
VEL= 9.8
DEPTH= 3.1

*SECNO 84900.000
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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 84900.00 EXTENDED .03 FEET

84900.000	5.04	62.34	.00	.00	63.36	1.02	1.33	.05	64.90
4000.0	.0	4000.0	.0	.0	492.6	.0	25.5	9.2	62.30
.08	.00	8.12	.00	.000	.030	.000	.000	57.30	38.86
.005267	200.	200.	200.	1	0	0	.00	144.14	183.00

FLOW DISTRIBUTION FOR SECNO= 84900.00 CWSEL= 62.34

STA= 39. 183.
PER Q= 100.0
AREA= 492.6
VEL= 8.1
DEPTH= 3.4

*SECNO 85100.000

3265 DIVIDED FLOW

85100.000	6.76	63.26	.00	.00	64.40	1.14	1.00	.03	67.00
4000.0	.0	4000.0	.0	.0	467.2	.0	27.7	9.7	64.10
.08	.00	8.56	.00	.000	.030	.000	.000	56.50	20.60
.004793	200.	200.	200.	3	0	0	.00	115.79	174.69

FLOW DISTRIBUTION FOR SECNO= 85100.00 CWSEL= 63.26

STA= 21. 193.
PER Q= 100.0
AREA= 467.2
VEL= 8.6
DEPTH= 4.0

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THIS RUN EXECUTED 31MAR95 16:34:12

****
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

SUMMARY PRINTOUT

	SECNO	VLOB	VCH	VROB	DEPTH	CWSEL	EG	TOPWID
*	82500.000	.00	8.95	.00	5.08	37.28	38.52	189.51
*	82700.000	.00	9.32	.00	6.32	40.12	41.46	176.65
	82900.000	.00	7.79	.00	6.12	42.22	43.16	181.29
*	83100.000	.00	8.93	.00	6.73	44.53	45.77	184.58
*	83300.000	.00	9.01	.00	5.69	46.59	47.85	177.13
*	83500.000	.00	8.99	.00	5.37	49.57	50.83	176.65

*	83700.000	.00	8.87	.00	6.52	53.12	54.34	173.53
	83900.000	.00	9.39	.00	6.23	54.83	56.20	143.89
	84100.000	.00	7.26	.00	6.21	56.71	57.53	172.23
	84300.000	.00	7.24	.00	5.84	57.64	58.45	165.74
*	84500.000	.00	9.73	.00	4.10	58.70	60.17	143.07
	84700.000	.00	9.76	.00	5.01	60.51	61.99	131.59
	84900.000	.00	8.12	.00	5.04	62.34	63.36	144.14
	85100.000	.00	8.56	.00	6.76	63.26	64.40	115.79

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SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.0
*	82500.000	.00	.00	.00	32.20	4000.00	37.28	37.28	38.52	106.53	8.95	447.01	387
*	82700.000	200.00	.00	.00	33.80	4000.00	40.12	40.12	41.46	111.76	9.32	429.39	378
	82900.000	200.00	.00	.00	36.10	4000.00	42.22	.00	43.16	63.60	7.79	513.68	501
*	83100.000	200.00	.00	.00	37.80	4000.00	44.53	44.53	45.77	102.97	8.93	447.80	394
*	83300.000	200.00	.00	.00	40.90	4000.00	46.59	46.59	47.85	99.20	9.01	444.15	401
*	83500.000	200.00	.00	.00	44.20	4000.00	49.57	49.57	50.83	98.66	8.99	444.74	402
*	83700.000	200.00	.00	.00	46.60	4000.00	53.12	53.12	54.34	93.16	8.87	450.71	414
	83900.000	200.00	.00	.00	48.60	4000.00	54.83	.00	56.20	89.11	9.39	425.90	423
	84100.000	200.00	.00	.00	50.50	4000.00	56.71	.00	57.53	47.76	7.26	550.74	578
	84300.000	200.00	.00	.00	51.80	4000.00	57.64	.00	58.45	44.00	7.24	552.76	603
*	84500.000	200.00	.00	.00	54.60	4000.00	58.70	58.70	60.17	95.35	9.73	411.22	409
	84700.000	200.00	.00	.00	55.50	4000.00	60.51	60.42	61.99	86.59	9.76	409.77	429
	84900.000	200.00	.00	.00	57.30	4000.00	62.34	.00	63.36	52.67	8.12	492.58	551

85100.000	200.00	.00	.00	56.50	4000.00	63.26	.00	64.40	47.93	8.56	467.24	577

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SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	82500.000	4000.00	37.28	.00	.00	2.08	189.51	.00
*	82700.000	4000.00	40.12	.00	2.84	.00	176.65	200.00
	82900.000	4000.00	42.22	.00	2.10	.00	181.29	200.00
*	83100.000	4000.00	44.53	.00	2.31	.00	184.58	200.00
*	83300.000	4000.00	46.59	.00	2.06	.00	177.13	200.00
*	83500.000	4000.00	49.57	.00	2.98	.00	176.65	200.00
*	83700.000	4000.00	53.12	.00	3.54	.00	173.53	200.00
	83900.000	4000.00	54.83	.00	1.72	.00	143.89	200.00
	84100.000	4000.00	56.71	.00	1.88	.00	172.23	200.00
	84300.000	4000.00	57.64	.00	.92	.00	165.74	200.00
*	84500.000	4000.00	58.70	.00	1.06	.00	143.07	200.00
	84700.000	4000.00	60.51	.00	1.81	.00	131.59	200.00
	84900.000	4000.00	62.34	.00	1.83	.00	144.14	200.00
	85100.000	4000.00	63.26	.00	.92	.00	115.79	200.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 82500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

EXHIBIT 2

WAGONWHEEL INTERCHANGE

DRAINAGE STRUCTURE/GRADING PLANS

FED. AID. PROJ. NO.	STATE	PROJECT NO.	COUNTY	SHEET
9	NEVADA	BF-F-095-1(7)	CLARK	4A

T.22S.-R.63E.
SEC. 34

LIMITS OF CONSTRUCTION
A1 926+00.00
AN1 926+00.00

A1 LINE
AN1 LINE
ES1 LINE
EN1 LINE
RW4 LINE

926 919 915 910 905
N. 42°45'14" W.
N. 83°45'14" W. ~ 761.32'
2260
2250

BEGIN PROJECT
ES1 285+30.00
EN1 285+30.00

A1 915+30± 30'± LT. — (1) REGRADE EXISTING DITCH – 600 FT. TO A1 908+70±, 30'± LT.

A1 911+12± 33'± LT. — (1) EXTEND EXISTING 24" CMP PER STD. DET. R-2.1.1, TYPE 1 PIPE CULVERT EXTENSION.

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION; SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND
IMPROVEMENTS (C1) CHANNEL NOTES
DITCH NOTES DRAINAGE NOTES

DATUM
075-307 (ASP-75)
N. 453288.62
E. 692982.30
ELEV.= 2225.015
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP WITH W.P. SET 3' SOUTH, AT 892+69.38, 415.60' LT.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY: KBA/MC
DRAWN BY: FJP
CHECKED BY: SKZ
REVIEWED BY: PAT

FED. ROAD REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	5A

EN1 296+24± 18'± LT. — (1) CONSTRUCT 36"X116' RCP WITH STD. RIP-RAP BASIN AT OUTLET. OUTLET AT EN1 296+15±, 97'± RT.

EN1 296+24± 19'± LT. — (2) CONSTRUCT TYPE 2A DROP INLET.

EN1 302+00± 16'± LT. — (3) CONSTRUCT TYPE 2 DROP INLET AND 24"X118' RCP WITH STD. RIP-RAP BASIN AT OUTLET. OUTLET AT RW4 17+00±, 20'± LT.

RW4 19+00± 29'± LT. — (4) CONSTRUCT 24"X57' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT RW4 19+00±, 28'± RT.

RW4 21+00± 21'± LT. — (5) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 27'± LT. (DOWNDRAIN).

ES1 298+40± 77'± LT. — (6) CONSTRUCT 36"X96' RCP WITH STD. RIP-RAP BASIN AT INLET. OUTLET AT EN1 296+24±, 20'± RT.

EN1 296+24± 100'± RT. — (2) REGRADE EXISTING DITCH – 200'± TO EN1 297+50±, 250'± RT.

RW4 19+00± 30'± RT. — (3) GRADE NEW V-DITCH – 40'± TO RW4 19+00±, 70'± RT.

075-307

075-309

230 KV TRANS

A1 LINE

ES1 LINE

RW4 LINE

EN1 LINE

AN1 LINE

RW1 LINE

"OLD VEGAS"

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND

IMPROVEMENTS — CHANNEL NOTES

DITCH NOTES — DRAINAGE NOTES

DATUM

075-307 (ASP 73)
N. 453268.62
E. 692962.30
ELEV.= 2225.015
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP WITH W.P. SET 3' SOUTH.
A1 892+69.38, 415.60' LT.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KRA/MF
DRAWN BY:	FJP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000026

PROJ. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
0	NEVADA	BF-F-095-1(7)	CLARK	6A

LIMITS OF CONSTRUCTION
WW 9+50.00
TO -200' FOR REGRADING
OF DRAINAGE CHANNEL

RW3 LINE

WW LINE

STRUCTURE NO. B-1911

STRUCTURE NO. F-1471

MATCH INTO EXISTING EARTH CHANNEL

DAWSON AVENUE

10" WATER

10" SEWER

CONESTOGA

T.22S. R.63E. SEC. 34

RW4 LINE

ES1 LINE

AN LINE

EN1 LINE

RW1 LINE

MATCH SHEET 6A

WAGONWHEEL

PARKING

PAVED

RW4 23+00± 35'± LT.	1	CONSTRUCT 48"X73' RCP WITH STD. CULVERT HEADWALLS AND STD. RIP-RAP AT BASIN AT OUTLET. OUTLET AT RW4 23+00±, 38'± RT.
RW1 18+30± 31'± LT.	2	CONSTRUCT 36"X83' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT RW1 18+30±, 32'± RT.
WW 9+50± 85'± LT.	3	CONSTRUCT TRIPLE-8'X4'X115' RCB WITH TYPE 1 HEADWALLS. OUTLET AT WW 10+65±, 85'± LT. (STRUCTURE NO. B-1911).
WW 10+62± 36'± RT.&LT.	4	CONSTRUCT SIDEWALK DRAINS.
EN1 309+35± 9'± LT.	5	CONSTRUCT TYPE 2 DROP INLET AND 18"X72' CMP WITH STD. RIP-RAP BASIN AT OUTLET. OUTLET AT ES1 309+35±, 60'± LT.
EN1 308+84± 8'± LT.	6	CONSTRUCT 18"X40' SLOTTED CMP DRAIN. OUTLET AT EN1 309+34±, 9'± LT. CONNECT TO TYPE 2 DROP INLET EN1 309+35±.

WW 9+50± 83'±LT.	C1	NEW DAWSON/CONESTOGA CHANNEL TO 200 FT. SOUTH AND PARALLEL TO DAWSON ROAD.
WW 9+72± 16'±RT.	80	ADJUST SEWER MANHOLE FRAME & COVER, METHOD "A".
WW 9+67± 6'±RT.	81	ADJUST WATER VALVE FRAME & COVER, METHOD "A".
WW 9+66± 4'±RT.	82	ADJUST WATER VALVE FRAME & COVER, METHOD "A".
WW 9+66± 3'±RT.	83	ADJUST WATER VALVE FRAME & COVER, METHOD "A".
WW 9+79± 25'±RT.	84	ADJUST GAS VALVE FRAME & COVER, METHOD "A" (BY OTHERS).
WW 9+81± 24'±RT.	85	ADJUST GAS VALVE FRAME & COVER, METHOD "A" (BY OTHERS).

075-307

LEGEND

○ IMPROVEMENTS (C1) CHANNEL NOTES

△ DITCH NOTES ◇ DRAINAGE NOTES

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4.
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1.
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6.
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1.
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-9.

DATUM

075-307 (ASP '75)
N. 453268.82
E. 692982.30
ELEV.= 2225.015
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP WITH W.P. SET 3' SOUTH.
A1 892+69.38, 415.60' LT.

MARVIN PERALA 4531 (1974) CIVIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/ME
DRAWN BY:	SVP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000027

REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	7A

A	319+50± 80'± RT.	4 GRADE NEW V-DITCH – 50' ± TO RW2 9+00±, 35'± LT.
RW2	9+00± 40'± RT.	5 REGRADE EXIST. DITCH – 100' ± TO RW2 8+50±, 130'±RT.

RW3	3+97± 27'± LT.	1 CONSTRUCT TRIPLE 8'X4'X313' RCB W/ TYPE-1 HEADWALLS. OUTLET AT A 316+00±, 83'± RT. (STRUCTURE NO. B-1912)
A	315+25± 89'± LT.	2 CONSTRUCT SPECIAL DROP INLET IN CONJUNCTION W/ STRUCTURE B-1912 (CONCRETE AND REINFORCING QUANTITIES ARE INCLUDED AS PART OF STRUCTURE NO. B-1912).
RW2	7+00± 64'± LT.	3 CONSTRUCT TRIPLE 8'X4'X122' RCB WITH TYPE 1 HEADWALLS. OUTLET AT RW2 7+22±, 56'± RT. (STRUCTURE NO. B-1913).
RW2	1+13± 21'± RT.	4 CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 43'± RT. (DOWNDRAIN).
RW2	7+20± 19'± LT.	5 CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 63'± LT. (DOWNDRAIN).

RW3	4+70± 10'± RT.	6 CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 23'± LT. SEE SPECIAL DETAIL, SHEET 109.
AS	38+08 20'±RT.	7 CONSTRUCT 30"X19"X120' HERCP WITH STD. HEADWALL AND LIGHT RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT A 325+00±, 68'± LT.
RW2	9+20 9'± LT.	8 CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 19'± RT. (DOWNDRAIN).
RW2	9+00± 36'± LT.	9 CONSTRUCT 24"X63' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT RW2 9+00±, 27'± RT.
AS	38+09± 13'± RT.	10 CONSTRUCT BARRIER RAIL OPENING. SEE SPECIAL DETAIL, SHEET 110.

WW	10+50± 85'±RT.	C2 CONESTOGA/RW3 CHANNEL TO RW3 3+97±, 27'± RT.
A	316+00± 83'±RT.	C3 A/RW2 CHANNEL TO RW2 7+00±, 64'± LT.
RW2	7+22± 56'±RT.	C4 AN CHANNEL TO AN 4+00±, 105'± RT.

RW4 LINE
RW3 LINE
AS LINE
WW LINE
ES1 LINE
EN1 LINE
RW1 LINE
A LINE
AN LINE
RW2 LINE
STRUCTURE NO. I-1471
STRUCTURE NO. B-1912
STRUCTURE NO. B-1913
STRUCTURE NO. I-1471R
CONESTOGA
10" WATER
4" CP NATIONAL GAS
10" SEWER
WAY
EL. 2218.50
RIM 2210.15
INV 2206.75
WAGONWHEEL
N. 63°56'49" W. ~ 2108.97
S. 64°56'49" E. ~ 1229.53
N. 62°37'42" W. ~ 340.06'
T.22S., R.63E., SEC. 34
E. 891,000
N. 454,500
MATCH SHEET 29A

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND

1 IMPROVEMENTS C1 CHANNEL NOTES
△ DITCH NOTES ◇ DRAINAGE NOTES

DATUM

076-105 (ASP 75)
N. 454476.04
E. 892103.94
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1 878+00.10 (226.22' RT.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

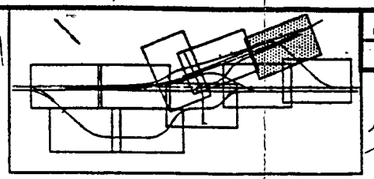
UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/ME
DRAWN BY:	FJP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000028

FED. AID. PROJ. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	8A



RETAINING WALL #3
AS LINE
RETAINING WALL #2
RETAINING WALL #1
RW3 LINE
2:1 RIP-RAP SLOPE (TYP.)
STRUCTURE NO. I-1900
RW2 LINE
A LINE
AS LINE
STRUCTURE NO. C-1914
RW3 LINE
RW2 LINE
A LINE
DROP STRUCTURES - SEE SPECIAL DETAIL SHEET 107.
CHANNEL C/L
MATCH SHEET 30A
T.22S. R.63E. SEC.

A	331+64± 100'± RT.	6	GRADE NEW DITCH - 100' ± TO A 332+00±, 180'± RT.
A	333+16± 115'± LT.	1	CONSTRUCT DOUBLE 8'X4'X307' RCB, INCLUDING APRON WITH TYPE 1 & TYPE 2 HEADWALLS. OUTLET AT A 332+17±, 160'± RT. (STRUCTURE NO. C-1914).
	331+64± 75'± LT.	2	CONSTRUCT 24"X175' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT A 331+64±, 100'± RT.
AS	22+00± 11'± LT.	3	CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 34'± LT. (DOWNDRAIN).
A	331+50± 58'± LT.	4	CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 66'± LT. (DOWNDRAIN).
A	332+62± 57'± LT.	5	CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 75'± LT. (DOWNDRAIN).
A	333+03± 57'± LT.	6	CONSTRUCT 18"X40' SLOTTED CMP DRAIN. OUTLET AT A 332+63±, 57'±LT. CONNECT TO TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR.
A	333+35± 3'± RT.	7	CONSTRUCT TYPE 2 DROP INLET AND 18"X51' CMP. OUTLET INTO SIDE OF DOUBLE 8'X4' RCB AT A 332+83±, 3'± RT.
A	333+76± 3'± RT.	8	CONSTRUCT 18"X40' SLOTTED CMP DRAIN. OUTLET AT A 333+36±. CONNECT TO TYPE 2 DROP INLET AT A 333+35±.
AS	28+00± 110'±LT.	C5	AS CHANNEL TO AS 16+00±, 70'± LT.

LEGEND

- IMPROVEMENTS
- DITCH NOTES
- C1 CHANNEL NOTES
- DRAINAGE NOTES

DATUM

075-108 (ASP 75)
N. 454476.04
E. 892103.94
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1 878+00.10 (226.22' RT.)

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA / AHE
DRAWN BY:	EJP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000025

FED. ROAD PROJ. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	28A

RW2 LINE

A1 LINE

RW1 LINE

N. 42°45'14" W.~1514.23'

MATCH SHEET 26A

AN1 LINE

STATE HIGHWAY PATROL SUBSTATION

WW LINE

15' TEMPORARY CONSTRUCTION EASEMENT

T.22S., R.63E., SEC. 34

ACC LINE

33' R.O.W.

15' TEMPORARY CONSTRUCTION EASEMENT

50' R.O.W.

APPALOOSA ROAD

END PROJECT
WW 27+00.00

MATCH SHEET 32A

WW	19+00± 120'± RT.	(7) REGRADE EXIST. DITCH – 300'± TO WW 22+50±, 60'± RT.
WW	22+50± 55'± RT.	(1) CONSTRUCT DOUBLE 24"X111' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT WW 22+50±, 57'± LT.
WW	21+71± 30'±LT.	(86) ADJUST GAS VALVE FRAME AND COVER, METHOD "A" (BY OTHERS).
WW	21+85± 10'±LT.	(87) ADJUST SEWER MANHOLE FRAME & COVER, METHOD "A".
WW	25+85± 38'±RT.	(88) ADJUST TELEPHONE MANHOLE FRAME & COVER, METHOD "C" (BY OTHERS).
WW	25+87± 38'±RT.	(89) ADJUST TELEPHONE MANHOLE FRAME & COVER, METHOD "C" (BY OTHERS).
WW	26+40± 12'±LT.	(90) ADJUST SEWER MANHOLE FRAME & COVER, METHOD "A".

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

DATUM

075-108 (ASP 75)
N. 454478.04
E. 892103.84
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1 878+00.10 (226.22' RT.)

LEGEND

IMPROVEMENTS (C1) CHANNEL NOTES

DITCH NOTES DRAINAGE NOTES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/ME
DRAWN BY:	FJP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C50000.30

FED. ROAD DEMO. PROJ. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	29A

ACS 15+50± 29'± RT. (1) CONSTRUCT DOUBLE 24"X128' RCB WITH STD. RIP-RAP BASINS AT INLETS AND OUTLET. OUTLETS AT 15+30±, 97'± LT.

ACS 3+00± 21'± RT. (2) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 36'± RT. (DOWNDRAIN).

AN 5+64± 17'± LT. (3) CONSTRUCT 24"X94' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT AN 4+80±, 25'± RT.

ACS 3+00± 17'±LT. (4) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 36'± LT. (DOWNDRAIN).

ACS 12+70± 17'± LT. (5) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 33'± LT. (DOWNDRAIN).

ACN 8+67± 19'± RT. (6) CONSTRUCT 24"X62' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT ACN 8+67±, 43'± LT.

ACS 15+00± 90'± LT. (8) GRADE NEW V-DITCH - 450'± TO ACN 8+00±, 150'± LT.

ACN 8+67± 50'± LT. (9) REGRADE EXISTING DITCH - 100'± TO ACN 8+10±, 120'± LT.

RW2 7+22± 56'±RT. (C4) AN CHANNEL TO AN 4+00±, 105'± RT.

A1 871+00± 120'±RT. (C6) A1 CHANNEL (EAST OF AS) TO A1 852+62±, 100'± RT.

AN 7+64± 35'±LT. (91) ADJUST SEWER MANHOLE FRAME & COVER, METHOD "C".

T.22S., R.63E., SEC.

MATCH SHEET 7A

230 KV LINES

CHANNEL DROP STRUCTURES SEE SPECIAL DETAIL SHT.

END CHANNEL AND LT. BANK RIP-RAP AT GRADE BREAK LINE

STRUCTURE NO. 1-1899

AN LINE

ACS LINE

ACN LINE

END RT. BANK RIP-RAP AT DROP STRUCTURE

S. 15°58'49" E. ~ 844.22'

S. 42°45'14" E. ~ 1128.22'

S. 42°45'14" E. ~ 1026.92'

-0.85%

-0.30%

2190

2180

2170

875

870

865

DATUM

075-108 (ASP 75)
N. 454478.04
E. 692103.94
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1-8784-00:10 (225.22' RT.)

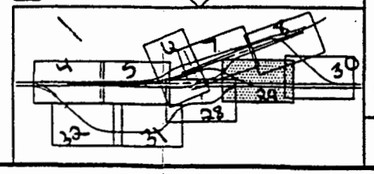
NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4.
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4.
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND

IMPROVEMENTS (C1) CHANNEL NOTES

DITCH NOTES DRAINAGE NOTES



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

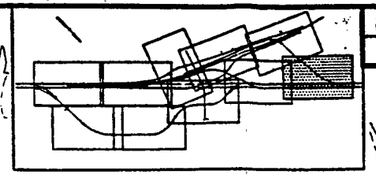
UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/ME
DRAWN BY:	FJP
CHECKED BY:	SKT
REVIEWED BY:	PAT

C5000031

FED. ROAD PROJ. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	30A



NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4 .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

MATCH SHEET 8A

690500

2180

T.22S. R.63E.

SEC.

SECTION

SECTION

A1 880+00± 40'± RT.

A1 853+35± 40'± RT.

10 REGRADE EXISTING DITCH – 25'± TO A1 858+85±, 23'± RT.

11 REGRADE EXISTING DITCH – 25'± TO A1 853+35±, 20'± RT.

AS 14+92± 25'± LT.

1 CONSTRUCT MULTIPLE 8'X4'X110' RCB WITH TYPE 2 HEADWALLS. OUTLET AT AS 13+96±, 30'± RT. (STRUCTURE NO. B-1915).

A1 851+52± 100'±RT.

C7 A1 CHANNEL (WEST OF AS) TO A1 845+00±, 100'± RT.

C5

C6

-0.30%

S. 01°43'10" E. 2112.07'

2170

AS LINE

A1 LINE

AN1 LINE

DROP STRUCTURES SEE SPECIAL DETAIL, SHT. 102

STRUCTURE NO. B-1915

LIMITS OF CONSTRUCTION
A1 845+00.00
AN1 845+00.00

OH T/P

860 855 850 845

S. 42°45'14" E.

HUSH HTS ROAD

LEGEND

IMPROVEMENTS (C1) CHANNEL NOTES

DITCH NOTES DRAINAGE NOTES

DATUM

075-108 (ASP 75)
N. 454476.04
E. 892103.94
ELEV.= 2198.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1-878+00.10 (228.22' RT.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLAN

Sverdrup CORPORATION

DESIGNED BY: KBA
DRAWN BY: FLP
CHECKED BY: SKZ
REVIEWED BY: PAT

C50

APPENDIX F

NDOT COMMENTS AND

WRC RESPONSES ON

PRELIMINARY DRAINAGE REPORT

WRC NEVADA, INC.

April 20, 1995

Ms. Janet Bender
State of Nevada Department of Transportation
1263 South Stewart Street
Carson City, Nevada 89712

WRC File: 1883/4

RE: Boulder Highway/Wagonwheel Interchange Area
Drainage Report

Dear Janet:

In response to your letter dated February 21, 1995, we have included modifications and additions to the subject drainage report (Report) to address your concerns. The following list describes our responses to your comments, with item numbers corresponding to the items in your letter (see attached).

1. See Report section V.A., paragraphs 4 and 5.

2. HEC-1 routing parameter calculations (channel sections) are included in Appendix B. Split flow calculations are presented in Appendix D.2. Highway 95 overtopping calculations are presented in Appendix D.4. Channel capacity calculations are presented in Appendix D.3., and included on aerial survey sheets of Exhibit 1. Culvert capacity calculations are included in Appendix D.1 and were based on construction drawings and field observations. Plan sheets used are included in the Exhibits and elsewhere in the Appendices where appropriate.

3. Corrected as requested.

4. Report changed to indicate cross flow through culverts and over highway.

5. Added as requested.

6. Discussion of surcharge capacity calculations has been added to section IV.B., paragraph 6 of the Report.

7. Typical sections are included in Appendix B of the Report. For a given routing element within the interchange project area, channel sections slopes were estimated as a typical average configuration for the various sections shown on the construction plans. Outside the interchange project area channel configurations were estimated based on field observations. Under actual conditions in the areas west of US 95, flow generally was carried in many small channels and the composite channels used in the modeling were considered to be an approximation of this condition.

8. Section IV.B., paragraph 3 modified to include statement that Manning's "n" values are not expected to change between existing and future scenarios.

9. Initial time of concentration calculations are included in parameter calculation sheets, Appendix B.

10. Section V.B. has been modified to explain the use of this diversion node and the comments are corrected to reflect a 120 cfs diversion.

11. Completed as requested.

12. Sample HEC-2 inputs and outputs have been included in Appendix E. As the determination of surcharged channel capacities was an iterative procedure requiring a number of HEC-2 runs, only representative input/output results have been included.

We appreciate your thorough review of the drainage report. If you have any additional questions or require additional information, please do not hesitate to call.

Very truly yours,

WRC NEVADA, INC.

Alan J. Leak, P.E.
Project Manager

RJU/AJL/jlb

Enclosure

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

2/24 ~~AH~~
2/25 ~~AE~~
ZL: 1883

BOB MILLER, *Governor*

February 21, 1995

TOM STEPHENS, P.E., *Director*

Alan Leak, P.E.
WRC Engineering, Inc.
950 South Cherry Street
Suite 404
Denver, CO 80222

Boulder Highway
EA 71016 -9
P052-94-010

Dear Mr. Leak:

The Nevada Department of Transportation Hydraulics Section has reviewed the preliminary drainage report for the Boulder Highway/ Wagonwheel Interchange area and has the following comments:

1. The comments for table 2, on page 9, are not clear. Please expand on the comments.

2. Please provide supporting documentation for flow splits and diversions. Include channel capacity calculations, US 95 culvert calculations, channel cross sections, and plan sheets used or referenced in the report. In addition, any other pertinent information shall be included in the appendix.

3. Paragraph 3 of page 10 refers to sub-basin H2 which should be H4.

4. A flow of 1,040 cfs is referred to (on page 10 paragraph 3) as the overtopping flow, this appears to include flow that crosses US 95 by way of cross drainage structures and is not the amount of overtopping flow.

5. Please show Dawson Avenue and Conestoga Way on the pertinent figures.

6. Paragraph 3 on page 13 states 290 and 430 cfs would overtop US 95 for the two events. The channel capacity at Station 839+00 is 320 cfs. There is no discussion of the surcharge capacity in the text. Please discuss the capacity with the surcharge in the report as to how the overtopping flow was calculated.

7. Please include pictures or plan sheets with typical sections of the routed parameters (i.e. channel width and sideslopes). Were these parameters field verified?

8. Will the manning roughness coefficient potentially change from existing to future conditions for the routed sections?

9. Calculations for the initial inlet overland flow time are not included in the lag time calculations. Please include a column for t_i.

10. The HEC-1 analysis for existing and future conditions shows 120 cfs being diverted out and immediately retrieved. Is the 120 cfs the amount diverted to the east by way of culverts under US 95? Please explain this diversion. In addition the comments statement states that 100 cfs is diverted, not the 120 cfs.

11. Please have an engineer check and initial all calculations.

12. Please include the output information for HEC-2, only the input information was submitted.

Once the above items have been checked and the conclusions of the report have not changed, a Final Report shall be prepared since no adverse impacts were identified.

If you have any questions or comments please let me know at (702) 687-3799.

Sincerely,

Janet L Bender

Janet L. Bender, P.E.
Senior Hydraulics Engineer

JLB:kl

cc: Gene Weight, Dist. Engr.
Tom Greco, Road Design

CURT CHANDLER, P.E.
LAND DEVELOPMENT MANAGER

PUBLIC WORKS DEPARTMENT
240 WATER STREET
HENDERSON, NV 89015
702·565·2329
FAX 702·565·5687

FINAL DRAINAGE REPORT
BOULDER HIGHWAY/WAGONWHEEL INTERCHANGE AREA

P052-94-010

TASK ORDER NO. 1

APPENDIX G

Prepared For:

NEVADA DEPARTMENT OF TRANSPORTATION
1263 STEWART STREET
CARSON CITY, NEVADA 89712

Prepared By:

WRC NEVADA, INC.
3340 SOUTH TOPAZ STREET, SUITE 170
LAS VEGAS, NEVADA 89121

(702) 893-6266

WRC FILE: 1883/2

APRIL 1995

CURT CHANDLER, P.E.
LAND DEVELOPMENT MANAGER

PUBLIC WORKS DEPARTMENT
240 WATER STREET
HENDERSON, NV 89015
702·565·2329
FAX 702·565·5687

FINAL DRAINAGE REPORT
BOULDER HIGHWAY/WAGONWHEEL INTERCHANGE AREA

P052-94-010

TASK ORDER NO. 1

APPENDIX G

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LAS VEGAS, NEVADA 89121

(702) 893-6266

WRC FILE: 1883/2

APRIL 1995

APPENDIX G

COMPLETE HEC-1 OUTPUTS

1. 50-YEAR RUNOFF

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  01/16/1995  TIME  16:06:43 *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104               *
*                                       *
*****************************************
```


```
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       BOULDER HIGHWAY RUNOFF ANALYSIS - HISTORIC CONDITIONS (PRE-PROJECT)
    2         ID       50-YEAR 6-HOUR STORM
    3         ID       THE ONLY US 95 CROSS-FLOW MODELLED IS THE 50/50 FLOW
    4         ID       SPLIT ASSUMED TO OCCUR AT WAGONWHEEL DRIVE/US 995 INTERSECTION
    5         IT       5              0     300
    6         IO       3
    7         JR     PREC    1.00    0.98    0.97    0.96    0.95    0.93    0.91

    8         KK       H3   BASIN H3 RUNOFF
    9         BA     0.20
   10         PB     2.86
   11         PC      0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
   12         PC     13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
```

```
 13          PC    19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
 14          PC    25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
 15          PC    49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
 16          PC    86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
 17          PC    98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
 18          PC    99.8    99.9   100.0
 19          LS       0      84
 20          UD     .20

 21          KK   RT_H3    ROUTE RUNOFF FROM H3 TO H5
 22          RK    6500    .042    .035            TRAP      20       6

 23          KK      H5    RUNOFF FROM BASIN H5
 24          BA    0.38
 25          LS       0      72
 26          UD    0.68

 27          KK   COMB1    COMBINE H3 AND H5
 28          HC       2

 29          KK   RT_H5    ROUTE RUNOFF FROM H5 TO H7
 30          RK    3300    .027    .035            TRAP      20       6

 31          KK      H7    RUNOFF FROM BASIN H7
 32          BA    0.22
 33          LS       0      77
 34          UD    0.54

 35          KK   COMB2    COMBINE H3, H5, H7
 36          HC       2

 37          KK      H1    RUNOFF FROM BASIN H1
 38          BA    1.50
 39          LS       0      74
 40          UD     .29
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 41          KK  H1_REM    FLOW AT H1 AFTER 50 PERCENT OVERTOPS US 95
 42          KM            DESIGN POINT 20
 43          DT  DIV_H1       0   10000
 44          DI       0      10     100    1000   10000
 45          DQ       0       5      50     500    5000

 46          KK   RT_H1    ROUTE RUNOFF FROM H1 TO H7
 47          RK    2800    .014    .035            TRAP      20       6

 48          KK   COMB3    COMBINE H3, H5, H1, H7
 49          KM            DESIGN POINT 30
 50          HC       2
```

```
 51          KK   RT_H7    ROUTE RUNOFF FROM H7 TO H6
 52          RK    1100    .027    .035           TRAP      20       6

 53          KK      H2    RUNOFF FROM BASIN H2
 54          BA    0.70
 55          LS       0     86
 56          UD    0.32

 57          KK   RT_H2    ROUTE RUNOFF FROM H2 TO H4
 58          RK    7500    .039    .035           TRAP      20       6

 59          KK      H4    RUNOFF FROM BASIN H4
 60          BA    0.62
 61          LS       0     82
 62          UD    0.75

 63          KK   COMB4    COMBINE BASINS H2, H4
 64          HC       2

 65          KK  C4_REM    FLOW AT COMB 4 REMAINING AFTER 50 PERCENT DIVERSION NORTH
 66          KM            FLOWS SPLITS 50/50 TO NORTH AND SOUTH OF APPROX MAGIC WAY
 67          DT  DIV_C4       0   10000
 68          DI       0      10     100    1000   10000
 69          DQ       0       5      50     500    5000

 70          KK   RT_H4    ROUTE RUNOFF FROM H4 TO H6
 71          RK    3000    .026    .035           TRAP      20       6

 72          KK      H6    RUNOFF FROM BASIN H6
 73          BA    0.14
 74          LS       0     72
 75          UD    0.54

 76          KK   COMB5    COMBINE H2, H4, H6
 77          HC       2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.......10

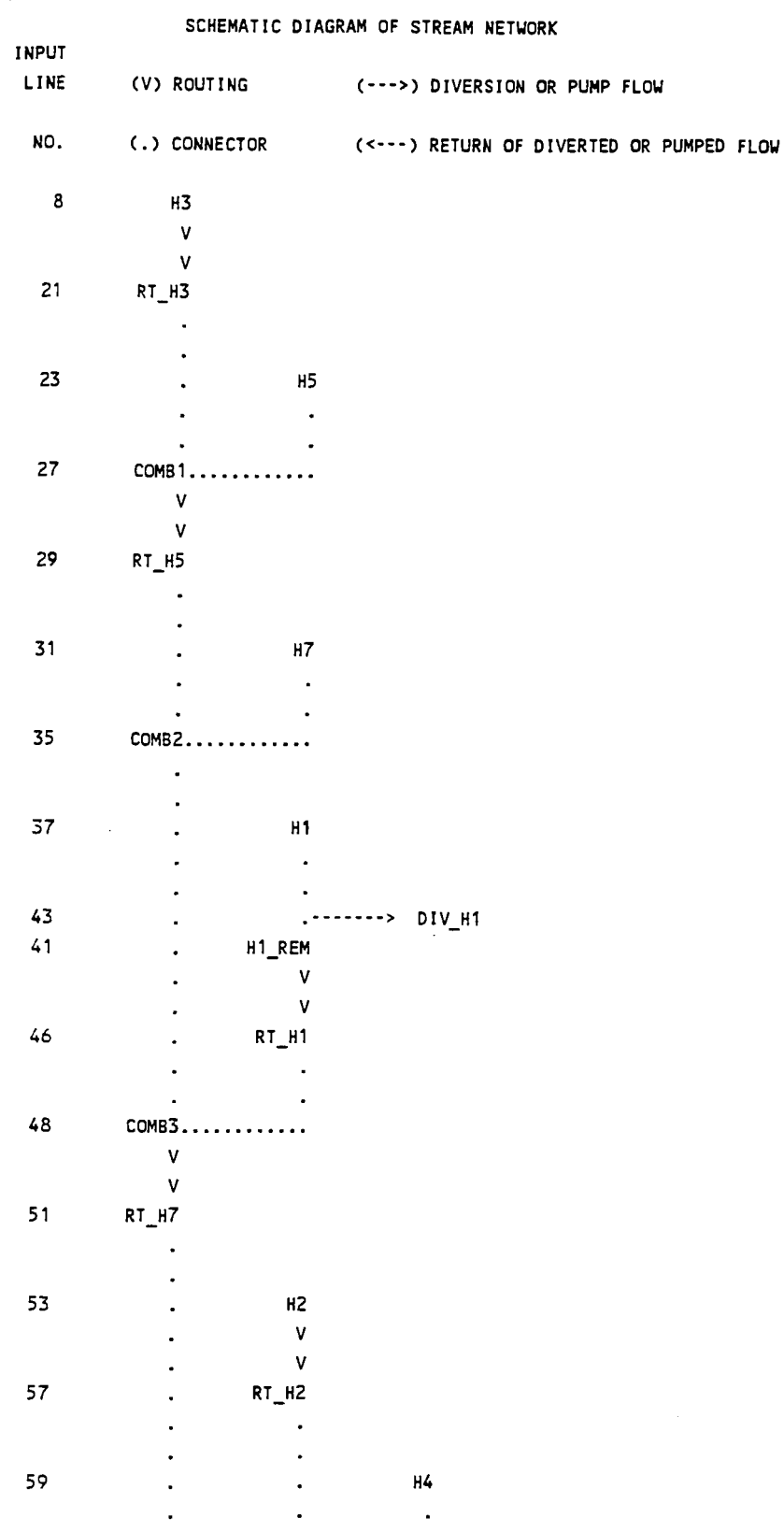
 78          KK   COMB6    COMBINE ALL BASINS EXCEPT DIV_C4
 79          KM            DESIGN POINT 40
 80          HC       2

 81          KK  GET_C4    RETRIEVE FLOW DIVERTED FROM COMB4
 82          DR  DIV_C4

 83          KK   COMB7    COMBINE ALL BASINS
 84          KM            DESIGN POINT 50
 85          HC       2
 86          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK



```
                .          .          .
63              .       COMB4.............
                .          .
                .          .
67              .          .--------> DIV_C4
65              .       C4_REM
                .          V
                .          V
70              .       RT_H4
                .          .
                .          .
72              .          .          H6
                .          .           .
                .          .           .
76              .       COMB5.............
                .          .
                .          .
78         COMB6.............
                .
                .
82              .          .<-------- DIV_C4
81              .       GET_C4
                .          .
                .          .
83         COMB7.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*  RUN DATE  01/16/1995  TIME  16:06:43 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

BOULDER HIGHWAY RUNOFF ANALYSIS - HISTORIC CONDITIONS (PRE-PROJECT)
50-YEAR 6-HOUR STORM
THE ONLY US 95 CROSS-FLOW MODELLED IS THE 50/50 FLOW
SPLIT ASSUMED TO OCCUR AT WAGONWHEEL DRIVE/US 995 INTERSECTION

```
 6 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          3  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         300  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE      2   0  ENDING DATE
              NDTIME         0055  ENDING TIME
               ICENT           19  CENTURY MARK

          COMPUTATION INTERVAL      .08 HOURS
              TOTAL TIME BASE    24.92 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
           1.00      .98       .97       .96       .95       .93       .91
```

*** *** *** *

9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

19 LS SCS LOSS RATE

STRTL	.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

20 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.20	LAG

***

UNIT HYDROGRAPH
14 END-OF-PERIOD ORDINATES

98.	321.	399.	319.	177.	102.	58.	33.	19.	11.
6.	4.	2.	1.						

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	211.	3.67		30.	8.	7.	7.
			(INCHES)	1.402	1.402	1.402	1.402
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	211.	3.67		30.	8.	7.	7.
			(INCHES)	1.402	1.402	1.402	1.402
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.36

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 204.	3.67	29.	7.	7.	7.
	(INCHES)	1.356	1.356	1.356	1.356
	(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.33

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 201.	3.67	29.	7.	7.	7.
	(INCHES)	1.333	1.333	1.333	1.333
	(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 2.75, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.31

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 197.	3.67	28.	7.	7.	7.
	(INCHES)	1.310	1.310	1.310	1.310
	(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.43, TOTAL EXCESS = 1.29

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	194.	3.67		28.	7.	7.	7.
			(INCHES)	1.287	1.287	1.287	1.287
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.42, TOTAL EXCESS = 1.24

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	187.	3.67		27.	7.	6.	6.
			(INCHES)	1.241	1.241	1.241	1.241
			(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.60, TOTAL LOSS = 1.41, TOTAL EXCESS = 1.20

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	181.	3.67		26.	6.	6.	6.
			(INCHES)	1.196	1.196	1.196	1.196
			(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *

			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 210.	3.75		30.	8.	7.	7.
		(INCHES)	1.409	1.410	1.410	1.410
		(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.57	2166.67	203.37	223.57	1.37	10.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1446E+02 EXCESS= .0000E+00 OUTFLOW= .1456E+02 BASIN STORAGE= .4738E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	203.33	225.00	1.37
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 203.	3.75		29.	7.	7.	7.
		(INCHES)	1.364	1.365	1.365	1.365
		(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.56	2166.67	199.95	224.13	1.34	10.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1421E+02 EXCESS= .0000E+00 OUTFLOW= .1430E+02 BASIN STORAGE= .4187E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	199.34	225.00	1.34
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	199.	3.75	29.	7.	7.	7.
		(INCHES)	1.340	1.341	1.341	1.341
		(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.56	2166.67	196.66	224.93	1.32	10.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1397E+02 EXCESS= .0000E+00 OUTFLOW= .1408E+02 BASIN STORAGE= .4111E-04 PERCENT ERROR= -.8

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	196.54	225.00	1.32
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				

			(CFS)				
+	197.	3.75		28.	7.	7.	7.
			(INCHES)	1.320	1.321	1.321	1.321
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.52	2166.67	193.91	226.08	1.29	10.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1373E+02 EXCESS= .0000E+00 OUTFLOW= .1380E+02 BASIN STORAGE= .4628E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	193.62	225.00	1.29
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 194.	3.75		28.	7.	7.	7.
		(INCHES)	1.291	1.292	1.292	1.292
		(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.62	2166.67	186.52	224.60	1.25	10.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1324E+02 EXCESS= .0000E+00 OUTFLOW= .1334E+02 BASIN STORAGE= .6153E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	186.10	225.00	1.25
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	186.	3.75	27.	7.	6.	6.
			(INCHES) 1.250	1.251	1.251	1.251
			(AC-FT) 13.	13.	13.	13.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.61	2166.67	180.40	225.87	1.20	10.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1276E+02 EXCESS= .0000E+00 OUTFLOW= .1283E+02 BASIN STORAGE= .4888E-04 PERCENT ERROR= -.6

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	180.13	225.00	1.20
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	180.	3.75	26.	6.	6.	6.

(INCHES)	1.201	1.202	1.202	1.202
(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .20 SQ MI

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          *            *
23 KK     *       H5   *        RUNOFF FROM BASIN H5
          *            *
          **************
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SUBBASIN RUNOFF DATA

24 BA SUBBASIN CHARACTERISTICS

TAREA	.38	SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM	2.86	BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

25 LS SCS LOSS RATE

STRTL	.78	INITIAL ABSTRACTION
CRVNBR	72.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

26 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.68	LAG

***

UNIT HYDROGRAPH
43 END-OF-PERIOD ORDINATES

10.	33.	62.	104.	157.	206.	238.	252.	253.	243.
224.	201.	173.	138.	111.	92.	76.	64.	53.	44.
36.	30.	25.	21.	17.	14.	12.	10.	8.	7.
6.	5.	4.	3.	3.	2.	2.	2.	1.	1.

1. 0. 0.

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.13, TOTAL EXCESS = .73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	109.	4.25		30.	7.	7.	7.
			(INCHES)	.726	.726	.726	.726
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.13, TOTAL EXCESS = .73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	109.	4.25		30.	7.	7.	7.
			(INCHES)	.726	.726	.726	.726
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 2.11, TOTAL EXCESS = .69

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	104.	4.25		28.	7.	7.	7.
			(INCHES)	.693	.693	.693	.693
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 2.10, TOTAL EXCESS = .68

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	101.	4.25		28.	7.	7.	7.
			(INCHES)	.677	.677	.677	.677
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 2.75, TOTAL LOSS = 2.08, TOTAL EXCESS = .66

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	99.	4.25		27.	7.	7.	7.
			(INCHES)	.661	.661	.661	.661
			(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 2.07, TOTAL EXCESS = .65

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	96.	4.25		26.	7.	6.	6.
			(INCHES)	.645	.645	.645	.645
			(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 2.05, TOTAL EXCESS = .61

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	91.	4.25		25.	6.	6.	6.
			(INCHES)	.614	.614	.614	.614
			(AC-FT)	12.	12.	12.	12.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.60, TOTAL LOSS = 2.02, TOTAL EXCESS = .58

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	86.	4.25		24.	6.	6.	6.
			(INCHES)	.583	.583	.583	.583
			(AC-FT)	12.	12.	12.	12.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	263.	3.83		60.	15.	14.	14.
			(INCHES)	.961	.962	.962	.962
			(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .58 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	254.	3.83		58.	14.	14.	14.
			(INCHES)	.924	.925	.925	.925
			(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .58 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	248.	3.83		56.	14.	14.	14.
			(INCHES)	.905	.906	.906	.906
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .58 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1

FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 244.	3.83		55.	14.	13.	13.
		(INCHES)	.888	.889	.889	.889
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .58 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 239.	3.83		54.	14.	13.	13.
		(INCHES)	.868	.868	.868	.868
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .58 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 230.	3.83		52.	13.	13.	13.
		(INCHES)	.833	.834	.834	.834
		(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .58 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	(CFS)	(HR)					
			(CFS)				
+	220.	3.83		50.	12.	12.	12.
			(INCHES)	.796	.796	.796	.796
			(AC-FT)	25.	25.	25.	25.

CUMULATIVE AREA = .58 SQ MI

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*            *
*     RT_H5  *
*            *
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29 KK ROUTE RUNOFF FROM H5 TO H7

HYDROGRAPH ROUTING DATA

30 RK KINEMATIC WAVE STREAM ROUTING

L	3300.	CHANNEL LENGTH
S	.0270	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	6.00	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	1.45	1.42	1.99	1100.00	262.14	232.50	.96	9.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2976E+02 EXCESS= .0000E+00 OUTFLOW= .2976E+02 BASIN STORAGE= .7066E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00		260.98	230.00	.96

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	261.	3.83	60.	15.	14.	14.
			(INCHES) .961	.962	.962	.962
			(AC-FT) 30.	30.	30.	30.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.93	1100.00	253.91	233.58	.93	9.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2861E+02 EXCESS= .0000E+00 OUTFLOW= .2862E+02 BASIN STORAGE= .7086E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	252.18	230.00	.93

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	252.	3.83	58.	14.	14.	14.
			(INCHES) .924	.925	.925	.925
			(AC-FT) 29.	29.	29.	29.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	2.05	1100.00	247.55	232.74	.91	9.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2803E+02 EXCESS= .0000E+00 OUTFLOW= .2803E+02 BASIN STORAGE= .7941E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00		245.68	230.00	.91
***	***	***	***		***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	246.	3.83		57.	14.	14.	14.
			(INCHES)	.906	.907	.907	.907
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.99	1100.00	243.48	233.23	.89	9.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2749E+02 EXCESS= .0000E+00 OUTFLOW= .2749E+02 BASIN STORAGE= .7423E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00		242.28	230.00	.89
***	***	***	***		***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 242.	3.83		55.	14.	13.	13.
		(INCHES)	.888	.889	.889	.889
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	2.08	1100.00	238.01	233.52	.87	9.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2686E+02 EXCESS= .0000E+00 OUTFLOW= .2686E+02 BASIN STORAGE= .8569E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	237.67	230.00	.87
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 238.	3.83		54.	14.	13.	13.
		(INCHES)	.868	.869	.869	.869
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	2.05	1100.00	229.04	234.23	.83	9.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2578E+02 EXCESS= .0000E+00 OUTFLOW= .2578E+02 BASIN STORAGE= .8080E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	227.19	230.00	.83
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 227.	3.83		52.	13.	13.	13.
		(INCHES)	.832	.833	.833	.833
		(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	2.07	1100.00	219.39	232.74	.80	9.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2463E+02 EXCESS= .0000E+00 OUTFLOW= .2463E+02 BASIN STORAGE= .7987E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	217.61	235.00	.80
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 218.	3.92		50.	12.	12.	12.
		(INCHES)	.795	.796	.796	.796
		(AC-FT)	25.	25.	25.	25.

CUMULATIVE AREA = .58 SQ MI

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UNIT HYDROGRAPH
34 END-OF-PERIOD ORDINATES

11.	33.	65.	111.	153.	177.	183.	176.	159.	137.
108.	82.	64.	51.	41.	33.	26.	20.	16.	13.
10.	8.	6.	5.	4.	3.	2.	2.	2.	1.
1.	1.	0.	0.						

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.88, TOTAL EXCESS = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	101.	4.00		23.	6.	6.	6.
			(INCHES)	.975	.975	.975	.975
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.88, TOTAL EXCESS = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	101.	4.00		23.	6.	6.	6.
			(INCHES)	.975	.975	.975	.975
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.87, TOTAL EXCESS = .94

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	97.	4.00		22.	6.	5.	5.
			(INCHES)	.937	.937	.937	.937
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.86, TOTAL EXCESS = .92

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	95.	4.00		22.	5.	5.	5.
			(INCHES)	.918	.918	.918	.918
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 2.75, TOTAL LOSS = 1.85, TOTAL EXCESS = .90

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	93.	4.00		21.	5.	5.	5.
			(INCHES)	.899	.899	.899	.899
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.84, TOTAL EXCESS = .88

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	91.	4.00		21.	5.	5.	5.

	(INCHES)	.880	.880	.880	.880
	(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.82, TOTAL EXCESS = .84

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 87.	4.00	20.	5.	5.	5.
	(INCHES)	.842	.842	.842	.842
	(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.60, TOTAL LOSS = 1.80, TOTAL EXCESS = .81

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 83.	4.00	19.	5.	5.	5.
	(INCHES)	.805	.805	.805	.805
	(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *

36 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 356.	3.92		83.	21.	20.	20.
		(INCHES)	.965	.966	.966	.966
		(AC-FT)	41.	41.	41.	41.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 343.	3.92		80.	20.	19.	19.
		(INCHES)	.928	.928	.928	.928
		(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 336.	3.92		78.	20.	19.	19.
		(INCHES)	.909	.910	.910	.910
		(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 329.	3.92		77.	19.	18.	18.
		(INCHES)	.891	.891	.891	.891
		(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 322.	3.92		75.	19.	18.	18.
		(INCHES)	.871	.872	.872	.872
		(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 310.	3.92		72.	18.	17.	17.
		(INCHES)	.835	.836	.836	.836
		(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	297.	3.92		69.	17.	17.	17.
			(INCHES)	.798	.799	.799	.799
			(AC-FT)	34.	34.	34.	34.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *

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UNIT HYDROGRAPH
19 END-OF-PERIOD ORDINATES

320. 1039. 1924. 2187. 1949. 1468. 917. 605. 413. 272.
180. 118. 80. 53. 35. 24. 17. 10. 5.

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.04, TOTAL EXCESS = .82

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	805.	3.75		132.	33.	32.	32.
			(INCHES)	.821	.821	.821	.821
			(AC-FT)	66.	66.	66.	66.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.04, TOTAL EXCESS = .82

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	805.	3.75		132.	33.	32.	32.
			(INCHES)	.821	.821	.821	.821
			(AC-FT)	66.	66.	66.	66.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 2.02, TOTAL EXCESS = .79

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	769.	3.75		127.	32.	31.	31.
			(INCHES)	.786	.786	.786	.786
			(AC-FT)	63.	63.	63.	63.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 2.01, TOTAL EXCESS = .77

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	751.	3.75		124.	31.	30.	30.
			(INCHES)	.768	.768	.768	.768
			(AC-FT)	61.	61.	61.	61.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 2.75, TOTAL LOSS = 1.99, TOTAL EXCESS = .75

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	734.	3.75		121.	30.	29.	29.
			(INCHES)	.751	.751	.751	.751
			(AC-FT)	60.	60.	60.	60.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.98, TOTAL EXCESS = .73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	716.	3.75		118.	30.	29.	29.

	(INCHES)	.734	.734	.734	.734
	(AC-FT)	59.	59.	59.	59.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.96, TOTAL EXCESS = .70

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 681.	3.75	113.	28.	27.	27.
	(INCHES)	.700	.700	.700	.700
	(AC-FT)	56.	56.	56.	56.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.60, TOTAL LOSS = 1.94, TOTAL EXCESS = .67

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 647.	3.75	108.	27.	26.	26.
	(INCHES)	.667	.667	.667	.667
	(AC-FT)	53.	53.	53.	53.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *

DESIGN POINT 20

DT	DIVERSION ISTAD	DIV_H1	DIVERSION HYDROGRAPH IDENTIFICATION			
DI	INFLOW	.00	10.00	100.00	1000.00	10000.00
DQ	DIVERTED FLOW	.00	5.00	50.00	500.00	5000.00

***

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 402.	3.75		66.	17.	16.	16.
		(INCHES)	.410	.410	.410	.410
		(AC-FT)	33.	33.	33.	33.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 402.	3.75		66.	17.	16.	16.
		(INCHES)	.410	.410	.410	.410
		(AC-FT)	33.	33.	33.	33.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				

+	385.	3.75		63.	16.	15.	15.
			(INCHES)	.393	.393	.393	.393
			(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 385.	3.75		63.	16.	15.	15.
		(INCHES)	.393	.393	.393	.393
		(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 376.	3.75		62.	15.	15.	15.
		(INCHES)	.384	.384	.384	.384
		(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 376.	3.75		62.	15.	15.	15.
		(INCHES)	.384	.384	.384	.384
		(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	367.	3.75		61.	15.	15.	15.
			(INCHES)	.376	.376	.376	.376
			(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	367.	3.75		61.	15.	15.	15.
			(INCHES)	.376	.376	.376	.376
			(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	358.	3.75		59.	15.	14.	14.
			(INCHES)	.367	.367	.367	.367
			(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	358.	3.75		59.	15.	14.	14.
			(INCHES)	.367	.367	.367	.367
			(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	341.	3.75		56.	14.	14.	14.
			(INCHES)	.350	.350	.350	.350
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	341.	3.75		56.	14.	14.	14.
			(INCHES)	.350	.350	.350	.350
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 323.	3.75		54.	13.	13.	13.
		(INCHES)	.333	.333	.333	.333
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 323.	3.75		54.	13.	13.	13.
		(INCHES)	.333	.333	.333	.333
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *

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	1.04	1.42	1.83	933.33	400.02	229.32	.41	8.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3283E+02 EXCESS= .0000E+00 OUTFLOW= .3285E+02 BASIN STORAGE= .1321E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	397.73	230.00	.41

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = 1.00

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
398.	3.83		66.	17.	16.	16.
		(INCHES)	.411	.411	.411	.411
		(AC-FT)	33.	33.	33.	33.

CUMULATIVE AREA = 1.50 SQ MI

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	1.04	1.42	1.86	933.33	382.43	229.33	.39	8.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3143E+02 EXCESS= .0000E+00 OUTFLOW= .3144E+02 BASIN STORAGE= .1430E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	380.34	230.00	.39

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 380.	3.83	63.	16.	15.	15.
	(INCHES)	.393	.393	.393	.393
	(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = 1.50 SQ MI

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	1.04	1.42	1.90	933.33	373.88	228.52	.38	8.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3073E+02 EXCESS= .0000E+00 OUTFLOW= .3075E+02 BASIN STORAGE= .1449E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	371.22	230.00	.38

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 371.	3.83	62.	16.	15.	15.
	(INCHES)	.384	.384	.384	.384
	(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = 1.50 SQ MI

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	1.04	1.42	1.90	933.33	365.80	229.04	.38	8.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3004E+02 EXCESS= .0000E+00 OUTFLOW= .3005E+02 BASIN STORAGE= .1103E-04 PERCENT ERROR= .

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	363.11	230.00	.38
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	363.	3.83	61.	15.	15.	15.
			(INCHES) .376	.376	.376	.376
			(AC-FT) 30.	30.	30.	30.

CUMULATIVE AREA = 1.50 SQ MI

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	1.04	1.42	1.95	933.33	354.90	229.87	.37	8.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2936E+02 EXCESS= .0000E+00 OUTFLOW= .2937E+02 BASIN STORAGE= .1070E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	354.56	230.00	.37
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	355.	3.83	59.	15.	14.	14.
			(INCHES) .367	.367	.367	.367
			(AC-FT) 29.	29.	29.	29.

CUMULATIVE AREA = 1.50 SQ MI

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	1.04	1.42	1.94	933.33	338.61	229.57	.35	8.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2801E+02 EXCESS= .0000E+00 OUTFLOW= .2802E+02 BASIN STORAGE= .9622E-05 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	337.58	230.00	.35
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	338.	3.83	57.	14.	14.	14.
			(INCHES) .350	.350	.350	.350
			(AC-FT) 28.	28.	28.	28.

CUMULATIVE AREA = 1.50 SQ MI

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	1.04	1.42	2.04	933.33	321.17	229.82	.33	8.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2667E+02 EXCESS= .0000E+00 OUTFLOW= .2667E+02 BASIN STORAGE= .9267E-05 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	320.79	230.00	.33

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	321.	3.83	54.	13.	13.	13.
		(INCHES)	.334	.334	.334	.334
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 746.	3.83		149.	37.	36.	36.
		(INCHES)	.603	.604	.604	.604
		(AC-FT)	74.	74.	74.	74.

CUMULATIVE AREA = 2.30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 716.	3.83		143.	36.	34.	34.
		(INCHES)	.579	.579	.579	.579
		(AC-FT)	71.	71.	71.	71.

CUMULATIVE AREA = 2.30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 698.	3.83		140.	35.	34.	34.
		(INCHES)	.567	.567	.567	.567
		(AC-FT)	70.	70.	70.	70.

CUMULATIVE AREA = 2.30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				

+	685.	3.83		137.	34.	33.	33.
			(INCHES)	.555	.555	.555	.555
			(AC-FT)	68.	68.	68.	68.

CUMULATIVE AREA = 2.30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 670.	3.83		134.	34.	32.	32.
		(INCHES)	.542	.543	.543	.543
		(AC-FT)	67.	67.	67.	67.

CUMULATIVE AREA = 2.30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 639.	3.83		128.	32.	31.	31.
		(INCHES)	.519	.519	.519	.519
		(AC-FT)	64.	64.	64.	64.

CUMULATIVE AREA = 2.30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 609.	3.83		122.	31.	30.	30.
		(INCHES)	.495	.495	.495	.495
		(AC-FT)	61.	61.	61.	61.

CUMULATIVE AREA = 2.30 SQ MI

*** *** *** *

			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 735.	3.83		149.	37.	36.	36.
		(INCHES)	.604	.604	.604	.604
		(AC-FT)	74.	74.	74.	74.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.58	366.67	714.97	231.27	.58	12.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7102E+02 EXCESS= .0000E+00 OUTFLOW= .7104E+02 BASIN STORAGE= .3905E-04 PERCENT ERROR= .

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	704.66	230.00	.58
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 705.	3.83		143.	36.	35.	35.
		(INCHES)	.579	.580	.580	.580
		(AC-FT)	71.	71.	71.	71.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.48	366.67	698.11	231.09	.57	12.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6958E+02 EXCESS= .0000E+00 OUTFLOW= .6959E+02 BASIN STORAGE= .3747E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	688.57	235.00	.57
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	689.	3.92	140.	35.	34.	34.
		(INCHES)	.567	.568	.568	.568
		(AC-FT)	70.	70.	70.	70.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.51	366.67	684.38	231.22	.56	12.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6808E+02 EXCESS= .0000E+00 OUTFLOW= .6810E+02 BASIN STORAGE= .3855E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	674.47	235.00	.56
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				

		(CFS)				
+ 674.	3.92		137.	34.	33.	33.
		(INCHES)	.555	.556	.556	.556
		(AC-FT)	68.	68.	68.	68.

CUMULATIVE AREA = 2.30 SQ MI

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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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	1.45	1.42	.66	366.67	669.15	231.32	.54	12.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6657E+02 EXCESS= .0000E+00 OUTFLOW= .6657E+02 BASIN STORAGE= .3892E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	659.40	235.00	.54
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	659.	3.92	134.	34.	32.	32.
			(INCHES) .543	.543	.543	.543
			(AC-FT) 67.	67.	67.	67.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.63	366.67	637.65	231.65	.52	12.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6370E+02 EXCESS= .0000E+00 OUTFLOW= .6371E+02 BASIN STORAGE= .3941E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	631.18	235.00	.52
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	631.	3.92		129.	32.	31.	31.
			(INCHES)	.520	.520	.520	.520
			(AC-FT)	64.	64.	64.	64.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.61	366.67	608.22	231.32	.50	12.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6075E+02 EXCESS= .0000E+00 OUTFLOW= .6077E+02 BASIN STORAGE= .3881E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	602.66	235.00	.50
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	603.	3.92		123.	31.	30.	30.

(INCHES)	.496	.496	.496	.496
(AC-FT)	61.	61.	61.	61.

CUMULATIVE AREA = 2.30 SQ MI

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          **************
          *            *
53 KK     *     H2     *     RUNOFF FROM BASIN H2
          *            *
          **************
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SUBBASIN RUNOFF DATA

54 BA SUBBASIN CHARACTERISTICS

TAREA	.70	SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM	2.86	BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

55 LS SCS LOSS RATE

STRTL	.33	INITIAL ABSTRACTION
CRVNBR	86.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

56 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.32	LAG

***

UNIT HYDROGRAPH
21 END-OF-PERIOD ORDINATES

119.	381.	753.	927.	896.	742.	511.	340.	236.	164.
112.	77.	52.	36.	25.	17.	12.	9.	6.	4.
2.									

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.32, TOTAL EXCESS = 1.54

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	674.	3.75		116.	29.	28.	28.
			(INCHES)	1.542	1.543	1.543	1.543
			(AC-FT)	58.	58.	58.	58.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.32, TOTAL EXCESS = 1.54

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	674.	3.75		116.	29.	28.	28.
			(INCHES)	1.542	1.543	1.543	1.543
			(AC-FT)	58.	58.	58.	58.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.31, TOTAL EXCESS = 1.49

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	654.	3.75		112.	28.	27.	27.
			(INCHES)	1.494	1.495	1.495	1.495
			(AC-FT)	56.	56.	56.	56.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2

FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.30, TOTAL EXCESS = 1.47

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	644.	3.75		111.	28.	27.	27.
			(INCHES)	1.470	1.471	1.471	1.471
			(AC-FT)	55.	55.	55.	55.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 2.75, TOTAL LOSS = 1.30, TOTAL EXCESS = 1.45

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	633.	3.75		109.	27.	26.	26.
			(INCHES)	1.446	1.447	1.447	1.447
			(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.29, TOTAL EXCESS = 1.42

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	623.	3.75		107.	27.	26.	26.
			(INCHES)	1.422	1.423	1.423	1.423
			(AC-FT)	53.	53.	53.	53.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.28, TOTAL EXCESS = 1.38

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 603.	3.75		104.	26.	25.	25.
		(INCHES)	1.375	1.375	1.375	1.375
		(AC-FT)	51.	51.	51.	51.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.60, TOTAL LOSS = 1.27, TOTAL EXCESS = 1.33

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 583.	3.75		100.	25.	24.	24.
		(INCHES)	1.328	1.328	1.328	1.328
		(AC-FT)	50.	50.	50.	50.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *

CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	6.00	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	1.74	1.42	2.88	2500.00	674.12	230.79	1.55	14.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5761E+02 EXCESS= .0000E+00 OUTFLOW= .5777E+02 BASIN STORAGE= .8594E-04 PERCENT ERROR= -.3

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	667.66	230.00	1.55

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	668.	3.83	116.	29.	28.	28.
		(INCHES)	1.546	1.548	1.548	1.548
		(AC-FT)	58.	58.	58.	58.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.95	2500.00	644.44	229.69	1.50	14.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5581E+02 EXCESS= .0000E+00 OUTFLOW= .5593E+02 BASIN STORAGE= .9407E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	644.35	230.00	1.50
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	644.	3.83	113.	28.	27.	27.
		(INCHES)	1.497	1.498	1.498	1.498
		(AC-FT)	56.	56.	56.	56.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.95	2500.00	640.89	230.58	1.47	14.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5491E+02 EXCESS= .0000E+00 OUTFLOW= .5504E+02 BASIN STORAGE= .7210E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	636.54	230.00	1.47
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	637.	3.83	111.	28.	27.	27.

(INCHES)	1.473	1.475	1.475	1.475
(AC-FT)	55.	55.	55.	55.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.98	2500.00	628.12	231.86	1.45	14.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5401E+02 EXCESS= .0000E+00 OUTFLOW= .5417E+02 BASIN STORAGE= .9007E-04 PERCENT ERROR= -.3

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	621.64	230.00	1.45
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .96

	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	622.	3.83	109.	27.	26.	26.
		(INCHES)	1.450	1.451	1.451	1.451
		(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	3.00	2500.00	617.89	231.92	1.43	14.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5312E+02 EXCESS= .0000E+00 OUTFLOW= .5327E+02 BASIN STORAGE= .7779E-04 PERCENT ERROR= -.3

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	611.42	230.00	1.43
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 611.	3.83		107.	27.	26.	26.
		(INCHES)	1.426	1.427	1.427	1.427
		(AC-FT)	53.	53.	53.	53.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	3.08	2500.00	593.84	232.77	1.38	14.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5134E+02 EXCESS= .0000E+00 OUTFLOW= .5144E+02 BASIN STORAGE= .9727E-04 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	592.19	230.00	1.38
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 592.	3.83		104.	26.	25.	25.
		(INCHES)	1.377	1.378	1.378	1.378
		(AC-FT)	51.	51.	51.	51.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	3.13	2500.00	574.30	230.15	1.33	13.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4957E+02 EXCESS= .0000E+00 OUTFLOW= .4967E+02 BASIN STORAGE= .7224E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	573.26	230.00	1.33
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .91

	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW	6-HR	24-HR	72-HR	24.92-HR
+	573.	3.83	(CFS)	100.	25.	24.	24.
			(INCHES)	1.330	1.331	1.331	1.331
			(AC-FT)	50.	50.	50.	50.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *

TAREA .62 SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM 2.86 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

61 LS SCS LOSS RATE

STRTL	.44	INITIAL ABSTRACTION
CRVNBR	82.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

62 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.75	LAG

***

UNIT HYDROGRAPH
47 END-OF-PERIOD ORDINATES

13.	41.	79.	130.	197.	269.	326.	362.	377.	377.
362.	336.	305.	268.	222.	180.	151.	126.	106.	92.
77.	65.	54.	46.	39.	33.	27.	23.	19.	16.
14.	12.	10.	8.	7.	6.	5.	4.	4.	3.
3.	2.	2.	1.	1.	1.	0.			

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.59, TOTAL EXCESS = 1.27

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	302.	4.25	85.	21.	20.	20.
		(INCHES)	1.268	1.270	1.270	1.270
		(AC-FT)	42.	42.	42.	42.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.59, TOTAL EXCESS = 1.27

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	302.	4.25	85.	21.	20.	20.
		(INCHES)	1.268	1.270	1.270	1.270
		(AC-FT)	42.	42.	42.	42.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.58, TOTAL EXCESS = 1.23

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	291.	4.25	82.	20.	20.	20.
		(INCHES)	1.224	1.226	1.226	1.226
		(AC-FT)	40.	41.	41.	41.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.57, TOTAL EXCESS = 1.20

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	286.	4.25	80.	20.	19.	19.
		(INCHES)	1.202	1.204	1.204	1.204
		(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4

FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 2.75, TOTAL LOSS = 1.56, TOTAL EXCESS = 1.18

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	281.	4.25		79.	20.	19.	19.
			(INCHES)	1.180	1.182	1.182	1.182
			(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.56, TOTAL EXCESS = 1.16

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	276.	4.25		77.	19.	19.	19.
			(INCHES)	1.159	1.160	1.160	1.160
			(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.54, TOTAL EXCESS = 1.12

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	266.	4.25		74.	19.	18.	18.
			(INCHES)	1.116	1.117	1.117	1.117
			(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.60, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.07

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	255.	4.25		72.	18.	17.	17.
			(INCHES)	1.073	1.074	1.074	1.074
			(AC-FT)	35.	36.	36.	36.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *

FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	856.	3.92		194.	49.	47.	47.
			(INCHES)	1.368	1.370	1.370	1.370
			(AC-FT)	96.	96.	96.	96.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	839.	3.92		191.	48.	46.	46.
			(INCHES)	1.346	1.347	1.347	1.347
			(AC-FT)	95.	95.	95.	95.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	827.	3.92		188.	47.	45.	45.
			(INCHES)	1.323	1.325	1.325	1.325
			(AC-FT)	93.	93.	93.	93.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR

+ (CFS)	(HR)					
			(CFS)			
+ 814.	3.92		185.	46.	45.	45.
		(INCHES)	1.300	1.302	1.302	1.302
		(AC-FT)	92.	92.	92.	92.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 786.	3.92		178.	45.	43.	43.
		(INCHES)	1.254	1.255	1.255	1.255
		(AC-FT)	88.	88.	88.	88.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 758.	3.92		172.	43.	41.	41.
		(INCHES)	1.209	1.210	1.210	1.210
		(AC-FT)	85.	85.	85.	85.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *

DT DIVERSION
ISTAD DIV_C4 DIVERSION HYDROGRAPH IDENTIFICATION

DI INFLOW .00 10.00 100.00 1000.00 10000.00

DQ DIVERTED FLOW .00 5.00 50.00 500.00 5000.00

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	440.	3.92		100.	25.	24.	24.
			(INCHES)	.708	.709	.709	.709
			(AC-FT)	50.	50.	50.	50.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	440.	3.92		100.	25.	24.	24.
			(INCHES)	.708	.709	.709	.709
			(AC-FT)	50.	50.	50.	50.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	428.	3.92		97.	24.	23.	23.

	(INCHES)	.684	.685	.685	.685
	(AC-FT)	48.	48.	48.	48.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 428.	3.92	97.	24.	23.	23.
	(INCHES)	.684	.685	.685	.685
	(AC-FT)	48.	48.	48.	48.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 419.	3.92	96.	24.	23.	23.
	(INCHES)	.673	.674	.674	.674
	(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 419.	3.92	96.	24.	23.	23.
	(INCHES)	.673	.674	.674	.674
	(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 413.	3.92		94.	24.	23.	23.
		(INCHES)	.662	.662	.662	.662
		(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 413.	3.92		94.	24.	23.	23.
		(INCHES)	.662	.662	.662	.662
		(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 407.	3.92		92.	23.	22.	22.
		(INCHES)	.650	.651	.651	.651
		(AC-FT)	46.	46.	46.	46.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	407.	3.92		92.	23.	22.	22.
			(INCHES)	.650	.651	.651	.651
			(AC-FT)	46.	46.	46.	46.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	393.	3.92		89.	22.	21.	21.
			(INCHES)	.627	.628	.628	.628
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	393.	3.92		89.	22.	21.	21.
			(INCHES)	.627	.628	.628	.628
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	379.	3.92	86.	21.	21.	21.
		(INCHES)	.604	.605	.605	.605
		(AC-FT)	43.	43.	43.	43.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	379.	3.92	86.	21.	21.	21.
		(INCHES)	.604	.605	.605	.605
		(AC-FT)	43.	43.	43.	43.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *

(DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.42	1.42	1.62	1000.00	438.26	237.32	.71	11.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4989E+02 EXCESS= .0000E+00 OUTFLOW= .4990E+02 BASIN STORAGE= .7378E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00		434.72	235.00	.71
***	***	***	***		***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = 1.00

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
+ 435.	3.92		100.	25.	24.	24.
		(INCHES)	.707	.709	.709	.709
		(AC-FT)	50.	50.	50.	50.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.63	1000.00	426.59	237.92	.69	10.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4823E+02 EXCESS= .0000E+00 OUTFLOW= .4824E+02 BASIN STORAGE= .7241E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00		421.51	240.00	.68
***	***	***	***		***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	422.	4.00		97.	24.	23.	23.
			(INCHES)	.683	.685	.685	.685
			(AC-FT)	48.	48.	48.	48.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.65	1000.00	417.88	237.56	.67	10.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4743E+02 EXCESS= .0000E+00 OUTFLOW= .4745E+02 BASIN STORAGE= .6571E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	413.94	240.00	.67
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	414.	4.00		96.	24.	23.	23.
			(INCHES)	.673	.674	.674	.674
			(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.69	1000.00	411.83	238.65	.66	10.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4663E+02 EXCESS= .0000E+00 OUTFLOW= .4663E+02 BASIN STORAGE= .7341E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	407.96	240.00	.66
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 408.	4.00		94.	23.	23.	23.
		(INCHES)	.661	.662	.662	.662
		(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.66	1000.00	405.95	238.21	.65	10.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4582E+02 EXCESS= .0000E+00 OUTFLOW= .4585E+02 BASIN STORAGE= .6159E-04 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	401.39	240.00	.65
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4

FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	401.	4.00		92.	23.	22.	22.
			(INCHES)	.650	.651	.651	.651
			(AC-FT)	46.	46.	46.	46.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.60	1000.00	392.62	238.11	.63	10.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4419E+02 EXCESS= .0000E+00 OUTFLOW= .4421E+02 BASIN STORAGE= .7236E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	387.97	240.00	.63
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	388.	4.00		89.	22.	21.	21.
			(INCHES)	.627	.628	.628	.628
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.63	1000.00	378.43	238.38	.61	10.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4260E+02 EXCESS= .0000E+00 OUTFLOW= .4261E+02 BASIN STORAGE= .6150E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	374.58	240.00	.61

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 375.	4.00		86.	21.	21.	21.
		(INCHES)	.604	.605	.605	.605
		(AC-FT)	43.	43.	43.	43.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *

.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

74 LS SCS LOSS RATE

STRTL	.78	INITIAL ABSTRACTION
CRVNBR	72.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

75 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.54	LAG

***

UNIT HYDROGRAPH
34 END-OF-PERIOD ORDINATES

7.	21.	42.	71.	97.	112.	116.	112.	101.	87.
69.	52.	41.	32.	26.	21.	16.	13.	10.	8.
6.	5.	4.	3.	3.	2.	2.	1.	1.	1.
1.	0.	0.	0.						

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.13, TOTAL EXCESS = .73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	47.	4.08		11.	3.	3.	3.
			(INCHES)	.726	.726	.726	.726
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.13, TOTAL EXCESS = .73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	47.	4.08		11.	3.	3.	3.
			(INCHES)	.726	.726	.726	.726
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 2.11, TOTAL EXCESS = .69

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	45.	4.08		10.	3.	3.	3.
			(INCHES)	.693	.693	.693	.693
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 2.10, TOTAL EXCESS = .68

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	43.	4.08		10.	3.	2.	2.
			(INCHES)	.677	.677	.677	.677
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 2.75, TOTAL LOSS = 2.08, TOTAL EXCESS = .66

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	42.	4.08		10.	2.	2.	2.
			(INCHES)	.661	.661	.661	.661

		(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 2.07, TOTAL EXCESS = .65

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	41.	4.08		10.	2.	2.	2.
			(INCHES)	.645	.645	.645	.645
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 2.05, TOTAL EXCESS = .61

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	39.	4.08		9.	2.	2.	2.
			(INCHES)	.614	.614	.614	.614
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.60, TOTAL LOSS = 2.02, TOTAL EXCESS = .58

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				

+	37.	4.08		9.	2.	2.	2.
			(INCHES)	.583	.583	.583	.583
			(AC-FT)	4.	4.	4.	4.

CUMULATIVE AREA = .14 SQ MI

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*            *
*    COMB5   *
*            *
**************
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76 KK COMBINE H2, H4, H6

77 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	480.	4.00		111.	28.	27.	27.
			(INCHES)	.709	.710	.710	.710
			(AC-FT)	55.	55.	55.	55.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	466.	4.00		107.	27.	26.	26.
			(INCHES)	.684	.685	.685	.685
			(AC-FT)	53.	53.	53.	53.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 457.	4.00	106.	26.	25.	25.
	(INCHES)	.673	.674	.674	.674
	(AC-FT)	52.	52.	52.	52.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 450.	4.00	104.	26.	25.	25.
	(INCHES)	.661	.662	.662	.662
	(AC-FT)	51.	52.	52.	52.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 442.	4.00	102.	26.	25.	25.
	(INCHES)	.649	.650	.650	.650
	(AC-FT)	51.	51.	51.	51.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 427.	4.00	98.	25.	24.	24.
	(INCHES)	.625	.626	.626	.626
	(AC-FT)	49.	49.	49.	49.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 411.	4.00	95.	24.	23.	23.
	(INCHES)	.602	.603	.603	.603
	(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1210.	3.92		261.	65.	63.	63.
			(INCHES)	.645	.646	.646	.646
			(AC-FT)	129.	129.	129.	129.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1166.	3.92		251.	63.	60.	60.
			(INCHES)	.620	.621	.621	.621
			(AC-FT)	124.	124.	124.	124.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1143.	3.92		246.	62.	59.	59.
			(INCHES)	.608	.609	.609	.609
			(AC-FT)	122.	122.	122.	122.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1119.	3.92		241.	60.	58.	58.
			(INCHES)	.596	.597	.597	.597
			(AC-FT)	120.	120.	120.	120.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1096.	3.92		236.	59.	57.	57.
			(INCHES)	.584	.585	.585	.585
			(AC-FT)	117.	117.	117.	117.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1052.	3.92		227.	57.	55.	55.
			(INCHES)	.561	.561	.561	.561
			(AC-FT)	112.	113.	113.	113.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1008.	3.92		217.	54.	52.	52.
			(INCHES)	.537	.537	.537	.537
			(AC-FT)	108.	108.	108.	108.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	419.	3.92		96.	24.	23.	23.
			(INCHES)	.236	.237	.237	.237
			(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	413.	3.92		94.	24.	23.	23.
			(INCHES)	.232	.233	.233	.233
			(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	407.	3.92		92.	23.	22.	22.
			(INCHES)	.228	.228	.228	.228
			(AC-FT)	46.	46.	46.	46.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 393.	3.92		89.	22.	21.	21.
		(INCHES)	.220	.220	.220	.220
		(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 379.	3.92		86.	21.	21.	21.
		(INCHES)	.212	.212	.212	.212
		(AC-FT)	43.	43.	43.	43.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	1650.	3.92	(CFS)	361.	90.	87.	87.
			(INCHES)	.893	.894	.894	.894
			(AC-FT)	179.	179.	179.	179.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .98

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	1594.	3.92	(CFS)	348.	87.	84.	84.
			(INCHES)	.860	.861	.861	.861
			(AC-FT)	172.	173.	173.	173.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .97

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	1562.	3.92	(CFS)	341.	85.	82.	82.
			(INCHES)	.844	.846	.846	.846
			(AC-FT)	169.	170.	170.	170.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .96

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	1533.	3.92	(CFS)	335.	84.	81.	81.
			(INCHES)	.828	.829	.829	.829

		(AC-FT)	166.	166.	166.	166.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1503.	3.92		328.	82.	79.	79.
		(INCHES)	.812	.813	.813	.813
		(AC-FT)	163.	163.	163.	163.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1445.	3.92		316.	79.	76.	76.
		(INCHES)	.781	.782	.782	.782
		(AC-FT)	157.	157.	157.	157.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1387.	3.92		303.	76.	73.	73.
		(INCHES)	.749	.750	.750	.750
		(AC-FT)	150.	150.	150.	150.

CUMULATIVE AREA = 3.76 SQ MI

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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

					RATIOS APPLIED TO PRECIPITATION						
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7
					1.00	.98	.97	.96	.95	.93	.91
HYDROGRAPH AT											
+	H3	.20	1	FLOW	211.	204.	201.	197.	194.	187.	181.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO											
+	RT_H3	.20	1	FLOW	210.	203.	199.	197.	194.	186.	180.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	H5	.38	1	FLOW	109.	104.	101.	99.	96.	91.	86.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT											
+	COMB1	.58	1	FLOW	263.	254.	248.	244.	239.	230.	220.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RT_H5	.58	1	FLOW	261.	252.	246.	242.	238.	227.	218.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT											
+	H7	.22	1	FLOW	101.	97.	95.	93.	91.	87.	83.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT											
+	COMB2	.80	1	FLOW	356.	343.	336.	329.	322.	310.	297.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	H1	1.50	1	FLOW	805.	769.	751.	734.	716.	681.	647.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO											
+	DIV_H1	1.50	1	FLOW	402.	385.	376.	367.	358.	341.	323.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	H1_REM	1.50	1	FLOW	402.	385.	376.	367.	358.	341.	323.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											

+	RT_H1	1.50	1	FLOW	398.	380.	371.	363.	355.	338.	321.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT											
+	COMB3	2.30	1	FLOW	746.	716.	698.	685.	670.	639.	609.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RT_H7	2.30	1	FLOW	735.	705.	689.	674.	659.	631.	603.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	H2	.70	1	FLOW	674.	654.	644.	633.	623.	603.	583.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											
+	RT_H2	.70	1	FLOW	668.	644.	637.	622.	611.	592.	573.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	H4	.62	1	FLOW	302.	291.	286.	281.	276.	266.	255.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT											
+	COMB4	1.32	1	FLOW	880.	856.	839.	827.	814.	786.	758.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO											
+	DIV_C4	1.32	1	FLOW	440.	428.	419.	413.	407.	393.	379.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	C4_REM	1.32	1	FLOW	440.	428.	419.	413.	407.	393.	379.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RT_H4	1.32	1	FLOW	435.	422.	414.	408.	401.	388.	375.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT											
+	H6	.14	1	FLOW	47.	45.	43.	42.	41.	39.	37.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT											
+	COMB5	1.46	1	FLOW	480.	466.	457.	450.	442.	427.	411.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT											
+	COMB6	3.76	1	FLOW	1210.	1166.	1143.	1119.	1096.	1052.	1008.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											

+		GET_C4	.00	1	FLOW	440.	428.	419.	413.	407.	393.	379.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

2 COMBINED AT

+		COMB7	3.76	1	FLOW	1650.	1594.	1562.	1533.	1503.	1445.	1387.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

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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= 1.00									
	RT_H3 MANE	3.47	210.26	225.16	1.41	5.00	210.15	225.00	1.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1495E+02 EXCESS= .0000E+00 OUTFLOW= .1504E+02 BASIN STORAGE= .4251E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .98									
	RT_H3 MANE	3.57	203.37	223.57	1.37	5.00	203.33	225.00	1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1446E+02 EXCESS= .0000E+00 OUTFLOW= .1456E+02 BASIN STORAGE= .4738E-04 PERCENT ERROR= -.7

FOR PLAN = 1 RATIO= .97									
	RT_H3 MANE	3.56	199.95	224.13	1.34	5.00	199.34	225.00	1.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1421E+02 EXCESS= .0000E+00 OUTFLOW= .1430E+02 BASIN STORAGE= .4187E-04 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .96									
	RT_H3 MANE	3.56	196.66	224.93	1.32	5.00	196.54	225.00	1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1397E+02 EXCESS= .0000E+00 OUTFLOW= .1408E+02 BASIN STORAGE= .4111E-04 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .95									
	RT_H3 MANE	3.52	193.91	226.08	1.29	5.00	193.62	225.00	1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1373E+02 EXCESS= .0000E+00 OUTFLOW= .1380E+02 BASIN STORAGE= .4628E-04 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .93

RT_H3	MANE	3.62	186.52	224.60	1.25	5.00	186.10	225.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1324E+02 EXCESS= .0000E+00 OUTFLOW= .1334E+02 BASIN STORAGE= .6153E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= .91

RT_H3	MANE	3.61	180.40	225.87	1.20	5.00	180.13	225.00	1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1276E+02 EXCESS= .0000E+00 OUTFLOW= .1283E+02 BASIN STORAGE= .4888E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= 1.00

RT_H5	MANE	1.99	262.14	232.50	.96	5.00	260.98	230.00	.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2976E+02 EXCESS= .0000E+00 OUTFLOW= .2976E+02 BASIN STORAGE= .7066E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= .98

RT_H5	MANE	1.93	253.91	233.58	.93	5.00	252.18	230.00	.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2861E+02 EXCESS= .0000E+00 OUTFLOW= .2862E+02 BASIN STORAGE= .7086E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= .97

RT_H5	MANE	2.05	247.55	232.74	.91	5.00	245.68	230.00	.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2803E+02 EXCESS= .0000E+00 OUTFLOW= .2803E+02 BASIN STORAGE= .7941E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= .96

RT_H5	MANE	1.99	243.48	233.23	.89	5.00	242.28	230.00	.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2749E+02 EXCESS= .0000E+00 OUTFLOW= .2749E+02 BASIN STORAGE= .7423E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= .95

RT_H5	MANE	2.08	238.01	233.52	.87	5.00	237.67	230.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2686E+02 EXCESS= .0000E+00 OUTFLOW= .2686E+02 BASIN STORAGE= .8569E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= .93

RT_H5	MANE	2.05	229.04	234.23	.83	5.00	227.19	230.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2578E+02 EXCESS= .0000E+00 OUTFLOW= .2578E+02 BASIN STORAGE= .8080E-04 PERCENT ERROR= .

FOR PLAN = 1 RATIO= .91

RT_H5	MANE	2.07	219.39	232.74	.80	5.00	217.61	235.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2463E+02 EXCESS= .0000E+00 OUTFLOW= .2463E+02 BASIN STORAGE= .7987E-04 PERCENT ERROR= .

FOR PLAN = 1 RATIO= 1.00

RT_H1	MANE	1.83	400.02	229.32	.41	5.00	397.73	230.00	.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3283E+02 EXCESS= .0000E+00 OUTFLOW= .3285E+02 BASIN STORAGE= .1321E-04 PERCENT ERROR= -.

FOR PLAN = 1 RATIO= .98

RT_H1	MANE	1.86	382.43	229.33	.39	5.00	380.34	230.00	.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3143E+02 EXCESS= .0000E+00 OUTFLOW= .3144E+02 BASIN STORAGE= .1430E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .97

RT_H1	MANE	1.90	373.88	228.52	.38	5.00	371.22	230.00	.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3073E+02 EXCESS= .0000E+00 OUTFLOW= .3075E+02 BASIN STORAGE= .1449E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .96

RT_H1	MANE	1.90	365.80	229.04	.38	5.00	363.11	230.00	.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3004E+02 EXCESS= .0000E+00 OUTFLOW= .3005E+02 BASIN STORAGE= .1103E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_H1	MANE	1.95	354.90	229.87	.37	5.00	354.56	230.00	.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2936E+02 EXCESS= .0000E+00 OUTFLOW= .2937E+02 BASIN STORAGE= .1070E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_H1	MANE	1.94	338.61	229.57	.35	5.00	337.58	230.00	.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2801E+02 EXCESS= .0000E+00 OUTFLOW= .2802E+02 BASIN STORAGE= .9622E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .91

RT_H1	MANE	2.04	321.17	229.82	.33	5.00	320.79	230.00	.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2667E+02 EXCESS= .0000E+00 OUTFLOW= .2667E+02 BASIN STORAGE= .9267E-05 PERCENT ERROR= .

FOR PLAN = 1 RATIO= 1.00

RT_H7	MANE	.53	744.93	231.22	.60	5.00	734.67	230.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7406E+02 EXCESS= .0000E+00 OUTFLOW= .7408E+02 BASIN STORAGE= .3762E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_H7	MANE	.58	714.97	231.27	.58	5.00	704.66	230.00	.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7102E+02 EXCESS= .0000E+00 OUTFLOW= .7104E+02 BASIN STORAGE= .3905E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .97

RT_H7	MANE	.48	698.11	231.09	.57	5.00	688.57	235.00	.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6958E+02 EXCESS= .0000E+00 OUTFLOW= .6959E+02 BASIN STORAGE= .3747E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .96

RT_H7	MANE	.51	684.38	231.22	.56	5.00	674.47	235.00	.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6808E+02 EXCESS= .0000E+00 OUTFLOW= .6810E+02 BASIN STORAGE= .3855E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_H7	MANE	.66	669.15	231.32	.54	5.00	659.40	235.00	.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6657E+02 EXCESS= .0000E+00 OUTFLOW= .6657E+02 BASIN STORAGE= .3892E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_H7	MANE	.63	637.65	231.65	.52	5.00	631.18	235.00	.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6370E+02 EXCESS= .0000E+00 OUTFLOW= .6371E+02 BASIN STORAGE= .3941E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .91

RT_H7	MANE	.61	608.22	231.32	.50	5.00	602.66	235.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6075E+02 EXCESS= .0000E+00 OUTFLOW= .6077E+02 BASIN STORAGE= .3881E-04 PERCENT ERROR=

FOR PLAN = 1 RATIO= 1.00

RT_H2	MANE	2.88	674.12	230.79	1.55	5.00	667.66	230.00	1.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5761E+02 EXCESS= .0000E+00 OUTFLOW= .5777E+02 BASIN STORAGE= .8594E-04 PERCENT ERROR= -.

FOR PLAN = 1 RATIO= .98

RT_H2	MANE	2.95	644.44	229.69	1.50	5.00	644.35	230.00	1.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5581E+02 EXCESS= .0000E+00 OUTFLOW= .5593E+02 BASIN STORAGE= .9407E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .97

RT_H2	MANE	2.95	640.89	230.58	1.47	5.00	636.54	230.00	1.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5491E+02 EXCESS= .0000E+00 OUTFLOW= .5504E+02 BASIN STORAGE= .7210E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .96

RT_H2	MANE	2.98	628.12	231.86	1.45	5.00	621.64	230.00	1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5401E+02 EXCESS= .0000E+00 OUTFLOW= .5417E+02 BASIN STORAGE= .9007E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .95

RT_H2	MANE	3.00	617.89	231.92	1.43	5.00	611.42	230.00	1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5312E+02 EXCESS= .0000E+00 OUTFLOW= .5327E+02 BASIN STORAGE= .7779E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .93

RT_H2	MANE	3.08	593.84	232.77	1.38	5.00	592.19	230.00	1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5134E+02 EXCESS= .0000E+00 OUTFLOW= .5144E+02 BASIN STORAGE= .9727E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .91

RT_H2	MANE	3.13	574.30	230.15	1.33	5.00	573.26	230.00	1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4957E+02 EXCESS= .0000E+00 OUTFLOW= .4967E+02 BASIN STORAGE= .7224E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= 1.00

RT_H4	MANE	1.62	438.26	237.32	.71	5.00	434.72	235.00	.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4989E+02 EXCESS= .0000E+00 OUTFLOW= .4990E+02 BASIN STORAGE= .7378E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_H4	MANE	1.63	426.59	237.92	.69	5.00	421.51	240.00	.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4823E+02 EXCESS= .0000E+00 OUTFLOW= .4824E+02 BASIN STORAGE= .7241E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .97

RT_H4	MANE	1.65	417.88	237.56	.67	5.00	413.94	240.00	.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4743E+02 EXCESS= .0000E+00 OUTFLOW= .4745E+02 BASIN STORAGE= .6571E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .96

RT_H4	MANE	1.69	411.83	238.65	.66	5.00	407.96	240.00	.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4663E+02 EXCESS= .0000E+00 OUTFLOW= .4663E+02 BASIN STORAGE= .7341E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_H4	MANE	1.66	405.95	238.21	.65	5.00	401.39	240.00	.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4582E+02 EXCESS= .0000E+00 OUTFLOW= .4585E+02 BASIN STORAGE= .6159E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .93

RT_H4	MANE	1.60	392.62	238.11	.63	5.00	387.97	240.00	.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4419E+02 EXCESS= .0000E+00 OUTFLOW= .4421E+02 BASIN STORAGE= .7236E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .91

RT_H4	MANE	1.63	378.43	238.38	.61	5.00	374.58	240.00	.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4260E+02 EXCESS= .0000E+00 OUTFLOW= .4261E+02 BASIN STORAGE= .6150E-04 PERCENT ERROR= .0

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  04/18/1995  TIME  14:15:05 *
*                                       *
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104               *
*                                       *
*****************************************
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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       BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
    2         ID       50-YEAR 6-HOUR STORM
    3         IT       5              0     300
    4         IO       3
    5         JR    PREC     1.0     .99     .98     .97     .95     .93

    6         KK      X2   BASIN X2 RUNOFF
    7         BA    0.50
    8         PB    2.86
    9         PC     0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
   10         PC    13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
   11         PC    19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
   12         PC    25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
```

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 13          PC    49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
 14          PC    86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
 15          PC    98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
 16          PC    99.8    99.9   100.0
 17          LS       0      69
 18          UD     .41

 19          KK      X1   BASIN X1 RUNOFF
 20          BA    0.49
 21          LS       0      69
 22          UD    0.20

 23          KK   RT_X1   ROUTE RUNOFF FROM X1 TO X2
 24          RK    2200    .027    .035            TRAP      10       3

 25          KK   COMB1   COMBINE X1 WITH [illegible] X2
 26          KM     COMBINATION POINT 1
 27          HC       2

 28          KK  RT_X2    ROUTE FROM DP20 TO DP30
 29          RK    3200    .005    .030            TRAP      45       2

 30          KK      X3   BASIN X3 RUNOFF
 31          BA    0.44
 32          LS       0      82
 33          UD    0.62

 34          KK      X5   BASIN X5 RUNOFF
 35          BA    0.12
 36          LS       0      84
 37          UD    0.27

 38          KK   COMB2   COMBINE X1, X2, X3, X5 RUNOFFS
 39          KM     COMBINATION POINT 2
 40          HC       3
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 41          KK   RT_X5   ROUTE FROM DP30 TO DP40
 42          RK    1000     .01    .030            TRAP      30       3

 43          KK      X4   BASIN X4 RUNOFF
 44          BA    0.30
 45          LS       0      84
 46          UD    0.59

 47          KK      X6   BASIN X6 RUNOFF
 48          BA    0.07
 49          LS       0      65
 50          UD    0.37
```

```
            51          KK   COMB3   COMBINE ALL BASINS
            52          KM       COMBINATION POINT 3
            53          HC        3
            54          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6          X2
                 .
                 .
    19           .          X1
                 .           V
                 .           V
    23           .       RT_X1
                 .           .
                 .           .
    25        COMB1.............
                 V
                 V
    28       RT_X2
                 .
                 .
    30           .          X3
                 .           .
                 .           .
    34           .           .          X5
                 .           .           .
                 .           .           .
    38        COMB2.........................
                 V
                 V
    41       RT_X5
                 .
                 .
    43           .          X4
                 .           .
                 .           .
    47           .           .          X6
                 .           .           .
                 .           .           .
    51        COMB3.........................

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *            SEPTEMBER 1990             *
```

```
*****************************************
*
*    U.S. ARMY CORPS OF ENGINEERS
*    HYDROLOGIC ENGINEERING CENTER
```

VERSION 4.0

RUN DATE 04/18/1995 TIME 14:15:05

609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
50-YEAR 6-HOUR STORM

4 IO OUTPUT CONTROL VARIABLES

IPRNT	3	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		300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		0055	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 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

1.00	.99	.98	.97	.95	.93

*** *** *** *

```
         *          *
6 KK     *    X2    *    BASIN X2 RUNOFF
         *          *
         ***************
```

SUBBASIN RUNOFF DATA

7 BA SUBBASIN CHARACTERISTICS

TAREA	.50	SUBBASIN AREA

PRECIPITATION DATA

8 PB

STORM	2.86	BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

17 LS SCS LOSS RATE

STRTL	.90	INITIAL ABSTRACTION
CRVNBR	69.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

18 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.41	LAG

***

UNIT HYDROGRAPH
27 END-OF-PERIOD ORDINATES

48.	146.	306.	461.	530.	527.	463.	376.	267.	194.
144.	108.	79.	59.	44.	32.	24.	18.	13.	10.
7.	6.	4.	3.	2.	1.	0.			

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.26, TOTAL EXCESS = .60

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	158.	3.92		32.	8.	8.	8.
			(INCHES)	.596	.596	.596	.596
			(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.26, TOTAL EXCESS = .60

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 158.	3.92		32.	8.	8.	8.
		(INCHES)	.596	.596	.596	.596
		(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 2.25, TOTAL EXCESS = .58

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 153.	3.92		31.	8.	8.	8.
		(INCHES)	.581	.581	.581	.581
		(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 2.24, TOTAL EXCESS = .57

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 149.	3.92		30.	8.	7.	7.
		(INCHES)	.567	.567	.567	.567
		(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 2.22, TOTAL EXCESS = .55

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	145.	3.92		30.	7.	7.	7.
			(INCHES)	.552	.552	.552	.552
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 2.19, TOTAL EXCESS = .52

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	137.	3.92		28.	7.	7.	7.
			(INCHES)	.524	.524	.524	.524
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 2.16, TOTAL EXCESS = .50

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	129.	3.92		27.	7.	6.	6.
			(INCHES)	.496	.496	.496	.496

(AC-FT) 13. 13. 13. 13.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	216.	3.67		31.	8.	8.	8.
			(INCHES)	.596	.596	.596	.596
			(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.26, TOTAL EXCESS = .60

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	216.	3.67		31.	8.	8.	8.
			(INCHES)	.596	.596	.596	.596
			(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 2.25, TOTAL EXCESS = .58

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	210.	3.67		31.	8.	7.	7.
			(INCHES)	.581	.581	.581	.581
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 2.24, TOTAL EXCESS = .57

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	204.	3.67		30.	7.	7.	7.
			(INCHES)	.567	.567	.567	.567
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 2.22, TOTAL EXCESS = .55

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	198.	3.67		29.	7.	7.	7.
			(INCHES)	.552	.552	.552	.552
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 2.19, TOTAL EXCESS = .52

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	187.	3.67		28.	7.	7.	7.
			(INCHES)	.524	.524	.524	.524
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1

FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 2.16, TOTAL EXCESS = .50

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	176.	3.67		26.	7.	6.	6.
			(INCHES)	.496	.496	.496	.496
			(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	208.12	225.00	.60
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	208.	3.75		31.	8.	8.	8.
			(INCHES)	.596	.596	.596	.596
			(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.27	733.33	208.98	222.54	.58	10.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+02 EXCESS= .0000E+00 OUTFLOW= .1520E+02 BASIN STORAGE= .8349E-06 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	202.75	225.00	.58
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	203.	3.75		31.	8.	7.	7.
			(INCHES)	.581	.581	.581	.581
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.19	733.33	203.19	222.59	.57	10.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1481E+02 EXCESS= .0000E+00 OUTFLOW= .1482E+02 BASIN STORAGE= .1353E-05 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	197.41	225.00	.57

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	197.	3.75		30.	7.	7.	7.
			(INCHES)	.567	.567	.567	.567
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.22	733.33	197.69	222.39	.55	10.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1444E+02 EXCESS= .0000E+00 OUTFLOW= .1445E+02 BASIN STORAGE= .1030E-05 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	192.10	225.00	.55
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 192.	3.75	29.	7.	7.	7.
	(INCHES)	.552	.552	.552	.552
	(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.25	733.33	185.33	223.12	.52	10.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1369E+02 EXCESS= .0000E+00 OUTFLOW= .1370E+02 BASIN STORAGE= .1250E-05 PERCENT ERROR= .(

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	181.59	225.00	.52
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 182.	3.75	28.	7.	7.	7.
	(INCHES)	.523	.523	.523	.523
	(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.27	733.33	174.65	222.31	.50	10.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1296E+02 EXCESS= .0000E+00 OUTFLOW= .1297E+02 BASIN STORAGE= .9054E-06 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	171.24	225.00	.50

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .93

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
171.	3.75	(CFS)	26.	7.	6.	6.
		(INCHES)	.495	.495	.495	.495
		(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	339.	3.75		63.	16.	15.	15.
			(INCHES)	.596	.596	.596	.596
			(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	329.	3.75		62.	15.	15.	15.
			(INCHES)	.581	.581	.581	.581
			(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	320.	3.75		60.	15.	15.	15.
			(INCHES)	.567	.567	.567	.567
			(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1

FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	311.	3.75		59.	15.	14.	14.
			(INCHES)	.552	.552	.552	.552
			(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	293.	3.75		56.	14.	13.	13.
			(INCHES)	.524	.524	.524	.524
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	276.	3.83		53.	13.	13.	13.
			(INCHES)	.496	.496	.496	.496
			(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *

28 KK * RT_X2 * ROUTE FROM DP20 TO DP30
* *
****

HYDROGRAPH ROUTING DATA

29 RK KINEMATIC WAVE STREAM ROUTING

L	3200.	CHANNEL LENGTH
S	.0050	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	45.00	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	.36	1.57	2.74	1066.67	338.55	230.60	.60	6.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3147E+02 EXCESS= .0000E+00 OUTFLOW= .3153E+02 BASIN STORAGE= .5362E-03 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	335.03	230.00	.60

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = 1.00

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
335.	3.83		64.	16.	15.	15.
		(INCHES)	.598	.598	.598	.598
		(AC-FT)	32.	32.	32.	32.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.77	1066.67	329.09	230.97	.58	6.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+02 EXCESS= .0000E+00 OUTFLOW= .3076E+02 BASIN STORAGE= .6802E-03 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		324.51	235.00	.58
***	***	***	***		***		

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	325.	3.92		62.	16.	15.	15.
			(INCHES)	.583	.583	.583	.583
			(AC-FT)	31.	31.	31.	31.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.75	1066.67	319.79	231.34	.57	6.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2992E+02 EXCESS= .0000E+00 OUTFLOW= .3001E+02 BASIN STORAGE= .5367E-03 PERCENT ERROR= -.3

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		316.08	235.00	.57

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 316.	3.92		60.	15.	15.	15.
		(INCHES)	.568	.568	.568	.568
		(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.74	1066.67	310.42	232.47	.55	6.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2915E+02 EXCESS= .0000E+00 OUTFLOW= .2916E+02 BASIN STORAGE= .6615E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	309.43	235.00	.55

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 309.	3.92		59.	15.	14.	14.
		(INCHES)	.552	.553	.553	.553
		(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.80	1066.67	292.82	230.60	.52	6.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2765E+02 EXCESS= .0000E+00 OUTFLOW= .2770E+02 BASIN STORAGE= .6882E-03 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		291.04	235.00	.52
***	***	***	***		***		

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	291.	3.92		56.	14.	13.	13.
			(INCHES)	.525	.525	.525	.525
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.85	1066.67	275.47	234.28	.50	6.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2617E+02 EXCESS= .0000E+00 OUTFLOW= .2622E+02 BASIN STORAGE= .6772E-03 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		274.21	235.00	.50
***	***	***	***		***		

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	274.	3.92		53.	13.	13.	13.
			(INCHES)	.496	.496	.496	.496
			(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *

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UNIT HYDROGRAPH
39 END-OF-PERIOD ORDINATES

15.	47.	91.	153.	227.	283.	315.	321.	312.	286.
254.	214.	168.	134.	108.	88.	73.	60.	48.	40.
32.	26.	21.	17.	14.	12.	9.	8.	6.	5.
4.	3.	3.	2.	2.	1.	1.	1.	0.	

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.59, TOTAL EXCESS = 1.27

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	243.	4.08		60.	15.	14.	14.
			(INCHES)	1.269	1.270	1.270	1.270
			(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.59, TOTAL EXCESS = 1.27

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	243.	4.08		60.	15.	14.	14.
			(INCHES)	1.269	1.270	1.270	1.270
			(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.58, TOTAL EXCESS = 1.25

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	239.	4.08		59.	15.	14.	14.

	(INCHES)	1.247	1.248	1.248	1.248
	(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.58, TOTAL EXCESS = 1.23

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	235.	4.08	58.	15.	14.	14.
		(INCHES)	1.225	1.226	1.226	1.226
		(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.57, TOTAL EXCESS = 1.20

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	231.	4.08	57.	14.	14.	14.
		(INCHES)	1.203	1.204	1.204	1.204
		(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.56, TOTAL EXCESS = 1.16

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				

			(CFS)				
+	222.	4.08		55.	14.	13.	13.
			(INCHES)	1.160	1.160	1.160	1.160
			(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.54, TOTAL EXCESS = 1.12

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 214.	4.08		53.	13.	13.	13.
		(INCHES)	1.116	1.117	1.117	1.117
		(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *

.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

36 LS SCS LOSS RATE

STRTL	.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

37 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.27	LAG

***

UNIT HYDROGRAPH
18 END-OF-PERIOD ORDINATES

30.	100.	173.	185.	155.	103.	65.	43.	27.	18.
11.	7.	5.	3.	2.	1.	1.	0.		

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	113.	3.67		18.	5.	4.	4.
			(INCHES)	1.402	1.402	1.402	1.402
			(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	113.	3.67		18.	5.	4.	4.
			(INCHES)	1.402	1.402	1.402	1.402
			(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.38

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 111.	3.67		18.	4.	4.	4.
		(INCHES)	1.379	1.379	1.379	1.379
		(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.36

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 109.	3.67		17.	4.	4.	4.
		(INCHES)	1.356	1.356	1.356	1.356
		(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.33

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 108.	3.67		17.	4.	4.	4.
		(INCHES)	1.333	1.333	1.333	1.333
		(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.43, TOTAL EXCESS = 1.29

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	104.	3.67		17.	4.	4.	4.
			(INCHES)	1.287	1.287	1.287	1.287
			(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.42, TOTAL EXCESS = 1.24

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	100.	3.67		16.	4.	4.	4.
			(INCHES)	1.241	1.241	1.241	1.241
			(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 637.	3.92		142.	35.	34.	34.
		(INCHES)	.850	.851	.851	.851
		(AC-FT)	70.	70.	70.	70.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 623.	3.92		139.	35.	33.	33.
		(INCHES)	.832	.833	.833	.833
		(AC-FT)	69.	69.	69.	69.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 609.	3.92		136.	34.	33.	33.
		(INCHES)	.814	.816	.816	.816
		(AC-FT)	67.	67.	67.	67.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2

FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	597.	3.92		133.	33.	32.	32.
			(INCHES)	.797	.798	.798	.798
			(AC-FT)	66.	66.	66.	66.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	568.	3.92		127.	32.	31.	31.
			(INCHES)	.763	.764	.764	.764
			(AC-FT)	63.	63.	63.	63.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	541.	3.92		122.	30.	29.	29.
			(INCHES)	.729	.730	.730	.730
			(AC-FT)	60.	60.	60.	60.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *

41 KK * RT_X5 * ROUTE FROM DP30 TO DP40
* *
****

HYDROGRAPH ROUTING DATA

42 RK KINEMATIC WAVE STREAM ROUTING

L	1000.	CHANNEL LENGTH
S	.0100	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	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	.74	1.51	.66	333.33	635.94	235.72	.85	10.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7035E+02 EXCESS= .0000E+00 OUTFLOW= .7036E+02 BASIN STORAGE= .1817E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	635.06	235.00	.85

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = 1.00

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
635.	3.92		142.	35.	34.	34.
		(INCHES)	.850	.852	.852	.852
		(AC-FT)	70.	70.	70.	70.

CUMULATIVE AREA = 1.55 SQ MI

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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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	.74	1.51	.51	333.33	622.32	235.91	.83	10.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6889E+02 EXCESS= .0000E+00 OUTFLOW= .6890E+02 BASIN STORAGE= .1866E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	620.47	235.00	.83

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	620.	3.92	139.	35.	33.	33.
			(INCHES) .833	.834	.834	.834
			(AC-FT) 69.	69.	69.	69.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.52	333.33	608.34	236.18	.82	10.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6744E+02 EXCESS= .0000E+00 OUTFLOW= .6746E+02 BASIN STORAGE= .1895E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	606.49	235.00	.82
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	606.	3.92	136.	34.	33.	33.
		(INCHES)	.815	.817	.817	.817
		(AC-FT)	67.	67.	67.	67.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.56	333.33	596.31	235.87	.80	10.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6596E+02 EXCESS= .0000E+00 OUTFLOW= .6597E+02 BASIN STORAGE= .1803E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	594.47	235.00	.80
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW

			MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 594.	3.92		133.	33.	32.	32.
		(INCHES)	.797	.799	.799	.799
		(AC-FT)	66.	66.	66.	66.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.57	333.33	567.83	236.00	.76	10.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6318E+02 EXCESS= .0000E+00 OUTFLOW= .6319E+02 BASIN STORAGE= .1828E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	565.87	235.00	.76
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .95

			MAXIMUM AVERAGE FLOW			
PEAK FLOW	TIME		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 566.	3.92		127.	32.	31.	31.
		(INCHES)	.764	.765	.765	.765
		(AC-FT)	63.	63.	63.	63.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.59	333.33	540.47	235.98	.73	10.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6035E+02 EXCESS= .0000E+00 OUTFLOW= .6037E+02 BASIN STORAGE= .1853E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	537.93	235.00	.73
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	538.	3.92	122.	30.	29.	29.
		(INCHES)	.729	.731	.731	.731
		(AC-FT)	60.	60.	60.	60.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *

.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

45 LS SCS LOSS RATE

STRTL	.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

46 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.59	LAG

***

UNIT HYDROGRAPH
37 END-OF-PERIOD ORDINATES

12.	36.	70.	120.	173.	211.	228.	228.	215.	194.
167.	133.	103.	83.	67.	55.	45.	35.	29.	23.
19.	15.	12.	10.	8.	6.	5.	4.	3.	3.
2.	2.	2.	1.	1.	1.	0.			

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	188.	4.08		45.	11.	11.	11.
			(INCHES)	1.401	1.402	1.402	1.402
			(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	188.	4.08		45.	11.	11.	11.
			(INCHES)	1.401	1.402	1.402	1.402
			(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.38

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	185.	4.08	44.	11.	11.	11.
		(INCHES)	1.378	1.379	1.379	1.379
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.36

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	182.	4.08	44.	11.	11.	11.
		(INCHES)	1.355	1.356	1.356	1.356
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.33

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	179.	4.08	43.	11.	10.	10.
		(INCHES)	1.332	1.333	1.333	1.333
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.43, TOTAL EXCESS = 1.29

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	173.	4.08		41.	10.	10.	10.
			(INCHES)	1.286	1.287	1.287	1.287
			(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.42, TOTAL EXCESS = 1.24

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	167.	4.08		40.	10.	10.	10.
			(INCHES)	1.241	1.241	1.241	1.241
			(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *

TAREA .07 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 2.86 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

49 LS SCS LOSS RATE

STRTL 1.08 INITIAL ABSTRACTION
CRVNBR 65.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .37 LAG

***

UNIT HYDROGRAPH
24 END-OF-PERIOD ORDINATES

8.	26.	55.	77.	82.	76.	63.	44.	31.	22.
16.	12.	8.	6.	4.	3.	2.	2.	1.	1.
1.	0.	0.	0.						

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.42, TOTAL EXCESS = .44

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	16.	3.92	3.	1.	1.	1.
		(INCHES)	.444	.444	.444	.444
		(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 2.42, TOTAL EXCESS = .44

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	16.	3.92		3.	1.	1.	1.
			(INCHES)	.444	.444	.444	.444
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 2.40, TOTAL EXCESS = .43

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	16.	3.92		3.	1.	1.	1.
			(INCHES)	.431	.431	.431	.431
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 2.38, TOTAL EXCESS = .42

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	15.	3.92		3.	1.	1.	1.
			(INCHES)	.419	.419	.419	.419
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 2.37, TOTAL EXCESS = .41

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	15.	3.92		3.	1.	1.	1.
			(INCHES)	.407	.407	.407	.407
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 2.33, TOTAL EXCESS = .38

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	14.	3.92		3.	1.	1.	1.
			(INCHES)	.383	.383	.383	.383
			(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 2.30, TOTAL EXCESS = .36

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	13.	3.92		3.	1.	1.	1.
			(INCHES)	.360	.360	.360	.360
			(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *

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          **************
          *            *
51 KK     *     COMB3  *        COMBINE ALL BASINS
          *            *
          **************
                          COMBINATION POINT 3

53 HC          HYDROGRAPH COMBINATION
                    ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

     ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION    COMB3
                         FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+     829.      3.92                  190.         48.         46.         46.
                        (INCHES)      .921        .923        .923        .923
                        (AC-FT)       94.         94.         94.         94.

                       CUMULATIVE AREA =    1.92 SQ MI

     ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION    COMB3
                         FOR PLAN 1, RATIO =  .99

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+     811.      3.92                  186.         47.         45.         45.
                        (INCHES)      .903        .904        .904        .904
                        (AC-FT)       92.         93.         93.         93.

                       CUMULATIVE AREA =    1.92 SQ MI

     ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION    COMB3
                         FOR PLAN 1, RATIO =  .98

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	793.	3.92		183.	46.	44.	44.
			(INCHES)	.885	.886	.886	.886
			(AC-FT)	91.	91.	91.	91.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	778.	3.92		179.	45.	43.	43.
			(INCHES)	.866	.868	.868	.868
			(AC-FT)	89.	89.	89.	89.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	742.	3.92		172.	43.	41.	41.
			(INCHES)	.831	.832	.832	.832
			(AC-FT)	85.	85.	85.	85.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	709.	4.00		164.	41.	40.	40.

(INCHES)	.796	.797	.797	.797
(AC-FT)	81.	82.	82.	82.

CUMULATIVE AREA = 1.92 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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
					1.00	.99	.98	.97	.95	.93
HYDROGRAPH AT										
+	X2	.50	1	FLOW	158.	153.	149.	145.	137.	129.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X1	.49	1	FLOW	216.	210.	204.	198.	187.	176.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_X1	.49	1	FLOW	208.	203.	197.	192.	182.	171.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	COMB1	.99	1	FLOW	339.	329.	320.	311.	293.	276.
				TIME	3.75	3.75	3.75	3.75	3.75	3.83
ROUTED TO										
+	RT_X2	.99	1	FLOW	335.	325.	316.	309.	291.	274.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X3	.44	1	FLOW	243.	239.	235.	231.	222.	214.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	X5	.12	1	FLOW	113.	111.	109.	108.	104.	100.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	637.	623.	609.	597.	568.	541.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO										
+	RT_X5	1.55	1	FLOW	635.	620.	606.	594.	566.	538.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92

HYDROGRAPH AT

+	X4	.30	1	FLOW	188.	185.	182.	179.	173.	167.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08

HYDROGRAPH AT

+	X6	.07	1	FLOW	16.	16.	15.	15.	14.	13.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92

3 COMBINED AT

+	COMB3	1.92	1	FLOW	829.	811.	793.	778.	742.	709.
				TIME	3.92	3.92	3.92	3.92	3.92	4.00

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= 1.00									
RT_X1	MANE	1.27	214.09	222.31	.60	5.00	208.12	225.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1558E+02 EXCESS= .0000E+00 OUTFLOW= .1558E+02 BASIN STORAGE= .8877E-06 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .99									
RT_X1	MANE	1.27	208.98	222.54	.58	5.00	202.75	225.00	.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+02 EXCESS= .0000E+00 OUTFLOW= .1520E+02 BASIN STORAGE= .8349E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .98									
RT_X1	MANE	1.19	203.19	222.59	.57	5.00	197.41	225.00	.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1481E+02 EXCESS= .0000E+00 OUTFLOW= .1482E+02 BASIN STORAGE= .1353E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .97									
RT_X1	MANE	1.22	197.69	222.39	.55	5.00	192.10	225.00	.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1444E+02 EXCESS= .0000E+00 OUTFLOW= .1445E+02 BASIN STORAGE= .1030E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .95									
RT_X1	MANE	1.25	185.33	223.12	.52	5.00	181.59	225.00	.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1369E+02 EXCESS= .0000E+00 OUTFLOW= .1370E+02 BASIN STORAGE= .1250E-05 PERCENT ERROR=

FOR PLAN = 1 RATIO= .93

RT_X1	MANE	1.27	174.65	222.31	.50	5.00	171.24	225.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1296E+02 EXCESS= .0000E+00 OUTFLOW= .1297E+02 BASIN STORAGE= .9054E-06 PERCENT ERROR= -.

FOR PLAN = 1 RATIO= 1.00

RT_X2	MANE	2.74	338.55	230.60	.60	5.00	335.03	230.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3147E+02 EXCESS= .0000E+00 OUTFLOW= .3153E+02 BASIN STORAGE= .5362E-03 PERCENT ERROR= -.

FOR PLAN = 1 RATIO= .99

RT_X2	MANE	2.77	329.09	230.97	.58	5.00	324.51	235.00	.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+02 EXCESS= .0000E+00 OUTFLOW= .3076E+02 BASIN STORAGE= .6802E-03 PERCENT ERROR= -.

FOR PLAN = 1 RATIO= .98

RT_X2	MANE	2.75	319.79	231.34	.57	5.00	316.08	235.00	.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2992E+02 EXCESS= .0000E+00 OUTFLOW= .3001E+02 BASIN STORAGE= .5367E-03 PERCENT ERROR= -.

FOR PLAN = 1 RATIO= .97

RT_X2	MANE	2.74	310.42	232.47	.55	5.00	309.43	235.00	.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2915E+02 EXCESS= .0000E+00 OUTFLOW= .2916E+02 BASIN STORAGE= .6615E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_X2	MANE	2.80	292.82	230.60	.52	5.00	291.04	235.00	.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2765E+02 EXCESS= .0000E+00 OUTFLOW= .2770E+02 BASIN STORAGE= .6882E-03 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .93

RT_X2	MANE	2.85	275.47	234.28	.50	5.00	274.21	235.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2617E+02 EXCESS= .0000E+00 OUTFLOW= .2622E+02 BASIN STORAGE= .6772E-03 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= 1.00

RT_X5	MANE	.66	635.94	235.72	.85	5.00	635.06	235.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7035E+02 EXCESS= .0000E+00 OUTFLOW= .7036E+02 BASIN STORAGE= .1817E-03 PERCENT ERROR= .

FOR PLAN = 1 RATIO= .99

RT_X5	MANE	.51	622.32	235.91	.83	5.00	620.47	235.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6889E+02 EXCESS= .0000E+00 OUTFLOW= .6890E+02 BASIN STORAGE= .1866E-03 PERCENT ERROR= .

FOR PLAN = 1 RATIO= .98

RT_X5	MANE	.52	608.34	236.18	.82	5.00	606.49	235.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6744E+02 EXCESS= .0000E+00 OUTFLOW= .6746E+02 BASIN STORAGE= .1895E-03 PERCENT ERROR= .(

FOR PLAN = 1 RATIO= .97

RT_X5	MANE	.56	596.31	235.87	.80	5.00	594.47	235.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6596E+02 EXCESS= .0000E+00 OUTFLOW= .6597E+02 BASIN STORAGE= .1803E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_X5	MANE	.57	567.83	236.00	.76	5.00	565.87	235.00	.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6318E+02 EXCESS= .0000E+00 OUTFLOW= .6319E+02 BASIN STORAGE= .1828E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_X5	MANE	.59	540.47	235.98	.73	5.00	537.93	235.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6035E+02 EXCESS= .0000E+00 OUTFLOW= .6037E+02 BASIN STORAGE= .1853E-03 PERCENT ERROR= .0

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990               *
*           VERSION 4.0                 *
*                                       *
*  RUN DATE  04/18/1995  TIME  14:16:01 *
*                                       *
*****************************************
```

U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

```
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

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              *DIAGRAM
    1         ID       BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
    2         ID       50-YEAR 6-HOUR STORM
    3         IT       5              0     300
    4         IO       3
    5         JR    PREC     1.0     .99     .98     .97     .95     .93

    6         KK      F2   BASIN F2 RUNOFF
    7         BA    0.50
    8         PB    2.86
    9         PC     0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
   10         PC    13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
   11         PC    19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
   12         PC    25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
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 13          PC    49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
 14          PC    86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
 15          PC    98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
 16          PC    99.8    99.9   100.0
 17          LS       0      85
 18          UD     .23

 19          KK      F1   BASIN F1 RUNOFF
 20          BA    0.49
 21          LS       0      75
 22          UD    0.14

 23          KK   RT_F1   ROUTE RUNOFF FROM F1 TO F2
 24          RK    2200    .027    .035            TRAP      10       3

 25          KK   COMB1   COMBINE F1 WITH 100 CFS FROM F2
 26          KM     DESIGN POINT 1
 27          HC       2

 28          KK  RT_F2    ROUTE FROM DP20 TO DP 30
 29          RK    3200    .005    .030            TRAP      45       2

 30          KK      F3   BASIN F3 RUNOFF
 31          BA    0.44
 32          LS       0      88
 33          UD    0.34

 34          KK      F5   BASIN F5 RUNOFF
 35          BA    0.12
 36          LS       0      84
 37          UD    0.27

 38          KK   COMB2   COMBINE F1, F2, F3, F5 RUNOFFS
 39          KM     DESIGN POINT 2
 40          HC       3
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 41          KK   RT_F5   ROUTE FROM DP30 TO DP40
 42          RK    1000     .01    .030            TRAP      30       3

 43          KK      F4   BASIN F4 RUNOFF
 44          BA    0.30
 45          LS       0      85
 46          UD    0.35

 47          KK      F6   BASIN F6 RUNOFF
 48          BA    0.07
 49          LS       0      85
 50          UD    0.20
```

```
          51          KK   COMB3   COMBINE ALL BASINS
          52          KM      DESIGN POINT 3
          53          HC       3
          54          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6          F2
                 .
                 .
    19           .          F1
                 .           V
                 .           V
    23           .       RT_F1
                 .           .
                 .           .
    25       COMB1............
                 V
                 V
    28       RT_F2
                 .
                 .
    30           .          F3
                 .           .
                 .           .
    34           .           .          F5
                 .           .           .
                 .           .           .
    38       COMB2.......................
                 V
                 V
    41       RT_F5
                 .
                 .
    43           .          F4
                 .           .
                 .           .
    47           .           .          F6
                 .           .           .
                 .           .           .
    51       COMB3.......................

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*                                       *
*****************************************
*
*    U.S. ARMY CORPS OF ENGINEERS
*    HYDROLOGIC ENGINEERING CENTER
```

* VERSION 4.0 *
* *
* RUN DATE 04/18/1995 TIME 14:16:01 *
* *
****

* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
****

BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
50-YEAR 6-HOUR STORM

4 IO OUTPUT CONTROL VARIABLES

IPRNT	3	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		300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		0055	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 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

1.00	.99	.98	.97	.95	.93

*** *** *** *

```
         *          *
6 KK     *    F2    *     BASIN F2 RUNOFF
         *          *
         ************
```

SUBBASIN RUNOFF DATA

7 BA SUBBASIN CHARACTERISTICS

TAREA	.50	SUBBASIN AREA

PRECIPITATION DATA

8 PB

STORM	2.86	BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

17 LS SCS LOSS RATE

STRTL	.35	INITIAL ABSTRACTION
CRVNBR	85.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

18 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.23	LAG

***

UNIT HYDROGRAPH
16 END-OF-PERIOD ORDINATES

176.	606.	882.	810.	568.	325.	201.	121.	74.	44.
27.	17.	10.	7.	4.	1.				

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.39, TOTAL EXCESS = 1.47

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 532.	3.67		79.	20.	19.	19.
		(INCHES)	1.471	1.471	1.471	1.471
		(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.39, TOTAL EXCESS = 1.47

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 532.	3.67		79.	20.	19.	19.
		(INCHES)	1.471	1.471	1.471	1.471
		(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.45

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 524.	3.67		78.	19.	19.	19.
		(INCHES)	1.448	1.448	1.448	1.448
		(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.42

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 516.	3.67		77.	19.	18.	18.
		(INCHES)	1.424	1.424	1.424	1.424
		(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.37, TOTAL EXCESS = 1.40

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 507.	3.67		75.	19.	18.	18.
		(INCHES)	1.400	1.401	1.401	1.401
		(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.36, TOTAL EXCESS = 1.35

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 491.	3.67		73.	18.	18.	18.
		(INCHES)	1.354	1.354	1.354	1.354
		(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.35, TOTAL EXCESS = 1.31

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 474.	3.67		70.	18.	17.	17.
		(INCHES)	1.307	1.307	1.307	1.307
		(AC-FT)	35.	35.	35.	35.

CUMULATIVE AREA = .50 SQ MI

*** *

```
          **************
          *            *
19 KK     *        F1  *        BASIN F1 RUNOFF
          *            *
          **************
```

SUBBASIN RUNOFF DATA

20 BA SUBBASIN CHARACTERISTICS

TAREA	.49	SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM	2.86	BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

21 LS SCS LOSS RATE

STRTL	.67	INITIAL ABSTRACTION
CRVNBR	75.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

22 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.14	LAG

***

UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

529.	1298.	1046.	483.	234.	110.	52.	25.	12.	5.

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.99, TOTAL EXCESS = .87

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	379.	3.58	(CFS)	46.	11.	11.	11.
			(INCHES)	.870	.870	.870	.870
			(AC-FT)	23.	23.	23.	23.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.99, TOTAL EXCESS = .87

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	379.	3.58	(CFS)	46.	11.	11.	11.
			(INCHES)	.870	.870	.870	.870
			(AC-FT)	23.	23.	23.	23.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.98, TOTAL EXCESS = .85

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	371.	3.58	(CFS)	45.	11.	11.	11.
			(INCHES)	.852	.852	.852	.852
			(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.97, TOTAL EXCESS = .83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 363.	3.58		44.	11.	11.	11.
		(INCHES)	.834	.834	.834	.834
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.96, TOTAL EXCESS = .82

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 355.	3.58		43.	11.	10.	10.
		(INCHES)	.816	.816	.816	.816
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.94, TOTAL EXCESS = .78

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 339.	3.58		41.	10.	10.	10.
		(INCHES)	.781	.781	.781	.781
		(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.91, TOTAL EXCESS = .75

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	323.	3.58	39.	10.	9.	9.
		(INCHES)	.746	.746	.746	.746
		(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .49 SQ MI

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*            *
*     RT_F1  *
*            *
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23 KK ROUTE RUNOFF FROM F1 TO F2

HYDROGRAPH ROUTING DATA

24 RK KINEMATIC WAVE STREAM ROUTING

L	2200.	CHANNEL LENGTH
S	.0270	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	10.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	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	1.94	1.42	1.00	733.33	377.32	217.01	.87	13.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2275E+02 EXCESS= .0000E+00 OUTFLOW= .2278E+02 BASIN STORAGE= .1322E-05 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	352.32	215.00	.87
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	352.	3.58	46.	11.	11.	11.
		(INCHES)	.871	.871	.871	.871
		(AC-FT)	23.	23.	23.	23.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.02	733.33	364.12	217.55	.85	12.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2227E+02 EXCESS= .0000E+00 OUTFLOW= .2229E+02 BASIN STORAGE= .1251E-05 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	344.41	215.00	.85
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	344.	3.58	45.	11.	11.	11.
		(INCHES)	.852	.852	.852	.852
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.06	733.33	356.31	217.56	.84	12.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2180E+02 EXCESS= .0000E+00 OUTFLOW= .2183E+02 BASIN STORAGE= .9394E-06 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	336.53	215.00	.83
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	337.	3.58	44.	11.	11.	11.
			(INCHES) .835	.835	.835	.835
			(AC-FT) 22.	22.	22.	22.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.02	733.33	352.33	216.94	.82	12.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2133E+02 EXCESS= .0000E+00 OUTFLOW= .2135E+02 BASIN STORAGE= .8918E-06 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	328.79	215.00	.82
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 329.	3.58		43.	11.	10.	10.
		(INCHES)	.816	.816	.816	.816
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.03	733.33	333.05	217.60	.78	12.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2041E+02 EXCESS= .0000E+00 OUTFLOW= .2043E+02 BASIN STORAGE= .1209E-05 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	313.30	215.00	.78
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 313.	3.58		41.	10.	10.	10.
		(INCHES)	.781	.781	.781	.781
		(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	.99	733.33	318.79	217.51	.75	12.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1949E+02 EXCESS= .0000E+00 OUTFLOW= .1951E+02 BASIN STORAGE= .8591E-06 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	298.34	220.00	.75

*** *** *** *** ***

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .93

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	298.	3.67	(CFS)	39.	10.	9.	9.
			(INCHES)	.746	.746	.746	.746
			(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 879.	3.67	125.	31.	30.	30.
	(INCHES)	1.174	1.174	1.174	1.174
	(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .99

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 864.	3.67	123.	31.	30.	30.
	(INCHES)	1.153	1.153	1.153	1.153
	(AC-FT)	61.	61.	61.	61.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 849.	3.67	121.	30.	29.	29.
	(INCHES)	1.132	1.132	1.132	1.132
	(AC-FT)	60.	60.	60.	60.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 833.	3.67		118.	30.	28.	28.
		(INCHES)	1.111	1.111	1.111	1.111
		(AC-FT)	59.	59.	59.	59.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 803.	3.67		114.	28.	27.	27.
		(INCHES)	1.070	1.070	1.070	1.070
		(AC-FT)	57.	57.	57.	57.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 773.	3.67		110.	27.	26.	26.
		(INCHES)	1.029	1.029	1.029	1.029
		(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = .99 SQ MI

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HYDROGRAPH ROUTING DATA

29 RK KINEMATIC WAVE STREAM ROUTING

L	3200.	CHANNEL LENGTH
S	.0050	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	45.00	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	.36	1.57	1.94	1066.67	869.92	222.41	1.18	9.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6199E+02 EXCESS= .0000E+00 OUTFLOW= .6217E+02 BASIN STORAGE= .6685E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	853.35	220.00	1.18

*** *** *** *** ***

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW	6-HR	24-HR	72-HR	24.92-HR
+	853.	3.67	(CFS)	125.	31.	30.	30.
			(INCHES)	1.176	1.177	1.177	1.177
			(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.95	1066.67	858.23	223.35	1.16	9.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6087E+02 EXCESS= .0000E+00 OUTFLOW= .6099E+02 BASIN STORAGE= .5308E-03 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	840.28	220.00	1.15
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	840.	3.67	123.	31.	30.	30.
			(INCHES) 1.153	1.154	1.154	1.154
			(AC-FT) 61.	61.	61.	61.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.99	1066.67	839.25	224.24	1.13	9.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5979E+02 EXCESS= .0000E+00 OUTFLOW= .5991E+02 BASIN STORAGE= .5633E-03 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	824.76	225.00	1.13
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 825.	3.75	121.	30.	29.	29.
		(INCHES) 1.134	1.135	1.135	1.135
		(AC-FT) 60.	60.	60.	60.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.93	1066.67	824.23	222.48	1.11	9.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5867E+02 EXCESS= .0000E+00 OUTFLOW= .5881E+02 BASIN STORAGE= .6628E-03 PERCENT ERROR= -..

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	810.51	225.00	1.11
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 811.	3.75	119.	30.	29.	29.
		(INCHES) 1.113	1.114	1.114	1.114
		(AC-FT) 59.	59.	59.	59.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.92	1066.67	802.65	223.83	1.07	9.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5651E+02 EXCESS= .0000E+00 OUTFLOW= .5670E+02 BASIN STORAGE= .7415E-03 PERCENT ERROR= -

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	781.36	225.00	1.07
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 781.	3.75	114.	29.	28.	28.
	(INCHES)	1.072	1.073	1.073	1.073
	(AC-FT)	57.	57.	57.	57.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.94	1066.67	765.48	222.86	1.03	9.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5436E+02 EXCESS= .0000E+00 OUTFLOW= .5459E+02 BASIN STORAGE= .7190E-03 PERCENT ERROR= -.4

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	753.88	225.00	1.03
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	754.	3.75		110.	28.	27.	27.
			(INCHES)	1.033	1.034	1.034	1.034
			(AC-FT)	55.	55.	55.	55.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *

UNIT HYDROGRAPH
22 END-OF-PERIOD ORDINATES

65.	205.	416.	542.	552.	474.	360.	238.	166.	119.
82.	58.	41.	28.	20.	14.	10.	7.	5.	4.
2.	1.								

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.17, TOTAL EXCESS = 1.69

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	447.	3.75		80.	20.	19.	19.
			(INCHES)	1.692	1.694	1.694	1.694
			(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.17, TOTAL EXCESS = 1.69

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	447.	3.75		80.	20.	19.	19.
			(INCHES)	1.692	1.694	1.694	1.694
			(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.16, TOTAL EXCESS = 1.67

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	441.	3.75		79.	20.	19.	19.
			(INCHES)	1.667	1.669	1.669	1.669
			(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.16, TOTAL EXCESS = 1.64

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	434.	3.75		78.	19.	19.	19.
			(INCHES)	1.642	1.644	1.644	1.644
			(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.16, TOTAL EXCESS = 1.62

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	428.	3.75		77.	19.	18.	18.
			(INCHES)	1.617	1.619	1.619	1.619
			(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.15, TOTAL EXCESS = 1.57

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	415.	3.75		74.	19.	18.	18.
			(INCHES)	1.567	1.569	1.569	1.569

(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.14, TOTAL EXCESS = 1.52

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	402.	3.75		72.	18.	17.	17.
			(INCHES)	1.518	1.519	1.519	1.519
			(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *

36 LS SCS LOSS RATE

STRTL	.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

37 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.27	LAG

***

UNIT HYDROGRAPH
18 END-OF-PERIOD ORDINATES

30.	100.	173.	185.	155.	103.	65.	43.	27.	18.
11.	7.	5.	3.	2.	1.	1.	0.		

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	113.	3.67		18.	5.	4.	4.
			(INCHES)	1.402	1.402	1.402	1.402
			(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	113.	3.67		18.	5.	4.	4.
			(INCHES)	1.402	1.402	1.402	1.402
			(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.38

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 111.	3.67	18.	4.	4.	4.
	(INCHES)	1.379	1.379	1.379	1.379
	(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.36

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 109.	3.67	17.	4.	4.	4.
	(INCHES)	1.356	1.356	1.356	1.356
	(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.33

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 108.	3.67	17.	4.	4.	4.
	(INCHES)	1.333	1.333	1.333	1.333
	(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5

FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.43, TOTAL EXCESS = 1.29

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 104.	3.67		17.	4.	4.	4.
		(INCHES)	1.287	1.287	1.287	1.287
		(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.42, TOTAL EXCESS = 1.24

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 100.	3.67		16.	4.	4.	4.
		(INCHES)	1.241	1.241	1.241	1.241
		(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1412.	3.75		223.	56.	54.	54.
		(INCHES)	1.338	1.341	1.341	1.341
		(AC-FT)	111.	111.	111.	111.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1388.	3.75		219.	55.	53.	53.
		(INCHES)	1.315	1.318	1.318	1.318
		(AC-FT)	109.	109.	109.	109.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1368.	3.75		216.	54.	52.	52.
		(INCHES)	1.294	1.296	1.296	1.296
		(AC-FT)	107.	107.	107.	107.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW

			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1345.	3.75		212.	53.	51.	51.
		(INCHES)	1.272	1.274	1.274	1.274
		(AC-FT)	105.	105.	105.	105.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1300.	3.75		205.	51.	49.	49.
		(INCHES)	1.228	1.230	1.230	1.230
		(AC-FT)	102.	102.	102.	102.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1256.	3.75		198.	50.	48.	48.
		(INCHES)	1.186	1.188	1.188	1.188
		(AC-FT)	98.	98.	98.	98.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *

HYDROGRAPH ROUTING DATA

42 RK KINEMATIC WAVE STREAM ROUTING

L	1000.	CHANNEL LENGTH
S	.0100	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	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	.74	1.51	.49	333.33	1409.56	225.53	1.34	14.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1109E+03 EXCESS= .0000E+00 OUTFLOW= .1109E+03 BASIN STORAGE= .1850E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	1407.21	225.00	1.34

*** *** *** *** ***

HYDROGRAPH AT STATION RT_F5
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1407.	3.75		223.	56.	54.	54.
			(INCHES)	1.340	1.343	1.343	1.343
			(AC-FT)	111.	111.	111.	111.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.44	333.33	1385.71	225.44	1.32	14.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1089E+03 EXCESS= .0000E+00 OUTFLOW= .1090E+03 BASIN STORAGE= .1819E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00		1383.28	225.00	1.32
***	***	***	***		***		

HYDROGRAPH AT STATION RT_F5
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1383.	3.75		220.	55.	53.	53.
			(INCHES)	1.317	1.320	1.320	1.320
			(AC-FT)	109.	109.	109.	109.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.47	333.33	1364.35	225.68	1.30	14.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1072E+03 EXCESS= .0000E+00 OUTFLOW= .1072E+03 BASIN STORAGE= .1841E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00		1361.80	225.00	1.30
***	***	***	***		***		

HYDROGRAPH AT STATION RT_F5

FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1362.	3.75		216.	54.	52.	52.
			(INCHES)	1.295	1.298	1.298	1.298
			(AC-FT)	107.	107.	107.	107.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.47	333.33	1342.35	225.46	1.27	14.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1054E+03 EXCESS= .0000E+00 OUTFLOW= .1054E+03 BASIN STORAGE= .1794E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	1339.35	225.00	1.28
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F5
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1339.	3.75		212.	53.	51.	51.
			(INCHES)	1.273	1.276	1.276	1.276
			(AC-FT)	105.	105.	105.	105.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.53	333.33	1295.48	225.30	1.23	13.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1017E+03 EXCESS= .0000E+00 OUTFLOW= .1017E+03 BASIN STORAGE= .1784E-03 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	1293.62	225.00	1.23
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F5
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1294.	3.75		205.	51.	49.	49.
		(INCHES)	1.230	1.232	1.232	1.232
		(AC-FT)	102.	102.	102.	102.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.48	333.33	1252.58	225.45	1.19	13.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9820E+02 EXCESS= .0000E+00 OUTFLOW= .9822E+02 BASIN STORAGE= .1827E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	1249.16	225.00	1.19
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F5
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1249.	3.75		198.	50.	48.	48.
		(INCHES)	1.187	1.189	1.189	1.189
		(AC-FT)	98.	98.	98.	98.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *

23 END-OF-PERIOD ORDINATES

41.	130.	267.	356.	368.	325.	256.	170.	119.	86.
61.	43.	30.	21.	15.	11.	8.	5.	4.	3.
2.	1.	0.							

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.39, TOTAL EXCESS = 1.47

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	262.	3.75	47.	12.	11.	11.
		(INCHES)	1.471	1.471	1.471	1.471
		(AC-FT)	24.	24.	24.	24.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.39, TOTAL EXCESS = 1.47

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	262.	3.75	47.	12.	11.	11.
		(INCHES)	1.471	1.471	1.471	1.471
		(AC-FT)	24.	24.	24.	24.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.45

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	258.	3.75	47.	12.	11.	11.
		(INCHES)	1.447	1.448	1.448	1.448
		(AC-FT)	23.	23.	23.	23.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.42

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 254.	3.75		46.	11.	11.	11.
		(INCHES)	1.424	1.424	1.424	1.424
		(AC-FT)	23.	23.	23.	23.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.37, TOTAL EXCESS = 1.40

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 250.	3.75		45.	11.	11.	11.
		(INCHES)	1.400	1.401	1.401	1.401
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.36, TOTAL EXCESS = 1.35

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 242.	3.75		44.	11.	11.	11.
		(INCHES)	1.354	1.354	1.354	1.354
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.35, TOTAL EXCESS = 1.31

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	233.	3.75		42.	11.	10.	10.
			(INCHES)	1.307	1.307	1.307	1.307
			(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *

49 LS SCS LOSS RATE

STRTL	.35	INITIAL ABSTRACTION
CRVNBR	85.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.20	LAG

***

UNIT HYDROGRAPH
14 END-OF-PERIOD ORDINATES

34. 112. 140. 112. 62. 36. 20. 12. 7. 4.
2. 1. 1. 0.

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.39, TOTAL EXCESS = 1.47

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	77.	3.58		11.	3.	3.	3.
			(INCHES)	1.471	1.471	1.471	1.471
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 2.86, TOTAL LOSS = 1.39, TOTAL EXCESS = 1.47

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	77.	3.58		11.	3.	3.	3.
			(INCHES)	1.471	1.471	1.471	1.471
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 2.83, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.45

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	76.	3.58		11.	3.	3.	3.
			(INCHES)	1.448	1.448	1.448	1.448
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 2.80, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.42

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	75.	3.58		11.	3.	3.	3.
			(INCHES)	1.424	1.424	1.424	1.424
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 2.77, TOTAL LOSS = 1.37, TOTAL EXCESS = 1.40

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	73.	3.58		11.	3.	3.	3.
			(INCHES)	1.400	1.401	1.401	1.401
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.72, TOTAL LOSS = 1.36, TOTAL EXCESS = 1.35

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	71.	3.67		10.	3.	2.	2.
			(INCHES)	1.354	1.354	1.354	1.354
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 2.66, TOTAL LOSS = 1.35, TOTAL EXCESS = 1.31

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	69.	3.67		10.	2.	2.	2.
			(INCHES)	1.307	1.307	1.307	1.307
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *

FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1736.	3.75		282.	71.	68.	68.
			(INCHES)	1.365	1.368	1.368	1.368
			(AC-FT)	140.	140.	140.	140.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1707.	3.75		277.	69.	67.	67.
			(INCHES)	1.342	1.344	1.344	1.344
			(AC-FT)	137.	138.	138.	138.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1680.	3.75		273.	68.	66.	66.
			(INCHES)	1.320	1.322	1.322	1.322
			(AC-FT)	135.	135.	135.	135.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+ (CFS)	(HR)					
		(CFS)				
+ 1653.	3.75		268.	67.	65.	65.
		(INCHES)	1.298	1.300	1.300	1.300
		(AC-FT)	133.	133.	133.	133.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1597.	3.75		259.	65.	62.	62.
		(INCHES)	1.253	1.255	1.255	1.255
		(AC-FT)	128.	129.	129.	129.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1542.	3.75		250.	63.	60.	60.
		(INCHES)	1.210	1.212	1.212	1.212
		(AC-FT)	124.	124.	124.	124.

CUMULATIVE AREA = 1.92 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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				1.00	.99	.98	.97	.95	.93
HYDROGRAPH AT									

+	F2	.50	1	FLOW	532.	524.	516.	507.	491.	474.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	F1	.49	1	FLOW	379.	371.	363.	355.	339.	323.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	RT_F1	.49	1	FLOW	352.	344.	337.	329.	313.	298.
				TIME	3.58	3.58	3.58	3.58	3.58	3.67
2 COMBINED AT										
+	COMB1	.99	1	FLOW	879.	864.	849.	833.	803.	773.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_F2	.99	1	FLOW	853.	840.	825.	811.	781.	754.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F3	.44	1	FLOW	447.	441.	434.	428.	415.	402.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F5	.12	1	FLOW	113.	111.	109.	108.	104.	100.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	1412.	1388.	1368.	1345.	1300.	1256.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RT_F5	1.55	1	FLOW	1407.	1383.	1362.	1339.	1294.	1249.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F4	.30	1	FLOW	262.	258.	254.	250.	242.	233.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F6	.07	1	FLOW	77.	76.	75.	73.	71.	69.
				TIME	3.58	3.58	3.58	3.58	3.67	3.67
3 COMBINED AT										
+	COMB3	1.92	1	FLOW	1736.	1707.	1680.	1653.	1597.	1542.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75

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								
RT_F1 MANE	1.00	377.32	217.01	.87	5.00	352.32	215.00	.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2275E+02 EXCESS= .0000E+00 OUTFLOW= .2278E+02 BASIN STORAGE= .1322E-05 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .99								
RT_F1 MANE	1.02	364.12	217.55	.85	5.00	344.41	215.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2227E+02 EXCESS= .0000E+00 OUTFLOW= .2229E+02 BASIN STORAGE= .1251E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .98								
RT_F1 MANE	1.06	356.31	217.56	.84	5.00	336.53	215.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2180E+02 EXCESS= .0000E+00 OUTFLOW= .2183E+02 BASIN STORAGE= .9394E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .97								
RT_F1 MANE	1.02	352.33	216.94	.82	5.00	328.79	215.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2133E+02 EXCESS= .0000E+00 OUTFLOW= .2135E+02 BASIN STORAGE= .8918E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .95								
RT_F1 MANE	1.03	333.05	217.60	.78	5.00	313.30	215.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2041E+02 EXCESS= .0000E+00 OUTFLOW= .2043E+02 BASIN STORAGE= .1209E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .93								
RT_F1 MANE	.99	318.79	217.51	.75	5.00	298.34	220.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1949E+02 EXCESS= .0000E+00 OUTFLOW= .1951E+02 BASIN STORAGE= .8591E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00								
RT_F2 MANE	1.94	869.92	222.41	1.18	5.00	853.35	220.00	1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6199E+02 EXCESS= .0000E+00 OUTFLOW= .6217E+02 BASIN STORAGE= .6685E-03 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .99

RT_F2	MANE	1.95	858.23	223.35	1.16	5.00	840.28	220.00	1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6087E+02 EXCESS= .0000E+00 OUTFLOW= .6099E+02 BASIN STORAGE= .5308E-03 PERCENT ERROR= -.

FOR PLAN = 1 RATIO= .98

RT_F2	MANE	1.99	839.25	224.24	1.13	5.00	824.76	225.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5979E+02 EXCESS= .0000E+00 OUTFLOW= .5991E+02 BASIN STORAGE= .5633E-03 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .97

RT_F2	MANE	1.93	824.23	222.48	1.11	5.00	810.51	225.00	1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5867E+02 EXCESS= .0000E+00 OUTFLOW= .5881E+02 BASIN STORAGE= .6628E-03 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .95

RT_F2	MANE	1.92	802.65	223.83	1.07	5.00	781.36	225.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5651E+02 EXCESS= .0000E+00 OUTFLOW= .5670E+02 BASIN STORAGE= .7415E-03 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .93

RT_F2	MANE	1.94	765.48	222.86	1.03	5.00	753.88	225.00	1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5436E+02 EXCESS= .0000E+00 OUTFLOW= .5459E+02 BASIN STORAGE= .7190E-03 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= 1.00

RT_F5	MANE	.49	1409.56	225.53	1.34	5.00	1407.21	225.00	1.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1109E+03 EXCESS= .0000E+00 OUTFLOW= .1109E+03 BASIN STORAGE= .1850E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .99

RT_F5	MANE	.44	1385.71	225.44	1.32	5.00	1383.28	225.00	1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1089E+03 EXCESS= .0000E+00 OUTFLOW= .1090E+03 BASIN STORAGE= .1819E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_F5	MANE	.47	1364.35	225.68	1.30	5.00	1361.80	225.00	1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1072E+03 EXCESS= .0000E+00 OUTFLOW= .1072E+03 BASIN STORAGE= .1841E-03 PERCENT ERROR= .

FOR PLAN = 1 RATIO= .97

RT_F5	MANE	.47	1342.35	225.46	1.27	5.00	1339.35	225.00	1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1054E+03 EXCESS= .0000E+00 OUTFLOW= .1054E+03 BASIN STORAGE= .1794E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_F5	MANE	.53	1295.48	225.30	1.23	5.00	1293.62	225.00	1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1017E+03 EXCESS= .0000E+00 OUTFLOW= .1017E+03 BASIN STORAGE= .1784E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_F5	MANE	.48	1252.58	225.45	1.19	5.00	1249.16	225.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9820E+02 EXCESS= .0000E+00 OUTFLOW= .9822E+02 BASIN STORAGE= .1827E-03 PERCENT ERROR= .0

*** NORMAL END OF HEC-1 ***

APPENDIX G

COMPLETE HEC-1 OUTPUTS

2. 100-YEAR RUNOFF

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*              VERSION 4.0              *
*                                       *
*  RUN DATE  01/16/1995  TIME  16:07:38 *
*                                       *
*****************************************
```

U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

```
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       BOULDER HIGHWAY RUNOFF ANALYSIS - HISTORIC CONDITIONS (PRE-PROJECT)
    2         ID       100-YEAR 6-HOUR STORM
    3         ID       THE  ONLY US 95 CROSS-FLOW MODELLED IS THE 50/50 FLOW
    4         ID       SPLIT ASSUMED TO UCCUR AT THE WAGONWHEEL DRIVE/US 95 INTERSECTION
    5         IT       5              0     300
    6         IO       3
    7         JR    PREC    1.00    0.98    0.97    0.96    0.95    0.93    0.91

    8         KK      H3   BASIN H3 RUNOFF
    9         BA    0.20
   10         PB    3.29
   11         PC     0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
   12         PC    13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
```

```
 13          PC    19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
 14          PC    25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
 15          PC    49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
 16          PC    86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
 17          PC    98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
 18          PC    99.8    99.9   100.0
 19          LS       0      84
 20          UD     .20

 21          KK   RT_H3   ROUTE RUNOFF FROM H3 TO H5
 22          RK    6500    .042    .035            TRAP      20       6

 23          KK      H5   RUNOFF FROM BASIN H5
 24          BA    0.38
 25          LS       0      72
 26          UD    0.68

 27          KK   COMB1   COMBINE H3 AND H5
 28          HC       2

 29          KK   RT_H5   ROUTE RUNOFF FROM H5 TO H7
 30          RK    3300    .027    .035            TRAP      20       6

 31          KK      H7   RUNOFF FROM BASIN H7
 32          BA    0.22
 33          LS       0      77
 34          UD    0.54

 35          KK   COMB2   COMBINE H3, H5, H7
 36          HC       2

 37          KK      H1   RUNOFF FROM BASIN H1
 38          BA    1.50
 39          LS       0      74
 40          UD     .29
```



```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 41          KK  H1_REM   FLOW AT H1 AFTER 50 PERCENT OVERTOPS US 95
 42          KM           DESIGN POINT 20
 43          DT  DIV_H1      0   10000
 44          DI       0     10     100    1000   10000
 45          DQ       0      5      50     500    5000

 46          KK   RT_H1   ROUTE RUNOFF FROM H1 TO H7
 47          RK    2800    .014    .035            TRAP      20       6

 48          KK   COMB3   COMBINE H3, H5, H1, H7
 49          KM           DESIGN POINT 30
 50          HC       2
```

```
 51          KK   RT_H7    ROUTE RUNOFF FROM H7 TO H6
 52          RK    1100    .027    .035           TRAP      20       6

 53          KK      H2    RUNOFF FROM BASIN H2
 54          BA    0.70
 55          LS       0     86
 56          UD    0.32

 57          KK   RT_H2    ROUTE RUNOFF FROM H2 TO H4
 58          RK    7500    .039    .035           TRAP      20       6

 59          KK      H4    RUNOFF FROM BASIN H4
 60          BA    0.62
 61          LS       0     82
 62          UD    0.75

 63          KK   COMB4    COMBINE BASINS H2, H4
 64          HC       2

 65          KK  C4_REM    FLOW AT COMB_4 REMAINING AFTER 50 PERCENT DIVERSION
 66          KM            FLOW SPLIT 50/50 TO NORTH AND SOUTH OF MAGIC WAY
 67          DT  DIV_C4       0   10000
 68          DI       0      10     100    1000   10000
 69          DQ       0       5      50     500    5000

 70          KK   RT_H4    ROUTE RUNOFF FROM H4 TO H6
 71          RK    3000    .026    .035           TRAP      20       6

 72          KK      H6    RUNOFF FROM BASIN H6
 73          BA    0.14
 74          LS       0     .72
 75          UD    0.54

 76          KK   COMB5    COMBINE H2, H4, H6
 77          HC       2
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 78          KK   COMB6    COMBINE ALL BASINS EXCEPT DIV_C4
 79          KM            DESIGN POINT 40
 80          HC       2

 81          KK  GET_C4    RETRIEVE FLOW DIVERTED FROM COMB4
 82          DR  DIV_C4

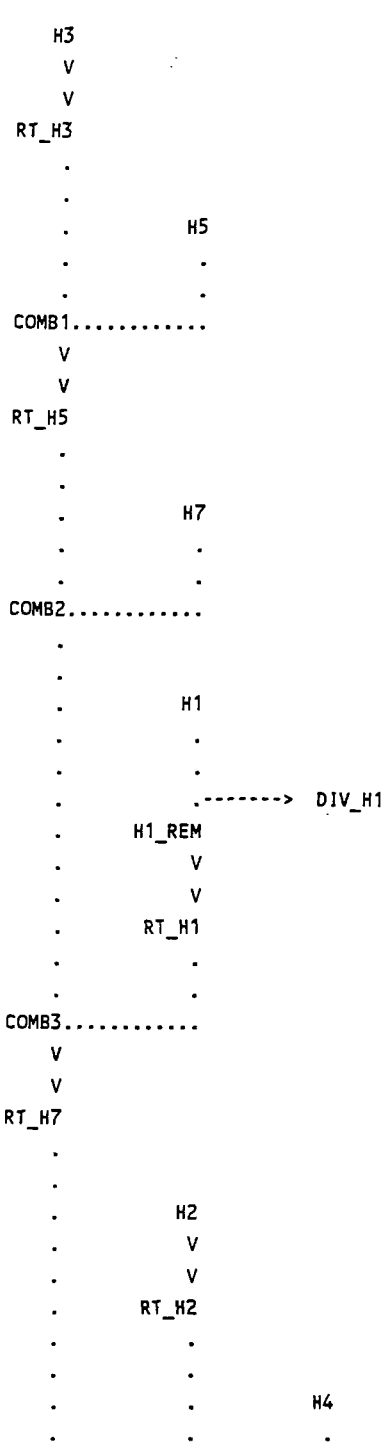
 83          KK   COMB7   COMBINE ALL BASINS
 84          KM           DESIGN POINT 50
 85          HC       2
 86          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING
(.) CONNECTOR
(---->) DIVERSION OR PUMP FLOW
(<----) RETURN OF DIVERTED OR PUMPED FLOW



```
                .          .          .
   63           .       COMB4.............
                .          .
                .          .
   67           .          .--------> DIV_C4
   65           .      C4_REM
                .          V
                .          V
   70           .       RT_H4
                .          .
                .          .
   72           .          .          H6
                .          .           .
                .          .           .
   76           .       COMB5.............
                .          .
                .          .
   78       COMB6.............
                .
                .
   82           .          .<-------  DIV_C4
   81           .      GET_C4
                .          .
                .          .
   83       COMB7.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*           SEPTEMBER 1990              *
*            VERSION 4.0                *
*                                       *
*  RUN DATE  01/16/1995  TIME  16:07:38 *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*          (916) 756-1104           *
*                                   *
*************************************
```

BOULDER HIGHWAY RUNOFF ANALYSIS - HISTORIC CONDITIONS (PRE-PROJECT)
100-YEAR 6-HOUR STORM
THE ONLY US 95 CROSS-FLOW MODELLED IS THE 50/50 FLOW
SPLIT ASSUMED TO UCCUR AT THE WAGONWHEEL DRIVE/US 95 INTERSECTION

6 IO OUTPUT CONTROL VARIABLES

IPRNT	3	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          300  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE      2   0  ENDING DATE
              NDTIME          0055  ENDING TIME
              ICENT            19  CENTURY MARK

          COMPUTATION INTERVAL      .08 HOURS
              TOTAL TIME BASE    24.92 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
          1.00      .98       .97       .96       .95       .93       .91
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         **************
         *            *
 8 KK    *       H3   *       BASIN H3 RUNOFF
         *            *
         **************

        SUBBASIN RUNOFF DATA

 9 BA     SUBBASIN CHARACTERISTICS
              TAREA        .20  SUBBASIN AREA

          PRECIPITATION DATA

10 PB          STORM       3.29  BASIN TOTAL PRECIPITATION

11 PI       INCREMENTAL PRECIPITATION PATTERN
             2.00     3.70     1.30     1.70     2.10     1.60      .60      .00      .00      .00
              .00      .00      .30      .70      .20      .60     1.00     1.40      .90      .90
              .70      .20      .10      .10      .30     1.00     1.50     1.20      .80      .20
              .50     1.40      .80      .30      .20     1.20     2.70     3.00     5.70     9.00
```

9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

19 LS SCS LOSS RATE

STRTL	.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

20 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.20	LAG

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UNIT HYDROGRAPH
14 END-OF-PERIOD ORDINATES

98.	321.	399.	319.	177.	102.	58.	33.	19.	11.
6.	4.	2.	1.						

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 263.	3.58		38.	9.	9.	9.
		(INCHES)	1.758	1.758	1.758	1.758
		(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 263.	3.58		38.	9.	9.	9.
		(INCHES)	1.758	1.758	1.758	1.758
		(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	255.	3.58		37.	9.	9.	9.
			(INCHES)	1.702	1.703	1.703	1.703
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.68

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	251.	3.58		36.	9.	9.	9.
			(INCHES)	1.675	1.675	1.675	1.675
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 3.16, TOTAL LOSS = 1.51, TOTAL EXCESS = 1.65

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	246.	3.58		35.	9.	9.	9.
			(INCHES)	1.647	1.648	1.648	1.648
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.51, TOTAL EXCESS = 1.62

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 242.	3.58		35.	9.	8.	8.
		(INCHES)	1.620	1.620	1.620	1.620
		(AC-FT)	17.	17.	17.	17.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.49, TOTAL EXCESS = 1.57

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 234.	3.58		34.	8.	8.	8.
		(INCHES)	1.565	1.566	1.566	1.566
		(AC-FT)	17.	17.	17.	17.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H3
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.99, TOTAL LOSS = 1.48, TOTAL EXCESS = 1.51

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 226.	3.58		33.	8.	8.	8.
		(INCHES)	1.511	1.511	1.511	1.511
		(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .20 SQ MI

*** *** *** *

			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 261.	3.75		38.	10.	9.	9.
		(INCHES)	1.765	1.767	1.767	1.767
		(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.33	2166.67	254.25	222.87	1.71	11.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1816E+02 EXCESS= .0000E+00 OUTFLOW= .1826E+02 BASIN STORAGE= .5927E-04 PERCENT ERROR= -.5

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	253.44	225.00	1.71
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 253.	3.75		37.	9.	9.	9.
		(INCHES)	1.711	1.713	1.713	1.713
		(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.31	2166.67	250.01	223.76	1.68	11.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1787E+02 EXCESS= .0000E+00 OUTFLOW= .1795E+02 BASIN STORAGE= .4152E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	248.75	225.00	1.68
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	249.	3.75	36.	9.	9.	9.
		(INCHES)	1.682	1.684	1.684	1.684
		(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.28	2166.67	246.01	224.59	1.66	11.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1757E+02 EXCESS= .0000E+00 OUTFLOW= .1767E+02 BASIN STORAGE= .5086E-04 PERCENT ERROR= -.6

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	244.90	225.00	1.66
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				

			(CFS)				
+	245.	3.75		36.	9.	9.	9.
			(INCHES)	1.655	1.657	1.657	1.657
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.42	2166.67	242.30	222.27	1.63	10.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1728E+02 EXCESS= .0000E+00 OUTFLOW= .1738E+02 BASIN STORAGE= .5259E-04 PERCENT ERROR= -.6

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	241.29	225.00	1.63
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	241.	3.75		35.	9.	8.	8.
			(INCHES)	1.626	1.628	1.628	1.628
			(AC-FT)	17.	17.	17.	17.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.48	2166.67	234.29	222.04	1.57	10.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1670E+02 EXCESS= .0000E+00 OUTFLOW= .1679E+02 BASIN STORAGE= .3964E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	233.32	225.00	1.57
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 233.	3.75		34.	8.	8.	8.
		(INCHES)	1.571	1.572	1.572	1.572
		(AC-FT)	17.	17.	17.	17.

CUMULATIVE AREA = .20 SQ MI

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	1.80	1.42	3.46	2166.67	226.27	223.15	1.52	10.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1612E+02 EXCESS= .0000E+00 OUTFLOW= .1625E+02 BASIN STORAGE= .5251E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.80	1.42	5.00	225.91	225.00	1.53
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H3
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 226.	3.75		33.	8.	8.	8.

(INCHES)	1.524	1.525	1.525	1.525
(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .20 SQ MI

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*            *
*        H5  *
*            *
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23 KK RUNOFF FROM BASIN H5

SUBBASIN RUNOFF DATA

24 BA SUBBASIN CHARACTERISTICS

TAREA .38 SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM 3.29 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

25 LS SCS LOSS RATE

STRTL .78 INITIAL ABSTRACTION
CRVNBR 72.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

26 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .68 LAG

***

UNIT HYDROGRAPH
43 END-OF-PERIOD ORDINATES

10.	33.	62.	104.	157.	206.	238.	252.	253.	243.
224.	201.	173.	138.	111.	92.	76.	64.	53.	44.
36.	30.	25.	21.	17.	14.	12.	10.	8.	7.
6.	5.	4.	3.	3.	2.	2.	2.	1.	1.

1. 0. 0.

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.30, TOTAL EXCESS = .99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 151.	4.17		40.	10.	10.	10.
		(INCHES)	.986	.986	.986	.986
		(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .38 SQ MI

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HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.30, TOTAL EXCESS = .99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 151.	4.17		40.	10.	10.	10.
		(INCHES)	.986	.986	.986	.986
		(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .38 SQ MI

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HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.28, TOTAL EXCESS = .94

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 144.	4.17		39.	10.	9.	9.
		(INCHES)	.945	.945	.945	.945
		(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 2.27, TOTAL EXCESS = .92

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	141.	4.17		38.	9.	9.	9.
			(INCHES)	.924	.924	.924	.924
			(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .38 SQ MI

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HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 3.16, TOTAL LOSS = 2.25, TOTAL EXCESS = .90

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	138.	4.17		37.	9.	9.	9.
			(INCHES)	.904	.904	.904	.904
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .38 SQ MI

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HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 2.24, TOTAL EXCESS = .88

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	135.	4.17		36.	9.	9.	9.
			(INCHES)	.884	.884	.884	.884
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 2.22, TOTAL EXCESS = .84

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	128.	4.17		34.	9.	8.	8.
			(INCHES)	.844	.844	.844	.844
			(AC-FT)	17.	17.	17.	17.

CUMULATIVE AREA = .38 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H5
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.99, TOTAL LOSS = 2.19, TOTAL EXCESS = .80

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	122.	4.17		33.	8.	8.	8.
			(INCHES)	.804	.804	.804	.804
			(AC-FT)	16.	16.	16.	16.

CUMULATIVE AREA = .38 SQ MI

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HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	337.	3.75		78.	20.	19.	19.
			(INCHES)	1.254	1.255	1.255	1.255
			(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .58 SQ MI

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HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	326.	3.75		75.	19.	18.	18.
			(INCHES)	1.208	1.210	1.210	1.210
			(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .58 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	319.	3.83		74.	19.	18.	18.
			(INCHES)	1.185	1.186	1.186	1.186
			(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .58 SQ MI

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HYDROGRAPH AT STATION COMB1

FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 314.	3.83		73.	18.	17.	17.
		(INCHES)	1.162	1.164	1.164	1.164
		(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = .58 SQ MI

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HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 308.	3.83		71.	18.	17.	17.
		(INCHES)	1.139	1.140	1.140	1.140
		(AC-FT)	35.	35.	35.	35.

CUMULATIVE AREA = .58 SQ MI

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HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 297.	3.83		68.	17.	16.	16.
		(INCHES)	1.094	1.095	1.095	1.095
		(AC-FT)	34.	34.	34.	34.

CUMULATIVE AREA = .58 SQ MI

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HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	(CFS)	(HR)				
		(CFS)				
+	286.	3.83	66.	16.	16.	16.
		(INCHES)	1.052	1.053	1.053	1.053
		(AC-FT)	33.	33.	33.	33.

CUMULATIVE AREA = .58 SQ MI

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HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	337.	3.83	78.	20.	19.	19.
			(INCHES) 1.254	1.256	1.256	1.256
			(AC-FT) 39.	39.	39.	39.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.84	1100.00	325.91	230.47	1.21	10.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3742E+02 EXCESS= .0000E+00 OUTFLOW= .3742E+02 BASIN STORAGE= .8472E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	325.83	230.00	1.21

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	326.	3.83	75.	19.	18.	18.
			(INCHES) 1.208	1.209	1.209	1.209
			(AC-FT) 37.	37.	37.	37.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.94	1100.00	319.33	231.63	1.19	10.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3670E+02 EXCESS= .0000E+00 OUTFLOW= .3672E+02 BASIN STORAGE= .7771E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	319.29	230.00	1.19
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	319.	3.83	74.	19.	18.	18.
			(INCHES) 1.185	1.186	1.186	1.186
			(AC-FT) 37.	37.	37.	37.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.87	1100.00	313.71	231.96	1.16	10.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3599E+02 EXCESS= .0000E+00 OUTFLOW= .3599E+02 BASIN STORAGE= .7383E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	313.35	230.00	1.16
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 313.	3.83	72.	18.	17.	17.
	(INCHES)	1.161	1.163	1.163	1.163
	(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.86	1100.00	308.03	230.99	1.14	10.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3528E+02 EXCESS= .0000E+00 OUTFLOW= .3528E+02 BASIN STORAGE= .7339E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	307.95	230.00	1.14
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 308.	3.83	71.	18.	17.	17.
	(INCHES)	1.139	1.140	1.140	1.140
	(AC-FT)	35.	35.	35.	35.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.84	1100.00	296.66	232.80	1.10	9.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3387E+02 EXCESS= .0000E+00 OUTFLOW= .3389E+02 BASIN STORAGE= .8077E-04 PERCENT ERROR= .

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	296.20	230.00	1.10
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 296.	3.83	68.	17.	16.	16.
	(INCHES)	1.094	1.095	1.095	1.095
	(AC-FT)	34.	34.	34.	34.

CUMULATIVE AREA = .58 SQ MI

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	1.45	1.42	1.86	1100.00	285.95	232.39	1.05	9.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3257E+02 EXCESS= .0000E+00 OUTFLOW= .3258E+02 BASIN STORAGE= .7176E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	285.08	230.00	1.05
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H5
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	285.	3.83		66.	16.	16.	16.
			(INCHES)	1.051	1.053	1.053	1.053
			(AC-FT)	33.	33.	33.	33.

CUMULATIVE AREA = .58 SQ MI

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*            *
31 KK   *   H7   *        RUNOFF FROM BASIN H7
*            *
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SUBBASIN RUNOFF DATA

32 BA SUBBASIN CHARACTERISTICS

TAREA	.22	SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM	3.29	BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

33 LS SCS LOSS RATE

STRTL	.60	INITIAL ABSTRACTION
CRVNBR	77.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

34 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.54	LAG

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UNIT HYDROGRAPH
34 END-OF-PERIOD ORDINATES

11.	33.	65.	111.	153.	177.	183.	176.	159.	137.
108.	82.	64.	51.	41.	33.	26.	20.	16.	13.
10.	8.	6.	5.	4.	3.	2.	2.	2.	1.
1.	1.	0.	0.						

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.01, TOTAL EXCESS = 1.28

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	133.	4.00		30.	8.	7.	7.
			(INCHES)	1.276	1.277	1.277	1.277
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.01, TOTAL EXCESS = 1.28

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	133.	4.00		30.	8.	7.	7.
			(INCHES)	1.276	1.277	1.277	1.277
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.00, TOTAL EXCESS = 1.23

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	128.	4.00		29.	7.	7.	7.
			(INCHES)	1.229	1.229	1.229	1.229
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.99, TOTAL EXCESS = 1.21

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	126.	4.00		29.	7.	7.	7.
			(INCHES)	1.205	1.206	1.206	1.206
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 3.16, TOTAL LOSS = 1.98, TOTAL EXCESS = 1.18

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	123.	4.00		28.	7.	7.	7.
			(INCHES)	1.182	1.182	1.182	1.182
			(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.97, TOTAL EXCESS = 1.16

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	121.	4.00		27.	7.	7.	7.

	(INCHES)	1.159	1.159	1.159	1.159
	(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.95, TOTAL EXCESS = 1.11

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 116.	4.00	26.	7.	6.	6.
	(INCHES)	1.113	1.113	1.113	1.113
	(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H7
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.99, TOTAL LOSS = 1.93, TOTAL EXCESS = 1.07

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 111.	4.00	25.	6.	6.	6.
	(INCHES)	1.067	1.067	1.067	1.067
	(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .22 SQ MI

*** *** *** *

36 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 460.	3.92		108.	27.	26.	26.
		(INCHES)	1.260	1.261	1.261	1.261
		(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 444.	3.92		104.	26.	25.	25.
		(INCHES)	1.214	1.215	1.215	1.215
		(AC-FT)	52.	52.	52.	52.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 435.	3.92		102.	26.	25.	25.
		(INCHES)	1.190	1.192	1.192	1.192
		(AC-FT)	51.	51.	51.	51.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 428.	3.92	100.	25.	24.	24.
	(INCHES)	1.167	1.168	1.168	1.168
	(AC-FT)	50.	50.	50.	50.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 420.	3.92	98.	25.	24.	24.
	(INCHES)	1.144	1.146	1.146	1.146
	(AC-FT)	49.	49.	49.	49.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 404.	3.92	95.	24.	23.	23.
	(INCHES)	1.099	1.100	1.100	1.100
	(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .80 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 389.	3.92		91.	23.	22.	22.
		(INCHES)	1.056	1.057	1.057	1.057
		(AC-FT)	45.	45.	45.	45.

CUMULATIVE AREA = .80 SQ MI

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UNIT HYDROGRAPH
19 END-OF-PERIOD ORDINATES

320.	1039.	1924.	2187.	1949.	1468.	917.	605.	413.	272.
180.	118.	80.	53.	35.	24.	17.	10.	5.	

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.19, TOTAL EXCESS = 1.10

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1086.	3.75		177.	44.	43.	43.
			(INCHES)	1.097	1.097	1.097	1.097
			(AC-FT)	88.	88.	88.	88.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.19, TOTAL EXCESS = 1.10

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1086.	3.75		177.	44.	43.	43.
			(INCHES)	1.097	1.097	1.097	1.097
			(AC-FT)	88.	88.	88.	88.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.17, TOTAL EXCESS = 1.05

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1042.	3.75		170.	42.	41.	41.
			(INCHES)	1.054	1.054	1.054	1.054
			(AC-FT)	84.	84.	84.	84.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 2.16, TOTAL EXCESS = 1.03

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1020.	3.75		166.	42.	40.	40.
			(INCHES)	1.032	1.032	1.032	1.032
			(AC-FT)	83.	83.	83.	83.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 3.16, TOTAL LOSS = 2.15, TOTAL EXCESS = 1.01

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	998.	3.75		163.	41.	39.	39.
			(INCHES)	1.010	1.010	1.010	1.010
			(AC-FT)	81.	81.	81.	81.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 2.14, TOTAL EXCESS = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	976.	3.75		160.	40.	38.	38.

	(INCHES)	.989	.989	.989	.989
	(AC-FT)	79.	79.	79.	79.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 2.11, TOTAL EXCESS = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 933.	3.75	153.	38.	37.	37.
	(INCHES)	.946	.946	.946	.946
	(AC-FT)	76.	76.	76.	76.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.99, TOTAL LOSS = 2.09, TOTAL EXCESS = .90

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 890.	3.75	146.	36.	35.	35.
	(INCHES)	.904	.904	.904	.904
	(AC-FT)	72.	72.	72.	72.

CUMULATIVE AREA = 1.50 SQ MI

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DESIGN POINT 20

DT	DIVERSION ISTAD	DIV_H1	DIVERSION HYDROGRAPH IDENTIFICATION			
DI	INFLOW	.00	10.00	100.00	1000.00	10000.00
DQ	DIVERTED FLOW	.00	5.00	50.00	500.00	5000.00

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*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	543.	3.75		89.	22.	21.	21.
			(INCHES)	.549	.549	.549	.549
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	543.	3.75		89.	22.	21.	21.
			(INCHES)	.549	.549	.549	.549
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				

+							
	521.	3.75		85.	21.	20.	20.
			(INCHES)	.527	.527	.527	.527
			(AC-FT)	42.	42.	42.	42.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 521.	3.75		85.	21.	20.	20.
		(INCHES)	.527	.527	.527	.527
		(AC-FT)	42.	42.	42.	42.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 510.	3.75		83.	21.	20.	20.
		(INCHES)	.516	.516	.516	.516
		(AC-FT)	41.	41.	41.	41.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 510.	3.75		83.	21.	20.	20.
		(INCHES)	.516	.516	.516	.516
		(AC-FT)	41.	41.	41.	41.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	499.	3.75		81.	20.	20.	20.
			(INCHES)	.505	.505	.505	.505
			(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	499.	3.75		81.	20.	20.	20.
			(INCHES)	.505	.505	.505	.505
			(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	488.	3.75		80.	20.	19.	19.
			(INCHES)	.494	.494	.494	.494
			(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 488.	3.75		80.	20.	19.	19.
		(INCHES)	.494	.494	.494	.494
		(AC-FT)	40.	40.	40.	40.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 467.	3.75		76.	19.	18.	18.
		(INCHES)	.473	.473	.473	.473
		(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 467.	3.75		76.	19.	18.	18.
		(INCHES)	.473	.473	.473	.473
		(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_H1
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 445.	3.75		73.	18.	18.	18.
		(INCHES)	.452	.452	.452	.452
		(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H1_REM
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 445.	3.75		73.	18.	18.	18.
		(INCHES)	.452	.452	.452	.452
		(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = 1.50 SQ MI

*** *** *** *

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	1.04	1.42	1.73	933.33	537.33	227.55	.55	9.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4389E+02 EXCESS= .0000E+00 OUTFLOW= .4392E+02 BASIN STORAGE= .1434E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	532.99	230.00	.55
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	533.	3.83		89.	22.	21.	21.
			(INCHES)	.549	.549	.549	.549
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = 1.50 SQ MI

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	1.04	1.42	1.69	933.33	516.00	229.23	.53	9.36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4214E+02 EXCESS= .0000E+00 OUTFLOW= .4218E+02 BASIN STORAGE= .1266E-04 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.04	1.42	5.00	511.83	230.00	.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9210E+02 EXCESS= .0000E+00 OUTFLOW= .9211E+02 BASIN STORAGE= .3897E-04 PERCENT ERROR= ..

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	920.13	230.00	.75
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	920.	3.83	186.	46.	45.	45.
			(INCHES) .751	.751	.751	.751
			(AC-FT) 92.	92.	92.	92.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.55	366.67	909.79	231.20	.74	13.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9026E+02 EXCESS= .0000E+00 OUTFLOW= .9027E+02 BASIN STORAGE= .3788E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	901.30	230.00	.74
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				

		(CFS)				
+	901.	3.83	182.	46.	44.	44.
		(INCHES)	.736	.736	.736	.736
		(AC-FT)	90.	90.	90.	90.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.57	366.67	891.08	231.31	.72	13.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8841E+02 EXCESS= .0000E+00 OUTFLOW= .8842E+02 BASIN STORAGE= .3919E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00		882.85	230.00	.72

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	883.	3.83	178.	45.	43.	43.
		(INCHES)	.721	.721	.721	.721
		(AC-FT)	88.	88.	88.	88.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.53	366.67	854.08	231.29	.69	13.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8481E+02 EXCESS= .0000E+00 OUTFLOW= .8482E+02 BASIN STORAGE= .3921E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	845.40	230.00	.69
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	845.	3.83	171.	43.	41.	41.
			(INCHES) .692	.692	.692	.692
			(AC-FT) 85.	85.	85.	85.

CUMULATIVE AREA = 2.30 SQ MI

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	1.45	1.42	.50	366.67	819.39	230.94	.66	13.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8126E+02 EXCESS= .0000E+00 OUTFLOW= .8128E+02 BASIN STORAGE= .3973E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.45	1.42	5.00	809.50	230.00	.66
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H7
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	809.	3.83	164.	41.	40.	40.

(INCHES)	.663	.663	.663	.663
(AC-FT)	81.	81.	81.	81.

CUMULATIVE AREA = 2.30 SQ MI

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*            *
53 KK   *   H2   *      RUNOFF FROM BASIN H2
*            *
**************
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SUBBASIN RUNOFF DATA

54 BA SUBBASIN CHARACTERISTICS

TAREA .70 SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM 3.29 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

55 LS SCS LOSS RATE

STRTL .33 INITIAL ABSTRACTION
CRVNBR 86.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

56 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .32 LAG

***

UNIT HYDROGRAPH
21 END-OF-PERIOD ORDINATES

119.	381.	753.	927.	896.	742.	511.	340.	236.	164.
112.	77.	52.	36.	25.	17.	12.	9.	6.	4.
2.									

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.91

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	830.	3.75		144.	36.	35.	35.
			(INCHES)	1.912	1.914	1.914	1.914
			(AC-FT)	71.	71.	71.	71.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.38, TOTAL EXCESS = 1.91

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	830.	3.75		144.	36.	35.	35.
			(INCHES)	1.912	1.914	1.914	1.914
			(AC-FT)	71.	71.	71.	71.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.37, TOTAL EXCESS = 1.86

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	806.	3.75		140.	35.	34.	34.
			(INCHES)	1.854	1.856	1.856	1.856
			(AC-FT)	69.	69.	69.	69.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2

FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.36, TOTAL EXCESS = 1.83

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	794.	3.75		137.	34.	33.	33.
			(INCHES)	1.826	1.828	1.828	1.828
			(AC-FT)	68.	68.	68.	68.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 3.16, TOTAL LOSS = 1.36, TOTAL EXCESS = 1.80

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	782.	3.75		135.	34.	33.	33.
			(INCHES)	1.797	1.799	1.799	1.799
			(AC-FT)	67.	67.	67.	67.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.35, TOTAL EXCESS = 1.77

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	770.	3.75		133.	33.	32.	32.
			(INCHES)	1.769	1.771	1.771	1.771
			(AC-FT)	66.	66.	66.	66.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.35, TOTAL EXCESS = 1.71

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	746.	3.75		129.	32.	31.	31.
			(INCHES)	1.712	1.714	1.714	1.714
			(AC-FT)	64.	64.	64.	64.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H2
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.99, TOTAL LOSS = 1.34, TOTAL EXCESS = 1.66

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	723.	3.75		125.	31.	30.	30.
			(INCHES)	1.656	1.657	1.657	1.657
			(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *

CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	20.00	BOTTOM WIDTH OR DIAMETER
Z	6.00	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	1.74	1.42	2.80	2500.00	827.55	230.73	1.92	15.41

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7144E+02 EXCESS= .0000E+00 OUTFLOW= .7162E+02 BASIN STORAGE= .8377E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	822.37	230.00	1.92

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 822.	3.83		144.	36.	35.	35.
		(INCHES)	1.915	1.920	1.920	1.920
		(AC-FT)	72.	72.	72.	72.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.77	2500.00	796.27	231.75	1.86	15.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6930E+02 EXCESS= .0000E+00 OUTFLOW= .6948E+02 BASIN STORAGE= .7861E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	793.99	230.00	1.86
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 794.	3.83	140.	35.	34.	34.
	(INCHES)	1.858	1.862	1.862	1.862
	(AC-FT)	69.	70.	70.	70.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.88	2500.00	789.09	230.33	1.83	15.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6823E+02 EXCESS= .0000E+00 OUTFLOW= .6837E+02 BASIN STORAGE= .7468E-04 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	786.63	230.00	1.83
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 787.	3.83	138.	34.	33.	33.

(INCHES)	1.828	1.832	1.832	1.832
(AC-FT)	68.	68.	68.	68.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.88	2500.00	776.46	231.29	1.80	15.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6716E+02 EXCESS= .0000E+00 OUTFLOW= .6729E+02 BASIN STORAGE= .9254E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	770.57	230.00	1.80
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 771.	3.83		136.	34.	33.	33.
		(INCHES)	1.800	1.803	1.803	1.803
		(AC-FT)	67.	67.	67.	67.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.81	2500.00	763.31	231.50	1.77	15.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6610E+02 EXCESS= .0000E+00 OUTFLOW= .6622E+02 BASIN STORAGE= .8703E-04 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	758.38	230.00	1.77
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	758.	3.83		133.	33.	32.	32.
			(INCHES)	1.771	1.774	1.774	1.774
			(AC-FT)	66.	66.	66.	66.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.91	2500.00	744.59	230.85	1.72	14.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6398E+02 EXCESS= .0000E+00 OUTFLOW= .6407E+02 BASIN STORAGE= .7967E-04 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	738.58	230.00	1.72
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	739.	3.83		129.	32.	31.	31.
			(INCHES)	1.714	1.717	1.717	1.717
			(AC-FT)	64.	64.	64.	64.

CUMULATIVE AREA = .70 SQ MI

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	1.74	1.42	2.87	2500.00	719.31	230.40	1.66	14.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6187E+02 EXCESS= .0000E+00 OUTFLOW= .6203E+02 BASIN STORAGE= .1181E-03 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.74	1.42	5.00	716.17	230.00	1.66
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H2
FOR PLAN 1, RATIO = .91

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
716.	3.83		125.	31.	30.	30.
		(INCHES)	1.660	1.662	1.662	1.662
		(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = .70 SQ MI

*** *** *** *

TAREA .62 SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM 3.29 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

61 LS SCS LOSS RATE

STRTL .44 INITIAL ABSTRACTION
CRVNBR 82.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

62 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .75 LAG

***

UNIT HYDROGRAPH
47 END-OF-PERIOD ORDINATES

13.	41.	79.	130.	197.	269.	326.	362.	377.	377.
362.	336.	305.	268.	222.	180.	151.	126.	106.	92.
77.	65.	54.	46.	39.	33.	27.	23.	19.	16.
14.	12.	10.	8.	7.	6.	5.	4.	4.	3.
3.	2.	2.	1.	1.	1.	0.			

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.68, TOTAL EXCESS = 1.61

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	382.	4.25	107.	27.	26.	26.
		(INCHES)	1.608	1.611	1.611	1.611
		(AC-FT)	53.	53.	53.	53.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.68, TOTAL EXCESS = 1.61

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	382.	4.25		107.	27.	26.	26.
			(INCHES)	1.608	1.611	1.611	1.611
			(AC-FT)	53.	53.	53.	53.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.67, TOTAL EXCESS = 1.56

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	369.	4.25		104.	26.	25.	25.
			(INCHES)	1.555	1.558	1.558	1.558
			(AC-FT)	51.	52.	52.	52.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.66, TOTAL EXCESS = 1.53

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	363.	4.25		102.	26.	25.	25.
			(INCHES)	1.528	1.531	1.531	1.531
			(AC-FT)	51.	51.	51.	51.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4

FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 3.16, TOTAL LOSS = 1.65, TOTAL EXCESS = 1.50

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	357.	4.25		100.	25.	24.	24.
			(INCHES)	1.502	1.505	1.505	1.505
			(AC-FT)	50.	50.	50.	50.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.65, TOTAL EXCESS = 1.48

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	351.	4.25		98.	25.	24.	24.
			(INCHES)	1.476	1.478	1.478	1.478
			(AC-FT)	49.	49.	49.	49.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.63, TOTAL EXCESS = 1.43

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	339.	4.25		95.	24.	23.	23.
			(INCHES)	1.424	1.426	1.426	1.426
			(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H4
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.99, TOTAL LOSS = 1.62, TOTAL EXCESS = 1.37

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	326.	4.25		91.	23.	22.	22.
			(INCHES)	1.372	1.374	1.374	1.374
			(AC-FT)	45.	45.	45.	45.

CUMULATIVE AREA = .62 SQ MI

*** *** *** *

FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1059.	3.92		243.	61.	59.	59.
		(INCHES)	1.714	1.719	1.719	1.719
		(AC-FT)	121.	121.	121.	121.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1043.	3.92		239.	60.	58.	58.
		(INCHES)	1.686	1.691	1.691	1.691
		(AC-FT)	119.	119.	119.	119.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1025.	3.92		236.	59.	57.	57.
		(INCHES)	1.659	1.663	1.663	1.663
		(AC-FT)	117.	117.	117.	117.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	1009.	3.92		232.	58.	56.	56.
			(INCHES)	1.632	1.635	1.635	1.635
			(AC-FT)	115.	115.	115.	115.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .93

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	977.	3.92		224.	56.	54.	54.
			(INCHES)	1.577	1.581	1.581	1.581
			(AC-FT)	111.	111.	111.	111.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB4
FOR PLAN 1, RATIO = .91

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	947.	3.92		216.	54.	52.	52.
			(INCHES)	1.524	1.527	1.527	1.527
			(AC-FT)	107.	107.	107.	107.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *

DT DIVERSION
ISTAD DIV_C4 DIVERSION HYDROGRAPH IDENTIFICATION

DI INFLOW .00 10.00 100.00 1000.00 10000.00

DQ DIVERTED FLOW .00 5.00 50.00 500.00 5000.00

***

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	545.	3.92		126.	31.	30.	30.
			(INCHES)	.885	.887	.887	.887
			(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	545.	3.92		126.	31.	30.	30.
			(INCHES)	.885	.887	.887	.887
			(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	529.	3.92		122.	31.	29.	29.

		6-HR	24-HR	72-HR	24.92-HR
	(INCHES)	.857	.859	.859	.859
	(AC-FT)	60.	61.	61.	61.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 529.	3.92	122.	31.	29.	29.
	(INCHES)	.857	.859	.859	.859
	(AC-FT)	60.	61.	61.	61.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 521.	3.92	120.	30.	29.	29.
	(INCHES)	.843	.845	.845	.845
	(AC-FT)	59.	60.	60.	60.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 521.	3.92	120.	30.	29.	29.
	(INCHES)	.843	.845	.845	.845
	(AC-FT)	59.	60.	60.	60.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 513.	3.92		118.	30.	28.	28.
		(INCHES)	.829	.832	.832	.832
		(AC-FT)	58.	59.	59.	59.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 513.	3.92		118.	30.	28.	28.
		(INCHES)	.829	.832	.832	.832
		(AC-FT)	58.	59.	59.	59.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 505.	3.92		116.	29.	28.	28.
		(INCHES)	.816	.818	.818	.818
		(AC-FT)	57.	58.	58.	58.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 505.	3.92	116.	29.	28.	28.
	(INCHES)	.816	.818	.818	.818
	(AC-FT)	57.	58.	58.	58.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 488.	3.92	112.	28.	27.	27.
	(INCHES)	.789	.790	.790	.790
	(AC-FT)	56.	56.	56.	56.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 488.	3.92	112.	28.	27.	27.
	(INCHES)	.789	.790	.790	.790
	(AC-FT)	56.	56.	56.	56.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *** ***

DIVERSION HYDROGRAPH DIV_C4
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW

			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 473.	3.92		108.	27.	26.	26.
		(INCHES)	.762	.763	.763	.763
		(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** ***

HYDROGRAPH AT STATION C4_REM
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 473.	3.92		108.	27.	26.	26.
		(INCHES)	.762	.763	.763	.763
		(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *

(DT SHOWN IS A MINIMUM)

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	1.42	1.42	1.53	1000.00	543.43	237.14	.89	11.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6246E+02 EXCESS= .0000E+00 OUTFLOW= .6249E+02 BASIN STORAGE= .6651E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	540.76	235.00	.89
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 541.	3.92		126.	31.	30.	30.
		(INCHES)	.884	.887	.887	.887
		(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.55	1000.00	527.99	237.72	.86	11.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6051E+02 EXCESS= .0000E+00 OUTFLOW= .6053E+02 BASIN STORAGE= .7624E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	523.34	235.00	.86
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 523.	3.92		122.	31.	29.	29.
		(INCHES)	.857	.859	.859	.859
		(AC-FT)	60.	60.	60.	60.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.57	1000.00	519.30	236.88	.85	11.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5952E+02 EXCESS= .0000E+00 OUTFLOW= .5954E+02 BASIN STORAGE= .6995E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	516.48	235.00	.85
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 516.	3.92		120.	30.	29.	29.
		(INCHES)	.843	.845	.845	.845
		(AC-FT)	59.	60.	60.	60.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.47	1000.00	511.74	237.63	.83	11.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5854E+02 EXCESS= .0000E+00 OUTFLOW= .5857E+02 BASIN STORAGE= .6179E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00		506.81	235.00	.83
***	***	***	***		***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .96

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
			(CFS)			
+	507.	3.92	118.	30.	28.	28.
			(INCHES) .829	.831	.831	.831
			(AC-FT) 58.	59.	59.	59.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.48	1000.00	503.81	237.59	.82	11.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5756E+02 EXCESS= .0000E+00 OUTFLOW= .5759E+02 BASIN STORAGE= .6914E-04 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00		498.69	235.00	.82
***	***	***	***		***		

HYDROGRAPH AT STATION RT_H4

FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	499.	3.92		116.	29.	28.	28.
			(INCHES)	.816	.818	.818	.818
			(AC-FT)	57.	58.	58.	58.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.57	1000.00	486.65	238.40	.79	11.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5563E+02 EXCESS= .0000E+00 OUTFLOW= .5565E+02 BASIN STORAGE= .6805E-04 PERCENT ERROR=

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	483.49	235.00	.79
***	***	***	***	***		

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	483.	3.92		112.	28.	27.	27.
			(INCHES)	.788	.790	.790	.790
			(AC-FT)	55.	56.	56.	56.

CUMULATIVE AREA = 1.32 SQ MI

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	1.42	1.42	1.57	1000.00	471.98	237.60	.76	11.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5374E+02 EXCESS= .0000E+00 OUTFLOW= .5377E+02 BASIN STORAGE= .7204E-04 PERCENT ERROR= -

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.42	1.42	5.00	468.02	235.00	.76

*** *** *** *** ***

HYDROGRAPH AT STATION RT_H4
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	468.	3.92	108.	27.	26.	26.
		(INCHES)	.762	.763	.763	.763
		(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = 1.32 SQ MI

*** *** *** *

.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

74 LS SCS LOSS RATE

STRTL	.78	INITIAL ABSTRACTION
CRVNBR	72.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

75 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.54	LAG

***

UNIT HYDROGRAPH
34 END-OF-PERIOD ORDINATES

7.	21.	42.	71.	97.	112.	116.	112.	101.	87.
69.	52.	41.	32.	26.	21.	16.	13.	10.	8.
6.	5.	4.	3.	3.	2.	2.	1.	1.	1.
1.	0.	0.	0.						

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.30, TOTAL EXCESS = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	64.	4.00		15.	4.	4.	4.
			(INCHES)	.986	.986	.986	.986
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.30, TOTAL EXCESS = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	64.	4.00		15.	4.	4.	4.
			(INCHES)	.986	.986	.986	.986
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.28, TOTAL EXCESS = .94

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	62.	4.00		14.	4.	3.	3.
			(INCHES)	.945	.945	.945	.945
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 2.27, TOTAL EXCESS = .92

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	60.	4.00		14.	3.	3.	3.
			(INCHES)	.924	.924	.924	.924
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .96

TOTAL RAINFALL = 3.16, TOTAL LOSS = 2.25, TOTAL EXCESS = .90

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	59.	4.00		14.	3.	3.	3.
			(INCHES)	.904	.904	.904	.904

		(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 2.24, TOTAL EXCESS = .88

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 57.	4.00		13.	3.	3.	3.
		(INCHES)	.884	.884	.884	.884
		(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 2.22, TOTAL EXCESS = .84

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 55.	4.08		13.	3.	3.	3.
		(INCHES)	.844	.844	.844	.844
		(AC-FT)	6.	6.	6.	6.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION H6
FOR PLAN 1, RATIO = .91

TOTAL RAINFALL = 2.99, TOTAL LOSS = 2.19, TOTAL EXCESS = .80

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				

+	52.	4.08		12.	3.	3.	3.
			(INCHES)	.804	.804	.804	.804
			(AC-FT)	6.	6.	6.	6.

CUMULATIVE AREA = .14 SQ MI

*** *** *** *

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 574.	3.92		134.	33.	32.	32.
		(INCHES)	.851	.853	.853	.853
		(AC-FT)	66.	66.	66.	66.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 563.	4.00		131.	33.	32.	32.
		(INCHES)	.836	.838	.838	.838
		(AC-FT)	65.	65.	65.	65.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 554.	4.00		129.	32.	31.	31.
		(INCHES)	.822	.824	.824	.824
		(AC-FT)	64.	64.	64.	64.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 535.	4.00		125.	31.	30.	30.
		(INCHES)	.794	.795	.795	.795
		(AC-FT)	62.	62.	62.	62.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB5
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 518.	4.00		120.	30.	29.	29.
		(INCHES)	.766	.767	.767	.767
		(AC-FT)	60.	60.	60.	60.

CUMULATIVE AREA = 1.46 SQ MI

*** *** *** *

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1561.	3.92		337.	85.	81.	81.
		(INCHES)	.834	.836	.836	.836
		(AC-FT)	167.	168.	168.	168.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1505.	3.92		325.	81.	78.	78.
		(INCHES)	.805	.806	.806	.806
		(AC-FT)	161.	162.	162.	162.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1479.	3.92		319.	80.	77.	77.
		(INCHES)	.790	.791	.791	.791
		(AC-FT)	158.	159.	159.	159.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				

				MAXIMUM AVERAGE FLOW			
	PEAK FLOW	TIME		6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1451.	3.92		313.	78.	76.	76.
			(INCHES)	.775	.776	.776	.776
			(AC-FT)	155.	156.	156.	156.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .95

				MAXIMUM AVERAGE FLOW			
	PEAK FLOW	TIME		6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1424.	3.92		307.	77.	74.	74.
			(INCHES)	.760	.761	.761	.761
			(AC-FT)	152.	153.	153.	153.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .93

				MAXIMUM AVERAGE FLOW			
	PEAK FLOW	TIME		6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1371.	3.92		296.	74.	71.	71.
			(INCHES)	.731	.732	.732	.732
			(AC-FT)	147.	147.	147.	147.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB6
FOR PLAN 1, RATIO = .91

				MAXIMUM AVERAGE FLOW			
	PEAK FLOW	TIME		6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1319.	3.92		284.	71.	69.	69.
			(INCHES)	.703	.704	.704	.704
			(AC-FT)	141.	141.	141.	141.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 521.	3.92		120.	30.	29.	29.
		(INCHES)	.296	.297	.297	.297
		(AC-FT)	59.	60.	60.	60.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .96

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 513.	3.92		118.	30.	28.	28.
		(INCHES)	.291	.292	.292	.292
		(AC-FT)	58.	59.	59.	59.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 505.	3.92		116.	29.	28.	28.
		(INCHES)	.286	.287	.287	.287
		(AC-FT)	57.	58.	58.	58.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	488.	3.92		112.	28.	27.	27.
			(INCHES)	.277	.277	.277	.277
			(AC-FT)	56.	56.	56.	56.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION GET_C4
FOR PLAN 1, RATIO = .91

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	473.	3.92		108.	27.	26.	26.
			(INCHES)	.268	.268	.268	.268
			(AC-FT)	54.	54.	54.	54.

CUMULATIVE AREA = .00 SQ MI

*** *** *** *

+	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	2106.	3.92	463.	116.	112.	112.
		(INCHES)	1.145	1.147	1.147	1.147
		(AC-FT)	230.	230.	230.	230.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .98

+	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	2035.	3.92	447.	112.	108.	108.
		(INCHES)	1.105	1.108	1.108	1.108
		(AC-FT)	222.	222.	222.	222.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .97

+	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	2000.	3.92	439.	110.	106.	106.
		(INCHES)	1.085	1.088	1.088	1.088
		(AC-FT)	218.	218.	218.	218.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .96

+	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR (CFS)	24-HR	72-HR	24.92-HR
+	1963.	3.92	431.	108.	104.	104.
		(INCHES)	1.066	1.068	1.068	1.068

		(AC-FT)	214.	214.	214.	214.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1928.	3.92		423.	106.	102.	102.
		(INCHES)	1.046	1.048	1.048	1.048
		(AC-FT)	210.	210.	210.	210.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1860.	3.92		408.	102.	98.	98.
		(INCHES)	1.008	1.010	1.010	1.010
		(AC-FT)	202.	202.	202.	202.

CUMULATIVE AREA = 3.76 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB7
FOR PLAN 1, RATIO = .91

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1793.	3.92		392.	98.	95.	95.
		(INCHES)	.970	.972	.972	.972
		(AC-FT)	195.	195.	195.	195.

CUMULATIVE AREA = 3.76 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	RATIO 7
					1.00	.98	.97	.96	.95	.93	.91
HYDROGRAPH AT											
+	H3	.20	1	FLOW	263.	255.	251.	246.	242.	234.	226.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO											
+	RT_H3	.20	1	FLOW	261.	253.	249.	245.	241.	233.	226.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	H5	.38	1	FLOW	151.	144.	141.	138.	135.	128.	122.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT											
+	COMB1	.58	1	FLOW	337.	326.	319.	314.	308.	297.	286.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RT_H5	.58	1	FLOW	337.	326.	319.	313.	308.	296.	285.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	H7	.22	1	FLOW	133.	128.	126.	123.	121.	116.	111.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT											
+	COMB2	.80	1	FLOW	460.	444.	435.	428.	420.	404.	389.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	H1	1.50	1	FLOW	1086.	1042.	1020.	998.	976.	933.	890.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO											
+	DIV_H1	1.50	1	FLOW	543.	521.	510.	499.	488.	467.	445.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT											
+	H1_REM	1.50	1	FLOW	543.	521.	510.	499.	488.	467.	445.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											

+	RT_H1	1.50	1	FLOW	533.	512.	501.	491.	480.	459.	439.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT											
+	COMB3	2.30	1	FLOW	987.	950.	930.	912.	893.	856.	820.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO											
+	RT_H7	2.30	1	FLOW	977.	940.	920.	901.	883.	845.	809.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	H2	.70	1	FLOW	830.	806.	794.	782.	770.	746.	723.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO											
+	RT_H2	.70	1	FLOW	822.	794.	787.	771.	758.	739.	716.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	H4	.62	1	FLOW	382.	369.	363.	357.	351.	339.	326.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT											
+	COMB4	1.32	1	FLOW	1090.	1059.	1043.	1025.	1009.	977.	947.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO											
+	DIV_C4	1.32	1	FLOW	545.	529.	521.	513.	505.	488.	473.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	C4_REM	1.32	1	FLOW	545.	529.	521.	513.	505.	488.	473.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO											
+	RT_H4	1.32	1	FLOW	541.	523.	516.	507.	499.	483.	468.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT											
+	H6	.14	1	FLOW	64.	62.	60.	59.	57.	55.	52.
				TIME	4.00	4.00	4.00	4.00	4.00	4.08	4.08
2 COMBINED AT											
+	COMB5	1.46	1	FLOW	602.	582.	574.	563.	554.	535.	518.
				TIME	3.92	4.00	3.92	4.00	4.00	4.00	4.00
2 COMBINED AT											
+	COMB6	3.76	1	FLOW	1561.	1505.	1479.	1451.	1424.	1371.	1319.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

HYDROGRAPH AT

+		GET_C4	.00	1	FLOW	545.	529.	521.	513.	505.	488.	473.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

2 COMBINED AT

+		COMB7	3.76	1	FLOW	2106.	2035.	2000.	1963.	1928.	1860.	1793.
					TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92

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= 1.00									
RT_H3	MANE	3.36	262.33	221.69	1.77	5.00	260.89	225.00	1.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1875E+02 EXCESS= .0000E+00 OUTFLOW= .1886E+02 BASIN STORAGE= .4607E-04 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .98									
RT_H3	MANE	3.33	254.25	222.87	1.71	5.00	253.44	225.00	1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1816E+02 EXCESS= .0000E+00 OUTFLOW= .1826E+02 BASIN STORAGE= .5927E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .97									
RT_H3	MANE	3.31	250.01	223.76	1.68	5.00	248.75	225.00	1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1787E+02 EXCESS= .0000E+00 OUTFLOW= .1795E+02 BASIN STORAGE= .4152E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .96									
RT_H3	MANE	3.28	246.01	224.59	1.66	5.00	244.90	225.00	1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1757E+02 EXCESS= .0000E+00 OUTFLOW= .1767E+02 BASIN STORAGE= .5086E-04 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .95									
RT_H3	MANE	3.42	242.30	222.27	1.63	5.00	241.29	225.00	1.63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1728E+02 EXCESS= .0000E+00 OUTFLOW= .1738E+02 BASIN STORAGE= .5259E-04 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .93

RT_H3 MANE	3.48	234.29	222.04	1.57	5.00	233.32	225.00	1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1670E+02 EXCESS= .0000E+00 OUTFLOW= .1679E+02 BASIN STORAGE= .3964E-04 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .91

RT_H3 MANE	3.46	226.27	223.15	1.52	5.00	225.91	225.00	1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1612E+02 EXCESS= .0000E+00 OUTFLOW= .1625E+02 BASIN STORAGE= .5251E-04 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= 1.00

RT_H5 MANE	1.93	337.36	229.07	1.26	5.00	337.28	230.00	1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3883E+02 EXCESS= .0000E+00 OUTFLOW= .3884E+02 BASIN STORAGE= .7224E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_H5 MANE	1.84	325.91	230.47	1.21	5.00	325.83	230.00	1.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3742E+02 EXCESS= .0000E+00 OUTFLOW= .3742E+02 BASIN STORAGE= .8472E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .97

RT_H5 MANE	1.94	319.33	231.63	1.19	5.00	319.29	230.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3670E+02 EXCESS= .0000E+00 OUTFLOW= .3672E+02 BASIN STORAGE= .7771E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .96

RT_H5 MANE	1.87	313.71	231.96	1.16	5.00	313.35	230.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3599E+02 EXCESS= .0000E+00 OUTFLOW= .3599E+02 BASIN STORAGE= .7383E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_H5 MANE	1.86	308.03	230.99	1.14	5.00	307.95	230.00	1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3528E+02 EXCESS= .0000E+00 OUTFLOW= .3528E+02 BASIN STORAGE= .7339E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_H5 MANE	1.84	296.66	232.80	1.10	5.00	296.20	230.00	1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3387E+02 EXCESS= .0000E+00 OUTFLOW= .3389E+02 BASIN STORAGE= .8077E-04 PERCENT ERROR= .

FOR PLAN = 1 RATIO= .91

RT_H5	MANE	1.86	285.95	232.39	1.05	5.00	285.08	230.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3257E+02 EXCESS= .0000E+00 OUTFLOW= .3258E+02 BASIN STORAGE= .7176E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

RT_H1	MANE	1.73	537.33	227.55	.55	5.00	532.99	230.00	.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4389E+02 EXCESS= .0000E+00 OUTFLOW= .4392E+02 BASIN STORAGE= .1434E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .98

RT_H1	MANE	1.69	516.00	229.23	.53	5.00	511.83	230.00	.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4214E+02 EXCESS= .0000E+00 OUTFLOW= .4218E+02 BASIN STORAGE= .1266E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .97

RT_H1	MANE	1.72	506.70	227.93	.52	5.00	501.30	230.00	.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4127E+02 EXCESS= .0000E+00 OUTFLOW= .4129E+02 BASIN STORAGE= .9105E-05 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .96

RT_H1	MANE	1.80	495.45	229.07	.51	5.00	490.80	230.00	.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4041E+02 EXCESS= .0000E+00 OUTFLOW= .4044E+02 BASIN STORAGE= .1340E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .95

RT_H1	MANE	1.72	485.17	227.96	.49	5.00	480.37	230.00	.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3955E+02 EXCESS= .0000E+00 OUTFLOW= .3958E+02 BASIN STORAGE= .1167E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .93

RT_H1	MANE	1.87	463.70	228.39	.47	5.00	459.17	230.00	.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3785E+02 EXCESS= .0000E+00 OUTFLOW= .3788E+02 BASIN STORAGE= .1374E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .91

RT_H1	MANE	1.81	440.82	227.85	.45	5.00	439.02	230.00	.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3617E+02 EXCESS= .0000E+00 OUTFLOW= .3620E+02 BASIN STORAGE= .1325E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00

RT_H7	MANE	.51	984.60	231.19	.80	5.00	977.00	230.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9771E+02 EXCESS= .0000E+00 OUTFLOW= .9773E+02 BASIN STORAGE= .3806E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_H7	MANE	.45	949.00	230.85	.77	5.00	939.60	230.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9398E+02 EXCESS= .0000E+00 OUTFLOW= .9400E+02 BASIN STORAGE= .3767E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .97

RT_H7	MANE	.60	927.31	230.88	.75	5.00	920.13	230.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9210E+02 EXCESS= .0000E+00 OUTFLOW= .9211E+02 BASIN STORAGE= .3897E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .96

RT_H7	MANE	.55	909.79	231.20	.74	5.00	901.30	230.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9026E+02 EXCESS= .0000E+00 OUTFLOW= .9027E+02 BASIN STORAGE= .3788E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_H7	MANE	.57	891.08	231.31	.72	5.00	882.85	230.00	.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8841E+02 EXCESS= .0000E+00 OUTFLOW= .8842E+02 BASIN STORAGE= .3919E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_H7	MANE	.53	854.08	231.29	.69	5.00	845.40	230.00	.69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8481E+02 EXCESS= .0000E+00 OUTFLOW= .8482E+02 BASIN STORAGE= .3921E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .91

RT_H7	MANE	.50	819.39	230.94	.66	5.00	809.50	230.00	.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8126E+02 EXCESS= .0000E+00 OUTFLOW= .8128E+02 BASIN STORAGE= .3973E-04 PERCENT ERROR= .

FOR PLAN = 1 RATIO= 1.00

RT_H2	MANE	2.80	827.55	230.73	1.92	5.00	822.37	230.00	1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7144E+02 EXCESS= .0000E+00 OUTFLOW= .7162E+02 BASIN STORAGE= .8377E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .98

RT_H2	MANE	2.77	796.27	231.75	1.86	5.00	793.99	230.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6930E+02 EXCESS= .0000E+00 OUTFLOW= .6948E+02 BASIN STORAGE= .7861E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .97

RT_H2	MANE	2.88	789.09	230.33	1.83	5.00	786.63	230.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6823E+02 EXCESS= .0000E+00 OUTFLOW= .6837E+02 BASIN STORAGE= .7468E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .96

RT_H2	MANE	2.88	776.46	231.29	1.80	5.00	770.57	230.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6716E+02 EXCESS= .0000E+00 OUTFLOW= .6729E+02 BASIN STORAGE= .9254E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .95

RT_H2	MANE	2.81	763.31	231.50	1.77	5.00	758.38	230.00	1.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6610E+02 EXCESS= .0000E+00 OUTFLOW= .6622E+02 BASIN STORAGE= .8703E-04 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .93

RT_H2	MANE	2.91	744.59	230.85	1.72	5.00	738.58	230.00	1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6398E+02 EXCESS= .0000E+00 OUTFLOW= .6407E+02 BASIN STORAGE= .7967E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .91

RT_H2	MANE	2.87	719.31	230.40	1.66	5.00	716.17	230.00	1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6187E+02 EXCESS= .0000E+00 OUTFLOW= .6203E+02 BASIN STORAGE= .1181E-03 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= 1.00

RT_H4	MANE	1.53	543.43	237.14	.89	5.00	540.76	235.00	.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6246E+02 EXCESS= .0000E+00 OUTFLOW= .6249E+02 BASIN STORAGE= .6651E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_H4	MANE	1.55	527.99	237.72	.86	5.00	523.34	235.00	.86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6051E+02 EXCESS= .0000E+00 OUTFLOW= .6053E+02 BASIN STORAGE= .7624E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .97

RT_H4	MANE	1.57	519.30	236.88	.85	5.00	516.48	235.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5952E+02 EXCESS= .0000E+00 OUTFLOW= .5954E+02 BASIN STORAGE= .6995E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .96

RT_H4	MANE	1.47	511.74	237.63	.83	5.00	506.81	235.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5854E+02 EXCESS= .0000E+00 OUTFLOW= .5857E+02 BASIN STORAGE= .6179E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_H4	MANE	1.48	503.81	237.59	.82	5.00	498.69	235.00	.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5756E+02 EXCESS= .0000E+00 OUTFLOW= .5759E+02 BASIN STORAGE= .6914E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_H4	MANE	1.57	486.65	238.40	.79	5.00	483.49	235.00	.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5563E+02 EXCESS= .0000E+00 OUTFLOW= .5565E+02 BASIN STORAGE= .6805E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .91

RT_H4	MANE	1.57	471.98	237.60	.76	5.00	468.02	235.00	.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5374E+02 EXCESS= .0000E+00 OUTFLOW= .5377E+02 BASIN STORAGE= .7204E-04 PERCENT ERROR= -.1

*** NORMAL END OF HEC-1 ***

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  04/18/1995  TIME  14:15:35 *
*                                       *
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U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

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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       BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
    2         ID       100-YEAR 6-HOUR STORM
    3         IT       5              0     300
    4         IO       3
    5         JR    PREC     1.0     .99     .98     .97     .95     .93

    6         KK      X2   BASIN X2 RUNOFF
    7         BA    0.50
    8         PB    3.29
    9         PC     0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
   10         PC    13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
   11         PC    19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
   12         PC    25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
```

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 13          PC    49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
 14          PC    86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
 15          PC    98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
 16          PC    99.8    99.9   100.0
 17          LS       0      69
 18          UD     .41

 19          KK      X1   BASIN X1 RUNOFF
 20          BA    0.49
 21          LS       0      69
 22          UD    0.20

 23          KK   RT_X1   ROUTE RUNOFF FROM X1 TO X2
 24          RK    2200    .027    .035            TRAP      10       3

 25          KK   COMB1   COMBINE X1 WITH ~~100 CFS FROM~~ X2
 26          KM     COMBINATION POINT 1
 27          HC       2

 28          KK  RT_X2    ROUTE FROM DP20 TO DP30
 29          RK    3200    .005    .030            TRAP      45       2

 30          KK      X3   BASIN X3 RUNOFF
 31          BA    0.44
 32          LS       0      82
 33          UD    0.62

 34          KK      X5   BASIN X5 RUNOFF
 35          BA    0.12
 36          LS       0      84
 37          UD    0.27

 38          KK   COMB2   COMBINE X1, X2, X3, X5 RUNOFFS
 39          KM     COMBINATION POINT 2
 40          HC       3
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


 41          KK   RT_X5   ROUTE FROM DP30 TO DP40
 42          RK    1000     .01    .030            TRAP      30       3

 43          KK      X4   BASIN X4 RUNOFF
 44          BA    0.30
 45          LS       0      84
 46          UD    0.59

 47          KK      X6   BASIN X6 RUNOFF
 48          BA    0.07
 49          LS       0      65
 50          UD    0.37
```

```
          51          KK   COMB3   COMBINE ALL BASINS
          52          KM       COMBINATION POINT 3
          53          HC        3
          54          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6          X2
                 .
                 .
    19           .          X1
                 .           V
                 .           V
    23           .       RT_X1
                 .           .
                 .           .
    25       COMB1............
                 V
                 V
    28      RT_X2
                 .
                 .
    30           .          X3
                 .           .
                 .           .
    34           .           .          X5
                 .           .           .
                 .           .           .
    38       COMB2.........................
                 V
                 V
    41       RT_X5
                 .
                 .
    43           .          X4
                 .           .
                 .           .
    47           .           .          X6
                 .           .           .
                 .           .           .
    51       COMB3.........................

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
```

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*****************************************
*
*     U.S. ARMY CORPS OF ENGINEERS
*     HYDROLOGIC ENGINEERING CENTER
```

VERSION 4.0

RUN DATE 04/18/1995 TIME 14:15:35

609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 756-1104

BOULDER HIGHWAY RUNOFF ANALYSIS - EXISTING CONDITIONS (POST-PROJECT)
100-YEAR 6-HOUR STORM

4 IO OUTPUT CONTROL VARIABLES

IPRNT	3	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	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2 0	ENDING DATE
NDTIME	0055	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 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

1.00	.99	.98	.97	.95	.93

*** *** *** *

```
         *           *
6 KK     *     X2    *     BASIN X2 RUNOFF
         *           *
         *************
```

SUBBASIN RUNOFF DATA

7 BA SUBBASIN CHARACTERISTICS

TAREA	.50	SUBBASIN AREA

PRECIPITATION DATA

8 PB

STORM	3.29	BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

17 LS SCS LOSS RATE

STRTL	.90	INITIAL ABSTRACTION
CRVNBR	69.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

18 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.41	LAG

***

UNIT HYDROGRAPH
27 END-OF-PERIOD ORDINATES

48.	146.	306.	461.	530.	527.	463.	376.	267.	194.
144.	108.	79.	59.	44.	32.	24.	18.	13.	10.
7.	6.	4.	3.	2.	1.	0.			

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.46, TOTAL EXCESS = .83

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	225.	3.92		45.	11.	11.	11.
			(INCHES)	.831	.831	.831	.831
			(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.46, TOTAL EXCESS = .83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 225.	3.92		45.	11.	11.	11.
		(INCHES)	.831	.831	.831	.831
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 2.45, TOTAL EXCESS = .81

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 220.	3.92		44.	11.	11.	11.
		(INCHES)	.812	.812	.812	.812
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.43, TOTAL EXCESS = .79

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 215.	3.92		43.	11.	10.	10.
		(INCHES)	.793	.793	.793	.793
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 2.42, TOTAL EXCESS = .77

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	209.	3.92		42.	10.	10.	10.
			(INCHES)	.775	.775	.775	.775
			(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 2.39, TOTAL EXCESS = .74

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	199.	3.92		40.	10.	10.	10.
			(INCHES)	.738	.738	.738	.738
			(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X2
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 2.36, TOTAL EXCESS = .70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	188.	3.92		38.	9.	9.	9.
			(INCHES)	.702	.702	.702	.702

(AC-FT) 19. 19. 19. 19.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 308.	3.67		44.	11.	11.	11.
		(INCHES)	.831	.831	.831	.831
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.46, TOTAL EXCESS = .83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 308.	3.67		44.	11.	11.	11.
		(INCHES)	.831	.831	.831	.831
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 2.45, TOTAL EXCESS = .81

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 300.	3.67		43.	11.	10.	10.
		(INCHES)	.812	.812	.812	.812
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.43, TOTAL EXCESS = .79

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	293.	3.67		42.	10.	10.	10.
			(INCHES)	.793	.793	.793	.793
			(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 2.42, TOTAL EXCESS = .77

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	286.	3.67		41.	10.	10.	10.
			(INCHES)	.775	.775	.775	.775
			(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 2.39, TOTAL EXCESS = .74

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	271.	3.67		39.	10.	9.	9.
			(INCHES)	.738	.738	.738	.738
			(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X1

FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 2.36, TOTAL EXCESS = .70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	257.	3.67		37.	9.	9.	9.
			(INCHES)	.702	.702	.702	.702
			(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	298.61	220.00	.83
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	299.	3.67		44.	11.	11.	11.
			(INCHES)	.830	.830	.830	.830
			(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.03	733.33	298.65	221.69	.81	12.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2122E+02 EXCESS= .0000E+00 OUTFLOW= .2124E+02 BASIN STORAGE= .1077E-05 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	291.22	220.00	.81
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	291.	3.67		43.	11.	10.	10.
			(INCHES)	.812	.812	.812	.812
			(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.01	733.33	292.30	221.86	.79	12.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2073E+02 EXCESS= .0000E+00 OUTFLOW= .2075E+02 BASIN STORAGE= .1163E-05 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	283.85	220.00	.79
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 284.	3.67		42.	10.	10.	10.
		(INCHES)	.793	.793	.793	.793
		(AC-FT)	21.	21.	21.	21.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.04	733.33	284.60	222.32	.78	11.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2025E+02 EXCESS= .0000E+00 OUTFLOW= .2026E+02 BASIN STORAGE= .1071E-05 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	276.58	220.00	.77
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 277.	3.67		41.	10.	10.	10.
		(INCHES)	.774	.774	.774	.774
		(AC-FT)	20.	20.	20.	20.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.17	733.33	268.99	221.82	.74	11.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1929E+02 EXCESS= .0000E+00 OUTFLOW= .1930E+02 BASIN STORAGE= .8543E-06 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	262.07	220.00	.74
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 262.	3.67		39.	10.	9.	9.
		(INCHES)	.738	.738	.738	.738
		(AC-FT)	19.	19.	19.	19.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.20	733.33	255.52	222.59	.70	11.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1834E+02 EXCESS= .0000E+00 OUTFLOW= .1835E+02 BASIN STORAGE= .8862E-06 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	247.80	220.00	.70

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X1
FOR PLAN 1, RATIO = .93

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
248.	3.67		37.	9.	9.	9.
		(INCHES)	.702	.702	.702	.702
		(AC-FT)	18.	18.	18.	18.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	487.	3.75		88.	22.	21.	21.
			(INCHES)	.831	.831	.831	.831
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	475.	3.75		86.	22.	21.	21.
			(INCHES)	.812	.812	.812	.812
			(AC-FT)	43.	43.	43.	43.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	464.	3.75		84.	21.	20.	20.
			(INCHES)	.793	.793	.793	.793
			(AC-FT)	42.	42.	42.	42.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1

FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	452.	3.75	82.	21.	20.	20.
		(INCHES)	.775	.775	.775	.775
		(AC-FT)	41.	41.	41.	41.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	429.	3.75	79.	20.	19.	19.
		(INCHES)	.738	.738	.738	.738
		(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	406.	3.75	75.	19.	18.	18.
		(INCHES)	.702	.702	.702	.702
		(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *

28 KK * RT_X2 * ROUTE FROM DP20 TO DP30
* *
****

HYDROGRAPH ROUTING DATA

29 RK KINEMATIC WAVE STREAM ROUTING

L	3200.	CHANNEL LENGTH
S	.0050	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	45.00	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	.36	1.57	2.32	1066.67	485.03	230.39	.83	7.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4386E+02 EXCESS= .0000E+00 OUTFLOW= .4384E+02 BASIN STORAGE= .7680E-03 PERCENT ERROR= .(

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	483.53	230.00	.83

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
			(CFS)				
+	484.	3.83		88.	22.	21.	21.
			(INCHES)	.831	.831	.831	.831
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.40	1066.67	471.56	231.14	.81	7.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4286E+02 EXCESS= .0000E+00 OUTFLOW= .4286E+02 BASIN STORAGE= .5534E-03 PERCENT ERROR= .

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		469.91	230.00	.81
***	***	***	***		***		

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	470.	3.83		86.	22.	21.	21.
			(INCHES)	.811	.812	.812	.812
			(AC-FT)	43.	43.	43.	43.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.39	1066.67	462.02	229.57	.80	7.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4188E+02 EXCESS= .0000E+00 OUTFLOW= .4202E+02 BASIN STORAGE= .6452E-03 PERCENT ERROR= -.3

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		461.34	230.00	.80

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	461.	3.83		85.	21.	20.	20.
			(INCHES)	.797	.798	.798	.798
			(AC-FT)	42.	42.	42.	42.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.37	1066.67	451.13	230.08	.78	7.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4090E+02 EXCESS= .0000E+00 OUTFLOW= .4100E+02 BASIN STORAGE= .7529E-03 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	450.67	230.00	.78

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	451.	3.83		83.	21.	20.	20.
			(INCHES)	.777	.778	.778	.778
			(AC-FT)	41.	41.	41.	41.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.49	1066.67	425.45	231.58	.74	7.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3897E+02 EXCESS= .0000E+00 OUTFLOW= .3898E+02 BASIN STORAGE= .6603E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		423.73	230.00	.74
***	***	***	***	***			

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	424.	3.83		79.	20.	19.	19.
			(INCHES)	.738	.738	.738	.738
			(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	2.49	1066.67	405.10	229.88	.70	7.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3706E+02 EXCESS= .0000E+00 OUTFLOW= .3707E+02 BASIN STORAGE= .6845E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00		404.95	230.00	.70
***	***	***	***	***			

HYDROGRAPH AT STATION RT_X2
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	405.	3.83	75.	19.	18.	18.
		(INCHES)	.703	.703	.703	.703
		(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *

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UNIT HYDROGRAPH
39 END-OF-PERIOD ORDINATES

15.	47.	91.	153.	227.	283.	315.	321.	312.	286.
254.	214.	168.	134.	108.	88.	73.	60.	48.	40.
32.	26.	21.	17.	14.	12.	9.	8.	6.	5.
4.	3.	3.	2.	2.	1.	1.	1.	0.	

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.68, TOTAL EXCESS = 1.61

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	308.	4.08	76.	19.	18.	18.
		(INCHES)	1.609	1.611	1.611	1.611
		(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.68, TOTAL EXCESS = 1.61

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	308.	4.08	76.	19.	18.	18.
		(INCHES)	1.609	1.611	1.611	1.611
		(AC-FT)	38.	38.	38.	38.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 1.67, TOTAL EXCESS = 1.58

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	303.	4.08	75.	19.	18.	18.

	(INCHES)	1.583	1.584	1.584	1.584
	(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.67, TOTAL EXCESS = 1.56

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	298.	4.08		74.	18.	18.	18.
			(INCHES)	1.556	1.558	1.558	1.558
			(AC-FT)	37.	37.	37.	37.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.66, TOTAL EXCESS = 1.53

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	293.	4.08		72.	18.	17.	17.
			(INCHES)	1.530	1.531	1.531	1.531
			(AC-FT)	36.	36.	36.	36.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.65, TOTAL EXCESS = 1.48

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					

			(CFS)				
+	283.	4.08		70.	17.	17.	17.
			(INCHES)	1.477	1.478	1.478	1.478
			(AC-FT)	35.	35.	35.	35.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X3
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.63, TOTAL EXCESS = 1.43

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	273.	4.08		67.	17.	16.	16.
			(INCHES)	1.425	1.426	1.426	1.426
			(AC-FT)	33.	33.	33.	33.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *

.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

36 LS SCS LOSS RATE

STRTL	.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

37 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.27	LAG

***

UNIT HYDROGRAPH
18 END-OF-PERIOD ORDINATES

30.	100.	173.	185.	155.	103.	65.	43.	27.	18.
11.	7.	5.	3.	2.	1.	1.	0.		

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	141.	3.67		23.	6.	5.	5.
			(INCHES)	1.757	1.758	1.758	1.758
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	141.	3.67		23.	6.	5.	5.
			(INCHES)	1.757	1.758	1.758	1.758
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	139.	3.67		22.	6.	5.	5.
			(INCHES)	1.730	1.730	1.730	1.730
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	137.	3.67		22.	5.	5.	5.
			(INCHES)	1.702	1.703	1.703	1.703
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.68

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	135.	3.67		22.	5.	5.	5.
			(INCHES)	1.675	1.675	1.675	1.675
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.51, TOTAL EXCESS = 1.62

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 130.	3.67		21.	5.	5.	5.
		(INCHES)	1.620	1.620	1.620	1.620
		(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X5
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.49, TOTAL EXCESS = 1.57

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 126.	3.67		20.	5.	5.	5.
		(INCHES)	1.565	1.566	1.566	1.566
		(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	855.	3.83		187.	47.	45.	45.
			(INCHES)	1.122	1.124	1.124	1.124
			(AC-FT)	93.	93.	93.	93.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	836.	3.83		183.	46.	44.	44.
			(INCHES)	1.100	1.102	1.102	1.102
			(AC-FT)	91.	91.	91.	91.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	821.	3.83		180.	45.	43.	43.
			(INCHES)	1.082	1.083	1.083	1.083
			(AC-FT)	89.	90.	90.	90.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2

FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	804.	3.83		177.	44.	43.	43.
			(INCHES)	1.059	1.061	1.061	1.061
			(AC-FT)	88.	88.	88.	88.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	768.	3.92		169.	42.	41.	41.
			(INCHES)	1.015	1.017	1.017	1.017
			(AC-FT)	84.	84.	84.	84.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	737.	3.92		162.	41.	39.	39.
			(INCHES)	.974	.975	.975	.975
			(AC-FT)	80.	81.	81.	81.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *

41 KK * RT_X5 * ROUTE FROM DP30 TO DP40
* *
****

HYDROGRAPH ROUTING DATA

42 RK KINEMATIC WAVE STREAM ROUTING

L	1000.	CHANNEL LENGTH
S	.0100	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	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	.74	1.51	.62	333.33	855.30	231.24	1.12	12.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9292E+02 EXCESS= .0000E+00 OUTFLOW= .9294E+02 BASIN STORAGE= .1868E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	854.25	235.00	1.12

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	854.	3.92	187.	47.	45.	45.
		(INCHES)	1.123	1.125	1.125	1.125
		(AC-FT)	93.	93.	93.	93.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.62	333.33	835.57	231.72	1.10	12.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9111E+02 EXCESS= .0000E+00 OUTFLOW= .9112E+02 BASIN STORAGE= .1875E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	835.01	235.00	1.10
***	***	***	***	***		

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 835.	3.92		184.	46.	44.	44.
		(INCHES)	1.101	1.103	1.103	1.103
		(AC-FT)	91.	91.	91.	91.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.61	333.33	820.69	231.79	1.08	11.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8956E+02 EXCESS= .0000E+00 OUTFLOW= .8957E+02 BASIN STORAGE= .1833E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	819.39	235.00	1.08

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	819.	3.92		180.	45.	44.	44.
			(INCHES)	1.082	1.084	1.084	1.084
			(AC-FT)	89.	90.	90.	90.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.55	333.33	804.25	231.41	1.06	11.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8770E+02 EXCESS= .0000E+00 OUTFLOW= .8772E+02 BASIN STORAGE= .1848E-03 PERCENT ERROR= .(

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00	803.99	235.00	1.06

*** *** *** *** ***

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	804.	3.92		177.	44.	43.	43.
			(INCHES)	1.060	1.062	1.062	1.062
			(AC-FT)	88.	88.	88.	88.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.50	333.33	767.89	235.72	1.02	11.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8404E+02 EXCESS= .0000E+00 OUTFLOW= .8406E+02 BASIN STORAGE= .1887E-03 PERCENT ERROR= .

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00		767.60	235.00	1.02
***	***	***	***		***		

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 768.	3.92	169.	42.	41.	41.
		(INCHES) 1.016	1.017	1.017	1.017
		(AC-FT) 84.	84.	84.	84.

CUMULATIVE AREA = 1.55 SQ MI

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	.74	1.51	.50	333.33	737.15	235.60	.98	11.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8062E+02 EXCESS= .0000E+00 OUTFLOW= .8063E+02 BASIN STORAGE= .1928E-03 PERCENT ERROR= .0

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.74	1.51	5.00		736.84	235.00	.98
***	***	***	***		***		

HYDROGRAPH AT STATION RT_X5
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
737.	3.92		162.	41.	39.	39.
		(INCHES)	.974	.976	.976	.976
		(AC-FT)	81.	81.	81.	81.

CUMULATIVE AREA = 1.55 SQ MI

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*            *
43 KK     *  X4  *      BASIN X4 RUNOFF
*            *
**************
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SUBBASIN RUNOFF DATA

44 BA SUBBASIN CHARACTERISTICS
TAREA .30 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 3.29 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

45 LS SCS LOSS RATE
STRTL .38 INITIAL ABSTRACTION
CRVNBR 84.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

46 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .59 LAG

***

UNIT HYDROGRAPH
37 END-OF-PERIOD ORDINATES

12.	36.	70.	120.	173.	211.	228.	228.	215.	194.
167.	133.	103.	83.	67.	55.	45.	35.	29.	23.
19.	15.	12.	10.	8.	6.	5.	4.	3.	3.
2.	2.	2.	1.	1.	1.	0.			

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	234.	4.08		57.	14.	14.	14.
			(INCHES)	1.756	1.758	1.758	1.758
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	234.	4.08		57.	14.	14.	14.
			(INCHES)	1.756	1.758	1.758	1.758
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	231.	4.08		56.	14.	13.	13.

	(INCHES)	1.728	1.730	1.730	1.730
	(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.70

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 227.	4.08		55.	14.	13.	13.
		(INCHES)	1.701	1.703	1.703	1.703
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.68

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 223.	4.08		54.	14.	13.	13.
		(INCHES)	1.673	1.675	1.675	1.675
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.51, TOTAL EXCESS = 1.62

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				

			(CFS)				
+	216.	4.08		52.	13.	13.	13.
			(INCHES)	1.619	1.620	1.620	1.620
			(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X4
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.49, TOTAL EXCESS = 1.57

			MAXIMUM AVERAGE FLOW			
PEAK FLOW	TIME		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 209.	4.08		50.	13.	12.	12.
		(INCHES)	1.564	1.566	1.566	1.566
		(AC-FT)	25.	25.	25.	25.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *

.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

49 LS SCS LOSS RATE

STRTL	1.08	INITIAL ABSTRACTION
CRVNBR	65.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.37	LAG

***

UNIT HYDROGRAPH
24 END-OF-PERIOD ORDINATES

8.	26.	55.	77.	82.	76.	63.	44.	31.	22.
16.	12.	8.	6.	4.	3.	2.	2.	1.	1.
1.	0.	0.	0.						

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.65, TOTAL EXCESS = .64

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	25.	3.92		5.	1.	1.	1.
			(INCHES)	.645	.645	.645	.645
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.65, TOTAL EXCESS = .64

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	25.	3.92		5.	1.	1.	1.
			(INCHES)	.645	.645	.645	.645
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 2.63, TOTAL EXCESS = .63

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	24.	3.92		5.	1.	1.	1.
			(INCHES)	.628	.628	.628	.628
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.61, TOTAL EXCESS = .61

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	23.	3.92		5.	1.	1.	1.
			(INCHES)	.612	.612	.612	.612
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 2.60, TOTAL EXCESS = .60

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	23.	3.92		4.	1.	1.	1.
			(INCHES)	.596	.596	.596	.596
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 2.56, TOTAL EXCESS = .56

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	21.	3.92		4.	1.	1.	1.
			(INCHES)	.565	.565	.565	.565
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION X6
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 2.53, TOTAL EXCESS = .53

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	20.	3.92		4.	1.	1.	1.
			(INCHES)	.534	.534	.534	.534
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = .07 SQ MI

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*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1102.	3.92		249.	62.	60.	60.
			(INCHES)	1.204	1.206	1.206	1.206
			(AC-FT)	123.	124.	124.	124.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1078.	3.92		244.	61.	59.	59.
			(INCHES)	1.182	1.184	1.184	1.184
			(AC-FT)	121.	121.	121.	121.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1059.	3.92		240.	60.	58.	58.
			(INCHES)	1.162	1.164	1.164	1.164
			(AC-FT)	119.	119.	119.	119.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1039.	3.92	235.	59.	57.	57.
		(INCHES) 1.139	1.141	1.141	1.141
		(AC-FT) 117.	117.	117.	117.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 994.	3.92	226.	57.	54.	54.
		(INCHES) 1.093	1.095	1.095	1.095
		(AC-FT) 112.	112.	112.	112.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 955.	3.92	217.	54.	52.	52.
		(INCHES) 1.050	1.052	1.052	1.052
		(AC-FT) 108.	108.	108.	108.

CUMULATIVE AREA = 1.92 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	.99	.98	.97	.95	.93
HYDROGRAPH AT										
+	X2	.50	1	FLOW	225.	220.	215.	209.	199.	188.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X1	.49	1	FLOW	308.	300.	293.	286.	271.	257.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_X1	.49	1	FLOW	299.	291.	284.	277.	262.	248.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	COMB1	.99	1	FLOW	487.	475.	464.	452.	429.	406.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RT_X2	.99	1	FLOW	484.	470.	461.	451.	424.	405.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+	X3	.44	1	FLOW	308.	303.	298.	293.	283.	273.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	X5	.12	1	FLOW	141.	139.	137.	135.	130.	126.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	855.	836.	821.	804.	768.	737.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92
ROUTED TO										
+	RT_X5	1.55	1	FLOW	854.	835.	819.	804.	768.	737.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	X4	.30	1	FLOW	234.	231.	227.	223.	216.	209.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	X6	.07	1	FLOW	25.	24.	23.	23.	21.	20.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT										
+	COMB3	1.92	1	FLOW	1102.	1078.	1059.	1039.	994.	955.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92

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= 1.00									
RT_X1	MANE	1.01	306.61	222.21	.83	5.00	298.61	220.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2171E+02 EXCESS= .0000E+00 OUTFLOW= .2173E+02 BASIN STORAGE= .1048E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .99									
RT_X1	MANE	1.03	298.65	221.69	.81	5.00	291.22	220.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2122E+02 EXCESS= .0000E+00 OUTFLOW= .2124E+02 BASIN STORAGE= .1077E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .98									
RT_X1	MANE	1.01	292.30	221.86	.79	5.00	283.85	220.00	.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2073E+02 EXCESS= .0000E+00 OUTFLOW= .2075E+02 BASIN STORAGE= .1163E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .97									
RT_X1	MANE	1.04	284.60	222.32	.78	5.00	276.58	220.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2025E+02 EXCESS= .0000E+00 OUTFLOW= .2026E+02 BASIN STORAGE= .1071E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .95									
RT_X1	MANE	1.17	268.99	221.82	.74	5.00	262.07	220.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1929E+02 EXCESS= .0000E+00 OUTFLOW= .1930E+02 BASIN STORAGE= .8543E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .93									
RT_X1	MANE	1.20	255.52	222.59	.70	5.00	247.80	220.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1834E+02 EXCESS= .0000E+00 OUTFLOW= .1835E+02 BASIN STORAGE= .8862E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00

RT_X2	MANE	2.32	485.03	230.39	.83	5.00	483.53	230.00	.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4386E+02 EXCESS= .0000E+00 OUTFLOW= .4384E+02 BASIN STORAGE= .7680E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .99

RT_X2	MANE	2.40	471.56	231.14	.81	5.00	469.91	230.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4286E+02 EXCESS= .0000E+00 OUTFLOW= .4286E+02 BASIN STORAGE= .5534E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_X2	MANE	2.39	462.02	229.57	.80	5.00	461.34	230.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4188E+02 EXCESS= .0000E+00 OUTFLOW= .4202E+02 BASIN STORAGE= .6452E-03 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .97

RT_X2	MANE	2.37	451.13	230.08	.78	5.00	450.67	230.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4090E+02 EXCESS= .0000E+00 OUTFLOW= .4100E+02 BASIN STORAGE= .7529E-03 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .95

RT_X2	MANE	2.49	425.45	231.58	.74	5.00	423.73	230.00	.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3897E+02 EXCESS= .0000E+00 OUTFLOW= .3898E+02 BASIN STORAGE= .6603E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_X2	MANE	2.49	405.10	229.88	.70	5.00	404.95	230.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3706E+02 EXCESS= .0000E+00 OUTFLOW= .3707E+02 BASIN STORAGE= .6845E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

RT_X5	MANE	.62	855.30	231.24	1.12	5.00	854.25	235.00	1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9292E+02 EXCESS= .0000E+00 OUTFLOW= .9294E+02 BASIN STORAGE= .1868E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .99

RT_X5	MANE	.62	835.57	231.72	1.10	5.00	835.01	235.00	1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9111E+02 EXCESS= .0000E+00 OUTFLOW= .9112E+02 BASIN STORAGE= .1875E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98

RT_X5	MANE	.61	820.69	231.79	1.08	5.00	819.39	235.00	1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8956E+02 EXCESS= .0000E+00 OUTFLOW= .8957E+02 BASIN STORAGE= .1833E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .97

RT_X5	MANE	.55	804.25	231.41	1.06	5.00	803.99	235.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8770E+02 EXCESS= .0000E+00 OUTFLOW= .8772E+02 BASIN STORAGE= .1848E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

RT_X5	MANE	.50	767.89	235.72	1.02	5.00	767.60	235.00	1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8404E+02 EXCESS= .0000E+00 OUTFLOW= .8406E+02 BASIN STORAGE= .1887E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

RT_X5	MANE	.50	737.15	235.60	.98	5.00	736.84	235.00	.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8062E+02 EXCESS= .0000E+00 OUTFLOW= .8063E+02 BASIN STORAGE= .1928E-03 PERCENT ERROR= .0

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  04/18/1995  TIME  14:16:32 *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104               *
*                                       *
*****************************************
```


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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       BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
    2     ID       100-YEAR 6-HOUR STORM
    3     IT       5              0     300
    4     IO       3
    5     JR   PREC     1.0     .99     .98     .97     .95     .93

    6     KK     F2   BASIN F2 RUNOFF
    7     BA   0.50
    8     PB   3.29
    9     PC    0.0     2.0     5.7     7.0     8.7    10.8    12.4    13.0    13.0    13.0
   10     PC   13.0    13.0    13.0    13.3    14.0    14.2    14.8    15.8    17.2    18.1
   11     PC   19.0    19.7    19.9    20.0    20.1    20.4    21.4    22.9    24.1    24.9
   12     PC   25.1    25.6    27.0    27.8    28.1    28.3    29.5    32.2    35.2    40.9
```

```
 13          PC    49.9    59.0    71.0    74.4    78.1    81.2    81.9    83.5    85.1    85.6
 14          PC    86.0    86.8    87.6    88.8    91.0    92.6    93.7    95.0    97.0    97.6
 15          PC    98.2    98.5    98.7    98.9    99.0    99.3    99.3    99.4    99.5    99.8
 16          PC    99.8    99.9   100.0
 17          LS       0      85
 18          UD     .23

 19          KK      F1   BASIN F1 RUNOFF
 20          BA    0.49
 21          LS       0      75
 22          UD    0.14

 23          KK   RT_F1   ROUTE RUNOFF FROM F1 TO F2
 24          RK    2200    .027    .035            TRAP      10       3

 25          KK   COMB1   COMBINE F1 WITH 100 CFS FROM F2
 26          KM     DESIGN POINT 1
 27          HC       2

 28          KK  RT_F2    ROUTE FROM DP20 TO DP 30
 29          RK    3200    .005    .030            TRAP      45       2

 30          KK      F3   BASIN F3 RUNOFF
 31          BA    0.44
 32          LS       0      88
 33          UD    0.34

 34          KK      F5   BASIN F5 RUNOFF
 35          BA    0.12
 36          LS       0      84
 37          UD    0.27

 38          KK   COMB2   COMBINE F1, F2, F3, F5 RUNOFFS
 39          KM      DESIGN POINT 2
 40          HC       3
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 41          KK   RT_F5   ROUTE FROM DDP30 TO DP40
 42          RK    1000     .01    .030            TRAP      30       3

 43          KK      F4   BASIN F4 RUNOFF
 44          BA    0.30
 45          LS       0      85
 46          UD    0.35

 47          KK      F6   BASIN F6 RUNOFF
 48          BA    0.07
 49          LS       0      85
 50          UD    0.20
```

```
          51          KK   COMB3   COMBINE ALL BASINS
          52          KM      DESIGN POINT 3
          53          HC       3
          54          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    6           F2
                .
                .
   19           .          F1
                .           V
                .           V
   23           .       RT_F1
                .           .
                .           .
   25        COMB1.............
                V
                V
   28       RT_F2
                .
                .
   30           .          F3
                .           .
                .           .
   34           .           .          F5
                .           .           .
                .           .           .
   38        COMB2.........................
                V
                V
   41       RT_F5
                .
                .
   43           .          F4
                .           .
                .           .
   47           .           .          F6
                .           .           .
                .           .           .
   51        COMB3.........................

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *            SEPTEMBER 1990             *
 *                                       *
 *****************************************
 *                                       *
 *    U.S. ARMY CORPS OF ENGINEERS       *
 *    HYDROLOGIC ENGINEERING CENTER      *
```

```
*            VERSION 4.0              *
*                                     *
*  RUN DATE  04/18/1995  TIME  14:16:32 *
*                                     *
***************************************
```

```
*        609 SECOND STREET
*      DAVIS, CALIFORNIA 95616
*         (916) 756-1104
*
************************************
```

BOULDER HIGHWAY RUNOFF ANALYSIS - FUTURE CONDITIONS
100-YEAR 6-HOUR STORM

```
 4 IO        OUTPUT CONTROL VARIABLES
                 IPRNT          3  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         300  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE      2   0  ENDING DATE
                NDTIME        0055  ENDING TIME
                ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL     .08 HOURS
                   TOTAL TIME BASE   24.92 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
               1.00       .99       .98       .97       .95       .93
```

*** **

****

```
         *           *
6 KK     *        F2 *        BASIN F2 RUNOFF
         *           *
         **************
```

SUBBASIN RUNOFF DATA

7 BA SUBBASIN CHARACTERISTICS

TAREA	.50	SUBBASIN AREA

PRECIPITATION DATA

8 PB

STORM	3.29	BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

17 LS SCS LOSS RATE

STRTL	.35	INITIAL ABSTRACTION
CRVNBR	85.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

18 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.23	LAG

***

UNIT HYDROGRAPH
16 END-OF-PERIOD ORDINATES

176.	606.	882.	810.	568.	325.	201.	121.	74.	44.
27.	17.	10.	7.	4.	1.				

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 658.	3.67		99.	25.	24.	24.
		(INCHES)	1.834	1.835	1.835	1.835
		(AC-FT)	49.	49.	49.	49.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.83

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 658.	3.67	99.	25.	24.	24.
	(INCHES)	1.834	1.835	1.835	1.835
	(AC-FT)	49.	49.	49.	49.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.81

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 648.	3.67	97.	24.	23.	23.
	(INCHES)	1.806	1.806	1.806	1.806
	(AC-FT)	48.	48.	48.	48.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.78

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 639.	3.67	96.	24.	23.	23.
	(INCHES)	1.778	1.778	1.778	1.778
	(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.75

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	629.	3.67		94.	24.	23.	23.
			(INCHES)	1.750	1.750	1.750	1.750
			(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.43, TOTAL EXCESS = 1.69

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	610.	3.67		91.	23.	22.	22.
			(INCHES)	1.694	1.694	1.694	1.694
			(AC-FT)	45.	45.	45.	45.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F2
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.42, TOTAL EXCESS = 1.64

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	590.	3.67		88.	22.	21.	21.
			(INCHES)	1.638	1.639	1.639	1.639
			(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = .50 SQ MI

*** *** *** *

+ (CFS)	(HR)					
		(CFS)				
+ 503.	3.58		61.	15.	15.	15.
		(INCHES)	1.155	1.155	1.155	1.155
		(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 2.13, TOTAL EXCESS = 1.16

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 503.	3.58		61.	15.	15.	15.
		(INCHES)	1.155	1.155	1.155	1.155
		(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 2.12, TOTAL EXCESS = 1.13

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 494.	3.58		60.	15.	14.	14.
		(INCHES)	1.133	1.133	1.133	1.133
		(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 2.11, TOTAL EXCESS = 1.11

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	484.	3.58		59.	15.	14.	14.
			(INCHES)	1.110	1.110	1.110	1.110
			(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 2.10, TOTAL EXCESS = 1.09

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	474.	3.58		57.	14.	14.	14.
			(INCHES)	1.088	1.088	1.088	1.088
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 2.08, TOTAL EXCESS = 1.04

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	455.	3.58		55.	14.	13.	13.
			(INCHES)	1.044	1.044	1.044	1.044
			(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F1
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 2.06, TOTAL EXCESS = 1.00

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	436.	3.58	53.	13.	13.	13.
		(INCHES)	1.000	1.000	1.000	1.000
		(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *

MAIN	1.94	1.42	5.00	474.82	215.00	1.16
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 475.	3.58		61.	15.	15.	15.
		(INCHES)	1.157	1.157	1.157	1.157
		(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	.95	733.33	491.41	216.90	1.13	14.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2960E+02 EXCESS= .0000E+00 OUTFLOW= .2965E+02 BASIN STORAGE= .1040E-05 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	465.30	215.00	1.13
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 465.	3.58		60.	15.	14.	14.
		(INCHES)	1.134	1.134	1.134	1.134
		(AC-FT)	30.	30.	30.	30.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.00	733.33	475.95	217.33	1.11	13.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2902E+02 EXCESS= .0000E+00 OUTFLOW= .2905E+02 BASIN STORAGE= .9771E-06 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	455.61	215.00	1.11
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .98

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
+ 456.	3.58		59.	15.	14.	14.
		(INCHES)	1.112	1.112	1.112	1.112
		(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.04	733.33	467.95	216.83	1.09	13.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2843E+02 EXCESS= .0000E+00 OUTFLOW= .2847E+02 BASIN STORAGE= .8309E-06 PERCENT ERROR= -.1

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	446.01	215.00	1.09
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	446.	3.58	57.	14.	14.	14.
		(INCHES)	1.090	1.090	1.090	1.090
		(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	.99	733.33	450.83	216.81	1.05	13.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2728E+02 EXCESS= .0000E+00 OUTFLOW= .2732E+02 BASIN STORAGE= .1224E-05 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	427.13	215.00	1.05
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	427.	3.58	55.	14.	13.	13.
		(INCHES)	1.045	1.045	1.045	1.045
		(AC-FT)	27.	27.	27.	27.

CUMULATIVE AREA = .49 SQ MI

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	1.94	1.42	1.04	733.33	429.55	216.75	1.00	13.55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2613E+02 EXCESS= .0000E+00 OUTFLOW= .2617E+02 BASIN STORAGE= .1210E-05 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	1.94	1.42	5.00	408.22	215.00	1.00

*** *** *** *** ***

HYDROGRAPH AT STATION RT_F1
FOR PLAN 1, RATIO = .93

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
408.	3.58		53.	13.	13.	13.
		(INCHES)	1.001	1.001	1.001	1.001
		(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .49 SQ MI

*** *** *** *

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1114.	3.67		160.	40.	38.	38.
			(INCHES)	1.499	1.499	1.499	1.499
			(AC-FT)	79.	79.	79.	79.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1096.	3.67		157.	39.	38.	38.
			(INCHES)	1.473	1.474	1.474	1.474
			(AC-FT)	78.	78.	78.	78.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1078.	3.67		154.	39.	37.	37.
			(INCHES)	1.448	1.449	1.449	1.449
			(AC-FT)	76.	76.	76.	76.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1060.	3.67		151.	38.	36.	36.
			(INCHES)	1.423	1.423	1.423	1.423
			(AC-FT)	75.	75.	75.	75.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1023.	3.67		146.	37.	35.	35.
			(INCHES)	1.372	1.373	1.373	1.373
			(AC-FT)	72.	72.	72.	72.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB1
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	987.	3.67		141.	35.	34.	34.
			(INCHES)	1.323	1.323	1.323	1.323
			(AC-FT)	70.	70.	70.	70.

CUMULATIVE AREA = .99 SQ MI

*** *** *** *

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HYDROGRAPH ROUTING DATA

29 RK KINEMATIC WAVE STREAM ROUTING

L	3200.	CHANNEL LENGTH
S	.0050	SLOPE
N	.030	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	45.00	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	.36	1.57	1.81	1066.67	1107.32	222.45	1.50	10.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7916E+02 EXCESS= .0000E+00 OUTFLOW= .7934E+02 BASIN STORAGE= .5151E-03 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	1099.61	220.00	1.50

*** *** *** *** ***

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1100.	3.67		160.	40.	39.	39.
			(INCHES)	1.502	1.504	1.504	1.504
			(AC-FT)	79.	79.	79.	79.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.85	1066.67	1088.70	221.85	1.48	10.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7782E+02 EXCESS= .0000E+00 OUTFLOW= .7798E+02 BASIN STORAGE= .7369E-03 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	1080.87	220.00	1.48
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1081.	3.67		157.	39.	38.	38.
			(INCHES)	1.475	1.477	1.477	1.477
			(AC-FT)	78.	78.	78.	78.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.83	1066.67	1070.50	222.45	1.45	10.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7648E+02 EXCESS= .0000E+00 OUTFLOW= .7669E+02 BASIN STORAGE= .6729E-03 PERCENT ERROR= -.3

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	1061.89	220.00	1.45
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1062.	3.67		154.	39.	37.	37.
			(INCHES)	1.451	1.452	1.452	1.452
			(AC-FT)	77.	77.	77.	77.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.72	1066.67	1056.78	222.84	1.43	10.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7515E+02 EXCESS= .0000E+00 OUTFLOW= .7534E+02 BASIN STORAGE= .6047E-03 PERCENT ERROR= -.3

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	1042.43	220.00	1.43

*** *** *** *** ***

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .97

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1042.	3.67		152.	38.	37.	37.
			(INCHES)	1.426	1.427	1.427	1.427
			(AC-FT)	75.	75.	75.	75.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.75	1066.67	1018.52	222.53	1.38	10.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7249E+02 EXCESS= .0000E+00 OUTFLOW= .7269E+02 BASIN STORAGE= .6765E-03 PERCENT ERROR= -.

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	1004.83	220.00	1.38
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	1005.	3.67	146.	37.	35.	35.
		(INCHES)	1.375	1.376	1.376	1.376
		(AC-FT)	73.	73.	73.	73.

CUMULATIVE AREA = .99 SQ MI

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	.36	1.57	1.78	1066.67	981.21	222.43	1.33	10.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6987E+02 EXCESS= .0000E+00 OUTFLOW= .7002E+02 BASIN STORAGE= .6668E-03 PERCENT ERROR= -.2

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.36	1.57	5.00	968.29	220.00	1.33
***	***	***	***	***		

HYDROGRAPH AT STATION RT_F2
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 968.	3.67		141.	35.	34.	34.
		(INCHES)	1.324	1.325	1.325	1.325
		(AC-FT)	70.	70.	70.	70.

CUMULATIVE AREA = .99 SQ MI

*** ***

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          **************
          *            *
30 KK     *        F3  *        BASIN F3 RUNOFF
          *            *
          **************
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SUBBASIN RUNOFF DATA

31 BA SUBBASIN CHARACTERISTICS

TAREA .44 SUBBASIN AREA

PRECIPITATION DATA

8 PB STORM 3.29 BASIN TOTAL PRECIPITATION

9 PI INCREMENTAL PRECIPITATION PATTERN

2.00	3.70	1.30	1.70	2.10	1.60	.60	.00	.00	.00
.00	.00	.30	.70	.20	.60	1.00	1.40	.90	.90
.70	.20	.10	.10	.30	1.00	1.50	1.20	.80	.20
.50	1.40	.80	.30	.20	1.20	2.70	3.00	5.70	9.00
9.10	12.00	3.40	3.70	3.10	.70	1.60	1.60	.50	.40
.80	.80	1.20	2.20	1.60	1.10	1.30	2.00	.60	.60
.30	.20	.20	.10	.30	.00	.10	.10	.30	.00
.10	.10								

32 LS SCS LOSS RATE

STRTL .27 INITIAL ABSTRACTION

CRVNBR 88.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

33 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .34 LAG

***

UNIT HYDROGRAPH
22 END-OF-PERIOD ORDINATES

65.	205.	416.	542.	552.	474.	360.	238.	166.	119.
82.	58.	41.	28.	20.	14.	10.	7.	5.	4.
2.	1.								

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.21, TOTAL EXCESS = 2.08

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	544.	3.75		98.	25.	24.	24.
			(INCHES)	2.075	2.078	2.078	2.078
			(AC-FT)	49.	49.	49.	49.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.21, TOTAL EXCESS = 2.08

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	544.	3.75		98.	25.	24.	24.
			(INCHES)	2.075	2.078	2.078	2.078
			(AC-FT)	49.	49.	49.	49.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 1.21, TOTAL EXCESS = 2.05

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	537.	3.75		97.	24.	23.	23.
			(INCHES)	2.045	2.048	2.048	2.048
			(AC-FT)	48.	48.	48.	48.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.21, TOTAL EXCESS = 2.02

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	529.	3.75		95.	24.	23.	23.
			(INCHES)	2.016	2.019	2.019	2.019
			(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.20, TOTAL EXCESS = 1.99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	522.	3.75		94.	24.	23.	23.
			(INCHES)	1.986	1.989	1.989	1.989
			(AC-FT)	47.	47.	47.	47.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.20, TOTAL EXCESS = 1.93

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	507.	3.75		91.	23.	22.	22.
			(INCHES)	1.927	1.930	1.930	1.930

	(AC-FT)	45.	45.	45.	45.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F3
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.19, TOTAL EXCESS = 1.87

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 492.	3.75		88.	22.	21.	21.
		(INCHES)	1.869	1.871	1.871	1.871
		(AC-FT)	44.	44.	44.	44.

CUMULATIVE AREA = .44 SQ MI

*** *** *** *

36 LS SCS LOSS RATE

STRTL	.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

37 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.27	LAG

***

UNIT HYDROGRAPH
18 END-OF-PERIOD ORDINATES

30.	100.	173.	185.	155.	103.	65.	43.	27.	18.
11.	7.	5.	3.	2.	1.	1.	0.		

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	141.	3.67		23.	6.	5.	5.
			(INCHES)	1.757	1.758	1.758	1.758
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.76

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	141.	3.67		23.	6.	5.	5.
			(INCHES)	1.757	1.758	1.758	1.758
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 1.53, TOTAL EXCESS = 1.73

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	139.	3.67		22.	6.	5.	5.
			(INCHES)	1.730	1.730	1.730	1.730
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	137.	3.67		22.	5.	5.	5.
			(INCHES)	1.702	1.703	1.703	1.703
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.52, TOTAL EXCESS = 1.68

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	135.	3.67		22.	5.	5.	5.
			(INCHES)	1.675	1.675	1.675	1.675
			(AC-FT)	11.	11.	11.	11.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5

FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.51, TOTAL EXCESS = 1.62

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	130.	3.67		21.	5.	5.	5.
			(INCHES)	1.620	1.620	1.620	1.620
			(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F5
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.49, TOTAL EXCESS = 1.57

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	126.	3.67		20.	5.	5.	5.
			(INCHES)	1.565	1.566	1.566	1.566
			(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .12 SQ MI

*** *** *** *

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = 1.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 1754.	3.75	280.	70.	68.	68.
	(INCHES)	1.682	1.687	1.687	1.687
	(AC-FT)	139.	139.	139.	139.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .99

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 1727.	3.75	276.	69.	67.	67.
	(INCHES)	1.654	1.659	1.659	1.659
	(AC-FT)	137.	137.	137.	137.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .98

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 1701.	3.75	271.	68.	66.	66.
	(INCHES)	1.628	1.633	1.633	1.633
	(AC-FT)	135.	135.	135.	135.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	1674.	3.75	267.	67.	64.	64.
		(INCHES)	1.601	1.606	1.606	1.606
		(AC-FT)	132.	133.	133.	133.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .95

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	1621.	3.75	258.	65.	62.	62.
		(INCHES)	1.548	1.552	1.552	1.552
		(AC-FT)	128.	128.	128.	128.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB2
FOR PLAN 1, RATIO = .93

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	1570.	3.75	249.	62.	60.	60.
		(INCHES)	1.495	1.499	1.499	1.499
		(AC-FT)	124.	124.	124.	124.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1567.	3.75		250.	63.	60.	60.
		(INCHES)	1.497	1.501	1.501	1.501
		(AC-FT)	124.	124.	124.	124.

CUMULATIVE AREA = 1.55 SQ MI

*** *** *** *

23 END-OF-PERIOD ORDINATES

41.	130.	267.	356.	368.	325.	256.	170.	119.	86.
61.	43.	30.	21.	15.	11.	8.	5.	4.	3.
2.	1.	0.							

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.83

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 326.	3.75	59.	15.	14.	14.
		(INCHES) 1.833	1.835	1.835	1.835
		(AC-FT) 29.	29.	29.	29.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = 1.00

TOTAL RAINFALL = 3.29, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.83

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 326.	3.75	59.	15.	14.	14.
		(INCHES) 1.833	1.835	1.835	1.835
		(AC-FT) 29.	29.	29.	29.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .99

TOTAL RAINFALL = 3.26, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.81

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 321.	3.75	58.	15.	14.	14.
		(INCHES) 1.805	1.806	1.806	1.806
		(AC-FT) 29.	29.	29.	29.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.78

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	316.	3.75		57.	14.	14.	14.
			(INCHES)	1.777	1.778	1.778	1.778
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.75

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	311.	3.75		56.	14.	14.	14.
			(INCHES)	1.749	1.750	1.750	1.750
			(AC-FT)	28.	28.	28.	28.

CUMULATIVE AREA = .30 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F4
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.43, TOTAL EXCESS = 1.69

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	301.	3.75		55.	14.	13.	13.
			(INCHES)	1.693	1.694	1.694	1.694
			(AC-FT)	27.	27.	27.	27.

```
 49 LS          SCS LOSS RATE
                      STRTL        .35  INITIAL ABSTRACTION
                     CRVNBR       85.00  CURVE NUMBER
                      RTIMP        .00  PERCENT IMPERVIOUS AREA

 50 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG        .20  LAG

                                                    ***

                                                 UNIT HYDROGRAPH
                                              14 END-OF-PERIOD ORDINATES
                34.     112.     140.     112.      62.      36.      20.      12.      7.       4.
                 2.       1.       1.       0.

   TOTAL RAINFALL =   3.29, TOTAL LOSS =   1.46, TOTAL EXCESS =   1.83

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+      96.      3.58                    14.         3.          3.          3.
                        (INCHES)      1.834       1.835       1.835       1.835
                        (AC-FT)         7.          7.          7.          7.

                        CUMULATIVE AREA =     .07 SQ MI

     ***           ***           ***           ***           ***

                      HYDROGRAPH AT STATION       F6
                        FOR PLAN 1, RATIO = 1.00

   TOTAL RAINFALL =   3.29, TOTAL LOSS =   1.46, TOTAL EXCESS =   1.83

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+      96.      3.58                    14.         3.          3.          3.
                        (INCHES)      1.834       1.835       1.835       1.835
                        (AC-FT)         7.          7.          7.          7.

                        CUMULATIVE AREA =     .07 SQ MI

     ***           ***           ***           ***           ***

                      HYDROGRAPH AT STATION       F6
                        FOR PLAN 1, RATIO =  .99

   TOTAL RAINFALL =   3.26, TOTAL LOSS =   1.45, TOTAL EXCESS =   1.81
```

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	94.	3.58		14.	3.	3.	3.
			(INCHES)	1.806	1.806	1.806	1.806
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .98

TOTAL RAINFALL = 3.22, TOTAL LOSS = 1.45, TOTAL EXCESS = 1.78

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	93.	3.58		13.	3.	3.	3.
			(INCHES)	1.778	1.778	1.778	1.778
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .97

TOTAL RAINFALL = 3.19, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.75

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	91.	3.58		13.	3.	3.	3.
			(INCHES)	1.750	1.750	1.750	1.750
			(AC-FT)	7.	7.	7.	7.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 3.13, TOTAL LOSS = 1.43, TOTAL EXCESS = 1.69

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	89.	3.58	13.	3.	3.	3.
		(INCHES)	1.694	1.694	1.694	1.694
		(AC-FT)	6.	6.	6.	6.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION F6
FOR PLAN 1, RATIO = .93

TOTAL RAINFALL = 3.06, TOTAL LOSS = 1.42, TOTAL EXCESS = 1.64

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)				
		(CFS)				
+	86.	3.58	12.	3.	3.	3.
		(INCHES)	1.638	1.639	1.639	1.639
		(AC-FT)	6.	6.	6.	6.

CUMULATIVE AREA = .07 SQ MI

*** *** *** *

FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	2160.	3.75		354.	89.	85.	85.
			(INCHES)	1.713	1.717	1.717	1.717
			(AC-FT)	175.	176.	176.	176.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	2127.	3.75		348.	87.	84.	84.
			(INCHES)	1.685	1.689	1.689	1.689
			(AC-FT)	173.	173.	173.	173.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	2095.	3.75		342.	86.	83.	83.
			(INCHES)	1.658	1.662	1.662	1.662
			(AC-FT)	170.	170.	170.	170.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
			(CFS)				
+	2061.	3.75		337.	84.	81.	81.
			(INCHES)	1.631	1.635	1.635	1.635
			(AC-FT)	167.	167.	167.	167.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .95

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
			(CFS)				
+	1996.	3.75		326.	82.	79.	79.
			(INCHES)	1.578	1.581	1.581	1.581
			(AC-FT)	162.	162.	162.	162.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .93

+	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
			(CFS)				
+	1932.	3.75		315.	79.	76.	76.
			(INCHES)	1.524	1.527	1.527	1.527
			(AC-FT)	156.	156.	156.	156.

CUMULATIVE AREA = 1.92 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	.99	.98	.97	.95	.93
HYDROGRAPH AT									

FOR PLAN 1, RATIO = 1.00

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	2160.	3.75		354.	89.	85.	85.
			(INCHES)	1.713	1.717	1.717	1.717
			(AC-FT)	175.	176.	176.	176.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .99

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	2127.	3.75		348.	87.	84.	84.
			(INCHES)	1.685	1.689	1.689	1.689
			(AC-FT)	173.	173.	173.	173.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .98

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	2095.	3.75		342.	86.	83.	83.
			(INCHES)	1.658	1.662	1.662	1.662
			(AC-FT)	170.	170.	170.	170.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+ (CFS)	(HR)					
		(CFS)				
+ 2061.	3.75		337.	84.	81.	81.
		(INCHES)	1.631	1.635	1.635	1.635
		(AC-FT)	167.	167.	167.	167.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1996.	3.75		326.	82.	79.	79.
		(INCHES)	1.578	1.581	1.581	1.581
		(AC-FT)	162.	162.	162.	162.

CUMULATIVE AREA = 1.92 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION COMB3
FOR PLAN 1, RATIO = .93

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1932.	3.75		315.	79.	76.	76.
		(INCHES)	1.524	1.527	1.527	1.527
		(AC-FT)	156.	156.	156.	156.

CUMULATIVE AREA = 1.92 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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				1.00	.99	.98	.97	.95	.93
HYDROGRAPH AT									

+	F2	.50	1	FLOW	658.	648.	639.	629.	610.	590.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	F1	.49	1	FLOW	503.	494.	484.	474.	455.	436.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	RT_F1	.49	1	FLOW	475.	465.	456.	446.	427.	408.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	COMB1	.99	1	FLOW	1114.	1096.	1078.	1060.	1023.	987.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RT_F2	.99	1	FLOW	1100.	1081.	1062.	1042.	1005.	968.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	F3	.44	1	FLOW	544.	537.	529.	522.	507.	492.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F5	.12	1	FLOW	141.	139.	137.	135.	130.	126.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	COMB2	1.55	1	FLOW	1754.	1727.	1701.	1674.	1621.	1570.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RT_F5	1.55	1	FLOW	1752.	1726.	1699.	1672.	1619.	1567.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F4	.30	1	FLOW	326.	321.	316.	311.	301.	292.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	F6	.07	1	FLOW	96.	94.	93.	91.	89.	86.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	COMB3	1.92	1	FLOW	2160.	2127.	2095.	2061.	1996.	1932.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75

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								
RT_F1 MANE	.99	495.41	216.48	1.16	5.00	474.82	215.00	1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3019E+02 EXCESS= .0000E+00 OUTFLOW= .3022E+02 BASIN STORAGE= .1299E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .99								
RT_F1 MANE	.95	491.41	216.90	1.13	5.00	465.30	215.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2960E+02 EXCESS= .0000E+00 OUTFLOW= .2965E+02 BASIN STORAGE= .1040E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .98								
RT_F1 MANE	1.00	475.95	217.33	1.11	5.00	455.61	215.00	1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2902E+02 EXCESS= .0000E+00 OUTFLOW= .2905E+02 BASIN STORAGE= .9771E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .97								
RT_F1 MANE	1.04	467.95	216.83	1.09	5.00	446.01	215.00	1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2843E+02 EXCESS= .0000E+00 OUTFLOW= .2847E+02 BASIN STORAGE= .8309E-06 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .95								
RT_F1 MANE	.99	450.83	216.81	1.05	5.00	427.13	215.00	1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2728E+02 EXCESS= .0000E+00 OUTFLOW= .2732E+02 BASIN STORAGE= .1224E-05 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .93								
RT_F1 MANE	1.04	429.55	216.75	1.00	5.00	408.22	215.00	1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2613E+02 EXCESS= .0000E+00 OUTFLOW= .2617E+02 BASIN STORAGE= .1210E-05 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= 1.00								
RT_F2 MANE	1.81	1107.32	222.45	1.50	5.00	1099.61	220.00	1.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7916E+02 EXCESS= .0000E+00 OUTFLOW= .7934E+02 BASIN STORAGE= .5151E-03 PERCENT ERROR= -.2

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET
9	NEVADA	BF-F-095-1(7)	CLARK	4A

T.22S.,R.63E.
SEC. 34

LIMITS OF CONSTRUCTION
A1 926+00.00
AN1 926+00.00

A1 LINE
AN1 LINE
ES1 LINE
EN1 LINE
RW4 LINE

BEGIN PROJECT
ES1 285+30.00
EN1 285+30.00

N. 42°45'14" W.
N. 43°45'14" W. ~ 761.32'

BOULDER HIGHWAY — US 93

10" WATER
10" SEWER
4" HP SW GAS
CABLE TV
20" WATER

RIM 2280.5
INV. 2274.68
RIM 2267.0
INV. 2260.48
RIM 2268
INV. 2250.99

N. 451,500
N. 452,000
N. 452,500
E. 695,000
E. 694,500
E. 695,000

926 919 915 910 905

2300 2290 2280 2270 2260 2250

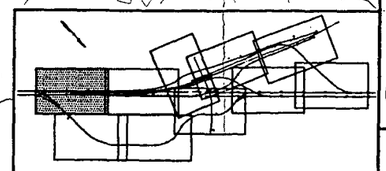
A1	915+30± 30'± LT.	1 REGRADE EXISTING DITCH – 600 FT. TO A1 908+70±, 30'± LT.
A1	911+12± 33'± LT.	1 EXTEND EXISTING 24" CMP PER STD. DET. R-2.1.1, TYPE 1 PIPE CULVERT EXTENSION.

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND

IMPROVEMENTS (C1) CHANNEL NOTES
DITCH NOTES DRAINAGE NOTES



REGISTERED PROFESSIONAL ENGINEERS OF NEVADA
MARLENE PERALA
5/15/91
CIVIL
No. 7991

DATUM
075-307 (ASP 75)
N. 453268.82
E. 692982.30
ELEV.= 2225.015
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP WITH W.P. SET 3' SOUTH.
A1 892+69.38, 415.60' LT.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/JNE
DRAWN BY:	FJP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000025

FED. RD. REQ. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	5A

EN1 296+24± 18'± LT.	1	CONSTRUCT 36"X116' RCP WITH STD. RIP-RAP BASIN AT OUTLET. OUTLET AT EN1 296+15±, 97'± RT.
EN1 296+24± 19'± LT.	2	CONSTRUCT TYPE 2A DROP INLET.
EN1 302+00± 16'± LT.	3	CONSTRUCT TYPE 2 DROP INLET AND 24"X118' RCP WITH STD. RIP-RAP BASIN AT OUTLET. OUTLET AT RW4 17+00±, 20'± LT.
RW4 19+00± 29'± LT.	4	CONSTRUCT 24"X57' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT RW4 19+00±, 28'± RT.
RW4 21+00± 21'± LT.	5	CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 27'± LT. (DOWNDRAIN).
ES1 296+40± 77'± LT.	6	CONSTRUCT 36"X96' RCP WITH STD. RIP-RAP BASIN AT INLET. OUTLET AT EN1 296+24±, 20'± RT.

EN1 296+24± 100'± RT. — 2 REGRADE EXISTING DITCH - 200'± TO EN1 297+50±, 250'± RT.

RW4 19+00± 30'± RT. — 3 GRADE NEW V-DITCH - 40'± TO RW4 19+00±, 70'± RT.

T.22S. R.63E. SEC. 34

075-307

075-309

230 KV TRANS

10" WATER

10" SEWER

RIM 2242.1 INV. 2232.5

OH T/P

4" HP SW GAS

A1 LINE

ES1 LINE

RW4 LINE

EN1 LINE

AN1 LINE

RW1 LINE

N. 43'45'14" W. ~ 761.32'

S. 42'45'14" E.

N. 42'45'14" W.

N. 42'45'14" W.

S. 42'45'14" E.

N. 42'45'14" W.~1514.23'

N. 453000 E. 693000

N. 453000 E. 693400

N. 453000 E. 693500

CABLE TV

CP NATIONAL GAS

"OLD VEGAS"

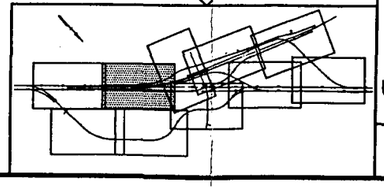
NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4.
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND

○ IMPROVEMENTS (C1) CHANNEL NOTES

△ DITCH NOTES ◇ DRAINAGE NOTES



DATUM

075-307 (ASP 75)
N. 453268.62
E. 692962.30
ELEV.= 2225.015
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP WITH W.P. SET 3' SOUTH.
A1 892+69.38, 415.60' LT.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/ME
DRAWN BY:	FJP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000028

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	6A

LIMITS OF CONSTRUCTION
WW 9+50.00
TO −200' FOR REGRADING
OF DRAINAGE CHANNEL

MATCH INTO EXISTING EARTH CHANNEL

STRUCTURE NO. B-1911

STRUCTURE NO. I-1471

RW3 LINE

WW LINE

RW4 LINE

ES1 LINE

AN LINE

EN1 LINE

RW1 LINE

MATCH SHEET 28A

DAWSON AVENUE

10" WATER
10" SEWER
4" CP NATIONAL GAS

CONESTOGA

T.22S. R.63E. SEC. 34

PAVED

PARKING

230 KV TRANS

WAGONWHEEL DRIVE

N. 453,500 E. 692,500

E. 693,000

N. 453,000

N. 60°57'35" W. ~ 1167.39'

N. 23°33'13" E. ~ 386.11'

N. 57°57'35" W. ~ 228.62'

N. 22°02'25" E. ~ 470.61'

S. 64°56'49" E. ~ 229.53'

N. 63°56'49" W. ~ 341.67'

N. 63°56'49" W. ~ 401.11'

~ 304.40'

S. 63°56'49" E.

N. 62°37'42" W. 340.06'

N. 62°37'42" W. ~ 151.12'

N. 42°45'14" E. ~ 1514.23'

RW4	23+00± 35'± LT.	(1) CONSTRUCT 48"X73' RCP WITH STD. CULVERT HEADWALLS AND STD. RIP-RAP AT BASIN AT OUTLET. OUTLET AT RW4 23+00±, 38'± RT.
RW1	18+30± 31'± LT.	(2) CONSTRUCT 36"X63' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT RW1 18+30±, 32'± RT.
WW	9+50± 85'± LT.	(3) CONSTRUCT TRIPLE-8'X4'X115' RCB WITH TYPE 1 HEADWALLS. OUTLET AT WW 10+65±, 85'± LT. (STRUCTURE NO. B-1911).
WW	10+62± 36'± RT.&LT.	(4) CONSTRUCT SIDEWALK DRAINS.
EN1	309+35± 9'± LT.	(5) CONSTRUCT TYPE 2 DROP INLET AND 18"X72' CMP WITH STD. RIP-RAP BASIN AT OUTLET. OUTLET AT ES1 309+35±, 60'± LT.
EN1	308+94± 9'± LT.	(6) CONSTRUCT 18"X40' SLOTTED CMP DRAIN. OUTLET AT EN1 309+34±, 9'± LT. CONNECT TO TYPE 2 DROP INLET EN1 309+35±.

WW	9+50± 83'± LT.	(C1) NEW DAWSON/CONESTOGA CHANNEL TO 200 FT. SOUTH AND PARALLEL TO DAWSON ROAD.
WW	9+72± 16'±RT.	(80) ADJUST SEWER MANHOLE FRAME & COVER, METHOD "A".
WW	9+67± 6'±RT.	(81) ADJUST WATER VALVE FRAME & COVER, METHOD "A".
WW	9+65± 4'±RT.	(82) ADJUST WATER VALVE FRAME & COVER, METHOD "A".
WW	9+66± 3'±RT.	(83) ADJUST WATER VALVE FRAME & COVER, METHOD "A".
WW	9+79± 26'±RT.	(84) ADJUST GAS VALVE FRAME & COVER, METHOD "A" (BY OTHERS).
WW	9+81± 24'±RT.	(85) ADJUST GAS VALVE FRAME & COVER, METHOD "A" (BY OTHERS).

LEGEND

IMPROVEMENTS (C1) CHANNEL NOTES

DITCH NOTES DRAINAGE NOTES

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4 .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

075-307

DATUM
075-307 (ASP 75)
N. 453268.62
E. 692962.30
ELEV.= 2225.015
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP WITH W.P. SET 3' SOUTH.
A1 892+69.38, 415.60' LT.

MARVIN E. PERALA 12/15/99 CIVIL No. 7892 REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/JME
DRAWN BY:	FUP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000027

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	7A

RW3 3+97± 27'± LT. (1) CONSTRUCT TRIPLE 8'X4'X313' RCB W/ TYPE 1 HEADWALLS. OUTLET AT A 316+00±, 83'± RT. (STRUCTURE NO. B-1912).

A 315+25± 89'± LT. (2) CONSTRUCT SPECIAL DROP INLET IN CONJUNCTION W/ STRUCTURE B-1912 (CONCRETE AND REINFORCING QUANTITIES ARE INCLUDED AS PART OF STRUCTURE NO. B-1912).

RW2 7+00± 64'± LT. (3) CONSTRUCT TRIPLE 8'X4'X122' RCB WITH TYPE 1 HEADWALLS. OUTLET AT RW2 7+22±, 56'± RT. (STRUCTURE NO. B-1913).

RW2 1+13± 21'± RT. (4) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 43'± RT. (DOWNDRAIN).

RW2 7+20± 19'± LT. (5) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 63'± LT. (DOWNDRAIN).

A 319+50± 80'± RT. (4) GRADE NEW V-DITCH – 50' ± TO RW2 9+00±, 35'± LT.

RW2 9+00± 40'± RT. (5) REGRADE EXIST. DITCH – 100' ±, TO RW2 8+50±, 130'±RT.

RW3 4+70± 10'± RT. (6) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 23'± LT. SEE SPECIAL DETAIL, SHEET 109.

AS 38+08 20'±RT. (7) CONSTRUCT 30"X19'X120' HERCP WITH STD. HEADWALL AND LIGHT RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT A 325+00±, 68'± LT.

RW2 9+20 9'± LT. (8) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 19'± RT. (DOWNDRAIN).

RW2 9+00± 36'± LT. (9) CONSTRUCT 24"X63' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT RW2 9+00±, 27'± RT.

AS 38+09± 13'± RT. (10) CONSTRUCT BARRIER RAIL OPENING. SEE SPECIAL DETAIL, SHEET 110.

WW 10+50± 85'±RT. (C2) CONESTOGA/RW3 CHANNEL TO RW3 3+97±, 27'± RT.

A 316+00± 83'±RT. (C3) A/RW2 CHANNEL TO RW2 7+00±, 64'± LT.

RW2 7+22± 56'±RT. (C4) AN CHANNEL TO AN 4+00±, 105'± RT.

T. 22S. R. 63E. SEC. 34

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4 .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND

(1) IMPROVEMENTS (C1) CHANNEL NOTES

△ DITCH NOTES ◇ DRAINAGE NOTES

DATUM

075-108 (ASP 75)
N. 454476.04
E. 692103.94
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1 878+00.10 (226.22' RT.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

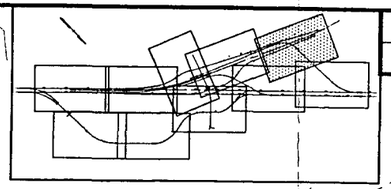
UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY: KBA/ME
DRAWN BY: FJP
CHECKED BY: SKZ
REVIEWED BY: PAT

C5000028

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	8A



RETAINING WALL #3
AS LINE
RETAINING WALL #2
RETAINING WALL #1
RW3 LINE
2:1 RIP-RAP SLOPE (TYP.)
STRUCTURE NO. I-1900
STRUCTURE NO. C-1914
RW2 LINE
A LINE
AS LINE
3' V DITCH
15" SEWER
OH T/P
230 KV TRANS
RIM 2205.3 IN 2199.17
RIM 2195.7 IN 2188.50
RIM 2193.2 IN 2184.09
RIM 2192.7 IN 2191.00
RIM 2432 IN 2186.32
E 691,000
N 454,530
DROP STRUCTURES - SEE SPECIAL DETAIL, SHEET 107.
CHANNEL C1
MATCH SHEET 30A
MATCH SHEET 3

A	331+64± 100'± RT.	6 GRADE NEW DITCH - 100' ± TO A 332+00±, 180'± RT.
A	333+16± 115'± LT.	1 CONSTRUCT DOUBLE 8'X4'X307' RCB INCLUDING APRON WITH TYPE 1 & TYPE 2 HEADWALLS. OUTLET AT A 332+17±, 160'± RT. (STRUCTURE NO. C-1914).
A	331+64± 75'± LT.	2 CONSTRUCT 24"X175' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT A 331+64±, 100'± RT.
AS	22+00± 11'± LT.	3 CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 34'± LT. (DOWNDRAIN).
A	331+50± 58'± LT.	4 CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 66'± LT. (DOWNDRAIN).
A	332+62± 57'± LT.	5 CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 75'± LT. (DOWNDRAIN).
A	333+03± 57'± LT.	6 CONSTRUCT 18"X40' SLOTTED CMP DRAIN. OUTLET AT A 332+63±, 57'±LT. CONNECT TO TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR.
A	333+35± 3'± RT.	7 CONSTRUCT TYPE 2 DROP INLET AND 18"X51' CMP. OUTLET INTO SIDE OF DOUBLE 8'X4' RCB AT A 332+83±, 3'± RT.
A	333+76± 3'± RT.	8 CONSTRUCT 18"X40' SLOTTED CMP DRAIN. OUTLET AT A 333+36±. CONNECT TO TYPE 2 DROP INLET AT A 333+35±.
AS	28+00± 110'±LT.	C5 AS CHANNEL TO AS 16+00±, 70'± LT.

LEGEND

IMPROVEMENTS — C1 CHANNEL NOTES

DITCH NOTES — DRAINAGE NOTES

DATUM

075-108 (ASP 75)
N. 454476.04
E. 692103.94
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1 878+00.10 (226.22' RT.)

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

REGISTERED PROFESSIONAL ENGINEER — STATE OF NEVADA — MARVINE PERALA — 021579 — CIVIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/JME
DRAWN BY:	FUP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000029

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	28A

RW2 LINE

A1 LINE

RW1 LINE

AN1 LINE

MATCH SHEET 26A

BOULDER HIGHWAY – US 93/95

STATE HIGHWAY PATROL SUBSTATION

4" CP NATIONAL GAS

10" WATER

15" SEWER

RIM 2185.2
INV. 2179.52

OH T/P

WW LINE

15' TEMPORARY CONSTRUCTION EASEMENT

33' R.O.W.

ACC LINE

50' R.O.W.

DRIVE

RIM 2183.6
INV. 2177.00

RIM 2189.8
INV. 2171.74

18" SEWER

RIM 2180.5
INV. 2173.50

END PROJECT
WW 27+00.00

RIM 2192.0
INV. 2185.62

8" SEWR

16" SEWR

8" SEWER

APPALOOSA ROAD

RIM 2191.4
INV. 2174.02

RIM 2189.8
INV. 2170.99

T.22S., R.63E.
SEC. 34

MATCH SHEET 32A

N. 42°45'14" W. 1514.23'

N. 454,300
E. 693,300

N. 455,000
E. 692,500

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

WW 19+00± 120'± RT.	(7)	REGRADE EXIST. DITCH – 300'± TO WW 22+50±, 60'± RT.
WW 22+50± 55'± RT.	(1)	CONSTRUCT DOUBLE 24"X111' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT WW 22+50±, 57'± LT.
WW 21+71± 30'±LT.	(86)	ADJUST GAS VALVE FRAME AND COVER, METHOD "A" (BY OTHERS).
WW 21+85± 10'±LT.	(87)	ADJUST SEWER MANHOLE FRAME & COVER, METHOD "A".
WW 25+85± 38'±RT.	(88)	ADJUST TELEPHONE MANHOLE FRAME & COVER, METHOD "C" (BY OTHERS).
WW 25+87± 38'±RT.	(89)	ADJUST TELEPHONE MANHOLE FRAME & COVER, METHOD "C" (BY OTHERS).
WW 26+40± 12'±LT.	(90)	ADJUST SEWER MANHOLE FRAME & COVER, METHOD "A".

DATUM

075-108 (ASP 75)
N. 454476.04
E. 692103.94
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH.
A1 878+00.10 (226.22' RT.)

LEGEND

IMPROVEMENTS (C1) CHANNEL NOTES

DITCH NOTES DRAINAGE NOTES

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/JME
DRAWN BY:	FJP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C50000.30

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	29A

ACS 15+50± 29'± RT. — (1) CONSTRUCT DOUBLE 24"X128' RCB WITH STD. RIP-RAP BASINS AT INLETS AND OUTLET. OUTLETS AT 15+30±, 97'± LT.

ACS 3+00± 21'± RT. — (2) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 36'± RT. (DOWNDRAIN).

AN 5+64± 17'± LT. — (3) CONSTRUCT 24"X94' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT AN 4+80±, 25'± RT.

ACS 3+00± 17'±LT. — (4) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 36'± LT. (DOWNDRAIN).

ACS 12+70± 17'± LT. — (5) CONSTRUCT TYPE 5 (MODIFIED) EMBANKMENT PROTECTOR. OUTLET AT 33'± LT. (DOWNDRAIN).

ACN 8+67± 19'± RT. — (6) CONSTRUCT 24"X62' RCP WITH STD. RIP-RAP BASINS AT INLET AND OUTLET. OUTLET AT ACN 8+67±, 43'± LT.

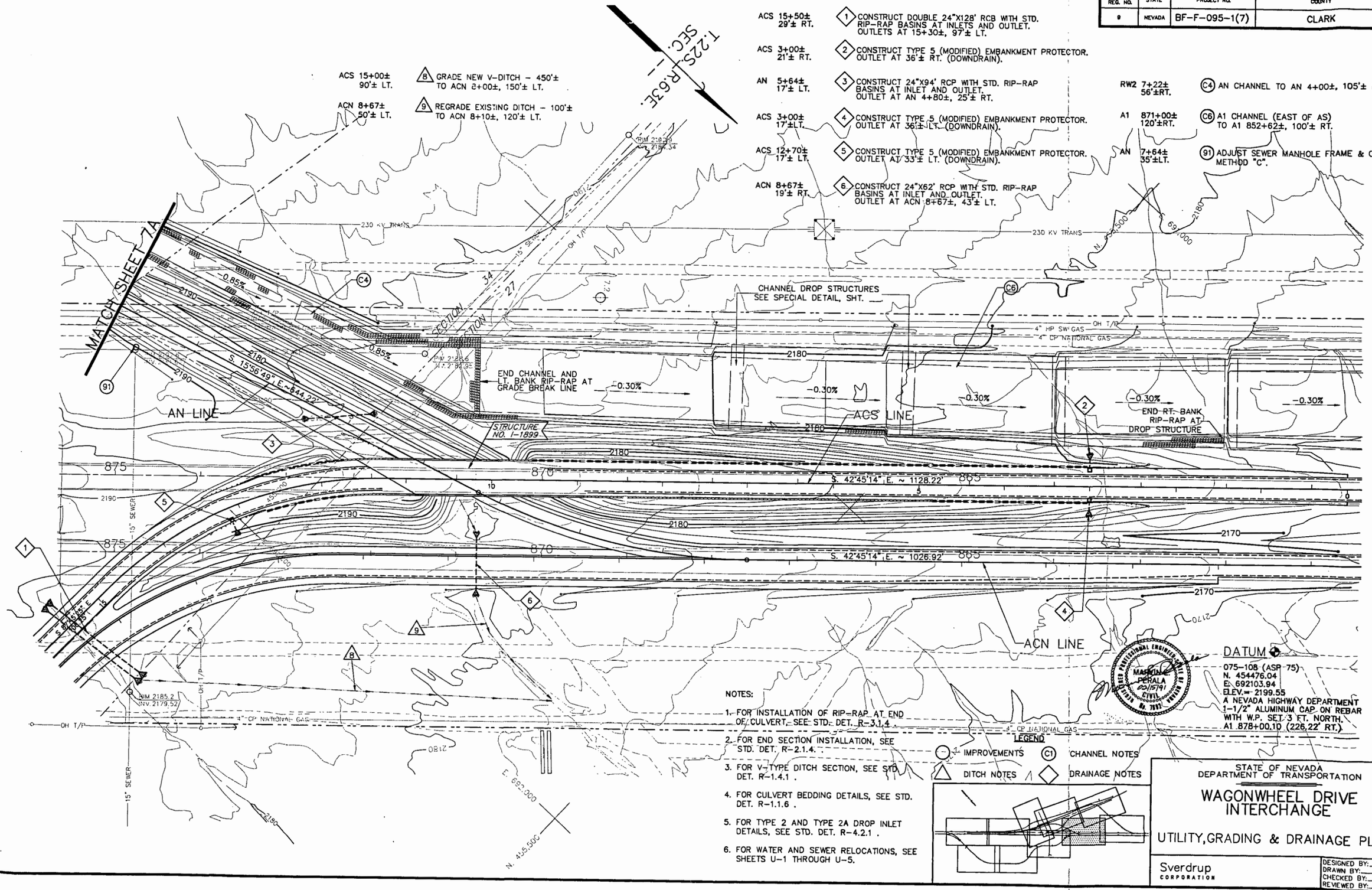
ACS 15+00± 90'± LT. — (8) GRADE NEW V-DITCH - 450'± TO ACN 8+00±, 150'± LT.

ACN 8+67± 50'± LT. — (9) REGRADE EXISTING DITCH - 100'± TO ACN 8+10±, 120'± LT.

RW2 7+22± 56'±RT. — (C4) AN CHANNEL TO AN 4+00±, 105'± RT.

A1 871+00± 120'±RT. — (C6) A1 CHANNEL (EAST OF AS) TO A1 852+62±, 100'± RT.

AN 7+64± 35'±LT. — (91) ADJUST SEWER MANHOLE FRAME & COVER, METHOD "C".



NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4.
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LEGEND

(-) IMPROVEMENTS (C1) CHANNEL NOTES

△ DITCH NOTES ◇ DRAINAGE NOTES

MARVIN PERALA 20157 CIVIL NEVADA REGISTERED PROFESSIONAL ENGINEER

DATUM

075-108 (ASP 75)
N. 454476.04
E. 692103.94
ELEV.= 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH. A1 878+00.10 (226.22' RT.)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

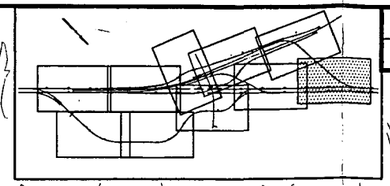
UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/JME
DRAWN BY:	FUP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000031

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	30A



MATCH SHEET 8A

690500 E

T.22S.-R.65E. SEC. 7

SECTION

SECTION

A1 860+00± 40'± RT.

10 REGRADE EXISTING DITCH – 25'± TO A1 859+85±, 23'± RT.

A1 853+35± 40'± RT.

11 REGRADE EXISTING DITCH – 25'± TO A1 853+35±, 20'± RT.

AS 14+92± 25'± LT.

1 CONSTRUCT MULTIPLE 8'X4'X110' RCB WITH TYPE 2 HEADWALLS. OUTLET AT AS 13+96±, 30'± RT. (STRUCTURE NO. B-1915).

A1 851+52± 100'±RT.

C7 A1 CHANNEL (WEST OF AS) TO A1 845+00±, 100'± RT.

NOTES:

1. FOR INSTALLATION OF RIP-RAP AT END OF CULVERT, SEE STD. DET. R-3.1.4 .
2. FOR END SECTION INSTALLATION, SEE STD. DET. R-2.1.4. .
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

LIMITS OF CONSTRUCTION
A1 845+00.00
AN1 845+00.00

S. 01°41'01" E. 1129.07'

AS LINE

A1 LINE

AN1 LINE

DROP STRUCTURES SEE SPECIAL DETAIL, SHT. 10

STRUCTURE NO. B-1915

230 KV TRANS

OH T/P

4" HP SW GAS

4" CP NATIONAL GAS

2 CP NATIONAL GAS

UTL

-0.30%

S. 42°45'14" E.

PAVED PARKING

SIGN

ROBERTS ROAD

BOULDER HIGHWAY

US 93/95

4" CP NATL GAS

N. 456,500

E. 690,000

E. 690,500

860 855 850 845

2180 2170 2160

DATUM

075-108 (ASP 75)
N. 454476.04
E. 692103.94
ELEV. = 2199.55
A NEVADA HIGHWAY DEPARTMENT 1-1/2" ALUMINUM CAP ON REBAR WITH W.P. SET 3 FT. NORTH. A1 878+00.10 (226.22' RT.)

LEGEND

IMPROVEMENTS (C1) CHANNEL NOTES

DITCH NOTES DRAINAGE NOTES

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA MARVIN K. BERRA 12/15/94 CIVIL No. 7992

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/JME
DRAWN BY:	FUP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000012

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	31A

T.22S. R.63E. SEC. 34

E. 694,500 N. 453,500

E. 694,500 N. 454,500

2" GAS

8" SEWER

8" SEWER

CABLE TV

4" ELEC. CONDUIT CABLE TV

8" WATER

8" WATER

8" WATER

8" WATER

8" WATER

CABLE TV

4" ELEC. CONDUIT

MATCH SHEET 30A

N. 794,436.33

TEMPORARY CONSTRUCTION EASEMENT

TEMPORARY CONSTRUCTION EASEMENT

S. 42°45'14" E. ~ 892.31'

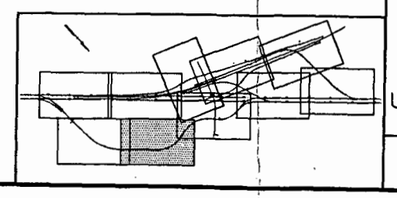
33' R.O.W.

33' R.O.W.

2250 2240 2230 2220 2210

20

25



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

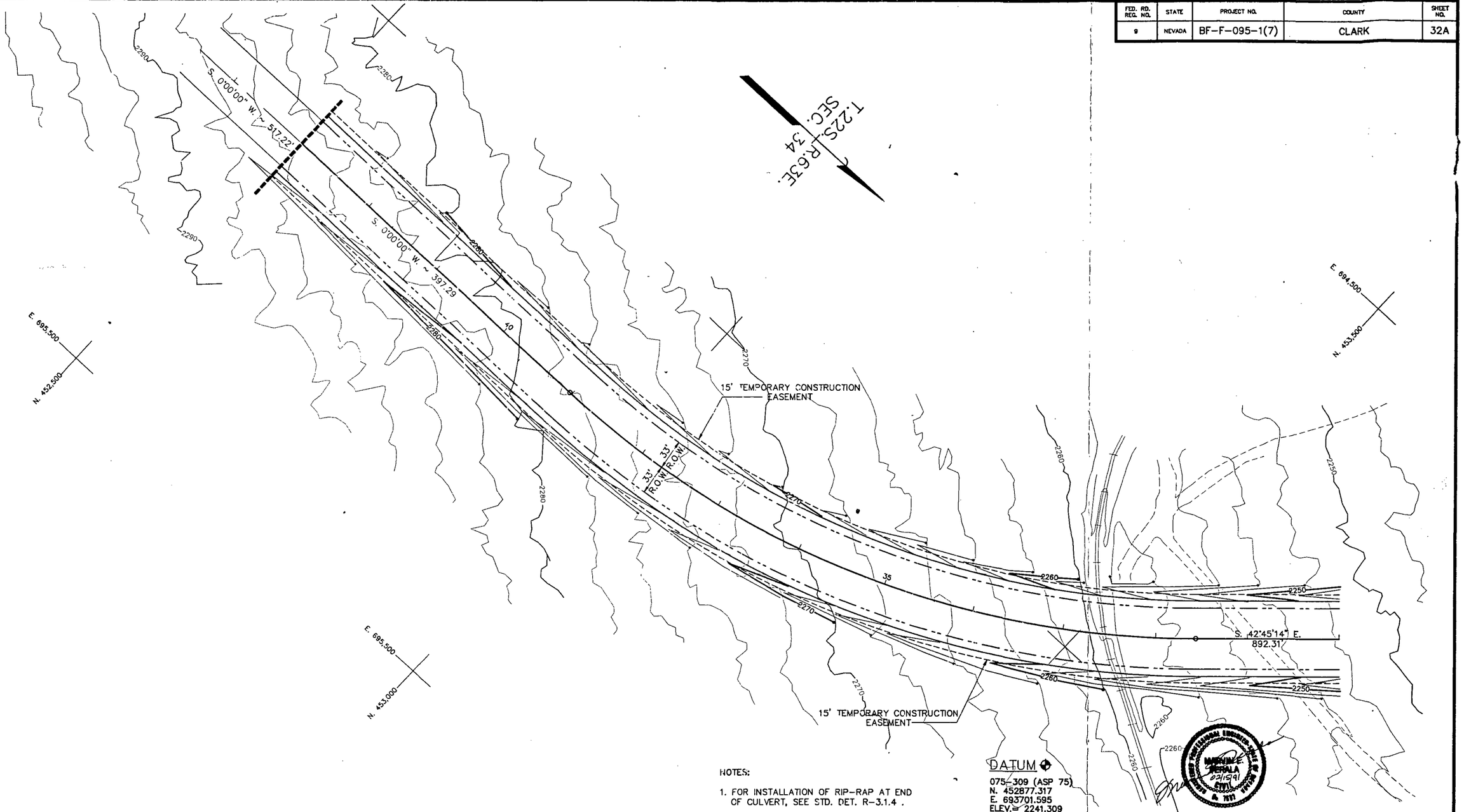
UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY: KBA/JME
DRAWN BY: FUP/MG
CHECKED BY: SKZ
REVIEWED BY: PAT

C5000033

FED. RD. REG. NO.	STATE	PROJECT NO.	COUNTY	SHEET NO.
9	NEVADA	BF-F-095-1(7)	CLARK	32A



NOTES:

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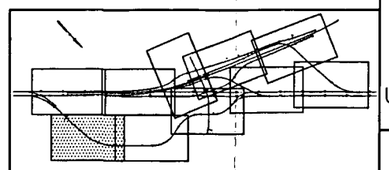
3. FOR V-TYPE DITCH SECTION, SEE STD. DET. R-1.4.1 .
4. FOR CULVERT BEDDING DETAILS, SEE STD. DET. R-1.1.6 .
5. FOR TYPE 2 AND TYPE 2A DROP INLET DETAILS, SEE STD. DET. R-4.2.1 .
6. FOR WATER AND SEWER RELOCATIONS, SEE SHEETS U-1 THROUGH U-5.

DATUM

075-309 (ASP 75)
N. 452877.317
E. 693701.595
ELEV.= 2241.309
A NEVADA HIGHWAY DEPARTMENT
1-1/2" ALUMINUM CAP WITH
W.P. SET 2-1/2' SOUTH.
A1 900+58.57, 138.90' LT.



STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

WAGONWHEEL DRIVE INTERCHANGE

UTILITY, GRADING & DRAINAGE PLANS

Sverdrup CORPORATION

DESIGNED BY:	KBA/JME
DRAWN BY:	FUP
CHECKED BY:	SKZ
REVIEWED BY:	PAT

C5000034

TECHNICAL DRAINAGE STUDY

LETTER OF MAP REVISION
FOR
EQUESTRIAN DETENTION BASIN

PDG PROJECT #1002005

BOOK 3
EAST C-1 DETENTION BASIN
FINAL DESIGN NOTEBOOK

PREPARED FOR:
THE CITY OF HENDERSON
DRAFT
DECEMBER 18, 1998
PREPARED BY:

POGGEMEYER DESIGN GROUP, INC.
ENGINEERS – PLANNERS – SURVEYORS – LANDSCAPE ARCHITECTS
2601 NORTH TENAYA WAY
LAS VEGAS, NEVADA 89128
(702) 255-8100 FAX (702) 255-8375
pdg-lv@pdg-lv.com

APPENDIX N

EAST C1 DETENTION BASIN

DESIGN MANUAL

East C-1 Detention Basin

Final Design Notebook

Submitted to:

Southern Nevada Water Authority

April 1998

Submitted by:

vtn nevada

2727 S. Rainbow Boulevard Las Vegas, Nv. 89102-5148
Telephone (702) 247-4020 Fax. (702) 247-4262

EAST C-1 DETENTION BASIN

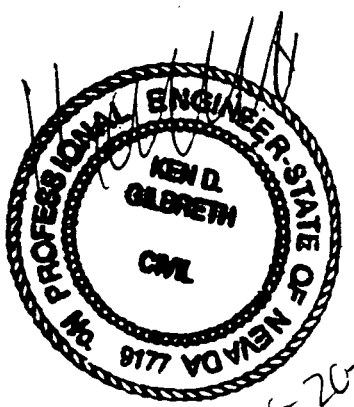
FINAL DESIGN NOTEBOOK

Submitted to:

SOUTHERN NEVADA WATER AUTHORITY

Submitted by:

April 1998



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4.0	PMP AND PMF SPILLWAY	6
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6.0	OUTFALL LEVEE ALIGNMENT	8
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Preliminary Construction Schedule ..... Appendix B
Cost Analysis and Estimation ..... Appendix C
Comments and Response ..... Appendix D
Vendor Data ..... Appendix E

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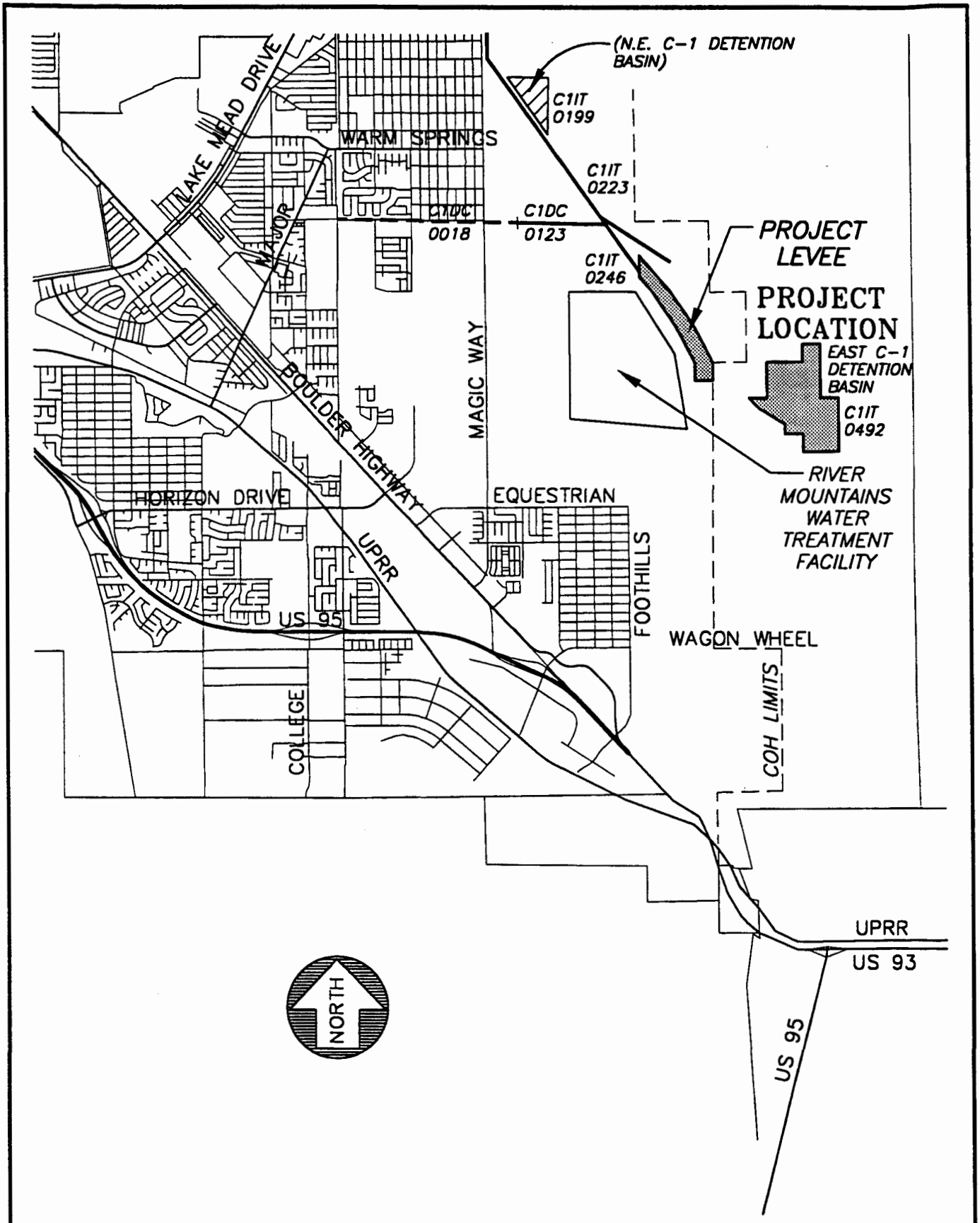
Existing HEC-1 Model ..... Section 2
Design HEC-1 Model ..... Section 3
PMF Study ..... Section 4
Low Level Outlet Calculation ..... Section 5
PMF Spillway Calculation ..... Section 6
Structure Design (by R2H) ..... Section 7
MPU Levee Design ..... Section 8
Inlet Structure Design and Sediment Transportation ..... Section 9
Geotechnical Report (by Kleinfelder) ..... Section 10

DESIGN SUMMARY

On October 24, 1997, VTN Nevada received Notice to Proceed from the Southern Nevada Water Authority (SNWA) on the design of the East C-1 Detention Basin. According to the *1996 Clark County Regional Flood Control District (CCRFCD) Master Plan Update (MPU)* for the Las Vegas Valley, the East C-1 Detention Basin is regional flood control facility number C1IT 0492. The primary purpose of this detention basin is to provide flood protection for the eastern part of the City of Henderson including the proposed Southern Nevada Water Authority Water Treatment Facility (SNWA-WTF), which will be located northwest of the detention basin. The SNWA-WTF site is located approximately one mile north of Equestrian Drive and approximately one mile east of Magic Way, and will ultimately be bounded on the north by the Burkholder Boulevard alignment (Vicinity Map - Figure 1.0). In addition to the Final Predesign Report for the East C-1 Detention Basin (November, 1997), there have been 4 major studies that have modeled this watershed: the 1991 MPU; the 1996 MPU; the Drainage Study for the SNWA Water Treatment Facility by Pentacore, and the Facilities Report for the C-1 Channel Flood Control System by VTN. The drainage basins located at the southeast corner of the SNWA-WTF have already been addressed by the SNWA-WTF design, and therefore will not be included in this analysis.

The SNWA-WTF site lies along the foothills of the River Mountains on an active alluvial fan. All major offsite storm runoff flows are generated from the steep mountain slopes of the River Mountains and then combined at the apex of this fan, which is located 0.5 mile northeast of the SNWA-WTF site. The East C-1 Detention Basin is located east of the SNWA-WTF, and has a tributary watershed area of approximately 5.32 square miles. The detention basin outfall system will convey the discharge from the East C-1 Detention Basin to the C-1 Channel, via the northeast levee (C1IT 0246) and the Drake Channel (C1DC 0000, 0018 and 0123).

The October 7, 1997 SNWA Steering Committee selected Alternative 3.1 (1000-yr basin) with an MPU levee (100-yr levee) for the final design. In addition, based on review comments from SNWA, the concrete spillway was selected for design in lieu of the RCC spillway.



VICINITY MAP
EAST C-1 DETENTION BASIN

FIGURE 1.0

1.0 Design Hydrology for the East C-1 Detention Basin

As a regional flood control facility, East C-1 Detention Basin is labeled as C1IT 0492 on the 1996 MPU, with a total tributary area of 5.32 square miles. The bottom elevation of the detention basin is approximately 2446 feet and the top of the dam is 2510 feet. In order to determine the impact of runoff on the East C-1 Detention Basin, storm events with return periods of 5-yr, 10-yr, 25-yr, 50-yr, 100-yr, 500-yr and 1000-yr and their runoff flows were predicted by the HEC-1 computer model using an SDN3 rainfall distribution. For this design, runoff flows were calculated by dividing the tributary watershed into three subbasins (C4CA, C4CB, and C4CC, see Figure 1.1), rather then the single subbasin (C4C) that was used in the 1996 MPU. The three subbasins include: (1) C4C-East Wash (C4CA) with a tributary area of 4.59 square miles; (2) C4C-Middle Wash (C4CB) with a tributary area of 0.38 square miles; and (3) C4C-West Wash (C4CC) with a tributary area of 0.35 square miles at the base of the MPU basin.

The watershed area upstream of the East C-1 Detention Basin site has slopes ranging from 5.0-50.0 percent. Areas near the western part of the watershed have slopes ranging from 3.0-10.0 percent. The slope of the entire watershed decreases in a westerly direction. Subbasin slope is an important drainage parameter that determines the runoff flow time through the subbasin. When a subbasin has an area greater than 1.0 square mile, the lag time for the storm hydrograph may be governed by the concentrated flow such as channel flow. When the subbasin area is less than 1.0 square mile, the lag time depends on both overland flow time and channel flow time. For this study, the lag times used in the MPU HEC-1 model were adopted from the 1996 MPU and then revised to reflect the latest developments within the watershed.

For subbasins with an area greater than 1.0 square mile, the length from the subbasin centroid to the outlet and the total length of the watercourse through the subbasin were used to calculate the lag time. For a subbasin with an area less than 1.0 square mile, the time of concentration of the subbasin was calculated by adding the overland flow time and the channel flow time along the watercourse. The lag time for such a subbasin was estimated at 60 percent of the time of concentration, according to the *CCRFCD Hydrologic Criteria and Drainage Design Manual.* Tables

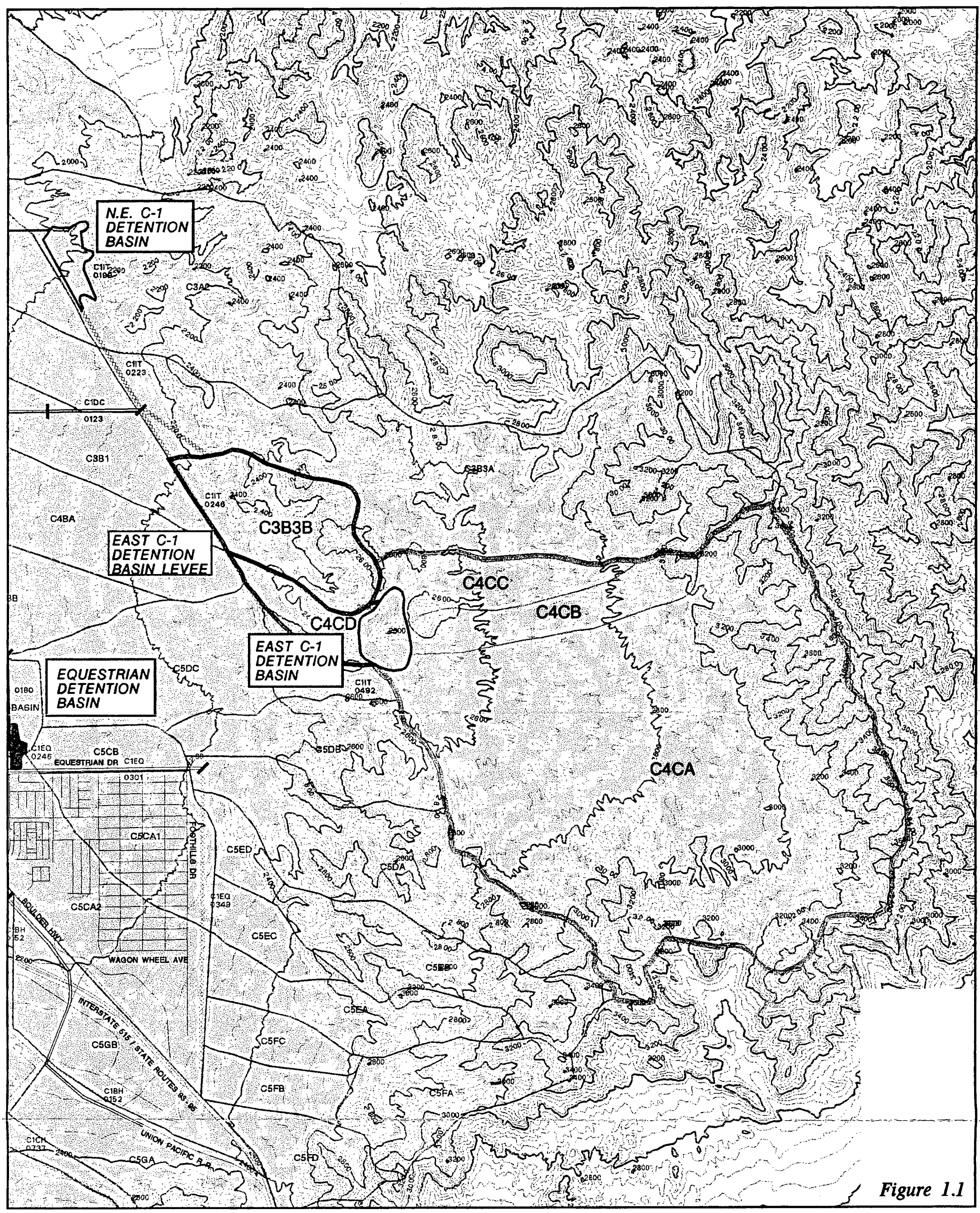


Figure 1.1

EAST C1 DETENTION BASIN
Drainage Basin Map

N

1 inch = 2800 feet

Vista nevada

1.1 and 1.2 summarize the information used to calculate the lag times for this study. Table 1.3 summarizes various design parameters that were calculated for each of the storm events considered during this study, including the total peak inflow, peak outflow, and storage volume of the detention basin. This table also gives selected hydrologic input parameters for each storm event, such as the rainfall depth and the depth area reduction factor.

TABLE 1.1

EAST C-1 DETENTION BASIN WATERSHED

SUBBASIN LAG TIMES AND ROUTING PARAMETERS - AREAS OVER 1 SQ. MILE

Study	Basin ID	Area (mi^2)	CN	T_{LAG} (hr)	Precipitation (in/6hr)
1996 MPU	C4C	5.53	80	0.89	3.43
East C-1 D.B. Study	C4CA	4.59	80	0.89*	3.43

*: Watershed length and length along longest watercourse measured upstream to a point opposite the centroid of the basin is not changed from 1996 MPU study.

TABLE 1.2

EAST C-1 DETENTION BASIN WATERSHED (REVISED)

SUBBASIN LAG TIMES AND ROUTING PARAMETERS - AREAS UNDER 1 SQ. MILE

Sub Basin	Area (mi^2)	Initial Length (ft)	Total Length (ft)	Slope (%)	CN	Hydr. Rad.	Velocity (ft/s)	K (CN)	Ti (min .)	Tt (min.)	T_{LAG} (hours)
C4CB	0.38	500	7650	2.2	80	1.5	4.83	0.67	13.34	26.38	**0.40**
C4CC	0.35	400	5200	2.5	80	1.5	4.83	0.67	11.51	17.93	**0.29**
C4CD	0.17	200	1300	2.5	80	1.5	4.83	0.67	8.14	4.48.	**0.13**
C3B3B (No change from Master Plan)					82						**0.42**

TABLE 1.3

SUMMARY OF EAST C-1 DETENTION BASIN PARAMETERS

FOR VARIOUS STORM EVENTS

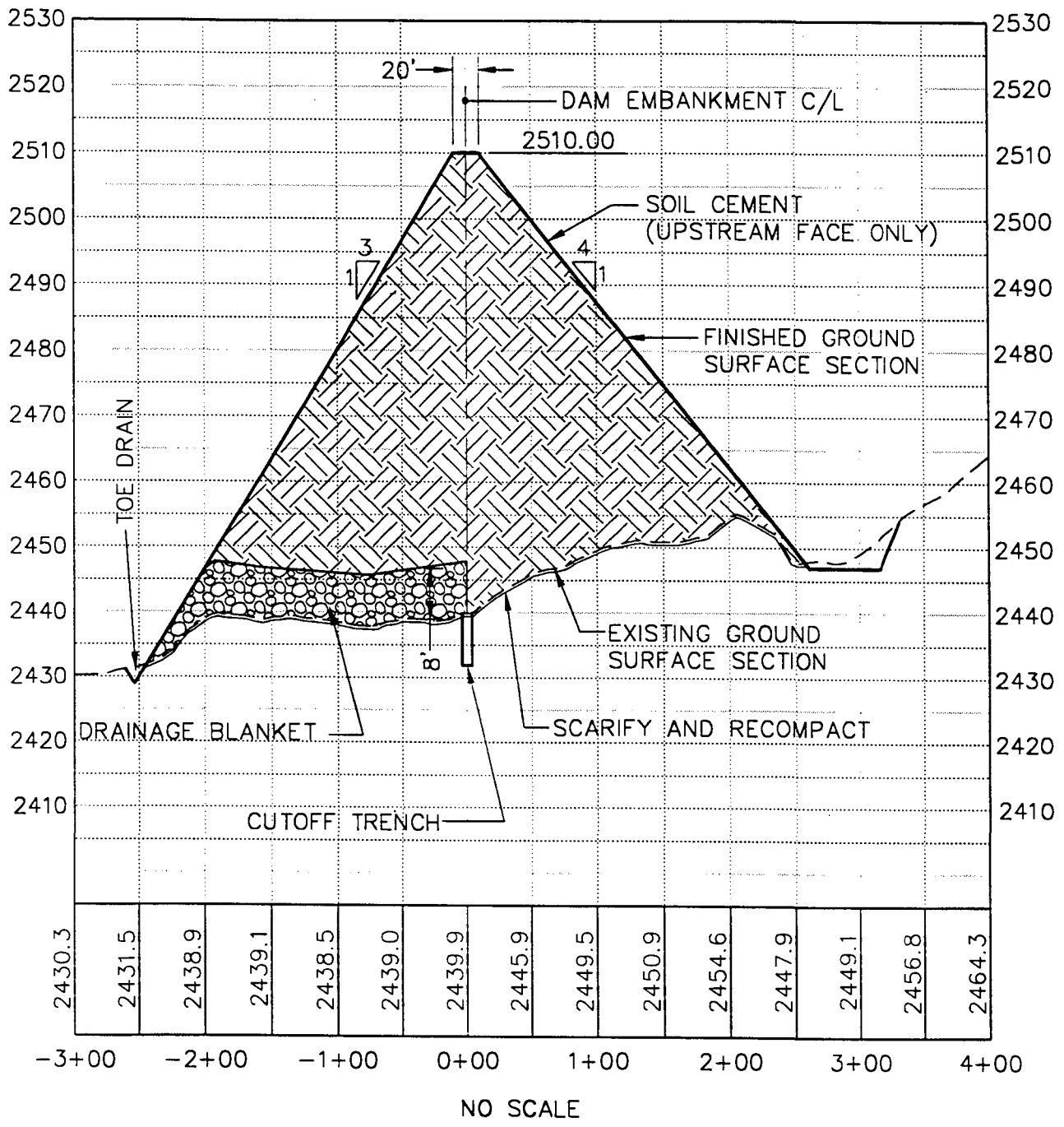
Return Period years	P/P_{100} Ratio	Rainfall Depth inches	Area Reduction Factor	West C4CC inflow (cfs)	East C4CA inflow (cfs)	Middle C4CB inflow (cfs)	Total Peak Inflow* (cfs)	Peak Outflow (cfs)[1)]	Storage Volume (acre-ft)
1000	1.60	5.49	1.45	497	4424	449	5133	100	773
500	1.20	4.12	1.09	320	2839	288	3300	92	484
100	1.00	3.43	0.91	233	2070	211	2404	87	347
50	0.87	2.98	0.79	182	1614	164	1872	83	267
25	0.74	2.54	0.67	132	1163	119	1347	77	190
10	0.57	1.96	0.52	74	653	67	758	67	105
5	0.44	1.51	0.40	36	320	32	369	56	50

*: The numbers were selected for higher peak (before revised lag time) as the design discharge. See response to CCPW - Appendix D.

1).Peak outflow is considered the low level outlet only. Drain time is about 50 hours for 100-yr storm event and about 95 hours for 1000-yr storm event.

2.0 Dam Embankment

The dam embankment of the East C-1 Detention Basin is filled with earth, sand and gravel. The dam is approximately 80 feet in height with a 4:1(H:V) upstream slope and a 3:1 (H:V) downstream slope, and is 20 feet wide on the top of the embankment (see Figure 2.1). The dam cross section contains a horizontal drainage blanket approximately 8 feet thick, and the upstream surface of the dam is covered with 1 foot of soil cement in order to prevent the surface erosion during the major storm event detention. The downstream face is well compacted to avoid the surface erosion due to rain fall The detailed embankment design is contained in Section 10 of the design calculation notebook.



TYPICAL EMBANKMENT CROSS-SECTION

FIGURE 2.1

3.0 Stage-Storage Information

The stage-storage curve for a detention basin is a graphical depiction of the relationship between the elevation of the water level in the basin and the volume of water in storage. The following table summarizes the stage-storage information and Figure 3.1 provides the storage-stage curve for the East C-1 Detention Basin.

TABLE 3.1 STORAGE - STAGE RELATIONSHIP

Water Surface Elevation (ft)	Water Storage Volume (ac-ft)	Water Surface Area (acre)
2446	0	0
2452	6	3
2458	25	5
2464	57	7
2470	105	10
2476	175	15
2482	272	20
2488	418	34
2494	625	40
2500*	880	48
2506	1184	56
2510**	1414	62

*PMF Spillway Crest, including 70 ac-ft for sediment storage (see Section 8)

** Top of the Dam Embankment

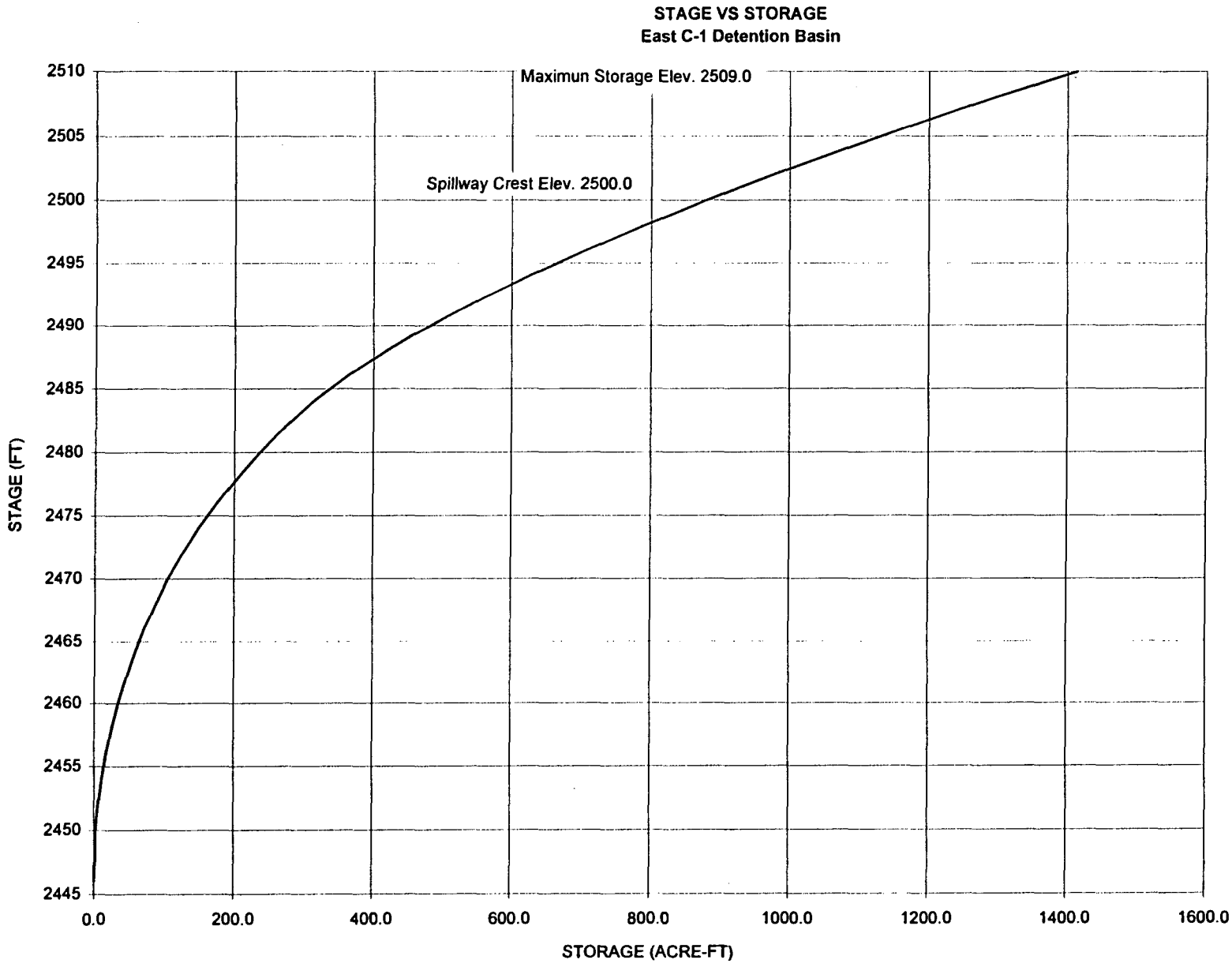

STAGE VS STORAGE
East C-1 Detention Basin
Maximun Storage Elev. 2509.0
Spillway Crest Elev. 2500.0
2510
2505
2500
2495
2490
2485
2480
2475
2470
2465
2460
2455
2450
2445
STAGE (FT)
0.0
200.0
400.0
600.0
800.0
1000.0
1200.0
1400.0
1600.0
STORAGE (ACRE-FT)

FIGURE 3.1

4.0 PMP and PMF Spillway

The Probable Maximum Precipitation (PMP) and Probable Maximum Flood (PMF) calculations are located in Section 4 of the calculation notebook. Using the PMP estimation, the HEC-1 watershed model for the East C-1 Detention Basin was used to compute the PMF conditions. To be conservative, the PMF for the East C-1 Detention Basin was predicted using a single subbasin with a total watershed area of 5.32 square miles, using the Modified Puls method of reservoir routing. This method is justified because flood depths are great, and the entire width of the canyon will be conveying flood flows. Therefore, little or no ineffective flow areas will occur, and attenuation of the flood peak will be minimal. The PMF peak inflow to the East C-1 Detention Basin is approximately 20,789 cfs. This is also the design value for the PMF spillway.

The East C-1 PMF spillway was designed as an ogee crest spillway with a width of 200 feet and a design head (h) of 9 feet. The spillway crest is 4 feet above the spillway apron, and is designed to convey 20,789 cfs at 2509 feet elevation (maximum water surface level for PMF condition). The PMF spillway crest elevation is 2500 feet, and the top of the dam is at 2510 feet. The downstream section of the spillway contains a Type III stilling basin 100 feet long with energy dissipator blocks, which are seven feet in height. The spillway design calculation and rating curve are included in Section 6 of the design calculation notebook.

5.0 Low Level Outlet

The low-level outlet of the detention basin is a 48-inch reinforced concrete pipe (RCP), and is designed to convey 100 cfs during the 1000-year event storm and 87 cfs during the 100-year event storm. The outflow into the RCP is controlled by a circular orifice with a diameter of 1.85 feet. The 48-inch RCP is placed on a supercritical slope and is designed as an open channel section for its entire length. The inlet to the 48-inch RCP is designed as an inlet control structure, and the outlet is a straight drop structure (see Section 5 of the design calculation notebook).

The performance of the low-level outlet is described by its stage-discharge curve. The following table summarizes the stage-discharge curve for the East C-1 Detention Basin.

TABLE 5.1 STAGE - LOW LEVEL OUTLET DISCHARGE RELATIONSHIP

Stage Elevation (feet)	Discharge (cfs)
2446	0.00
2452	31.59
2458	46.66
2464	57.94
2470	67.35
2476	75.60
2482	83.04
2488	89.86
2494	96.20
2500*	102.15
2504	105.93
2056	107.77
2509**	110.47

*PMF Spillway Crest

**Maximum Water Surface - Top of Dam Elevation : 2510 feet

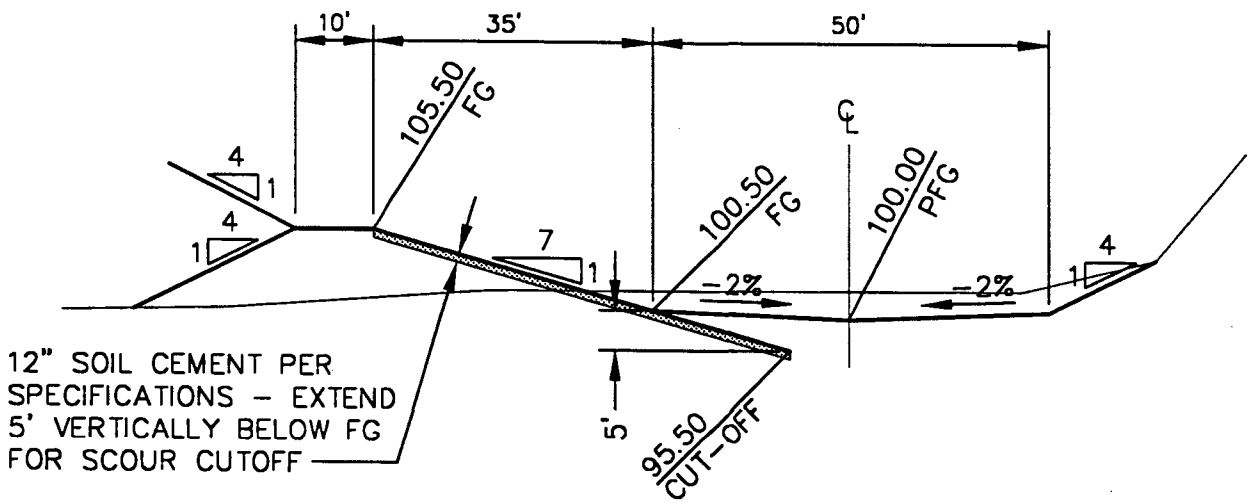
6.0 Outfall Levee Alignment

On October 7, 1997, the SNWA Steering Committee selected the MPU levee (100-yr levee) for the final design adjacent to the eastern boundary of the site. To comply with CCRFCD criteria, the peak flow at the northern end of the levee after the East C-1 Detention Basin and levee are built, must be equal to or less than the peak flow at this point under existing condition. The flow at this point will consist of runoff from C3B3B and outflow from the detention basin, as well as local runoff between the detention basin and the MPU levee. The design flow for the 100 year and 1000 year events at the end of the levee are 599 cfs and 1211 cfs, respectively. The following table summarizes the flow characteristics along the levee during 100 year and 1000 year storm events.

TABLE 6.1 STATION vs 1000-YR AND 100-YR FLOW CONDITION

Station	1000 year Design Flow (cfs)	Flow Depth (feet)	Flow Velocity (fps)	100 year Design Flow (cfs)	Flow Depth (feet)	Flow Velocity (fps)
11+20	1211	1.73	15.10	599	1.24	11.65
14+50	1211	1.74	15.47	599	1.23	11.85
18+56	1211	1.64	15.38	599	1.22	11.72
24+50	1211	1.54	18.96	599	1.09	15.01
29+61	1211	1.66	16.41	599	1.21	12.25
36+00	1211	1.67	16.30	599	1.18	12.62
43+50	1211	1.68	16.23	599	1.21	12.15

The levee was designed as a composite channel with a 2% slope to the centerline and a width of 50 feet. The embankment of the levee is about 5 feet high, with side slopes of 4:1 (H:V) on the upstream side and 7:1 (H:V) on the downstream side (see Figure 6.1) . The channel profile follows the existing surface with minor grading. The detailed analysis is located in Section 8 of the design calculation notebook.



TYPICAL CROSS-SECTION TRAPEZOIDAL CHANNEL WITH LEVEE

FIGURE 6.1

7.0 Inlet and Sediment Control Structure

The detention basin has two inlet locations, one at the north wash and one at the south wash. The inlet structure at each location consists of an earthen stilling basin, covered with a one-foot thickness of soil cement to force a hydraulic jump, which will dissipate the energy of the inflow to the basin. A complete analysis of the inflow discharge versus the detention basin stage was completed for each of the two inlet locations, to determine what inflow discharge was the critical event for the hydraulic jump. The analysis indicated that the optimum location of the stilling basin for the north wash is at station 17+00 where the elevation is approximately 2484.0 which is the 100 year storm event water surface elevation. The inlet structures were designed to force a hydraulic jump to occur as far upstream in the inlet channel as possible, yet still within the detention basin. This placement allows the energy dissipation associated with the jump to occur over a wide range of flow conditions, while allowing any associated sediment deposition to take place within the detention basin rather than in the inlet channel. The calculations for the inlet structure are contained in Section 9 of the design calculation notebook.

8.0 Sediment

A sediment analysis of the watershed was conducted in Section 9 of the design calculation notebook. It estimated sediment inflow from watershed basins to the East C-1 Detention Basin during various storm events with return periods varying from 5 year to the 1000 year design event. The analysis included an application of the Modified Universal Soil Loss Equation (MUSLE) for estimation of the sediment supply from upland areas. For watershed basins having defined channels, the potential sediment supply from stream bed and bank erosion was estimated using a sediment transport equation. The total sediment inflow was then computed as the sum of the sediment supply from upland areas and the sediment supply from stream bed and bank erosion. The sediment storage is two 10-yr events back to back, plus one 1000-yr design event, which totals approximately 70 acre-feet.

Table 8.1 is a summary of the sediment yields from the upstream watershed.

TABLE 8.1

TOTAL SEDIMENT YIELDS FOR UPSTREAM WATERSHED

Return Period (years)	Total Sediment Yields (acre-feet)			
	C4CA	C4CB	C4CC	Total
1,000	44.0	5.0	3.9	53
500	27.4	3.2	2.5	33
100	19.3	2.3	1.8	24
50	15.6	1.8	1.4	20
25	11.3	1.3	1.0	14
10	6.3	0.8	0.6	8
5	3.3	0.4	0.3	4

9.0 Potential Bidders

American Asphalt&Grading

Diamond Construction

Frehner Construction

Las Vegas Paving

Meadow Valley Construction

Lake Mead Constructors

10.0 Appendix

Section	Contents
A.	Permits Matrix
B.	Preliminary Construction Schedule
C.	Cost Estimation and Quantity
D.	Comments and Response from Predesign Report and 90% Submittal.
E.	Vendor Data

The design calculation notebook (separate report) contains the following information in the section listed:

Section	Contents
1.	Basin Parameters
2.	Existing HEC-1 Model
3.	Design HEC-1 Model
4.	PMF Study
5.	Low Level Outlet Calculation
6.	PMF Spillway Calculation
7	Structure Design (by R2H)
8.	MPU Levee Design
9.	Inlet structure Design and Sediment Transportation
10.	Geotechnical Report (by Kleinfelder)

APPENDIX A

PERMITS MATRIX

EAST C-1 DETENTION BASIN
Agency Requirements Summary

Issuing Agency	Permit Type	Regulated Activity	Responsible Party / Application Schedule	Approximate Processing Time	Estimated Fee ($)	Remarks / Status	Schedule
City of Henderson	Grading and Drainage Permit	Required for drainage associated with grading and construction	Contractor - after Conditional Notice to Proceed	1 day	None	Grading Permits must be obtained from the City of Henderson prior to issuance for this permit.	Start of Construction
Clark County Health District	Dust Control Permit	Required for dust emissions from construction, grading and trenching	Contractor - after Conditional Notice to Proceed	7 days	$85.00 per acre		Start of Construction
Clark County Health District	Authority to Construct Certificate	Required for dust emissions from sand and gravel processing from a permanent facility	Contractor - after Conditional Notice to Proceed	2 weeks	**one time:** $168 / emission unit +$42 / ton of emit **annual:** $157 / emission unit	This is required for either the permanent location of a processing unit or if large quantities of material are to be processed through a temporary unit. Health Department will determine if this is required for temporary unit.	Start of Construction
Clark County Health District	Various Locations Operating Permit	Required for dust emissions from construction. grading and trenching where screening is required	Contractor - after Conditional Notice to Proceed	2 weeks	**one time:** $168 / emission unit +$42 / ton of emit **annual:** $157 / emission unit	This is required for the temporary placement of processing equipment. The Clark County Health Department will determine if a Various Locations Permit or a Sand and Gravel Processing permit is required.	Start of Construction
Nevada Division of Environmental Protection	Stormwater Discharge Permit for Construction Activities	Required for storm water diversion/control from work site	Contractor - after Conditional Notice to Proceed	2 weeks	$200.00	Contractor shall fully comply with all provisions as specified.	Start of Construction
Division of Water Resources State Engineer	Dam Permit	Constructed Dam	SNWA	30 days to 60 days	$500.00	Approval of Plans	Final Submittal
Clark County	Use Permit	To construct basin	SNWA	60 days to 90 days		Planning Commission Clark County	Submitted February

EAST C-1 DETENTION BASIN
Agency Requirements Summary

Issuing Agency	Permit Type	Regulated Activity	Responsible Party / Application Schedule	Approximate Processing Time	Estimated Fee ($)	Remarks / Status	Schedule
Division of Water Resources State Engineer	Impoundment Permit	To Impoundment	SNWA	30	$500.00	At the Completion of Construction	End of Construction
City of Henderson	Use Permit	To construct levee	SNWA	60 to 90		Planning Commission COH	Submitted February
Nevada Division of Environmental Protection	Temporary Rolling Stock Part	Work in State Waters and Drainages	Contractor	30 days	$750.00	Requested by SNWA	Start of Construction
Corps of Engineers	404	Work in water way of United States	SNWA	30 to 60 days	N/A		After 90% Submittal
Clark County Public Works	Offsite permit	Construction of basin	SNWA	30 to 60 days	N/A	In lieu of grading permit	Before construction

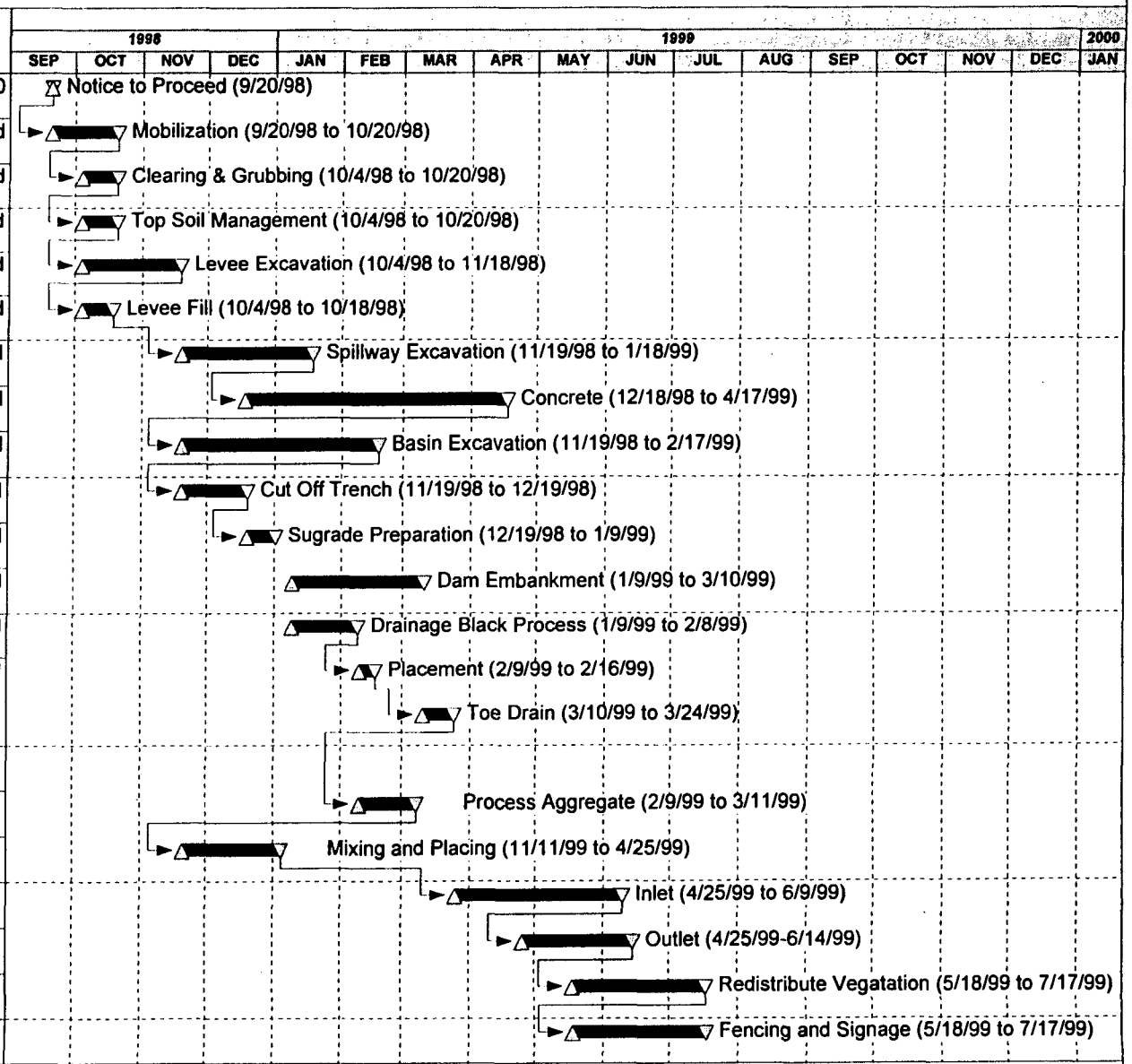
APPENDIX B

PRELIMINARY CONSTRUCTION SCHEDULE

EAST C-1 DETENTION BASIN CONSTRUCTION SCHEDULE

Southern Nevada Water Authority

Description	Orig Dur
Notice to Proceed (9/20/98)	0
Mobilization (9/20/98 to 10/20/98)	30d
Clearing & Grubbing (10/4/98 to 10/20/98)	16d
Top Soil Management (10/4/98 to 10/20/98)	16d
Levee Excavation (10/4/98 to 11/18/98)	45d
Levee Fill (10/4/98 to 10/18/98)	14d
Spillway Excavation (11/19/98 to 1/18/99)	60d
Concrete (12/18/98 to 4/17/99)	120d
Basin Excavation (11/19/98 to 2/17/99)	90d
Cut Off Trench (11/19/98 to 12/19/98)	30d
Sugrade Preparation (12/19/98 to 1/9/99)	21d
Dam Embankment (1/9/99 to 3/10/99)	60d
Drainage Black Process (1/9/99 to 2/8/99)	30d
Placement (2/9/99 to 2/16/99)	7d
Toe Drain (3/10/99 to 3/24/99)	14d
Soil Cement	46d
Process Aggregate (2/9/99 to 3/11/99)	30d
Mixing and Placing (11/11/99 to 4/25/99)	45d
Inlet (4/25/99 to 6/9/99)	45d
Outlet (4/25/99-6/14/99)	50d
Redistribute Vegatation (5/18/99 to 7/17/99)	60d
Fencing and Signage (5/18/99 to 7/17/99)	60d



APPENDIX C

COST ANALYSIS AND ESTIMATION

COST ANALYSIS

No.	Item	Unit	Quantity	Unit Item Price	Total
1	Mobilization	LS	1	280000.00	$280,000
2	Clearing and Grubbing	Acre	50	1500.00	$75,000
3	Subgrade Preparation	SY	690000	1.50	$1,035,000
4	Excavation	CY	450000	3.25	$1,462,500
5	Levee Construction	CY	26000	2.50	$65,000
6	Barrier Rail	LF	1400	40.00	$56,000
7	Dam Embankment	CY	350000	0.35	$122,500
8	Cut-off Trench	LF	220	140.00	$30,800
9	Drainage Blanket	CY	33000	8.00	$264,000
10	Toe Drain	LF	2000	15.00	$30,000
11	Low Level Outlet Pipe	LF	610	450.00	$274,500
12	Inlet Structure	LS	1	130000.00	$130,000
13	Spillway	LS	1	1300000.00	$1,300,000
14	Soil Cement	SY	42000	15.00	$630,000
15	Cement	Ton	2220	90.00	$199,800
16	Flood Control Monitoring Station	LS	1	13000.00	$13,000
17	Outlet Structure	LS	1	35000.00	$35,000
18	Type II Rip Rap	CY	1700	90.00	$153,000
19	Flood Warning Sign	EACH	25	90.00	$2,250
20	End of Road Sign	EACH	7	80.00	$560
21	Chain Link Fence	LF	1960	12.00	$23,520
22	Pipe Rail Gate	EACH	1	3500.00	$3,500
23	Disputes Review Board Allowance	LS	1	25000.00	$25,000
24	Builder's Risk Insurance Allowance	LS	1	6400.00	$6,400
25	All Other Work Required by the Contract Documents	LS	1	350000.00	$350,000
				Total	$6,567,330

Clearing & Grubbing

Basin + Embankment = 1,425,425 ft^2
Nort Sediment Trap = 13,516 ft^2
Spillway = 176,122 ft^2
Outfall Levee = 472,733 ft^2

Subgrade Preparation

Embankment = 444,185 ft^2
Levee = 174,992 ft^2

Barrier Rail

(from plan) = 1400 L.F.

Drainage Blanket

Uppermost Area = 110,502 ft^2

Low Level Outlet Pipe

(from plan) = 610 L.F.

Toe Drain

227 + 328 + 590 + 900 = 1945 L.F.

Cut-off Trench

Embankment area = 220 L.F.

Soil Cement

Embankment = 193,997 ft^2

Inlet stilling basin = 1100 L.F.

Levee = 133,350 ft^2

Cut-Off Wall = 3710 L.F.

Type II Rip Rap

Power Pole I = 883 ft^2
Power Pole II = 2565 ft^2
End of MPU Levee = 16,190 ft^2
Outlet Structure = 2,760 ft^2

Chain Link Fence

Spillway Wall = 596 L.F.
Stilling Basin = 202 L.F.
Outlet Structure = 335 L.F.
Drop Structure = 22 L.F.

Flood Warning Sign

(from plan) = 25

Pipe Rail Gate

(from plan) = 1

End of Road Sign

(from plan) = 7

Flood Control Monitoring Station

(from plan) = 1

Wednesday, February 18, 1998

EAST C-1 DETENTION BASIN
W.O. #5244

DETENTION BASIN EARTHWORKS

GRID METHOD USING 5' x 5' GRID CELL SIZE

Site Volume Table: Unadjusted

Cut yards	Fill yards	Net yards	Method
Site: d7			
Stratum: d7 eg-b d7			
251782	339213	87431 (F)	Grid

Wednesday, February 18, 1998

EAST C-1 DETENTION BASIN
W.O. #5244

SPILLWAY EARTHWORKS

SECTION METHOD CUT SW TO NE AT 2' INTERVALS

Site Volume Table: Unadjusted

Cut yards	Fill yards	Net yards	Method
Site: sw2			
Stratum: sw2 eg-b sw2			
144302	1531	142770 (C)	End area
144299	1558	142741 (C)	Prismoidal

5244
C-1 DETENTION BASIN
CUT VOLUME

STATION	CUT AREA (ft.^2)	AVG CUT AREA (ft.^2)	VOLUME (ft.^3)	VOLUME (YDS^3)
19+50	250	825	41,250	1,528
20+00	1,400	2,200	110,000	4,074
20+50	3,000	3,000	150,000	5,556
21+00	3,000	2,050	102,500	3,796
21+50	1,100	1,075	53,750	1,991
22+00	1,050	1,050	52,500	1,944
22+50	1,050	1,000	50,000	1,852
23+00	950	925	46,250	1,713
23+50	900	875	43,750	1,620
24+00	850	900	45,000	1,667
24+50	950	1,013	50,625	1,875
25+00	1,075	1,188	59,375	2,199
25+50	1,300	1,650	82,500	3,056
26+00	2,000	2,285	114,250	4,231
26+50	2,570	2,385	119,250	4,417
27+00	2,200	1,775	88,750	3,287
27+50	1,350	1,075	53,750	1,991
28+00	800	875	43,750	1,620
28+50	950	1,275	63,750	2,361
29+00	1,600	2,050	102,500	3,796
29+50	2,500	3,000	150,000	5,556
30+00	3,500	3,775	188,750	6,991
30+50	4,050	3,525	176,250	6,528
31+00	3,000	2,850	142,500	5,278
31+50	2,700	3,075	153,750	5,694
32+00	3,450	4,200	210,000	7,778
32+50	4,950	5,550	277,500	10,278
33+00	6,150	6,175	308,750	11,435
33+50	6,200	6,175	308,750	11,435
34+00	6,150	6,275	313,750	11,620
34+50	6,400	6,925	346,250	12,824
35+00	7,450	8,025	401,250	14,861
35+50	8,600	9,075	453,750	16,806
36+00	9,550	9,575	478,750	17,731
36+50	9,600	9,250	462,500	17,130
37+00	8,900	7,900	395,000	14,630
37+50	6,900	5,775	288,750	10,694
38+00	4,650	3,475	173,750	6,435
38+50	2,300	1,550	77,500	2,870
39+00	800	525	26,250	972
39+50	250	125	6,250	231

TOTAL CUT VOLUME =	6,813,500	252,352

Tuesday, April 14, 1998

REVISED LEVEE EARTHWORK QUANTITIES

Site Volume Table: Unadjusted

Cut yards	Fill yards	Net yards	Method
Site: lev2			
Stratum: lev2 eglev lev2			
19867	13795	6072 (C)	Grid
20050	13995	6055 (C)	End area
20048	13991	6057 (C)	Prismoidal

EAST C-1 CHANNEL
STRUCTURAL QUANTITIES

SPILLWAY	
CONCRETE	2661 CY
WEEP HOLES	18
DRAIN ROCK	88 CY
GEOTEXTILE FABRIC	559 SY
EXPANSION DOWELS	410
EXPANSION JOINT FILLER	410 LF
HORIZONTAL SEALED JOINTS	1845 LF
VERTICAL SEALED JOINTS	504 LF
OUTLET DROP STRUCTURE	
CONCRETE	41 CY
WEEP HOLES	3
DRAIN ROCK	11 CY
GEOTEXTILE FABRIC	68 SY

OUTLET STRUCTURE	
CONCRETE	426 CY
WEEP HOLES	10
DRAIN ROCK	50 CY
GEOTEXTILE FABRIC	321 SY
GALVANIZED STEEL FOR TRASH RACK	15,525 LB
EXPANSION JOINT FILLER	410 LF
HORIZONTAL SEALED JOINTS	187 LF
VERTICAL SEALED JOINTS	100 LF

APPENDIX D

COMMENTS AND RESPONSE

COMMENTS AND RESPONSE FOR PRE-DESIGN REPORT

Southern Neva ater Authority
East C-1 Detention Basi. e-design Report (080-K)
Draft Redesign Report

Package: East C-1 Detention Basin
Reviewer: Marc Jensen
Documents : ALL

Date: 17 October 1997
Discipline : General

Item No.	Reference	Comment	Resp. Code	Response
1.	Table of Contents Page ii	Section 1.1, Summary and Recommendation is actually on page 26, not 21	A(2)	OK
2.	Introduction	I have some minor editorial comments as noted on the attached copy of this page. Additionally, please note that the primary purpose of this MPU facility is to provide flood protection to a region of the Las Vegas Valley, not just the Authority's WTF. Also, the Authority has established a standard of referring to the River Mountains Water Treatment Plant as a "facility" not a "plant". These concepts should be applied appropriately throughout this predesign report.	A(2)	OK
3.	Section 3.0, Par. 3.2A, Pg 2	If I add up the areas listed for subassins C4CA, C4CB, C4CC I get 5.32 sq mi. This is consistent with the total area stated in other areas of the report, but not consistent with the total drainage area of 5.49 sq mi stated in this paragraph for subbasin C4C.	A(2)	OK
4.	Figure 1.1	For the City of Henderson Grading and Drainage Permit, since the basin is not in the City of Henderson, is a COH grading and drainage permit still required? The remarks section for this permit references an Occupancy Permit. What is that?	A(2)	Yes. The levee portion is still within the COH. A grading permit may be required. Occupancy Permit is a loose term/ Grading Permit is prosper
5.	Figure 1.1	For the Division of Water Resources Dam Permit, should not the City of Henderson apply for this permit since they will be the owners and operators? The processing time for this permit does not identify the units of time. Is it days, weeks, months or what?	D	Will require discussion with COH and SNWA. 60 - 90 days typical for Permit.

Package: East C-1 Detention Basin
Reviewer: Marc Jensen
Documents : ALL

Date: 17 October 1997
Discipline : General

Item No.	Reference	Comment	Resp. Code	Response
6.	Figure 1.1	For the Clark County Use Permitted, perhaps it should state "Use Permit". Same comment as above about time units.	A(2)	OK
7.	Figure 1.1	For the Division of Water Resources Impoundment Permit, should not the City of Henderson apply for this permit since they will be the owners and operators?	D	Will require discussion with COH and SNWA.
8.	Figure 2.1	This Property Ownership Map should show all existing easements (such as for power transmission lines) and mining claims. The text on this figure is so small as to be almost unreadable. The boundaries of the WTF are shown but not identified. The version of the figure is a poor work product.	A(2)	OK
9.	Section 3.0, par. 3.2.a, Pg 3	Change "WTP" to "WTF.	A(2)	OK
10.	Section 3.0, Par. 3.5.C, Pg 7	Change "WTP" to "WTF". Identify the precipitation period duration in Tables 3.3 and 3.4. It seems from the text that the precipitation is in inches per 6 hours.	A(2)	Yes. Six hour is the design storm per the CCRFCD Manual.
11.	Section 4.0, Table 4.1, Pg 10	The title of this table does not seem to be consistent with its content. The table seems mostly to be a summary of the hydraulic conditions for the C4C subbasin under various storm events. But the last two columns seem to describe the outflow and storage of a particular detention basin, without identifying what basin that is. This confuses me as a reader. Also, why do the inflows for each of the east, middle and west subbasins not equal the number shown in the total inflow column	A(2) N	The numbers were based on 1996 MPU plan. It will be clarified in the text. The time to peak for each subbasin is different than in the overall time to peak for the detention basin.

Package: East C-1 Detention Basin
Reviewer: Marc Jensen
Documents : ALL

Date: 17 October 1997
Discipline : General

Item No.	Reference	Comment	Resp. Code	Response
12.	Section 5.0, Par. 5.1 Pg 10	Please see my editorial comments on the attached copy of page 10.	A(2)	OK
13.	Section 5.0, Table 5.1, Pg 12	This table is exactly the same as Table 4.1, except that the title is different and you have added a row for the PMP event. The same comments I made for table 4.1 apply to Table 5.1.	N	Yes. PMP is discussed in section 5.0 therefore we compared it to the data in Table 4.1 and in Table 5.1.
14.	Section 6.0, Table 6.1, Pg 13	Here we have another table that offers little additional information that is not already provided in Table 4.1 and 5.1. What is the point? My comments pertaining to table 4.1 also apply to 6.1?	A(2)	OK. Table 6.1 will be deleted.
15.	Section 6.0, Table 6.2 , Pg 13	The significant digits for the Storage Elevations in table 6.2 are not consistent.	A(2)	OK

Package: East C-1 Detention Basin
Reviewer: Marc Jensen
Documents : ALL

Date: 17 October 1997
Discipline : General

Item No.	Reference	Comment	Resp. Code	Response
16.	Figure 8.1	My comments on this figure apply to all figures illustrating each alternative discussed in the report.	A(2)	OK
		The figure should provide a subtitle box or table that prominently identifies the basin hydraulic criteria including: - Design inflow event (recurrence interval) - Inflow for that design event - Maximum design outflow - Clearwater storage volume - Sediment storage volume	A(2)	OK
		Much of the text in the figure is too small to comfortably read.	A(2)	OK
		This predesign report should discuss, identify and show on this figure the expected route of the access road for construction and operations.	A(2)	OK
		This predesign report should discuss, identify, and show on this figure the expected temporary fencing required for construction and permanent fencing required for operations.	D	It will be shown in the final design, which is typical for this type of project.
		The basin should incorporate a concrete pad in the sediment storage area to provide a hardened scraping surface for sediment removal.	N	Typically sediment storage is earth, with bench markers used to guide sediment removal.
		Cut and fill slopes should be sufficiently gentle to keep erosion of sediments into the basin at reasonable levels.	A(2)	OK. Soil cement will also provide the erosion protection on the embankment.

Package: East C-1 Detention Basin
Reviewer: Marc Jensen
Documents : ALL

Date: 17 October 1997
Discipline : General

Item No.	Reference	Comment	Resp. Code	Response
17.	Table 8.1, Pg 17	This table is not well organized. I suggest reordering the sequence of the columns and completely revising the footnotes to be more logical in their presentation., see the attached copy of my markups for this page.	A(2)	OK
18.	Section 9.0, Par. 9.1, Pgs 17 & 18	I had a hard time understanding the presentation on the levee alternatives to the basin alternatives. I believe this Section needs more work to clarify the concepts. I have some markups of these two pages attached, but the Section needs much more revision than my markups indicate to make it a clear and understandable presentation.	A(2)	OK
19.	Figure 9.2	Show the flow path from the overflow spillway of the basin to the type IV stilling basin. Label the stilling basin.	A(2)	OK
20.	Section 9.0, Par. 9.5 and Section 10. Pg 19	See the attached copy of my markups.	A(2)	OK
21.	Tables 10-1 thru 10-6, Pgs 20 -25	Put a subtitle on each estimate sheet that identifies the design inflow event or recurrence interval flood protection that this alternative provides to the WTF.	A(2)	OK
22.	Section 11.0, Pg 26	This summary section should describe the conclusions of the Technical Steering Committee presentation on 7 Oct 97. Also, see the attached copy of my markups for this page.	A(2)	OK

Package: East C-1 Detention Basin
Reviewer: Marc Jensen
Documents : ALL

Date: 17 October 1997
Discipline : General

Item No.	Reference	Comment	Resp. Code	Response
23.	Appendix L	This Environmental Impact Update is very disappointing and unacceptable to me. It appears that the authors spent less than a day's effort in preparing this report. I cannot believe that it is wise to assume that the environmental issues can wait until the final design is complete to be addressed. Moreover, with reference to Section 6.0, why does Kleinfelder believe SNWA has responsibility for conducting field reconnaissance for biological resources? It was my understanding that all environmental issues would be addressed under VTN's scope of work. This expectation established the basis of my disappointment with this environmental report. It is wholly inadequate for the requirements of the project, is my expectation for this scope of work in error?	D	Note: Response by Kleinfelder Final Design Plans: Based on our meeting with Bureau of Land Management (BLM) and Regional Flood Control District (RFCD), the evaluation of issues, including but not limited to cultural and biological resources had to be delayed until the preferred engineering design alternative plans were available. It is our understanding that the final engineering design alternative would be selected by October 23, 1997. Based upon the preferred engineering design, the Area of Potential Effect (APE) can be identified. Once the APE is identified, the impact of the biological resources, cultural resources and other environmental issues can be completely evaluated. If potential impacts are identified, appropriate mitigation/avoidance plans will be developed. Note: Response by VTN VTN agrees. Environmental is part of our scope. There appears to be confusion on the assignment of responsibilities for this task (see also L. Luptowitz comments and Kleinfelder's response). Suggest that we meet and work this out.
24.	General	In addition to the technical issues, this report should identify and provide a short discussion of the potential and recommended conjunctive uses for the detention basin. For example, the basin could be used as a shooting range, horse arena or BMX course in dry weather conditions.	D	Need to discuss with SNWA, CCRFCD and COH.
25.	General	There should be a discussion in this report about the relocation of power poles and the impact of each alternative on power poles. I expect to see in this report some results of preliminary discussions with Nevada Power Co.	A(2)	OK. This will be included in Appendix.

Package: East C-1 Detention Basin
Reviewer: Marc Jensen
Documents : ALL

Date: 17 October 1997
Discipline : General

Item No.	Reference	Comment	Resp. Code	Response
26.	General	This report should include a discussion of fencing issues.	D	We suggest that this be addressed in the final design.

Southern Neva ater Authority
East C-1 Detention Basin Predesign Report (080-K)
Draft Predesign Report

Package: East C-1 Detention Basin
Reviewer: L. Luptowitz

Date: October 22, 1997
Discipline: Environmental

Item No.	Reference	Comment	Resp. Code	Response
1	Figure 1.1 Permit Summary	Add another permit: Nevada Division of Environmental Protection, Temporary Rolling Stock Permit, Required for work in state waters and drainageways with a defined bank, Contractor - after Conditional Notice to Proceed, 30 days, $250.00, Contractor shall be responsible for fully complying with all stipulations of the permit, start of construction.	A(2)	OK.
2	Appendix I.	Item 6.0, Biological Resources, second paragraph. Delete second sentence. Add sentence at end of paragraph: the Southern Nevada Water Authority will conduct the construction monitoring and reporting required in the Biological Opinion.	A(2)	Note: Response is by Kleinfelder This sentence will be added in our final report.
3	Appendix L	Item 10.0, Cultural Resources. Delete last sentence. Replace with: When detailed engineering plans become available, the Southern Nevada Water Authority will conduct cultural resources field surveys of the impact area. If any potentially significant cultural resources are present, the Authority will prepare and submit a site treatment plan in consultation with the Bureau of Reclamation, and conduct the treatment prior to initiation of construction. During the construction of the project, if any cultural resources are uncovered, ground disturbing construction activities in the immediate area shall be temporarily halted, and a qualified archaeologist shall be contacted to evaluate the discovery and make any recommendations for additional mitigation. Construction cannot resume in the affected area until the mitigation measures have been completed.	W	

Southern Neva[illegible]ater Authority
East C-1 Detention Basin (080-K)
Draft Predesign Report

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-01	Table of Contents	Please recheck the reference page number.	A(2)	OK
CIVPD R-02	General	Suggest providing more descriptions of design criteria, design parameters, design methodology and approach procedure.	A(2)	Design criteria per CCRFCD manual.
CIVPD R-03	General	Please cross check all calculated values presented in the text, tables, figures and Appendixes. These are not consistent.	A(2)	OK
CIVPD R-04	General	Suggest addressing the function of each Appendix.	A(2)	OK
CIVPD R-05	Figure 1	Please add locations of SNWA-WTP, C-1 channel and Drake channel in this figure.	A(2)	OK
CIVPD R-06	P. 2 & 3	Is C4C including C4CA, C4CB, C4CC and C4CD? If yes, the area for C4CD should be 0.17 square miles not 0.017 square miles. Otherwise, the area of C4C should be 5.32 square miles not 5.49 square miles.	A(2)	OK.
CIVPD R-07	Figure 2.1	Please add a North sign.	A(2)	OK
CIVPD R-08	P. 5, Section 3.5	The hydrology analysis is based on 100-year six-hour rainfall. Why is it not based on 100-year 24-hour rainfall? Does 6-hour rainfall generated more flood flow than 24-hour rainfall? The CCRFCD (Section 304.2) required the design based on runoff from two storm events; a minor storm event (10-year) and a major storm event (100-year). Shouldn't this criteria be applied to this study? Please clarify.	A(2) N	Per CCRFCD Design Criteria p-504. In this case, the facility is designed to handle the major event (100-year plus). Since the minor event will produce much less runoff, the facility will also handle the minor event.
CIVPD R-09	P. 6, Section C	Please present a typical figure (Figures 501 to 506) to indicate the site location on the map. This will facilitate interpolating the rainfall depth from the "Rainfall Depth-Duration-Frequency" curve.	A(2)	Agree. It will be added to Appendix M.

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-10	P. 7, Table 3.3	Suggest adding two rows to show the rainfall depth and the local precipitation adjustment ratio.	A(2)	Agree.
CIVPD R-11	P. 7, Table 3.4	P/P_{100} value is not consistent with the values presented in Appendix J. Please verify.	A(2)	OK
CIVPD R-12	P. 7, 1st paragraph	Log Pearson Type 3 distribution has been popularly used in the flood analysis. Shouldn't this method be more appropriate for this study?	N	No. Based on the study provided in this report (Appendix J), Gumbel distribution provides the best prediction result, with correlation factor (R squared) equal to 0.996.
CIVPD R-13	P. 8, Section 3.8	The range of the weighting factor from 0.15 to 0.2 are used in this study. Are these weighting factors based on recorded survey data? Please indicate the source.	N	Per CCRFCD Design Criteria P-620 attached.
CIVPD R-14	P. 9, Section 4.0	The storage volume 271.0 acre-ft and peak outflow 414 cfs of 100-year frequency are not consistent with Table 4.1. Please verify. Last sentence, suggest adding words "except PMP" after "Table 4.1".	A(2) A(2)	The values cited are regional estimates for planning from the MPU. Table 4.1 values were developed using site - specific data. OK
CIVPD R-15	P. 12, Section 6.1	Should Figure 2.1 be Figure 3.1?	A(2)	OK
CIVPD R-16	P. 13	The PMF peak outflow in Table 6.1 and Table 6.2 is not consistent. Please revise.	A(2)	OK

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-17	P. 14, Table 7.1	What is the crest length? Is it the length of embankment? Why does the spillway require 200' width since the outflow rate is so low (see Figures 8.2 & 8.6)?	A(2)	The crest length equals the width of the spillway for this project. Spillway is for emergency and is sized for PMF with 1' freeboard.
		Is it reasonable to use straight PMF flow rate, as Appendix E calculated, to size the spillway without considering reservoir additional detention volume? Suggest evaluating the embankment height and width of spillway using the reservoir flood routing method to obtain an optimum design.	N	Yes. The size of emergency spillway was based on no storage condition, which is the worst case for the design.
CIVPD R-18	P. 14, Section 7.2	If there is only $100,000 difference between RCC spillway and reinforced concrete spillway, then the reinforce concrete spillway will be favored due to the consideration of concrete strength, flow negative pressure, RCC cracking, and flow friction.	A(2)	OK Concrete spillway will be included for final design.

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-19	Figures 7.1 and 7.2	Should Z value be 4 or 6 not 4' or 6'? Please revise. What is the embankment height?	A(2)	OK. The height of the embankment is varied. Please see the alternative grading plans.
		Is it safe to locate the energy dissipator basin within the embankment section?	A(2)	Embankment will be protected
		Shouldn't retaining walls on both sides of spillway be required?	A(2)	Yes.
		Shouldn't the impervious cut-off core (or curtain) be required? Shouldn't seepage control facility be required?	N	Drain time is less than 7 days, which is a low seepage flow rate. A drainage Blanket is also considered for the design. See comment #R-43.
		Shouldn't erosion protection be needed to protect the embankment face?	A(2)	Yes. Soil Cement. See Cost Estimate.
		Shouldn't inlet and outlet structures be required for the 48"⌀ RCP?	A(2)	Yes. Planned on in Design. See Cost Estimate.
		At the spillway entrance at the upstream, shouldn't the concrete slab be constructed along and on top of the embankment slope?	A(2)	OK Will be looked at in Design.
		Please provide more detail of embankment cross section.	A(2)	OK

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-20	Figure I	In general the RCC dam has mass structure body. Is this RCC spillway stable and durable? If the spillway RCC slab is only 4' thick and downstream face protected by a layer of RCC (10' RCC lifts). Please discuss in the text.	N	RCC has proven in the past to be excellent for detention basins in the Las Vegas Valley, and by the Corps of Engineers.
CIVPD R-21	P. 15, Section 8.0	Please recheck all values specify in this section. They are not consistent with the values shown on Table 6.1.	N	Table 6.1 is a comparison between different design events. Section 8 contains the actual design models for different alternatives.
CIVPD R-22	Section 8.0, General	Shouldn't rerouting the existing roads and locating the construction road be considered in this planning stage?	D	No. This will would be addressed in final design since roads are only unimproved dirt.
CIVPD R-23	Section 8.0, General	Is there any possibility of locating the spillway on the existing ground (over the hill top) instead constructed on top of the embankment?	N	No. Spillway is for emergency flow in excess of the design flows.

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-24	Figure 8.2	Please indicate (point out) 100-year and 1000-year inflow and outflow hydrograph curves on this figure.	A(2)	Agree.
		Why is the outflow hydrograph curve so flat? Is this outflow hydrograph for both spillway and 48"ø discharge pipe? What is the delay time between peak inflow and outflow? Please clarify in the text.	N	It is the low level outlet flow only.
		Is this outflow hydrograph calculated based on the reservoir flood routing method? Please address in the text.	A(2)	The calculation is based on reservoir flood routing method provided by HEC-1 package.
		The peak outflow rate seems very low. Based on the maximum storage elevation 2445 ft (Figure 8.4), the outflow rates from 48"ø discharge pipe (Inv. El. 2375.5 ft) and 200' width spillway (crest El. 2435 ft) will general much higher flow rates. Please verify.	N	It is only for low level outlet.
CIVPD R-25	Figure 8.4	Should the top of the embankment be 2445 ft instead of the maximum storage elevation? See Section 8.2.	A(2)	OK
CIVPD R-26	P. 16, Section 8.4	Figure 8.1 is not for Alternative 3, please change to Figure 8.9.	A(2)	OK
CIVPD R-27	Figure 8.9	Relocating the embankment site about 50' downstream at the more narrower valley section should be seriously considered.	D	It will be reviewed however it would severely affect existing power poles.
CIVPD R-28	P. 18, Section 9.2	What kind of material will be used to build the levee?	A(2)	Earth/ with RCC/ soil cement cap.
		Should surface protection be required?	A(2)	Yes.
CIVPD R-29	Figure 9.1	Suggest adding horizontal and vertical dimension scales and hydraulic grade line on profile. Please indicate embankment site on this figure.	A(2)	OK

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-30	Figure 9.2	Please indicate the embankment location on the plan.	A(2)	OK
		Is it possible a hydraulic jump right at the upstream of the weir? Please verify.	A(2)	Yes. It was designed on purpose to control the sediment and flow condition (ie subcritical flow condition).
		In section A-A, is 50' width channel enough to handle the PMF flood?	N	It is the MPU levee (designed for the 100-year event, not the PMF flood).
		What is 100' opening of weir structure mean? Is it the width of weir crest or an orifice?	A(2)	Horizontal crested weir.
CIVPD R-31	P. 20, Table 10.1	Is the excavation material used for embankment fill? Why is the excavation volume higher than fill volume?	A(2)	To make RCC/soil cement/ sediment control structure/horizontal drainage blanket.
		Is this excess excavation volume a non-suitable material?	A(2)	It will be determined when we receive more detail geotechnical report.
		How is the excess material to be disposed of and what is the cost?	A(2)	Excess would be disposed on site per Federal Law. See cost estimation.
CIVPD R-32	P. 26, Section 11	Suggest including conclusions and recommendations from the dam break study (Appendix F), sediment transport (Appendix H), stability analysis and seepage analysis (Appendix K) and environmental impact (Appendix L) in this Section.	A(2)	Agree for sediment transport and dam break study.
			N	Environmental impact and stability analysis and seepage analysis should be in appropriate appendix

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-33	Appendix A & Appendix B	This hydrology study was based on the information from the 96 MPU Study. The HEC-1 calculation of 96 MPU Study only provided C4C information, but no information for C4CA, C4CB, C4CC and C4CD was provided. Please verify how you interpolate the information from Appendix A for Appendix B HEC-1 calculations.	A(2)	1996 MPU is a planning document. C4CA, C4CB,C4CC and C4CD are sub-divided from C4C, based on more detailed topo, to define design points within the basin. All the design parameters are re-calculated per CCRFCD Design Criteria.
CIVPD R-34	Appendix C	Suggest explaining the calculation methodology and procedure in the text. Where is the inflow rate?	D	Need clarification before we can respond to this comment.
CIVPD R-35	Appendix C, P.1	The discharge pipe is a 48" ø RCP, do you plan to install a gate as an orifice at the entrance to control the discharge flow rate? Please clarify.	N	No. All flood control systems must be passive per CCRFCD Design Criteria.
CIVPD R-36	Appendix D	Page 2, please indicate the hour sequence in first column.	A(2)	OK
CIVPD R-37	Appendix E, Stepped spillway design	Suggest providing complete information of reference document. Are these steps of spillway completely submerged and in a skimming flow regime? If yes, the current method presented by Dr. Rajaratnam does not apply to this case, which is under development now. Please see internet information (http/maligne.civil.ualberta.ca/water/research/restopics/mohammad.html).	A(2) N	Agree. The paper provided in this report has been accepted and applied in Las Vegas area. A similar lab study, performed by Charles E. Rice and Kem C. Kadavy, is attached.
CIVPD R-38	Appendix G	Which computer program is used to perform this calculation?	A(2)	WSPG
CIVPD R-39	Appendix K	Suggest providing description of this geotechnical report.	A(2)	OK
CIVPD R-40	Appendix K	Suggest providing rock description table.	D	Will be included in final geotechnical reports.
CIVPD R-41	Plate B-12, Appendix K	Are both samples using the information from B-1 boring at 0-5 ft depth?	A(2)	The second test was performed on soils from B-2, 0-5 feet.

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-42	Appendix K, P. 3 Seepage Analysis	The permeability coefficient $1x10^{-1}$ cm/sec used in the analysis is one order of magnitude large than the test results indicated in the Plate B-12. Is this an upper boundary value? If yes, what is the analysis result for the corresponding lower value?	N	We selected the worst case permeability for our analysis, which indicates that the seepage front will not migrate through the embankment. An analysis based on a lower permeability value would result in a shorter seepage front migration distance (less embankment saturation).
CIVPD R-43	Appendix K, Figure 1	Please indicate water levels, basin bottom elevation, soil embankment and bedrock zones.	A(2)	Labels will be included on Figure 1 in future reports. The analysis takes into account inflow stage seepage, and is based upon the design hydrologic data provided.
		Is this seepage analysis based on the seepage starting when the flood front reached the embankment? If not, please include in the analysis because this inflow stage seepage may affect the outcome. The longer seepage results should be used for slope stability analysis.	A(2)	Both a blanket and toe drain have been recommended to control seepage within the embankment, in the event that the embankment is subjected to longer inundation times.
		Did you consider the worst seepage condition while flood stays in the reservoir for a much longer time or for two consecutive floods?		
CIVPD R-44	Appendix K, P.3 Stability Analysis	The LLE seismic ground acceleration is 0.22g. Is this a peak ground acceleration or amplified responses? Please indicate soil type and amplification factor used in the analysis.	N	0.22g is the peak ground acceleration.
CIVPD R-45	Appendix K, P. 3 Seepage Analysis	The d_{10} values obtained from the sieve analysis indicated values varied from 0.3 mm of fine sand to 0.08 mm of silt. These values indicate that there will be significant capillary action. Has this capillary action been considered in the seepage analysis?	A(2)	Yes. SEEPW users select a conductivity function which incorporates the negative pore pressure associated with capillarity into the seepage analysis.

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, B. Liu, J. Chuang
Documents: Draft Predesign Report

Date: 10 October 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVPD R-46	Appendix K, P. 3 Slope Stability Analysis	The soil internal friction angle of 35° was used in the analysis. Does this value apply to both saturated and unsaturated conditions?	A(2)	Yes. Most of the strength for granular soil comes from the interlocking of grains and typically does not vary significantly between wet and dry.
CIVPD R-47	Appendix K, General	Shouldn't sliding analysis, piping effect analysis and face sloughing analysis be performed?	D	Final embankment location and geometry were not established at the time of the pre-design report.

Southern Neva ter Authority
East C-1 Detention Basin re-Design Report (080-K)
Draft Predesign Report

Package: East C-1 Detention Basin
Reviewer: J. Clark
Documents: ALL

Date: October 10, 1997
Discipline: MW/Hill

Item No.	Reference	Comment	Resp. Code	Response
1	Figure 1.0	Suggest showing River Mountains Water Treatment Facility on this figure	A(2)	OK
2	Paragraph 3.2.A	Total drainage area reported does not appear to add up. 4.59+0.38+0.35=5.32 square miles. Subbasin C4CD not mentioned.	A(2)	OK
3	Figure 1.2	Construction of low level outlet and heavy spillway excavation are shown to occur simultaneously, how is this possible? Why are inlet excavation tasks repeated?	N	Because the Spillway on the Recommended alternative is on the hill, and the low level outlet is in the valley. There are three inlets in the recommend alternative.
4	General	Calculations for curve numbers and lag times should be provided. Difficult to compare to hydrologic report for RMWTF without them.	A(2)	OK
5	Table 3.4	Probable maximum precipitation values should be provided.	N	Disagree. The PMF is not discussed until Section 5.
6	Table 5.1, 6.1	It's not clear why storage volumes reported in Table 5.1 and 6.1 are different. Please clarify.	A(2)	OK
7	Paragraphs 8.2, 8.4 and Table 8.1	Inflows and in some cases, storage volume values reported do not match values reported in Tables 5.1 and 6.1. Please clarify.	A(2)	Table 5.1 and 6.1 compare different storm events based on 1996 MPU plan. Section 8.0 is the actual design model.
8	Paragraph 9.1	Area reported for Subbasin C4CD is 0.017 square miles. Table 3.2 shows the area to be 0.17. Which value is correct?	A(2)	The correct value is 0.17 sq. miles.
9	Table 10.1 through 10.6	Recommend that a breakdown of spillway costs be provided.	D	The breakdown will be addressed during design when more detail quantities are developed.
10	Paragraph 5.3	It is generally recommended that minimal attenuation NOT be assumed for a PMF flood.	N	This is a minor issue, and would not have any effect on the size of the spillway.

Southern Neva[illegible]/ater Authority
East C-1 Detention Bas[illegible]redesign Report (080-K)
Draft Predesign Report

Package: East C-1Detention Basin
Reviewer: S. Cross
Documents: Draft Pre-design Report

Date: October 22, 1997
Discipline: Construction

Item No.	Reference	Comment	Resp. Code	Response
1	1.1 Permit Matrix Fig. 1.1	Responsible party/application schedule references a footnote - none included	A(2)	OK
2	7.2 Spillway Type Pg 14	Last paragraph "The standard conc. spillway ... without the steps of the d/s face... should the or be on? Standard concrete spillway will have a d/s face.	D	Need clarification to respond to this comment.
3	7.2 Spillway Type Pg 14	Last paragraph; last sentence, double typing "of the"	A(2)	OK
4	Fig. 7.2 Alternate 2	Should buffle block be baffle?	A(2)	Yes.
5	Fig. 7.1 & 7.2	Title clock: Are the East C-1 Detention Basin & Railroad East Detention Basin in the same	A(2)	OK.
6	Table 8.1 Pg 17	Alternate 1.1 has outflow = 108 cfs the text description, paragraph 8.2, Pg. 15 has peak overflow = 105 cfs. Which is correct?	A(2)	OK.
7	Para. 9.1, Pg 17	Last sentence: correct "downs -stream"	A(2)	OK.
8	Appendix E, Pg 3	The ogee spillway crest rating curve appears to have used a "C" value of 3.88, not 3.78	A(2)	OK.
9	Appendix E, Pg 1	Stepped spillway design: 6th line, reference misspelled	A(2)	OK.
10	Appendix E, Pg 1	Flow characteristics over spillway basin depression: Height misspelled	A(2)	OK.

Package: East C-1Detention Basin
Reviewer: S. Cross
Documents: Draft Pre-design Report

Date: October 22, 1997
Discipline: Construction

Item No.	Reference	Comment	Resp. Code	Response
11	Appendix F, Pg 2	Characteristics of dam "beak" waves, Break misspelled in heading, 2nd line change "he" to "the"	A(2)	OK.
12	Appendix F, Pg 7	References misspelled	A(2)	OK.
13	Appendix G, drop sti Pg 1	Location misspelled	A(2)	OK.
14	Appendix H, Pg 1	Sediment study - last line, last work change loses	A(2)	OK.
15	Appendix H, Pg 22	Second line work missing after "based"	A(2)	OK.
16	Appendix H, Pg 25	Second line "protected" should not be past tense	A(2)	OK.
17	Appendix H, Pg 33	V. references - second line division misspelled	A(2)	OK.
18	Appendix J Equation (9)	Third line after equation (9) achieved should not be past tense	A(2)	OK.
19	Appendix J	Analysis of preceip depths for LV area listing Gumbel Distribution - (3) normalized misspelled.	A(2)	OK.

Southern Neva Water Authority
East C-1 Detention Basin Predesign Report (080-K)
Draft Predesign Report

Package: East C-1Detention Basin
Reviewer: N. Keele

Date: October 22, 1997
Discipline: Construction

Item No.	Reference	Comment	Resp. Code	Response
1	Table 3.1, Pg 5	Due to the low infiltration rate characteristics to the valley use of type "A" soils should be eliminated in the hydrologic considerations?	N	The information was based on the SCS soil map. Small Portion of type "A" soil is found in this area.
2	Page 16, P.8.5	Should the first sentence read "Alternate 4 is an expansion of Alternate 3..."	A(2)	OK.

Package: East C-1 Detention Basin
Reviewer: Steve Roberts
Documents: ALL

Date: October 27, 1997
Discipline: CCRFCD

Item No.	Reference	Comment	Resp. Code	Response
1.	Section 2	Provide a description of current land ownership, including City of Henderson's ROW grant from the Bureau of Land Management, mining claims, and power company easements, and what actions are being taken to secure sufficient interest in the land to construct the project. Improve referenced Figure 2.1 to show limits of various land ownership with the recommended detention basin and levee configuration.	A2	OK
2.	Section 3	VTN developed only one existing condition hydrologic model of the watershed for each detention basin alternative. The assumption implicit with this design approach is the watershed upstream of the detention basin will not be developed during the design life of the basin. Normal practice for hydrologic analyses for design of flood control facilities includes assembling hydrologic models of the watershed for existing and future conditions. State explicitly that development of the watershed is not anticipated.	N	Based on 1996 Master Plan Update, the detention basin site is located outside Ultimate Developed Boundary of Las Vegas Valley. The models developed in this report were based on the assumption that future and existing condition will remain the same.
3.	Following Section 3.4	Provide a summary table showing the subbasin characteristics.	A2	OK
4.	In Section 3.5-C	State the District's standard design storm. flood control facilities is the 100-year, 6-hour storm; the Authority desires a higher level of protection for the water treatment plant (WTP); and the Authority directed VTN to complete a hydrologic analysis for storms with recurrence intervals exceeding 100 years.	A2	OK
5.	In Section 3.5-D	Consider revising the term "percent of total depth tabulation" to "temporal cumulative rainfall distribution".	A2	OK

Package: East C-1 Detention Basin
Reviewer: Steve Roberts
Documents: ALL

Date: October 27, 1997
Discipline: CCRFCD

Item No.	Reference	Comment	Resp. Code	Response
6.	In Section 5.1	Clarify that the WTP is not an existing facility but that various phases of the project are under design and construction. The report states, "The probable maximum flood (PMF) is considered the level of design for either the storage volume or the emergency spillway..." The statement is not true and should be qualified. The Districts, as well as many other agencies responsible for the design and construction of flood control facilities, has adopted the PMF as the spillway design flood for high hazard dams. However, few, if any, agencies have adopted the PMF as the reservoir design flood. The Authority has proposed an exceptionally high level of protection for the WTP by requesting VTN to investigate detaining the PMF behind the East C-1 Detention Basin. Please revise the statement to read the PMF was selected for the spillway design flood in accordance with District's *Hydrologic and DrainageDesign Manual*. Also include a statement indicating the Authority directed VTN investigate detaining storm events behind the detention basin that exceed the 100-year, 6 hour storm, which is the District's standard for Master Plan facilities.	A2	OK
7.	In Section 7.1	Add a phrase stating that the operational outlet will be sized to release flows at a rate that will not exceed the capacity of existing and proposed Master Plan facilities located downstream of the detention basin. Correct the title block for Figures 7.1 and 7.2	A2	OK
8.	In Section 8.1	Include a statement that Alternatives 2 and 4 were designed to detain the PMF at the Authority's request. This level of protection exceeds the District's standards.	A2	OK
9.	In Section 8.2 through 8.5	Include a brief description of the embankment (upstream slope, crest width, downstream slope, zoned or homogenous fill, etc...), size of the low level outlet, and the outlet spillway alternative selected for each detention basin alternative.	N	The description of the embankment has been provided in Appendix K, the geotechnical section, also the low level outlet and outlet spillway. Please refer to Appendix D and Appendix G.

Package: East C-1 Detention Basin
Reviewer: Steve Roberts
Documents: ALL

Date: October 27, 1997
Discipline: CCRFCD

Item No.	Reference	Comment	Resp. Code	Response
10.	In Section 9.1	Include a general discussion of the purpose, location, and general description of the levee. Also include a statement that the District's design standard is the peak flow of the hydrography form the 100-year, 6 hour storm, and the Authority has requested VTN to design the levee for storms with recurrence intervals that exceed 100 years.	A2	OK
11.	In Section 11	Consider expanding the discussion on why the recommended alternatives were selected. Consider incorporating the conclusions of the Authority's Steering Committee that were made following VTN's project presentation on October 7, 1997 into this draft report.	A2	OK

Package: East C-1 Detention Basin (080-K)
Reviewer: A. Lin, J. Venckus, C.C. Wang. J. Chuang
Documents: Drawings, Design Criteria, Design Data Handbook & Specifications
Date: 26 November 1997
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVFIN-01	CIVPDR-08	Response Acceptable	A (2)	OK
CIVFIN-02	CIVPDR-12	Log Pearson Type 3 distribution is a better one, however, Gumbel's distribution is acceptable.	A (2)	OK
CIVFIN-03	CIVPDR-17	Second question; we do not have problem to accept the PMF for spillway design. However, the construction cost may be higher. Has any cost analysis been performed to compare the cost difference between the spillways designed with/without flood routing?	A (2)	The spillway design discharge is 20789 cfs. It will be decreased to 18300 cfs after flood routing is performed. The flow would reduced the height of the spillway approximately 0.8 ft which would be a minor cost difference.
CIVFIN-04	CIVPDR-19	Fourth question; Parsons recommendation is to insure the integrity of the design. It is designer's choice if he considers his design is adequate.	A (2)	Agree.
CIVFIN-05	CIVPDR-20	RCC is no longer in the consideration of design, therefore, further discussion is not required.	A (2)	OK
CIVFIN-06	CIVPDR-21 & 23	Response Acceptable	A (2)	OK
CIVFIN-07	CIVPDR-24	Explained in the text, response is acceptable.	A (2)	OK
CIVFIN-08	CIVPDR-30 & 32	Response Acceptable	A (2)	OK

Cmt No.	Reference	Comment	Resp Code	Response
CIVFIN-09	CIVPDR-34	Are calcualtion performed in Appendix C only for the 48" ⌀ orifice outflows? Has the storage volume of reservoir been considered in the calculation? Please address in the text.	A (2)	It will be clarified in design report.
CIVFIN-10	CIVPDR-35, 37, 42 & 44	Response Acceptable	A (2)	OK

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

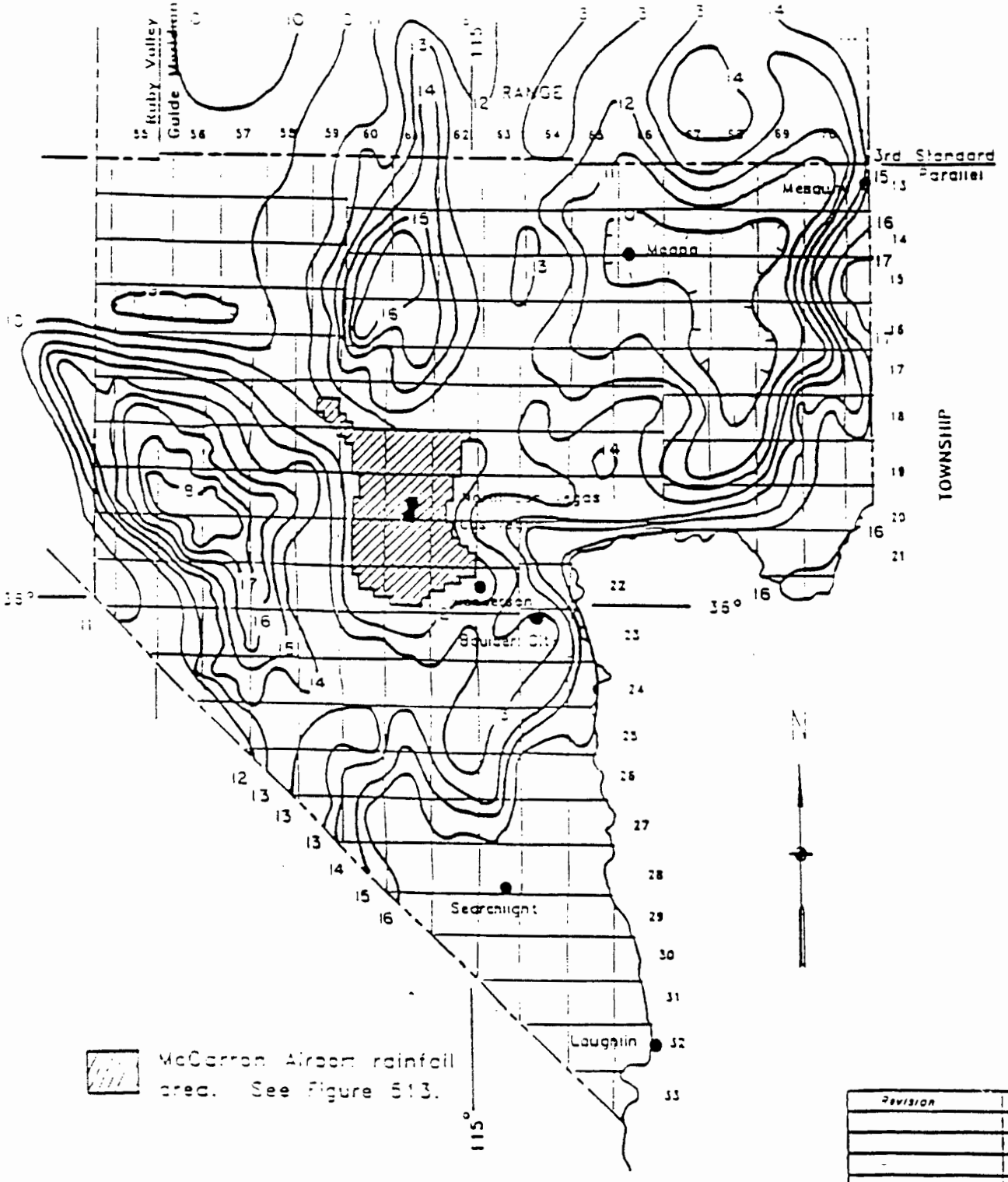
NOTE: 1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.

2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.

3. Tables 505 and 506 require no adjustments.

Revision	Da

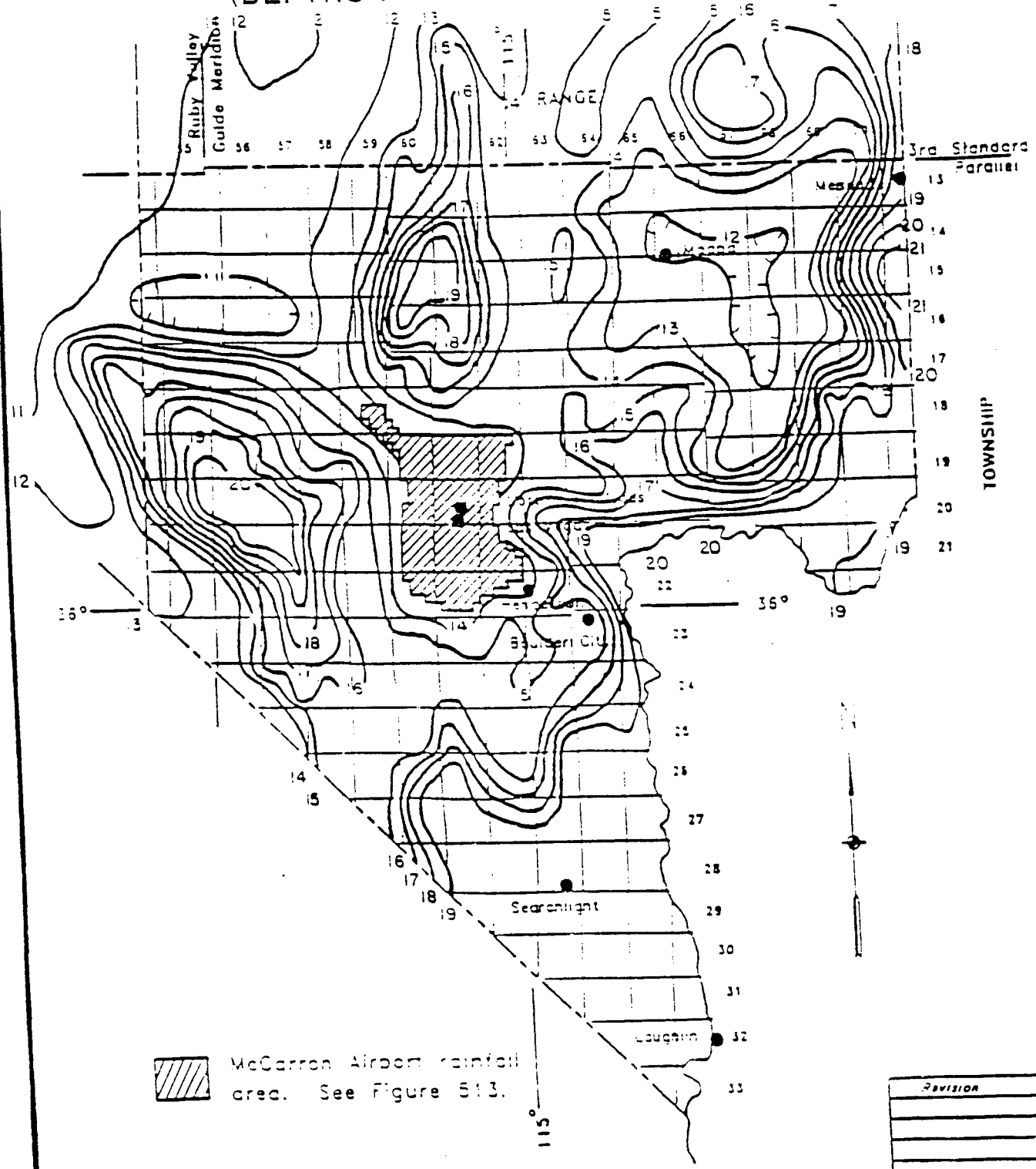
RAINFALL DEPTH-DURATION-FREQUENCY
5-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 502

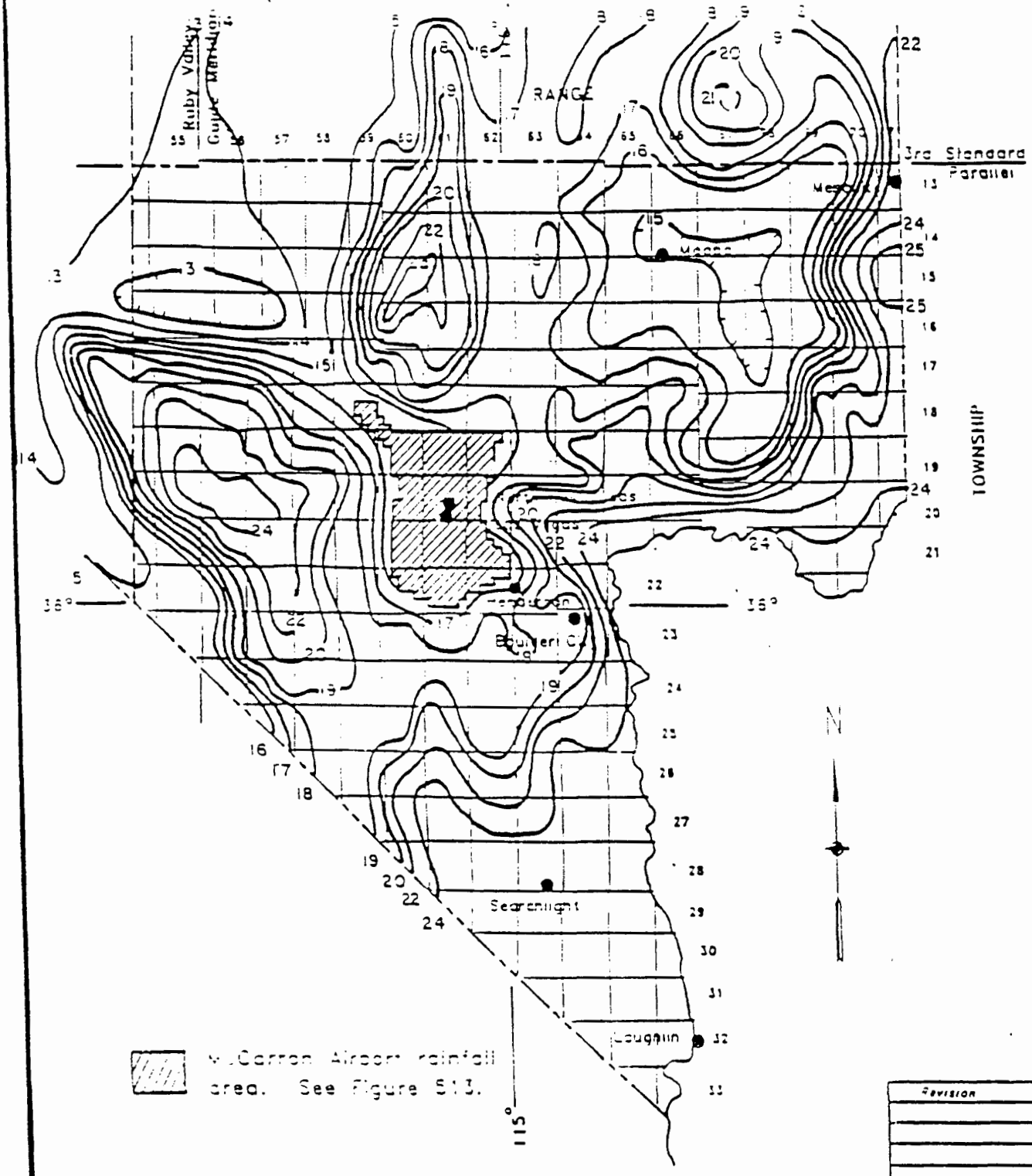
RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 503

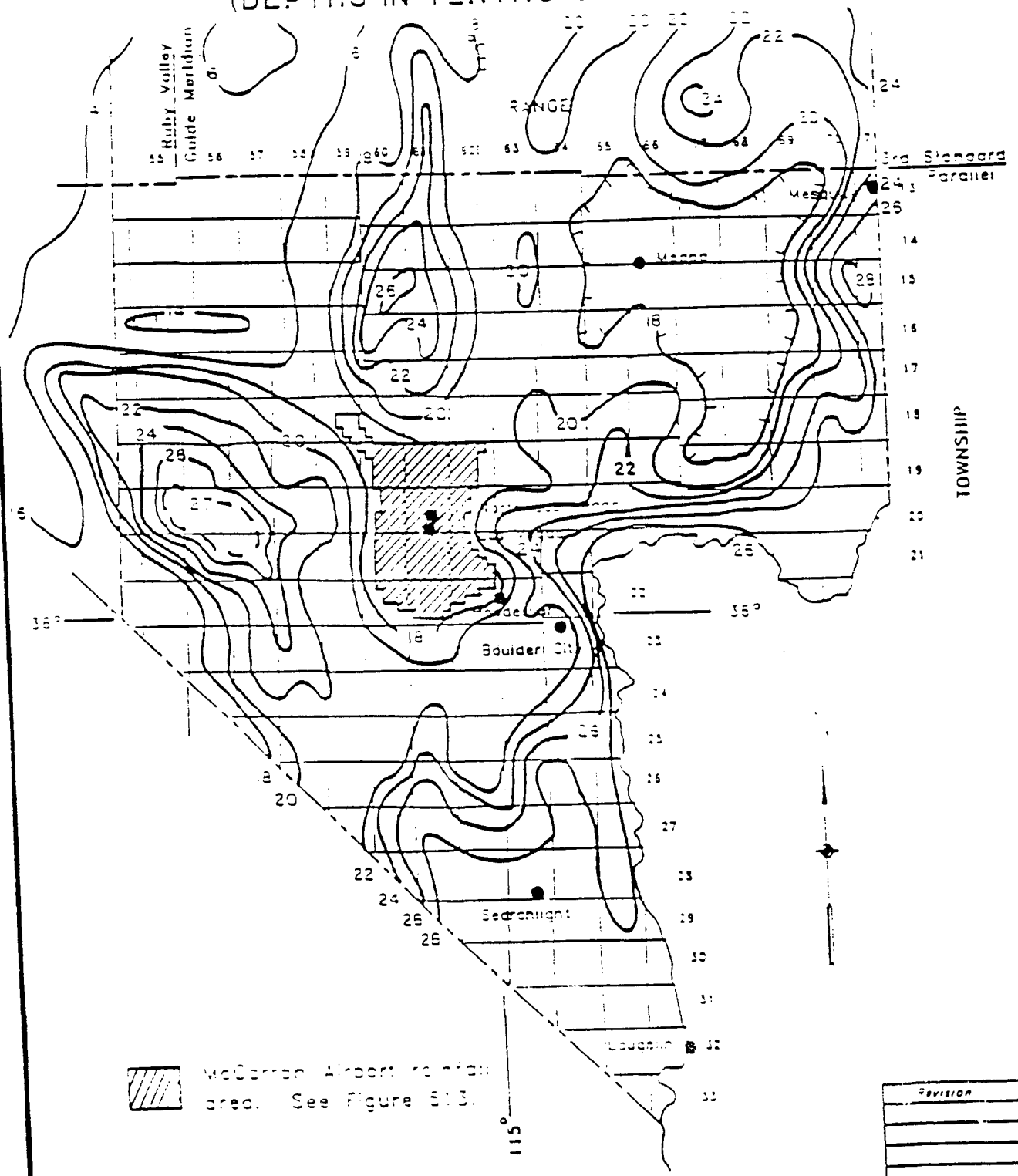
RAINFALL DEPTH-DURATION-FREQUENCY
25-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 504

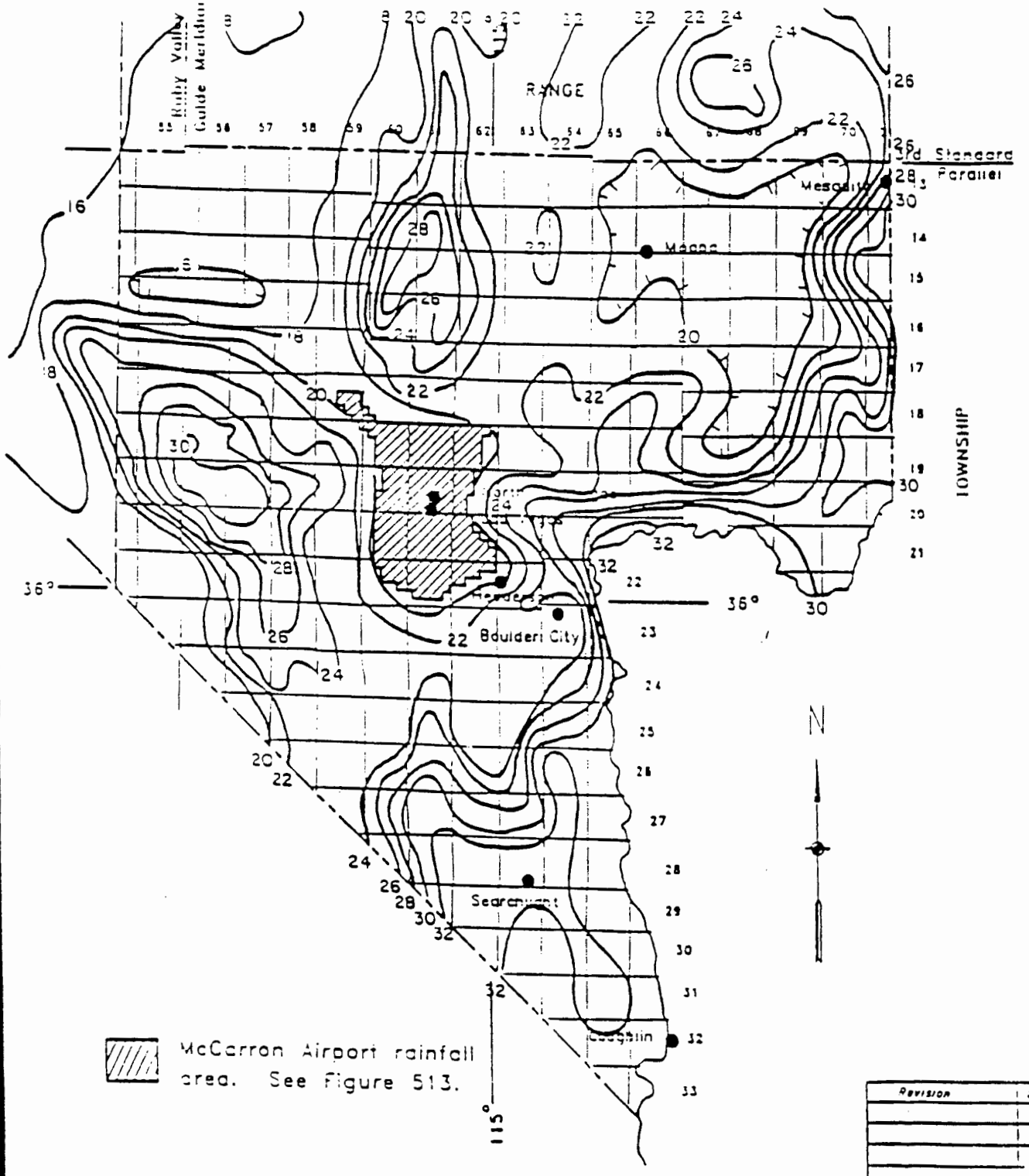
RAINFALL DEPTH-DURATION-FREQUENCY
50-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 505

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGUR 506

In which O_2 = Outflow from the reach at the end of the unit time increment (beginning of the next time increment)

O_1 = Outflow from the reach at the beginning of the time increment.

I_1 = Inflow into the reach at the beginning of the time increment.

I_2 = Inflow into the reach at the end of the time increment.

C_1, C_2 = Coefficients found using Equations 619 and 620, respectively.

$$C_1 = \frac{2\Delta t}{2K(1-X) + \Delta t} \quad (619)$$

$$C_2 = \frac{\Delta t - 2KX}{2K(1-X) + \Delta t} \quad (620)$$

In which $K = L/(3600V)$ (621)

K = Muskingum storage time constant in hours.

L = Channel reach length in feet.

V = Translation velocity in fps.

Δt = Unit time increment in hours.

X = Muskingum weighting factor.

The Muskingum routing parameters requested in the HEC-1 program and their record locations are as follows:

PARAMETER	HEC-1 VARIABLE	RECORD
Weighting Factor (X)	X	RM-Field 3
Storage Constant (K)	AMSKK	RM-Field 2
Time Steps	NSTPS	RM-Field 1

The weighting factor (X) in the Muskingum routing method accounts for the peak flow reduction caused by channel routing. The weighting factor generally varies from zero to 0.5 with zero representing a reservoir type peak reduction and 0.5 representing no peak reduction. Values of this weighting factor in the Clark County area could range from 0.15 for channel reaches with some storage in overbank but few obstructions such as would be found on alluvial fans, to 0.10 for inadequate channels in developed basins where overbank flows would encounter severe obstruction and consequently be significantly attenuated. The reader is referred to the Bureau of Reclamation's

The Corps of Engineers (USACE, 1988) used slightly different depth-area reduction factors than those presented in "Hydro 40" for areas greater than 30 square miles. These factors were based on analysis of thunderstorms in the greater Las Vegas area. For areas up to 30 square miles the depth-area reduction factors are almost the same as those in "Hydro 40".

The six-hour Corps of Engineers (USACE, 1988) depth-area reduction factors are to be used for all rainfall analysis in the Clark County area. The Corps of Engineers depth-area reduction curve is shown in Figure 514. The depth-area reduction factors for the six-hour storm are also tabulated in Table 502.

For areas greater than 200 square miles, the ability of the thunderstorm generating mechanisms (i.e. available moisture, strong convective currents, etc.) to sustain a thunderstorm much greater than 200 square miles in diameter is greatly reduced. Therefore, only a portion of an entire drainage basin could be subject to precipitation from the thunderstorm event. Analysis of this effect on runoff peaks and volumes is complicated by the necessity to determine the "storm centering" which produces the greatest peak flow and/or volume at the selected design point. In order to obtain a consistent method of analysis for these areas, the designer shall consult the local entity (and/or the CCRFCD if suggested by the local entity) to determine the appropriate method of analysis and design rainfall area reduction factors for the specific location and basin under consideration.

504 DESIGN STORMS

504.1 GENERAL

The design storm within the jurisdiction of the MANUAL shall be a 6-hour duration storm. The 6-hour duration storm is to be used for all HEC-1 runoff modeling in the Clark County area. The exception to the 6-hour design storm duration is when the SCS TR-55 method is used to compute runoff values. For SCS TR-55, a Type II rainfall distribution shall be used in conjunction with the 24-hour rainfall depth as described in TR-55.

504.2 SIX-HOUR DESIGN STORM DISTRIBUTION

Two different six-hour storm distributions are to be used as design storms in the Clark County area. The two design storm distributions, labeled SDN 3 and SDN 5, are graphically presented in Figure 515 and tabularized in Table 503. For drainage areas less than 10 square miles in size, use SDN 3. For drainage areas equal to or greater than 10 square miles in size, use SDN 5.

APPENDIX. ..EI

Gill, M. (1977). '
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SKIMMING FLOW IN STEPPED SPILLWAYS

By N. Rajaratnam,[1] Member, ASCE

INTRODUCTION

In a stepped spillway, the spillway face is provided with a series of steps, from near the crest to the toe. The energy dissipation caused by the steps reduces the size of the energy dissipator, generally provided at the toe of the spillway. Stepped spillways have been built in the past but there appears to be renewed interest in them because of significant cost savings. A recent example is the Monksville dam (Sorensen 1985).

Based on the experimental observations of Essery and Horner (1971) and Sorensen (1985), the flow over stepped spillways can be divided into nappe flow and skimming flow regimes [Figs. 1(*a*) and (*b*)]. In the nappe flow regime, the flow from each step hits the step below as a falling jet, with the energy dissipation occurring by jet breakup in air, jet mixing on the step, with or without the formation of a partial hydraulic jump on the step. In the skimming flow regime, the water flows down the stepped face as a coherent stream, skimming over the steps and cushioned by the recirculating fluid trapped between them. The energy dissipation in the flow appears to be enhanced by the momentum transfer to the recirculating fluid. In this note, a method for predicting the shear stress, thus frictional energy loss of the skimming flow is presented.

ANALYSIS OF SKIMMING FLOW

For a stepped spillway of constant slope, $S_o = \sin\alpha$, with a large number of identical steps of height, h, and (horizontal) length, l (note that $\sin\alpha = h/\sqrt{l^2 + h^2}$), the flow is assumed to become fully developed after the first few steps. For such a fully developed flow, with a constant mean velocity of V_o and normal depth of y_o, considering unit width of the spillway, we write

$$y_o\gamma \sin\alpha = \tau \quad \ldots\ldots (1)$$

where γ = the weight per unit volume of the fluid (water); and τ = the average Reynolds shear stress that exists between the skimming stream and the recirculating fluid underneath. Let us assume

$$\tau = c_f \frac{\rho V_o^2}{2} \quad \ldots\ldots (2)$$

where c_f = the coefficient of fluid friction and would be equal to $f/4$, where f = the Darcy-Weisbach friction factor; and ρ = the mass density of the

[1]Prof., Dept. of Civ. Engrg., Univ. of Alberta, Edmonton, Alberta, Canada T6G 2G7.

Note. Discussion open until September 1, 1990. To extend the closing date one month, a written request must be filed with the ASCE Manager of Journals. The manuscript for this paper was submitted for review and possible publication on July 11, 1988. This paper is part of the *Journal of Hydraulic Engineering*, Vol. 116, No. 4, April, 1990. ©ASCE, ISSN 0733-9429/90/0004-0587/$1.00 + $.15 per page. Paper No. 24515.

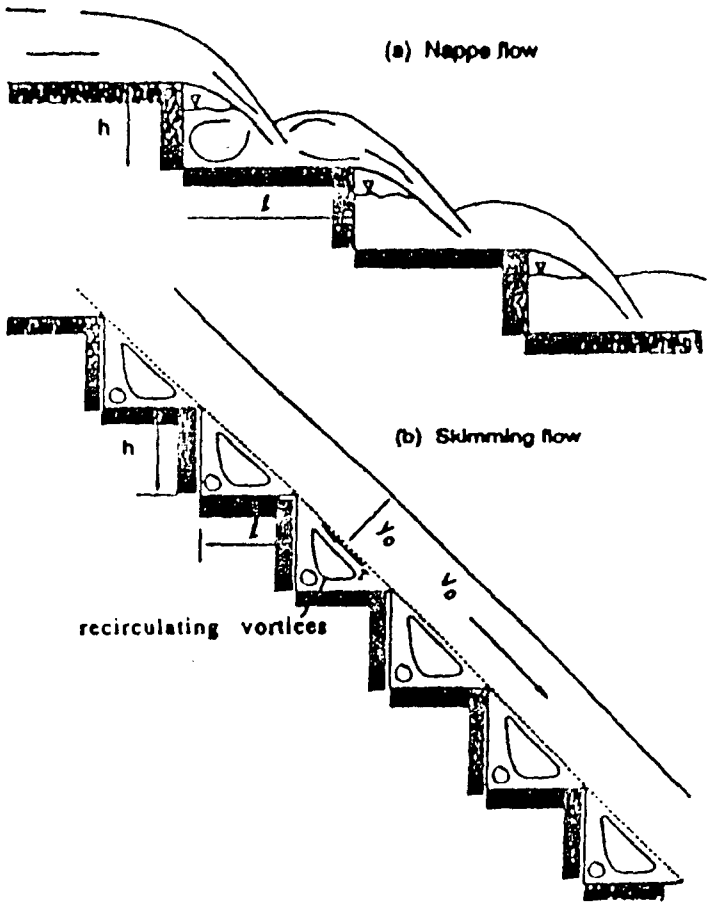

FIG. 1. Definition Sketches for Flow Over Stepped Spillways

fluid. Combining Eqs. 1 and 2, we obtain

$$c_f = \frac{2y_0^2 g \sin\alpha}{q^2} \quad \ldots\ldots (3)$$

where g = the acceleration due to gravity; and q = discharge per unit width of the spillway.

The idea of Eq. 2 is to represent the turbulent shear stress between the main stream and the recirculating fluid, trapped between the steps of the spillway. For example, this method has been used in developing flow equations for Denil, Vertical Slot, and other fishways (Rajaratnam and Katopodis 1984; Rajaratnam et al. 1986; Rajaratnam et al. 1988). For a Denil fishway, with the depth of flow much larger than its width, so that the shear comes mainly from the sides and for subcritical flows, c_f has been found to be equal to about 0.09 and for relatively smaller depths, values of c_f have been found to be as large as 0.6. The Reynolds number $R = V_0 y_0/\nu$, with ν being the kinematic viscosity of the fluid, was in the range of 10^5–10^6 for the prototype and equal to about 10^5 for the 1/3 scale model of the Denil fishway. For pool and weir fishways, c_f has been found to be about 0.09. Ervine and Baird (1982) used the same idea to express the apparent shear between the main channel and flood-plain channel flows and found a value of 0.05 for c_f. The slopes for Denil fishways had a maximum value of about 0.3 whereas for the compound channel of Ervine and Baird, they were very small. The point is that the idea of Eq. 2 appears to be generally valid for the range of slopes studied so far and is used for stepped spillway only to attempt to estimate its flow characteristics. It should be pointed out that for smooth boundaries, the coefficient of skin friction decreases from about 0.0035 to 0.0025 as R increases from 10^5 to 10^6.

To evaluate c_f for skimming flow in a stepped spillway, the experimental observations of Sorensen on a 1:25 scale model of the new Monksville dam spillway of approximate height of 32 m are used. Steps at the crest were fitted to the standard Waterways Experiment Station (WES) spillway profile. But for the small number of steps near the crest, the height h of the remaining steps was 0.6 m with a spillway slope of 1 (vertical) on 0.78 (horizontal). The horizontal length, l, of the steps was 0.47 m, thus giving a value of 1.28 for h/l.

For experiments (C1–C8), c_f was found to vary from 0.11 to 0.2 with an average value of 0.18. For experiments C9 and C10, with very small flow rates, c_f was found to be 0.25 and 0.28, respectively, and it is possible that in these experiments the flow was in a transition state between nappe and skimming regimes. It is realized that for the C-series, Sorensen measured the flow depths downstream of the toe and on the stepped spillway the flow would have been aerated. Sorensen also admits to 10–15% error in depth measurements between continuity calculations and stagnation tube measurements. Aeration aspects are also important. Hence, calculations of c_f and energy loss on the spillway (presented later) would have to be considered very approximate. The average value of 0.18 for the skimming flow in the stepped spillway studied by Sorensen, is about twice as large as the value for a Denil fishway with a relatively large depth of flow. For a vertical slot fishway, c_f was found to be equal to about 0.14 for a 1/16 scale model with R equal to about 5,000. For a pool and weir fishway, $c_f = 0.09$ in the streaming flow regime (Rajaratnam et al. 1988). Considering all these values including 0.05 (Ervine and Baird 1982), c_f is the range of 0.05–0.18 with the Reynolds number in the approximate range of 5,000–10^6. It would be interesting and useful to find c_f for skimming flow stepped spillways for a range of slopes or h/l.

For convenience of use, rewrite Eq. 3 as

$$V_0 = \sqrt{\frac{2}{c_f}}\sqrt{g y_0 S_0} \quad \ldots\ldots (4)$$

For the discharge per unit width q, write

$$q = \sqrt{\frac{2}{c_f}}\, y_0^{3/2}\sqrt{g S_0} \quad \ldots\ldots (5)$$

Energy Loss in a Stepped Spillway

An estimate of the energy loss for skimming flow in a stepped spillway is presented using the analysis presented in the previous sections. If E is the energy in the flow at the toe of the stepped spillway

$$E = y_0 + \frac{V_0^2}{2g} \quad \ldots\ldots (6)$$

$$E = \left(\frac{c_f q^2}{2g \sin\alpha}\right)^{1/3} + \left(\frac{q \sin\alpha}{\sqrt{2g}}\right)^{2/3} \quad \ldots\ldots (7)$$

If y_0' and V_0' = the corresponding depth and velocity at the toe of a smooth spillway without steps

$$E' = y_0' + \frac{V_0'^2}{2g} \quad \ldots\ldots (8)$$

and one can write an equation similar to Eq. 7 with c_f' replacing c_f, where c_f' = the coefficient of skin friction for the smooth spillway. Sorensen's tests (B series) on a smooth spillway give a value of 0.0065 for c_f'. If ΔE is defined as

$$\Delta E = E' - E \quad \ldots\ldots (9)$$

ΔE gives the energy loss caused by the steps over that caused by the smooth spillway face. If the relative energy loss is defined as $\Delta E/E'$, it can be shown that

$$\frac{\Delta E}{E'} = \frac{(1 - A) + \frac{F_0'^3}{2}\left(A^3 - 1\right)}{1 + \frac{F_0'^3}{2}} \quad \ldots\ldots (10)$$

where $A = (c_f/c_f')^{1/3}$; and F_0' = the Froude number at the toe of the smooth spillway. Taking $c_f = 0.18$ and $c_f' = 0.0065$, $A = 3$ and for a relatively large value of F_0', $\Delta E/E'$ is approximately equal to $(A^3 - 1)/A^3$, which further reduces to 8/9. This indicates the considerable amount of energy loss that can be produced by steps, as was found by Sorensen.

Onset of Skimming Flow

Based on their experimental observations, Essery and Horner (1971) found that for horizontal steps, for the onset of skimming flow, the ratio y_c/l, wherein y_c is the critical depth, increased with h/l from about 0.32 for $h/l = 0.4$ to about 0.69 for $h/l = 0.9$. By a reanalysis of their data, it was found that for the whole range of h/l from 0.4 to 0.9, at the onset of skimming flow, y_c/h was approximately equal to 0.8. This means that for y_c/h greater than 0.8, skimming flow occurs. The observations of Sorensen for $h/l = 1.28$ support this criteria. For y_c/h less than 0.8, one would expect to get nappe flow and in Sorensen's experiments, nappe flow occurred for $y_c/h = 0.16$.

Conclusions

This technical note presents a method of predicting the characteristics of skimming flow on stepped spillways. For a stepped spillway with a slope of 1 vertical on 0.78 horizontal, the fluid friction coefficient c_f was evaluated using the experimental results of Sorensen and found to be about 0.18. An estimate has been made of the energy loss on stepped spillways for skimming flow.

Appendix. References

Ervine, D. A., and Baird, J. I. (1982). "Rating Curves for Rivers with Overbank Flow," *Proc. Instn. of Civ. Engrs., Part 2*, Institute of Civil Engineers, 465–472.

Essery, I. T. S., and Horner, M. W. (1971). "The hydraulic design of stepped spillways," *Report 33*, Constr. Industry Res. and Information Assoc., London, England.

Rajaratnam, N., and Katopodis, C. (1984). "Hydraulics of Denil fishways," *Proc. ASCE*, 110(9), 1219–1233.

Rajaratnam, N., Katopodis, C., and Mainali, A. (1988). "Plunging and streaming flows in pool and weir fishways," *Proc., ASCE*, 114(8), 939–944.

Rajaratnam, N., Van der Vinne, G., and Katopodis, C. (1986). "Hydraulics of Vertical Slot fishways," *Proc., ASCE*, 112(10), 909–927.

Sorensen, R. M. (1985). "Stepped spillway hydraulic model investigation," *Proc. ASCE*, 111(12), 1461–1472.

$$\frac{V_0^2}{2g} = \frac{2g\, y_0 \sin\alpha}{c_f\, 2g}$$

$$= \frac{y_0 \sin\alpha}{c_f}$$

$$= \frac{q \sin\alpha}{c_f V_0}$$

$$\frac{V_0^3}{2g} = \frac{q \sin\alpha}{c_f}$$

$$\frac{V_0^3}{2g\sqrt{2g}} = \frac{q \sin\alpha}{c_f \sqrt{2g}}$$

$$\frac{V_0^3}{(2g)^{3/2}} = \frac{q \sin\alpha}{c_f \sqrt{2g}}$$

$$\left(\frac{V_0^2}{2g}\right)^{3/2} =$$

$$\frac{V_0^2}{2g} = \left(\frac{q \sin\alpha}{c_f \sqrt{2g}}\right)^{2/3}$$

Model Study of a Roller Compacted Concrete Stepped Spillway

By Charles E. Rice[1] and Kem C. Kadavy[2]

Abstract: Studies were conducted with a two-dimensional 1:20 scale model of a roller compacted concrete stepped spillway to evaluate the flow transition from the level spillway crest to the sloping steps, the energy dissipation of the steps, and performance of the proposed stilling basin. The steps were effective in dissipating energy. At maximum discharge, 14.5 m³/s/m (156 ft³/s/ft), the energy dissipation with the steps was 48% compared with an energy dissipation of 20% for the spillway with a smooth chute surface. At 5.81 m³/s/m (62.5 ft³/s/ft), the energy dissipation with the steps was 71% compared with 25% with a smooth chute surface. The energy dissipation caused by the steps significantly reduces the size of stilling basin required at the toe of the spillway compared to a conventional chute spillway.

INTRODUCTION

A roller compacted concrete stepped spillway was designed by the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS), Temple, Texas, for the Salado Creek Site 10, San Antonio, Texas. Location of the reservoir within the city limits of San Antonio places the reservoir in a high-hazard-potential category. Concern for safety and because the generalized criteria for the design of stepped spillways are limited, the SCS contracted our laboratory to conduct hydraulic model studies to evaluate the proposed design.

The proposed spillway for Salado Creek Site 10 is 73.15 m (240 ft) wide with a design discharge of 1,062 m³/s (37,500 ft³/s); the design unit discharge is 14.5 m³/s/m (156 ft³/s/ft). The difference in elevation between the spillway crest and the floor of the stilling basin is 17.07 m (56 ft). The spillway crest is at an elevation of 260.91 m (856.0 ft) and the stilling basin floor is at an elevation of 243.84 m (800.0 ft). The spillway will be constructed over an existing earthen dam with a $1V$:$3H$ downstream slope. The proposed step dimensions are 0.610 m (2 ft) high by 1.524 m (5 ft) in length, giving a $1V$:$2.5H$ slope. A schematic of the spillway is presented in Fig. 1.

BACKGROUND

The design concept for stepped spillways is not new. However, there was little interest in the spillways prior to 1982. In 1982 the Bureau of Reclamation conducted model studies of a stepped spillway for the Upper Stillwater Dam proposed for construction in Utah (Houston 1987; Young 1982). Sorensen (1985) reported on the model study of the Monksville Dam of the Wanaque South Project in New Jersey. Rajaratnam (1990) and Christodoulou (1993) present analyses of energy dissipation for stepped spillways. These studies have demonstrated that stepped spillways are effective in kinetic energy dissipation, thereby reducing the required size of the stilling basin at the toe of the dam.

For the Upper Stillwater Dam (Houston 1987; Young 1982), the energy reduction achieved by the stepped spillway over a conventional smooth spillway of the same height was approximately 75%. This reduction in energy required a stilling basin only half as long as one for a conventional (equivalent) high dam. Sorensen (1985) reported toe velocities of 9.2 m/s (30 ft/s) for the 36.6 m (120 ft) high Monksville Dam stepped spillway compared with toe velocities of 22.9 m/s (75 ft/s) for a prototypical spillway (smooth chute surface), which represented a kinetic energy dissipation of 84%.

Christodoulou (1993) found from experiments on a moderately sized stepped spillway that the energy dissipation may be significantly less than that suggested by earlier studies based on the establishment of uniform flow on high spillways. The energy loss due to the steps depended primarily on the y_c/h ratio, where y_c is the critical depth of flow passing over the spillway and h is the step height; as well as on the number of steps N. For small values of y_c/h near unity, i.e., near the limit of skimming flow, the stepped surface was very effective in dissipating energy, and for higher values of y_c/h, the effect of N became appreciable. At a certain y_c/h, the relative energy loss increased with N.

Using model results and experimental results from Sorensen (1985), Christodoulou (1993) presented a general relation between the energy loss and the parameter y_c/h, and an experimental curve expressing the relative energy loss in terms of the parameter y_c/Nh for the commonly used values of l/h (where l is the step length) close to 0.7 and y_c/h in the range of 1–4.

Rajaratnam (1990) presented a method for predicting the shear stress and the frictional energy loss for skimming flow and suggested it would be interesting and useful to find the coefficient of fluid friction, c_f, for skimming flow for stepped spillways for a range of slopes or h/l values. Using the experimental observations of Sorensen (1985) on a 1:25-scale model of the new Monksville Dam (h/l = 1.28), Rajaratnam (1990) found that c_f for skimming flow varied from 0.11 to 0.20, with an average value of 0.18.

Previous model studies have used the Waterways Experiment Station or theoretical nappe curves for the spillway crest, with a steep (>$1V$:$1H$) slope tangent to the crest curve for the remaining spillway height. The profile for the proposed Salado spillway is considerably flatter, $1V$:$2.5H$. It would be expected that the flatter slope would have a smaller fluid friction coefficient, thus, less energy dissipation compared to spillways with steeper slopes.

The unit discharge for the Salado spillway is 14.5 m³/s/m (156 ft³/s/ft), 2.4 times the 6 m³/s/m (65 ft³/s/ft) unit discharge for the Monksville spillway, and 6.2 times the 2.32 m³/s/m (25 ft³/s/ft) unit discharge for the Upper Stillwater spillway. The high unit discharge for the Salado spillway is sufficient reason for investigating its performance.

EXPERIMENTAL DESIGN

A two-dimensional 1:20-scale sectional model representing a 15.24 m (50 ft) width of spillway was used: (1) To evaluate

[1]Res. Hydr. Engr., Hydr. Engrg. Res. Unit, USDA-Agric. Res. Service, 1301 N. Western St., Stillwater, OK 74075.
[2]Agric. Engr., Hydr. Engrg. Res. Unit, USDA-Agric. Res. Service, 1301 N. Western St., Stillwater, OK.

Note. Discussion open until November 1, 1996. To extend the closing date one month, a written request must be filed with the ASCE Manager of Journals. The manuscript for this paper was submitted for review and possible publication on June 13, 1994. This paper is part of the *Journal of Hydraulic Engineering*, Vol. 122, No. 6, June, 1996. ©ASCE, ISSN 0733-9429/96/0006-0292–0297/$4.00 + $.50 per page. Paper No. 8643.

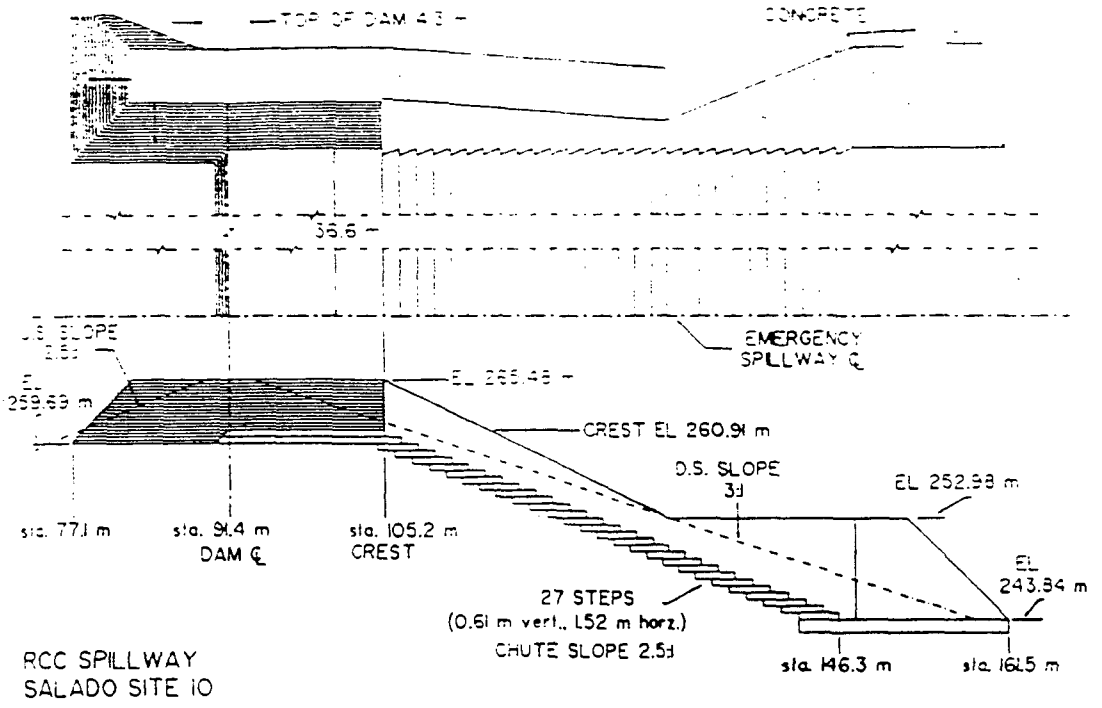

FIG. 1. Schematic of Proposed Spillway

the flow transition from the level spillway crest to the steps on the sloping spillway face; (2) to determine the amount of energy dissipation caused by the steps; and (3) to evaluate the design stilling basin performance. Froude similarity criteria were used to define the model:prototype scale relationships.

The model steps were constructed of clear redwood, sanded and painted with five coats of polyurethane. The tops of the steps were horizontal with vertical faces and the step edges were slightly rounded. Tests were conducted with a smooth surface to provide data to compare the energy dissipation for the two surface conditions. Exterior A-C plywood, sanded and painted with five coats of polyurethane, was used for the smooth chute surface. The crest sections were constructed with an acrylic plastic material. The side walls of the model were a transparent acrylic plastic material that permitted visual observation of flow in the model. The model was tested with and without an end sill in the stilling basin.

Similitude Considerations

The Froude criterion is generally used in hydraulic problems involving turbulent free-surface flow because the effects of gravity outweigh those of viscosity and surface tension (*Hydraulic* 1980). When viscous and surface tension forces are neglected, effort should be made to minimize their effects. This can be accomplished by using large-scale models with smooth boundaries. Also, viscous forces are relatively unimportant when the Reynolds number of the model is greater than 10^4 using the depth of flow for the length term.

An important step in a successful laboratory model study is the selection of a model scale. Large rather than small models should be built if available space and water supply are available. However, the cost and difficulty of operation may offset the advantage of large size.

Bureau of Reclamation models of large dams and spillways have been constructed to scale ratios of 1:30 to 1:100. For medium-size structures the Bureau recommends that models should not be smaller than the 1:60 scale. To minimize the effects of viscosity and surface tension, the Bureau recommends that the flow depth over the crest of the spillway model be at least 75 mm (0.246 ft) for the design's normal operating range. For two-dimensional model studies, the Bureau recommends a minimum model width of 150 mm (0.492 ft).

The model scale for this study is 1:20; the flow depth for the design stilling basin discharge is 106 mm (0.348 ft); the model width is 762 mm (2.5 ft); and the Reynolds number > 10^4. Thus, the Bureau of Reclamation recommendations have been met in this study.

According to Vischer (1984):

> Energy dissipators with a dominating free flow are reproduced according to the model law of Froude, because their current is mainly influenced by gravity. In contrast to river models for instance, the majority of dissipator models are so short that roughness, and therfore the Reynolds number, plays a minor part. If the water depth exceeds a few centimeters, the effects of the surface tension and thus the Weber number can be disregarded as well. These remarks are certainly valid for relatively compact stilling basins, stilling chambers and stilling wells, provided air entrainment is unimportant.
>
> This is, generally speaking, also the case for the energy dissipators of the "cascade" type. They can be reproduced without relevant scale effects because they form by definition an extremely rough conduit and have an overall friction coefficient, which does not vary much within a large range of Reynolds numbers. Therefore, it is easy to produce the described similarity by running the models in this range.

Vischer's (1984) comments are in agreement with the theory and recommendations of the Bureau of Reclamation and provide evidence that physical model studies of hydraulic structures like those presented here can be reproduced without relevant scale effects.

PROCEDURE

Flows were measured with orifice plates and an air-water differential manometer. Tailwater depths were controlled with an adjustable overflow weir at the downstream end of the test channel. Water levels, model elevations, and stream-bed ele-

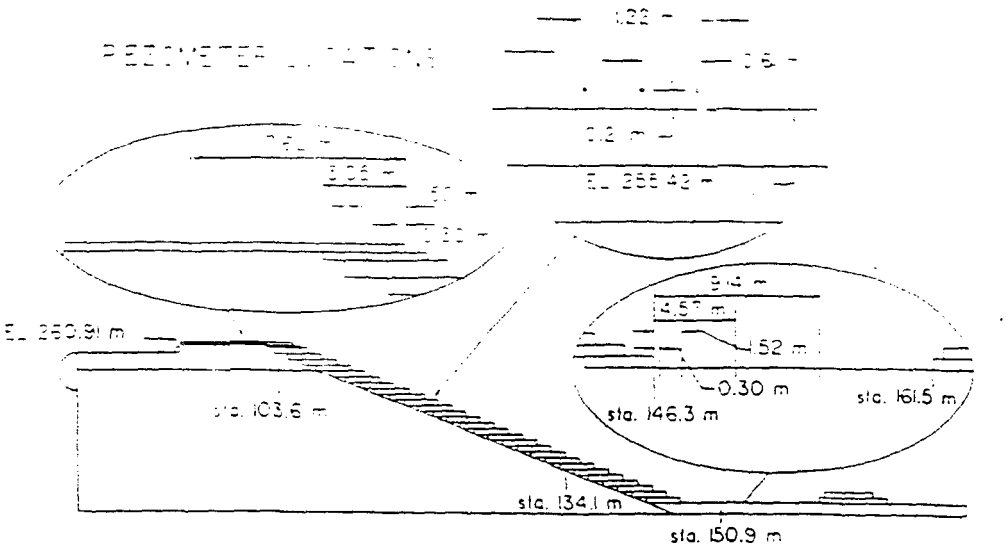

FIG. 2. Cross-Sectional Schematic, Two-Dimensional Model

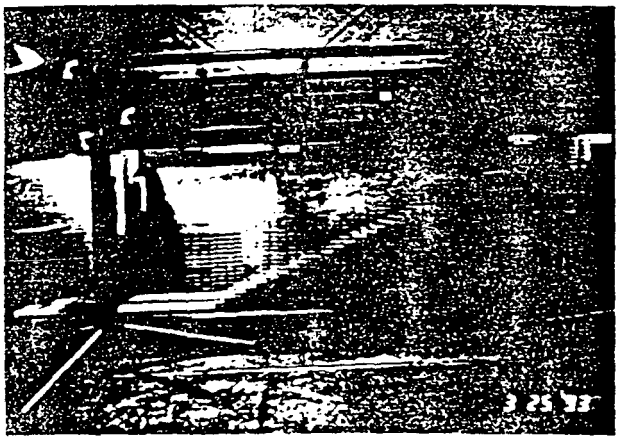

FIG. 3. Two-Dimensional Model

vations were measured with a manually operated point gauge. Piezometers were also used to measure water-surface elevations. Velocities were measured using a 0.318 cm (0.125 in.) pitot-static tube, differential pressure transducer, and digital voltmeter.

Pitot-static tubes may be affected by the presence of air in the flow. The velocity profiles were taken at flow rates of 14.5 (156), 9.66 (104), and 5.81 (62.5) $m^3/s/m$ ($ft^3/s/ft$). At these flow rates, and especially at 14.5 (156) and 9.67 (104) $m^3/s/m$ ($ft^3/s/ft$), there appeared to be no air entrainment in the flow. Since there was no air presence in the range of flows tested, the pitot-static tube was considered an acceptable device for measuring the velocities.

Photographs and videos were taken to document flow conditions in the spillway and stilling basin.

Fig. 2 presents a cross-sectional schematic of the two-dimensional model showing the location of piezometers used to measure the piezometric head. Fig. 3 is a photograph of the model. The piezometers in the spillway crest and the stilling basin floor were located along the centerline of the section. The piezometers at the step were located in the side wall of the model.

Calculation of the undersurface profile of the nappe at maximum discharge, 14.5 $m^3/s/m$ (156 $ft^3/s/ft$), showed that the nappe would impact on the first step of the spillway chute. Thus, the first tests were conducted without a curved or reduced slope transition from the crest to the steps.

Elevations, flow depths, and velocity profiles were taken to permit calculations of the energy dissipation due to the steps. Velocity profiles were taken, with the smooth chute surface and with the step surface, at stations: 103.6 m (340 ft) [on the crest, 1.52 m (5.0 ft) upstream of the first step]; 118.9 m (390 ft) and 134.1 m (440 ft) (along the slope), and 146.3 m (480 ft) (toe of spillway); and 150.9 m (495 ft) and 155.4 m (510 ft) (in the stilling basin). The profiles were taken at discharges of 14.5 $m^3/s/m$ (156 $ft^3/s/ft$), 9.66 $m^3/s/m$ (104 $ft^3/s/ft$), and 5.81 $m^3/s/m$ (62.5 $ft^3/s/ft$). At discharges less than these values air concentration would probably have affected the pitot-static tube readings resulting in errors in the velocities.

The upstream face of the end sill had two 0.61 m (2 ft) high by 0.61 m (2 ft) long steps and the top width was 1.22 m long. Two end sill locations were used, 10.67 m (35 ft) and 15.24 m (50 ft), downstream from the toe of the spillway.

RESULTS AND ANALYSIS

Transition Flow, Spillway Crest to Steps

A major concern for stepped spillways is in providing smooth transition flow from the spillway crest to the first few steps. The proposed steps for the Salado spillway are 0.61 m (2.0 ft) high and 1.52 m (5.0 ft) (horizontal) long, resulting in a spillway slope of 1*V*:2.5*H*. At maximum discharge, the profile of the undersurface of the nappe impacts on the first step. Thus, an acceptable transition flow was not difficult to attain. Fig. 4 shows the transition flow for this step arrangement at maximum discharge, 14.5 $m^3/s/m$ (156 $ft^3/s/ft$). The flow at the transition is very good; there is no undesirable disturbance of the flow, no tumbling action, and no separation of the nappe at the break in slope. The transition flow from the spillway crest to the steps was very good at all discharges tested.

Stilling Basin Performance

For high-hazard dams, the SCS normally designs the spillway to safely pass the probable maximum flood (PMF) event. However, the stilling basin is generally designed to pass two-third of the PMF without compromising the integrity of the stilling basin for the full PMF event.

The SCS design stilling basin is 15.24 m (50 ft) long with-

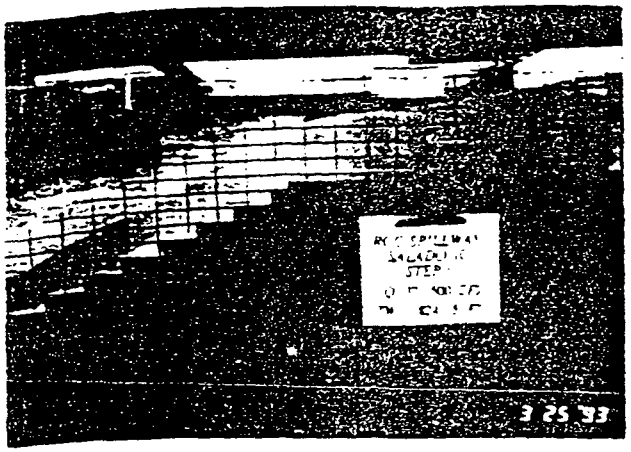

FIG. 4. Transition Flow, Spillway Crest/Steps Juncture

out an end sill at the basin exit. Tests were run with the SCS design stilling basin length to evaluate performance with and without an end sill. There was significantly less attack on the downstream channel bed with the end sill compared to the basin without an end sill. The downstream velocities without an end sill will result in greater erosion, compared to the basin with an end sill, in an unprotected downstream channel and could cause concern for the integrity of the spillway.

Tests were also conducted with the end sill located 10.67 m (35 ft) downstream of the toe of the spillway. At 14.5 $m^3/s/m$ (156 $ft^3/s/ft$), the performance was poor. At 9.66 $m^3/s/m$ (104 $ft^3/s/ft$), there was little difference in performance compared with the end sill located 15.24 m (50 ft) downstream from the toe of the spillway. As a compromise, it is recommended that the end sill be placed 12.19 m (40 ft) downstream of the spillway toe.

Energy Dissipation

The steps were effective in dissipating kinetic energy down the spillway slope. A roller develops on the steps. Flow enters the roller, rotates for a brief period, and then returns to the main flow resulting in a transfer of momentum. This momentum transfer results in significant energy dissipation.

Figs. 5(a) and 5(b), respectively, present typical examples of velocity profiles with steps and with a smooth surface for q = 14.5 $m^3/s/m$ (156 $ft^3/s/ft$). The profiles, taken along the slope [station 134.1 m (440 ft)], illustrate the effect of the steps. With steps, the momentum transfer caused by the roughness of the steps penetrates a considerable distance vertically into the flow, as evidenced by the pointed profile and lower velocities, than for the smooth surface. With a smooth surface, the momentum transfer caused by the surface roughness is small and penetrates very little vertically into the flow, resulting in a blunt profile and higher velocities. The momentum transfer with the steps results in greater energy dissipation compared to the energy dissipation with a smooth surface.

Table 1 presents the energy data at four stations along the spillway for three discharges without tailwater. The total energy loss to a given step, relative to the stilling basin floor elevation, is (see Fig. 6)

$$\Delta H = H_o - H \qquad (1)$$

where $H = y_n \cos\alpha + (V^2/2g)$; $H_o = Y + (V_o^2/2g)$; V = local mean velocity; and V_o = approach velocity. There is little energy dissipation for both smooth and step surfaces between stations 103.6 m (340 ft) and 118.9 m (390 ft). Between stations 118.9 m (390 ft) and 146.3 m (480 ft) the energy dissipation increases for both surfaces, but the increase is much greater with the step surface. Energy profiles (total head loss)

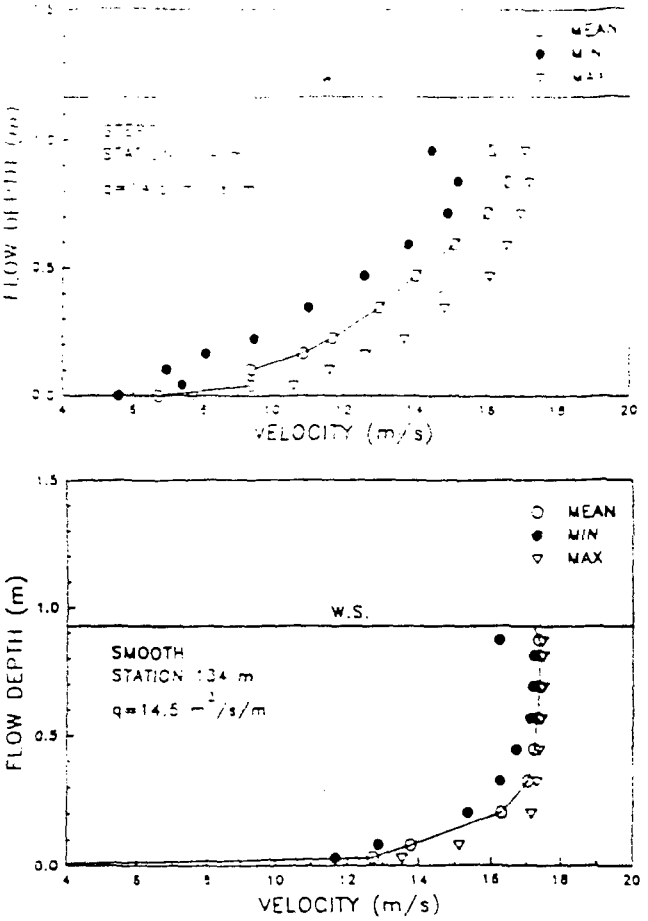

FIG. 5. Velocity Profiles, q = 14.5 $m^3/s/m$ (156 $ft^3/s/ft$), Station 134 m (440 ft): (a) Step Surface; (b) Smooth Surface

TABLE 1. Energy Dissipation Data, Crest to Toe of Spillway

q $m^3/s/m$ ($ft^3/s/ft$) (1)	Step Surface				Smooth Surface			
	Station m (ft) (2)	H m (ft) (3)	ΔH m (ft) (4)	Percent loss (5)	H m (ft) (6)	ΔH m (ft) (7)	Percent loss (8)	ΔH^* (9)
14.5 (156)	104[b] (340)	21.6 (70.9)	10.3 (33.8)	48	21.6 (70.9)	4.3 (14.1)	20	2.4
	146[c] (480)	11.3 (37.2)			17.3 (56.8)			
9.66 (104)	104[b] (340)	20.5 (67.3)	11.9 (39.0)	58	20.5 (67.3)	4.1 (13.5)	20	2.9
	146[c] (480)	8.5 (28.3)			16.5 (54.1)			
5.81 (62.5)	104[b] (340)	19.5 (64.0)	13.9 (45.5)	71	19.5 (64.1)	4.9 (16.1)	25	2.8
	146[c] (480)	5.64 (18.5)			14.6 (47.8)			

[a] $\Delta H^* = (\Delta H)_{\text{step}}/(\Delta H)_{\text{smooth}}$.
[b] Crest.
[c] Toe.

presented in Fig. 7 graphically illustrate the energy dissipation from the crest to the toe of the spillway. The percent energy reduction for both the smooth and stepped surfaces increases as the discharge decreases because of the decrease in depth of flow.

With the steps, the energy loss varies from 48% at q = 14.5 $m^3/s/m$ (156 $ft^3/s/ft$) to 71% at q = 5.81 $m^3/s/m$ (62.5 $ft^3/s/ft$). With the smooth surface, the energy loss varies from 20% at q = 14.5 $m^3/s/m$ (156 $ft^3/s/ft$) to 25% at q = 5.81 $m^3/s/m$ (62.5 $ft^3/s/ft$). For the discharges presented, the energy loss from the crest to the toe of the spillway with the steps is 2.4–2.9 times greater than the energy loss with the smooth surface. For a hydraulic-jump-type stilling basin, at maximum discharge, the

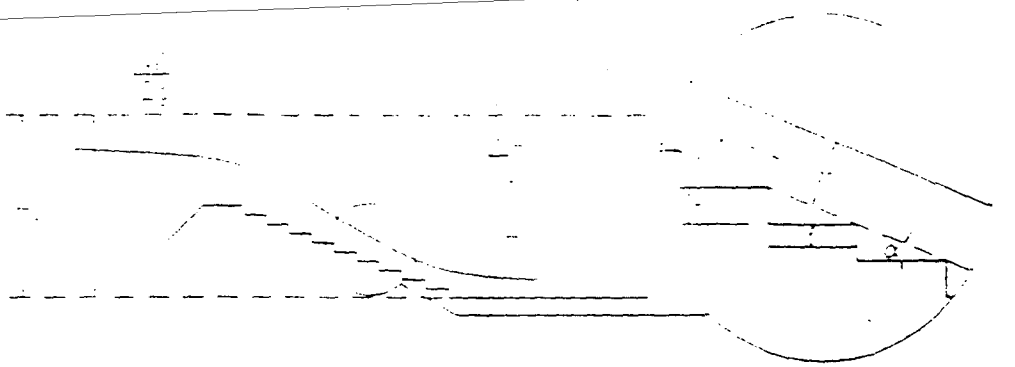

FIG. 6. Energy Notation

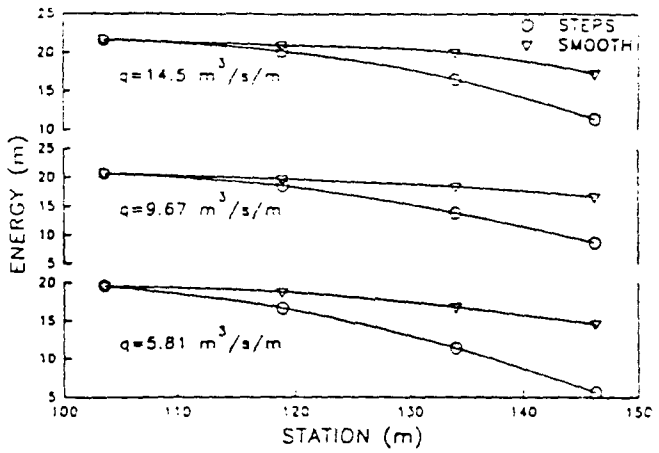

FIG. 7. Total Head Loss Profiles

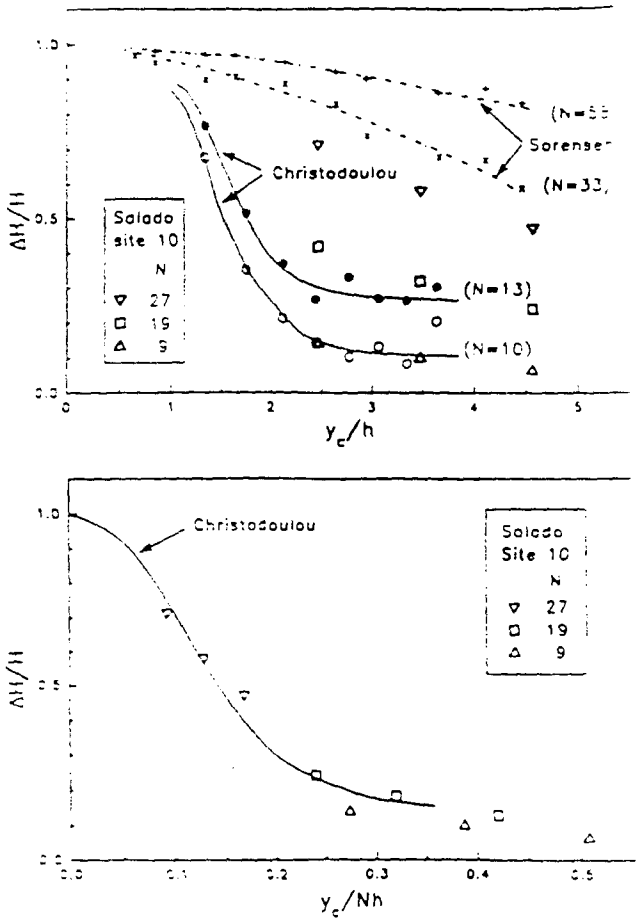

FIG. 8. Comparison of Current Results with Christodoulou's (1993): (a) $\Delta H/H_o$ versus y_c/h, (Fig. 3); (b) $\Delta H/H_o$ versus y_c/Nh (Fig. 4)

energy dissipation caused by the steps will permit a stilling basin approximately 70% as long as the stilling basin required with a conventional chute spillway.

Comparison with Christodoulou's (1993) Results

Figs. 8(a) and 8(b), respectively, present data from Fig. 3 ($\Delta H/H_o$ versus y_c/h) and Fig. 4 (ΔH_o versus y_c/Nh) presented by Christodoulou (1993) for l/h values close to 0.7 and y_c/h in the 1–4 range. The Salado spillway results, for $l/h = 2.5$ and y_c/h in the range of 1–4.5, have been added to the figures. The Salado spillway results follow the general trend of the results presented by Christodoulou (1993). This was not expected by the writers because of the difference in the spillway slopes. The writers expected a family of curves represented by different slopes and less relative energy loss due to the flatter slope. However, the Christodoulou (1993) curves shown in Fig. 8, expressing the relative energy loss, represent the Salado spillway results very well.

The energy loss for a stepped spillway is strongly dependent on the slope length. For a given spillway height, step height, and discharge, a steep spillway slope will have a larger friction coefficient and thus a larger energy loss per unit of slope length compared with a flatter spillway slope. However, the flatter slope will have a longer slope length so the total energy loss for the flatter slope may approximate the energy loss for the steeper slope. This would explain why the curve presented by Christodoulou (1993), Fig. 8b, represents the current results very well even though the slope for the Christodoulou spillway is 3.6 times as great as the slope for the Salado spillway.

The slope range of 0.4–1.43, $y_c/h \leq 4.5$, and $y_c/Nh \leq 0.5$ in Fig. 8 will generally be in the range of values used for most stepped spillways. Thus, it would appear the relative energy loss represented by the Christodoulou (1993) curve in Fig. 8(b) may be adequate to predict the energy loss for most stepped spillways. However, this should be verified with additional experimental data.

SUMMARY AND CONCLUSIONS

Physical model studies were conducted on a roller compacted concrete stepped spillway to evaluate the proposed design and hydraulic performance of the spillway and stilling basin. A two-dimensional 1:20 scale sectional model was used to evaluate the flow transition from the level spillway crest to the sloping steps, the energy dissipation of the steps, and performance of the proposed stilling basin. The two-dimensional model was also tested with a smooth chute surface to provide data to compare energy dissipation with the step surface.

The hydraulic performance of the spillway was very good for all discharges tested. The flow transition from the level crest to the sloping blocks was very good without use of a

curved section or a reduced slope for the first few steps. The steps were effective in dissipating energy. The energy dissipated with the steps was [illegible] to three times as great as the energy dissipated with a smooth surface. The energy dissipation at maximum discharge, 14.5 m³/s·m (156 ft³/s/ft), with the steps was 48% compared to an energy dissipation of 20% for the spillway with a smooth chute surface. At 5.81 m³/s·m (62.5 ft³/s/ft), the energy dissipation for the steps was 71% compared to 25% with the smooth chute surface. The energy dissipation caused by the steps significantly reduces the size of the stilling basin required at the spillway toe. At a maximum discharge, the energy dissipation caused by the steps will require a stilling basin approximately 70% as long as the stilling basin required for a conventional chute spillway.

ACKNOWLEDGMENTS

This study was partially funded by the U.S. Department of Agriculture (USDA), Soil Conservation Service (SCS), Temple, Texas. The writers thank Fred W. Blaisdell, Fellow, ASCE, and Larry Goertz, USDA, SCS, for their comments and suggestions that improved the final draft of this manuscript.

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APPENDIX II. NOTATION

The following symbols are used in this paper:

f = coefficient of fluid friction;
H = energy head, m (ft);
H_s = $Y + (V_0^2/2g)$, energy head at spillway crest, m (ft);
h = height of step, m (ft);
l = length (horizontal) of step, m (ft);
N = number of steps;
Q = discharge, m³/s (ft³/s);
q = unit discharge, m³/s/m (ft³/s/ft);
V = mean velocity, m/s (ft/s);
V_0 = approach velocity, m/s (ft/s);
Y = upstream depth, m (ft);
y_c = critical depth, m (ft);
y_n = depth of flow normal to spillway slope, m (ft);
α = $\tan^{-1}(h/l)$, angle of downstream face of spillway to horizontal;
ΔH = difference in energy head, m (ft); and
ΔH^* = $(\Delta H)_{step}/(\Delta H)_{smooth}$.

COMMENTS AND RESPONSE FOR 90% DESIGN REPORT

Southern Nev[illegible] Water Authority
East C-1 Detention Basin (080 - K)
90% Design Submittal

Package: 90% Design Submittal
Reviewer: A. Lin, J. Venckus, R. Liu, J. Chuang Date: 2-27-98
Documents: Drawings, Design Calculations, Design Report & Specifications Discipline: STRUCTURE

Item No.	Reference	Comment	Resp. Code	Response
STR090-001	Specifications Section 03290	Par. 1.2.B contains references to ASTM D638. ASTM D746, ASTM D747 and ASTM D1076 which all relate to PVC waterstops, etc. Par. 1.3.A thru C all refer to waterstops and water bearing members. No PVC waterstop criteria is provided in this specification section nor details provided on the drawings. Should the noted ASTM references in Par. 1.2 and waterstop references in Par. 1.3 be deleted?	A(2)	Yes
STR090-002	Specifications Section 03300	Should ACI 304, ACI 305 and ACI 306, as referenced in Par. 3.4.C, 3.3.J.1 and 3.3.I.1 respectively, be added to Par. 1.2.B "Commercial Standards"?	A(2)	Yes
STR090-003	Specifications Section 03300	ASTM E119 "Method for Fire Tests of Building Construction and Materials" does not seem applicable for cast-in-place concrete. Should the reference be deleted from Par. 1.2.B "Commercial Standards"?	A(2)	Yes
STR090-004	Specifications Section 03300	Par. 2.1.B and C: Should the referenced Sections 201, 203, 204 and 205 of ACI 301 be Sections 2.1, 2.3, 2.4 and 2.5 respectively?	A(2)	Yes

Southern Nev[illegible] Water Authority
East C-1 Detention Basin (080 - K)
90% Design Submittal

Package: 90% Design Submittal
Reviewer: A. Lin, J. Venckus, R. Liu, J. Chuang — Date: 2-27-98
Documents: Drawings, Design Calculations, Design Report & Specifications — Discipline: STRUCTURE

Item No.	Reference	Comment	Resp. Code	Response
STR090-005	Calculations Spillway Page 1 Outlet Drop Structure Page 34	Differences from the geotechnical report are noted: The subgrade modulus should be 200 tcf instead of 400 pci. The coefficient of friction should be 0.40 instead of 0.35. A Case 3 - Seismic Load is not included as recommended in Section 6.5 of the geotechnical report. Will the above items be included in the 100% calculations?	A(2)	Yes
STR090-006	Calculations Spillway Pages 5 & 6	The maximum moment at the base of the wall and in the slab appear to be low. Will they be reviewed with respect to corrected geotechnical values?	A(2)	The moments have been reviewed and are corrected.
STR090-007	Calculations Spillway Pages 7 thru 12	This input file does verify the output files as follows: It is noted as "STAAD-III Demo Version - No Commercial Use". There is a "STAAD-III Error Message - Demo Version Limited to 6 Members and 5 Load Cases". The "Date = Jan 21, 1998" does not agree with the Dec 1997 dated output. Will input files related to the output files be included with the 100% calculations?	A(2)	Yes
STR090-008	Calculations Outlet Structures Page 72	The coefficient of friction should be 0.40 instead of 0.35. See Comment STR090-005.	A(2)	Will be corrected

Southern Nev[illegible] Water Authority
East C-1 Detention Basin (080 - K)
90% Design Submittal

Package: 90% Design Submittal
Reviewer: A. Lin, J. Venckus, R. Liu, J. Chuang — Date: 2-27-98
Documents: Drawings, Design Calculations, Design Report & Specifications — Discipline: STRUCTURE

Item No.	Reference	Comment	Resp. Code	Response
STR090-009	Calculations Outlet Drop Structure Page 145	The passive pressure should be 600 pcf instead of 300 pcf and the coefficient of friction should be 0.40 instead of 0.35. See Comment STR090-005.	A(2)	Will be corrected
STR090-010	Drawing 3	General Note 7: The Geotechnical Data Report is dated February 12, 1998 and the Geotechnical Design Report is dated February 13, 1998 instead of January 15, 1998 as given in the drawing note.	A(2)	Ok
STR090-011	Drawings S-1 and S-5	It appears that the placement of the weephole PVC pipe at the construction joints (Detail 1/S-2) will interfere with the installation of the key in the joint (Detail 5/S-2). Suggest that the weepholes be located away from the construction joint for simpler construction and joint sealing.	A(2)	Ok
STR090-012	Drawing S-2	Post Embedment Detail 6: This detail is duplicating Detail 4/31 with some variations. Why are two details needed for fence post embedment? Suggest that this detail be deleted and appropriate references on S-3 Sections A and B, S-4 Section A and S-5 Section A should be to Detail 4/31.	A(2)	Ok
STR090-013	Drawings S-2 and S-3	Should the drawing titles be "SPILLWAY / SECTIONS AND DETAILS" to match Drawing 3 Sheet Index?	A(2)	S2: Typical / Sections and Details S3: Spillway / Sections and Details

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Item No.	Reference	Comment	Resp. Code	Response
STR090-014	Drawing S-3	a) Sections A and B: Should the wall drain be located at the bottom of the wall?	A(2)	Yes
		b) Sections A, B and C: The thickness of the bottom slab is shown as 1'-1" (13") in Sections A and B; whereas Section C which is perpendicular to Section A shows the slab to be 15" thick. What is the correct thickness?	A(2)	1'- 1" is correct
		c) Section D: The left side of the section shows dowels into the soil and a severe construction notch into the slab. What is the correct detail for this section?	A(2)	Will be corrected
		d) Section E: The control points for the curved nose should be shown here as they are not found on the civil drawings.	A(2)	Will be shown
STR090-015	Drawing S-4	Section B: Should the left top corner of the baffle be dimensioned or shown at 45°?	A(2)	Ok
STR090-016	Drawing S-5	Plan: Should the right retaining wall callout be D/S-6 instead of A/S-6?	A(2)	Yes
STR090-017	Drawings S-5 and S-7	The dimensions for locating the trash rack wall mounting brackets shown in Section B / S-5 do not agree with the dimensions given in Detail Section 5 / S-7. What are the correct dimensions?	A(2)	Will be corrected

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Item No.	Reference	Comment	Resp. Code	Response
STR090-018	Drawings S-6 and S-7	Should the drawing titles be "OUTLET STRUCTURE / . . . ." to match Drawing 3 Sheet Index?	A(2)	Yes

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Item No.	Reference	Comment	Resp Code	Response
		DESIGN REPORT		
CIV090-01	General	It is assumed that the Design Report is used to describe design criteria, design method and design approaches for the major elements of East C-1 Detention Basin. This report, does not have these descriptions. Therefore, suggest explaining all major elements of design in detail and also indicate where calculations are to be found.	W	
CIV090-02	P. 2, Section 1.0	Please define the relationship between C4CA, C4CB, C4CC and C4C-East, C4C-Middle, C4C-West. Suggest including a drainage basin map.	A(2)	Ok. See Design Report and Figure 1.1(drainage basin map).
CIV090-04	P. 3, Table 1.2	Where are the locations of C4CD and C3B3B?	A(2)	Ok. See Figure 1.1(drainage basin map).
CIV090-05	P. 3, Tables 1 & 2	Suggest adding an AREA column in both tables to show their acreage.	A(2)	Ok

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Item No.	Reference	Comment	Resp Code	Response
CIV090-06	P. 4, Table 1.3	Is the peak outflow considering discharge from the low level outlet only? Please clarify and address in the report. What is the discharge time to empty water? Please verify.	A(2) A(2)	Ok The drain time to empty water is a requirement per CCRFCD Drainage Manual that all detentions will have 90% of the capacity after 7 days.
CIV090-07	P. 4, Section 2.0	Shouldn't the protection for the downstream face of the embankment be required? Please verify.	N	The downstream face would not have wave action and the only water reaching it would be the surface runoff.
CIV090-08	Figure 2.1	What is the cutoff trench depth? Please indicate. The freeboard is only 1 ft (this is the difference between embankment crest 2510 ft and maximum water 2509 ft). Could this 1 ft freeboard withstand the wave action? Did you consider wave height? What is it?	A(2) N	Ok Detention basin design in Las Vegas area is typically required to pass PMF discharge as a minimum and a minimum of one foot freeboard is required above the emergency spillway design water surface elevation (EL.2509 ft).

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Item No.	Reference	Comment	Resp Code	Response
CIV090-09	P. 6, Section 4.0	2nd paragraph, should water level at Elevation 2509 feet be the maximum water level for PMF condition? Please clarify.	A(2)	Yes. But it is typical in Las Vegas area to use top of dam as maximum water level.
CIV090-10	P. 7, Table 5.1	Shouldn't the Stage Elevation of 2509 feet be considered? Suggest adding discharge at this stage elevation.	A(2)	Ok

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Item No.	Reference	Comment	Resp Code	Response
CIV090-11	P. 8, Section 8	Suggest including a detention basin and two stilling basins on the layout drawing or map in order to understand their relationship.	A(2)	Ok
		Shouldn't a dike and riser discharge pipe be constructed at the stilling basin to provide time for settlement? If so, why is energy dissipator required for inflow to the stilling basin? Please clarify and explain in more detail. Also, shouldn't velocity cheek dike be used to slow the flow to meet settlement purpose?	N	The energy dissipator and the 0.5% slope flate area were designed to create hydraulic jump and slow the flow for sediment purpose.
		There is no hydraulic jump calculation. Please clarify.	N	The hydraulic jump and sequent depth calculation and design chart were provided in the section 9 of the calculation notebook.
		Is it possible to install a riser inlet at the entrance of low level outlet, such that the detention basin could also be used as sediment basin?	N	The detention basin is designed for both detention and sediment basin.
CIV090-12	P. 9, Section 8.0	What is the sediment built-up depth at each stilling basin? How often to remove the sediment is required?	A(2)	It will be 2 ft to 2.5 ft during 2-10 years storm events . The sediment will also be removed after 2-10 years events.

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Item No.	Reference	Comment	Resp Code	Response
		DESIGN CALCULATION NOTEBOOK		
CIV090-13	Section 5	Page 2, Item II, shouldn't pipe outlet loss and dissipator energy loss be considered in the calculation of the total head for open channel? Otherwise, should the title of this Item be changed to "Total Head at Outlet of Culvert"?	A(2)	Ok
CIV090-14	Section 5	Suggest calculate or consider the entrance condition based on the CULVERT flow calculation method in addition to the orifice method? Use of orifice method is questionable for this application.	N	The orifice formula is applied for the entrance of the outlet pipe only. The pipe is designed as open channel flow with high incoming velocity flow.

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Item No.	Reference	Comment	Resp Code	Response
CIV090-15	Section 5	Is 48" ∅ required by the Authority? Based on your calculation results, the water depth is about 50% of pipe size, is that economic? Shouldn't smaller size pipe, such as 36" ∅, be considered? Actually, this discharge pipe could be designed to be under pressure? The flow velocity is up to 23 fps, can this type RCP pipe take this velocity? Can this RCP take 70 ft earth cover?	N N N	Referring to comment No.14, the pipe was designed as inlet control by using high water head at the entrance and avoiding the backwater effect from downstream of the pipe. Yes. Based on the information from local RCP producers and our research. As velocity up to 23 fps, it will not create problems for concrete pipe. Yes. The RCP can take 70 ft earth cover per ASTM C361 design.
CIV090-16	Section 6	Last sheet of this calculation, please define the purpose of this calculation and show the dimensions by a sketch.	A(2)	Ok
CIV090-17	Section 7	Shouldn't the hydraulic dynamic force be considered for spillway slab and wall design?	N	The dynamic force is considered for spillway slab only.

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Item No.	Reference	Comment	Resp Code	Response
CIV090-18	Section 8, channel capacity analysis	As you define in 1st page, the n = 0.024. Why are some of calculations in the tables using a different value?	A(2)	Will be corrected.
CIV090-19	Section 9	Inlet sediment control structure design. How could wave height of 3 ft be generated at 1.04 ft or 2.1`8 ft water depths? In general, the maximum wave height H = 0.78 d (water depth), (see Corps of Engineer Slope Protection Manual). What is the thickness of the protection layer? Normally, it requires two rocks size. If H = 3 ft, the wave will be overtopping the dike. Shouldn't the dike be designed under wave overtopping condition?	N	The flow depth is about 1.1 ft for incoming. The desigh chart with solid line will be the numbers applied. H = 3 ft is the example problem provided by " Design of Riprap Revetment " by Federal Highway Administration.

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Item No.	Reference	Comment	Resp. Code	Response
		SECTION 10 GEOTECHNICAL NREPORT		
		DATA REPORT		
CIV090-20	Figure 1A	Suggest calling out Embankment and Spillway Structures.	A(2)	The embankment and spillway structures will be labeled on Figure 1A.
CIV090-21	Plate A-18b	Suggest providing values of "Elevation" and "Depth in Feet" for reference.	A(2)	Plate A-18b will be amended to show "Elevation" and "Depth" in feet as suggested.
CIV090-22	Plate A-33b	Suggest providing RQD% values for boring C-33 at Elevations 2476 to 2474.	A(2)	Plate 33b will be amended as suggested
CIV090-23	Plate B-2	Should % sand for sample B-3 be 35.9%?	A(2)	The sand percentage is correct at 35.7. The correct gravel percentage is 43.0 rather than 42.8. This rounding error will be amended.
		DESIGN REPORT		

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-24	P.11, Section 6.2.5	Suggest including fill material gradation and indicating borrow area.	N	It is our opinion that a structural fill gradation requirement for this site is unnecessary. As stated in Paragraph 2 of Section 6.2.5, laboratory tests indicate that the on-site soils encountered in all locations explored are granular and non-expansive and should therefore meet the fill specification as presented after processing to remove oversized materials.

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-25	P. 12, Section 6.3.2	Suggest specifying material requirement for option 1 structure fill. The cut-off trench material should be relatively impermeable. Is this material compatible with the properties used in the seepage analysis?	N	As stated in Section 4.2, our seepage analysis is based on compacted native soils in the cut-off trench. Overexcavated and recompacted soils will be less permeable because of the compactive effort and also due to the disruption of any natural conduits perpendicular to the axis of the dam which may exist in these native soil deposits. It is our opinion that this material is compatible with the properties used in the seepage analysis.

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-26	P.13, Section 6.3.4	Shouldn't geotextile be required on top of gravel blanket drain to avoid loss fine fill material? Also, shouldn't a perforated pipe be required in the blanket to drain seepage water at some lowest pocket?	N	As stated in Section 6.3.4, the gravel blanket drain material was developed using USBR criteria for both filters and drains. Therefore, a filter fabric will not be required. Based upon the results of our analyses, it is our opinion that the drain design is adequate.
CIV090-27	P. 14, Section 6.4.1	What is the safety factor of the recommended bearing capacity of soils?	A(3)	3.0
CIV090-28	P. 18	1st paragraph, Please delete second "will be" words in the last sentence.	A(2)	This sentence will be modified as suggested.
CIV090-29	P. 18, Section 6.8	Is this Section also applied to spillway floor and wall?	A(2)	This section applies to the outlet structures only and will be clarified in the first sentence.

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-30	Appendix B	Please show the information in lines to identify the following: water levels, basin bottom elevation, soil embankment including native soil and compacted layer, and bedrock zone.	A(2)	Additional clarification of maximum water levels, along with basin bottom elevations, both native soil zones and compacted layers in the embankment, and bedrock zones will be added to the final plates.

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Item No.	Reference	Comment	Resp. Code	Response
		SPECIFICATIONS		
CIV090-31	022110, Par. 1.1	Should a reference be made to dust control in the requirement?	N	Dust abatement is covered in Section 01560.
CIV090-32	02200, Par. 2.4.E, 3.1.C.6.f, 3.11 Section 02621	General comment for all Sections, should "OWNER" be changed to "AUTHOPRITY" for consistency?	A(2)	Changes made.
CIV090-33	02200, Par. 3	Should mention be made to protect trees from injury during excavation?	N	That is adequately covered in Section 02110.
CIV090-34	02200, Par. 3.3.F	Should mention be made not to drag the trench shield along trench bottom?	A(2)	Changes made, text added.
CIV090-35	02200, Par. 3.7.A.1	Should the trench zone be defined as 12 inches above top of pipe instead of 6 inches? This would then check with trench zone definition.	A(2)	Changes made.
CIV090-36	02200, Par.3	Should a paragraph on placement of CLSM be included?	A(2)	Text added.
CIV090-37	02200, Par. 1.2	Should ASTM D2901 be included in Reference Specifications?	A(2)	Reference added.

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-38	02274, Par. 1.3.C	Should a sample of the securing pin and washer be submitted?	A(2)	Text added.
CIV090-39	02274, Par. 2	Should a specification be included for securing pin?	A(2)	Text added.
CIV090-40	02621, Par. 3	Should any pressure or hydrostatic test be done on the pipe in the field? Would need to specify this.	N	Tests in accordance with C361 performed at the place of manufacture will be sufficient for this application, no field hydrostatic testing will be required.
CIV090-41	02830, Par. 1.4	Should a sample of the chain link fabric be submitted?	N	Shop drawings and technical submittals of the chain link fabric will be sufficient to determine its viability.

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-42	02621, Par.2.1.A	Please check requirement of ASTM C361 for RCP pipe. Standard seems only to 20 feet of earth fill.	N	According to ASTM C361, for external loading conditions of more than 20 feet of fill, detailed design calculations must be made rather than using the tables with predetermined reinforcement sizes and wall thicknesses. Therefore, ASTM C361 is still appropriate, the CONTRACTOR will just have to supply detailed calcs for the pipe for this special circumstance.
CIV090-43	General	Where is the PVC pipe specification?	A(3)	It is in Section 03290.

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Item No.	Reference	Comment	Resp. Code	Response
		DRAWINGS		
CIV090-44	General	Suggest showing all flow directions on the drawings.	A(2)	Ok
CIV090-45	No. 3, Legend	Suggest adding arrow head to flowline to indicate flow direction.	A(2)	Ok
CIV090-46	No. 3, Sheet Index	For consistence, suggest checking drawing title of following drawings: No. 25 through No. 29, No. S2 and No. S3.	A(2)	Ok
CIV090-47	No. 3, General Notes	Shouldn't temporary drainage system and erosion control be provided by Contractor?	A(2)	Ok. Per specifications.
CIV090-48	No. 5	Suggest adding a Note "the outflow hydrograph is for the low level discharge pipe only.".	A(2)	Ok
CIV090-49	No. 5	STAGE vs. STORAGE curve, should the maximum storage be Elev. 2509 instead Elev. 2510?	A(2)	Ok
CIV090-50	No. 5	STAGE vs. LOW LEVEL DISCHARGE curve, suggest deleting call-out "SPILLWAY CREST ELEV. 2500.00" and adding note "Based on orifice of 1.85 ft diameter".	A(2)	Ok

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-51	General	Suggest providing overall site access road and construction road plan and detail. The road alignment should avoid using PRC as possible for easy driving.	N	Access road and construction road plan will relate to R/W permit application which will effect construction schedule.
CIV090-52	No. 7	GLO is not in Abbreviation list (Drawing No. 3).	A(2)	Ok
CIV090-53	Nos. 8 to 11	Suggest providing all horizontal control coordinates for the center line alignment.	A(2)	Ok
CIV090-54	No. 11	There is no boring taken at the centerline of the spillway. Do you think that the provided geotechnical data is enough for the spillway design?	N	Yes. The data provided by Geotech including overall mapping is enough for spillway design.
CIV090-55	No. 15	What is shaded area with hatch line presenting? Which is not in drawing No. 3 Legend. Please show centerline legend in drawing No. 3.	N	Not hatch lines but contours.
CIV090-56	No. 15	Suggest showing coordinates of center channel.	A(2)	Ok
CIV090-57	No. 15	Suggest calling out "Embankment". Suggest providing detail arrangements: a) access road tie to existing road, and b) intersection area between embankment and MPU levee channel.	A(2) A(2)	Ok Ok. Levee and access road are revised per CCRFCD comments.

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-58	No. 16	At the channel end, shouldn't erosion protection be required? On Typical Cross-section, "PFG" is not shown in Abbreviation list.	A(2) A(2)	Ok Ok
CIV090-59	No. 17	Suggest showing the structure fill materials borrowing pit area.	N	Included in part of excavation area.
CIV090-60	No. 18	Suggest showing the elevation call-outs on the new contour lines. This comment is also for all other plan drawings.	A(2)	Ok
CIV090-61	No. 19	Just for reminder, all values in the Tables should be double checked by designer. These coordinates and elevations are so important to the contractor.	A(2)	Ok
CIV090-62	No. 20	Suggest showing the cut off trench on the plan including beginning and ending location coordinates.	A(2)	Ok
CIV090-63	No. 20	According to ASTM C361, the RCP pipe can only take 20 ft earth cover. Do you think that this RCP pipe still can be used in this project? Should concrete encasement be required? If so, please show the detail. Also, please provide detail for RCP joint.	N	Appendix to C361 allow adding head/fill above 20 ft.
CIV090-64	No. 21, Plan	How could the sediment be retained in the stilling basin, if there is a channel opening in the middle of dike? The sediment will carry with the flood water.	A(2)	The opening was designed as access road and will be relocated.

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-65	No. 21, Cut Off Collar	Suggest showing the collar height and spacing requirement.	A(2)	Ok
CIV090-66	No. 22	Suggest providing coordinates at the intersection points between the centerline of embankment and all cross-section lines.	A(2)	Ok. Centerline control data will be provided in Sheet No. 22 and refer to Sheet No.16.
CIV090-67	Nos. 24 to 29	Suggest showing the water level.	N	It wouldn't be necessary.
CIV090-68	No. 24	Suggest showing the cutoff trench depth.	N	The depths are varied. Refer to specification.
CIV090-69	No. 24	Shouldn't geotextile be required between drainage blanket material and embankment material? Shouldn't bottom of the drainage blanket be graded and sloped toward downstream for the drainage purpose? Otherwise, shouldn't a perforated pipe be installed to collect seepage water at the lowest pocket area?	N N	No. No.
CIV090-70	No. 30	4' Gate Elevation, why use 13/8" O.D. plunger rod? It seems too big.	N	It is typical gate used in detention basin design in Las Vegas area.
CIV090-71	No. 30, SECTION 2	Suggest reversing the layout in order to match the PLAN shown. Please check.	A(2)	Ok
CIV090-72	No. 30	What is the painting requirement for the Bollard post?	A(2)	Ok

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Item No.	Reference	Comment	Resp. Code	Response
CIV090-73	No. 31, Section 2	Should the welding symbol be also applied to lower 3/16" plate? Please show pad lock and detail.	A(2)	Ok
CIV090-74	No. 31, Section 3	The dimension of 12" dia. concrete footing for gate posts is discrepancy with DETAIL 1. Please check.	A(2)	Ok. 12 inches on section 3 is for chain link fense. Detail 1 is for Pipe link fense.
CIV090-75	General	Chain link fence is not in legend of drawing No. 3.	A(2)	Ok
CIV090-75	No. 31	Suggest relocating DETAIL 4 to Drawing S-2, where is more appropriate.	A(2)	Ok
CIV090-76	No. S-1	Please indicate fence post locations.	A(2)	The fence is located on Dwg 34. Post spacing is given in Detail 2, Dwg---
CIV090-77	No. S-1	The dimension is missing, baffle block to wall.	A(2)	Will be corrected.
CIV090-78	No. S-1	Shouldn't weepholes be required for the bottom concrete slab?	N	No
CIV090-79	Nos. S-2 & S-3	Suggest adding word "SPILLWAY" to the title block.	A(2)	Will be revised.
CIV090-80	No. S-2	Suggest relocating DETAIL 6 to Drawing S-4, where is more appropriate.	A(2)	Detail deleted. See Item No. STR090-012.

Southern Nev[illegible] Water Authority
East C-1 Detention Basin (080 - K)
90% Design Submittal

Package: 90% Design Submittal
Reviewer: A. Lin, J. Venckus, R. Liu, J. Chuang — Date: 2-27-98
Documents: Drawings, Design Calculations, Design Report & Specifications — Discipline: CIVIL

Item No.	Reference	Comment	Resp. Code	Response
CIV090-81	No. S-3	Suggest providing a data table for OGEE crest curvature.	A(2)	Ok
CIV090-82	No. S-4	Shouldn't riprap apron be required downstream of the concrete apron?	A(2)	Ok
CIV090-83	No. S-5	Suggest providing the apron length. Suggest indicating 1-1/8" plate on the PLAN.	A(2)	Will be revised.
CIV090-84	No. S-5	Should SECTION A on wing wall be SECTION D?	A(2)	Yes
CIV090-85	No. S-5	Can 48" ∅ RCP be replaced by a smaller pipe, such as 36" ∅, in order to eliminate the orifice, since this culvert could be designed under pressure?	N	Please refer to comment 15.
CIV090-86	No. S-6	Shouldn't construction joint be required at the wall's elevation break?	A(2)	Yes
CIV090-87	Nos. S-6 & S-7	Suggest adding words "OUTLET STRUCTURE" in the title block.	A(2)	Will be revised.
CIV090-88	No. S-7	Should LOCK opening be provided for each panel?	A(2)	Yes

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
Draft Geotechnical Reports

Package: Draft Geotechnical Reports
Reviewer: A. Lin, J. Chuang
Documents: Reports

Date: 2-17-98
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
		GEOTECHNICAL DESIGN REPORT		
CIVGEO-001	P. 9, Section 6.2	Shouldn't dewatering be required during foundation construction?	N	Groundwater was not encountered during the field investigation and is expected to be present at depths of greater than 100 feet below the deepest cuts. Dewatering is therefore not anticipated to be required.
CIVGEO-002	P. 12, Section 6.3.3	Is the blanket drain extended to the centerline of the crest? If so, shouldn't the blanket drain be built into the center cut-off wall?	N	As stated in Section 6.3.3, the blanket drain should extend from the landside toe to the centerline of the crest. The purpose of the blanket drain is to control seepage within the embankment. The purpose of the cut-off trench is to retard seepage in the embankment foundation soils. These two features serve different functions and work independently of one another. It is therefore acceptable for the drainage blanket to overlay the cut-off trench.

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
Draft Geotechnical Reports

Package: Draft Geotechnical Reports
Reviewer: A. Lin, J. Chuang
Documents: Reports

Date: 2-17-98
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
CIVGEO-003	P. 13, Section 6.4.1	Suggest using 95% of maximum dry density compaction for the foundation structural fill.	A(2)	Preliminary grades indicate that the outlet structure, outlet drop structure, and spillway structure will all be founded on native soils in areas of cuts. Fills below foundations are therefore expected to be less than one foot thick. 90 percent compaction is suitable in this case. As a precaution in the event of unanticipated deeper fills, the following statement will be added to the end of paragraph 4 in Section 6.2.5. "Fills greater than 3 feet in depth in areas of the proposed outlet drop, outlet, and spillway structures should be compacted to a minimum of 95 percent of maximum dry density".
CIVGEO-004	P. 15, Section 6.5	1st paragraph, Should Section 6.2.6 be Section 6.2.5?	A(2)	This typographical error has been corrected as of March 4, 1998 for all future versions of this document.
CIVGEO-005	Appendix B	Suggest indicating the cut-off trench dimension in the sketch.	A(2)	The approximate dimensions of the cut-off trench represented in these generalized sections will be added to versions of this document issued subsequent to 3-4-98.
CIVGEO-006	Plate C-1 to C-8	Please provide a sketch to show the boundary of the four soil zones and corresponding soil properties used in the stability analysis.	A(2)	A sketch summarizing this data will be included in Appendix C in versions of this document issued subsequent to March 4, 1998.

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
Draft Geotechnical Reports

Package: Draft Geotechnical Reports
Reviewer: A. Lin, J. Chuang
Documents: Reports

Date: 2-17-98
Discipline: CIVIL

Item No.	Reference	Comment	Resp Code	Response
		GEOTECHNICAL DATA REPORT		
CIVGEO-007	Plate B-7	Grain size analysis for B-18 sample; shouldn't it be classified as poorly graded gravel with sand?	N	The USCS coefficients of uniformity and curvature for this sample meet the criteria for well-graded gravel.
CIVGEO-008	Plate B-7	B-17 sample; shouldn't the sample at 5ft deep be classified as well graded gravel with sand?	N	The USCS coefficient of curvature exceeds 3 so this sample does not meet the criteria for well-graded gravel.

Southern Neva[illegible]'ater Authority
East C-1 Detention Basin (080-K)
Draft Geotechnical Reports

Package: Draft Geotechnical Reports
Reviewer: Norman Keele
Documents: Geotechnical Design Report, Drawings

Date: February 11, 1998
Discipline: Construction
File: c:\norm\080KXX.doc

Item Number	Reference	Comments	Resp. Code	Response
CONDFT001	Page 10 of 20 paragraph 6.2.3	Delete the last sentence – excavation methods to be determined by Contractor based on Geotechnical data	A(2)	Amended as suggested
CONDFT002	Page 17 of 20 paragraph 6.7	Rewrite last sentence in first paragraph for clarification, e.i. "...drainage blanket will be more than the amount required..."	A(2)	Amended as suggested
CONDFT003	Appendix A Section III	References to "Plate 1" should be changed to "Plate A1"	A(2)	Amended as suggested
CONDFT004	Drawing – General	A drawing showing proposed access route to site should be included.	A(2)	Agree
CONDFT005	Drawing	Drawing titled "Embankment Centerline Profile" – the bedrock line does not appear to agree with the Geotechnical data. Bedrock elevation at B-19 is 2435.5 and at B-20 elevation is 2459; slope up to the left, not down.	A(2)	Will be revised
CONDFT006	Para. 6.2 page 9	Budget for Geotechnical engineer to observe foundations	D	SNWA issue.
CONDFT007	Para. 6.4.1 page 13 of 20	Fourth (4^{th}) paragraph, third line "....volcanic rock "and" anticipated..."	A(2)	Amended
CONDFT008	Para. 6.4.2 page 14 of 20	Second sentence"...Geotechnical engineer be present..." Is there special soil testing required or what's normally monitored: lift height and compaction?	N	No special testing is required
CONDFT009	Appendix A page A-3	Formula and explanation inconsistent log N (m) where n (m) upper and lower case.	A(2)	Amended as suggested

Southern Nev[illegible]ater Authority
East C-1 Deten[illegible] Basin (080-K)
90% Design Submittal

Package: 90% Submittal
Reviewer: Norman Keele, Steve Cross
Documents: Specifications

Date: March 2, 1998
Discipline: Construction
File: EC1080KNK.doc

Item Number	Reference	Comments	Resp. Code	Response
CON09001	Page 00020-3	Delete "Anticipated Contract Award" - may be redundant to Martin's comments.	W	Duplicates project counsel comment.
CON09002	Page 00300-3	Unit Price Schedule – add item for "Dispute Board Allowance" <5-$15,000; or add to section 00800 that no Dispute Review Board will be used.	W	Duplicates project counsel comment.
CON09003	Page 00700-10	Paragraph 4.1 – Include requirement that no additional lands to be acquired without SNWA concurrence. (see Sharon Kennemar's comments)	W	Land acquisition will make comment, if required.
CON09004	Page 00800-1	Paragraph SC.2.5 – Add CMP schedule to milestones; give complete description for each milestone. (see comment CON090024)	W	Does not conform to Rev. 7 master construction documents.
CON09005	Page 00800-14	paragraph SC-14.18 – Milestone Table to agree with SC-2.5	A(1)	Changes made.
CON09006	Page 01025-1	Add pay item for "Dispute Review Board". (see comment CON090002)	A(1)	Change made.
CON09007	Page 01300-7	Paragraph 1.13 – paragraph not needed if section 01302 added. (see latest release of Div 0 & 1)	N	Not using 01302.
CON09008	Page 01400-1	Paragraph 1.2 – Change second "CONTRACTOR" to "CONSTRUCTION MANAGER".	W	Does not conform to Rev. 7 master construction documents.
CON09009	Page 01520-1	Section will not be needed if Section 01302 is added. (see comment CON090007)	N	Not using 01302.
CON09010	Page 02200-4	Paragraph 2.1.E.3C – First line top of page change "7" to "28". (100 – 300 psi is 28-day requirement)	A(1)	Change made.
CON09011	Page 02200-1	Paragraph 3.1.C.8d – where are monitors to be located? Within 100' of structure?	A(1)	Text added, within 100'

Southern Nev[illegible] ater Authority
East C-1 Deten[illegible] Basin (080-K)
90% Design Submittal

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Date: March 2, 1998
Discipline: Construction
File: EC1080KNK.doc

CON09012	Page 02200-12	Paragraph 3.3 – The open trench limits does not apply. This is not a major pipeline project.	A(2)	Limit deleted.
CON09013	Page 02200-13	Paragraph 3.5 – Should add requirement to use a sheepsfoot roller on the embankment to prevent sepeadition of lifts.	N	Would dictate means and methods—CONTRACTOR is responsible for determining appropriate equipment to achieve compaction requirements.
CON09014	Page 02200-14	Paragraph 3.7 – Delete sub paragraphs B & C. Embankment above pipe.	N	Paragraphs should be included in Specifications in case trench is excavated after embankment has been constructed rather than the embankment constructed around the pipe.
CON09015	Drawing 4	Add proposed access route to site.	D	Need clarified.
CON09016	Drawing 23	Add notes on compaction, lift requirements, roller requirements.	D	Need clarified
CON09017	Drawing S-5	Is title correct – this is the Inlet Structure for the outlet pipe?	A(2)	Will be corrected.
CON09018	Drawing S-6 & S-7	Complete the title.	A(2)	Ok
CON09019	Design Report Page 4	Paragraph 2.0, third line "...20 wide of ...", change of to either at or on.	A(2)	Ok
CON09020	Design Report page 4	Paragraph 2.0, fourth line, add upstream before surface.	A(2)	Ok
CON09021	Design Report Page 7	Paragraph 6.0, fourth line, "...would must...", eliminate would.	A(2)	Ok
CON09022	Design Report Page 8	Paragraph 7.0, last line, Section 9 of this document should be the design calculation notebook.	A(2)	Ok
CON09023	Design Report Appendix C	Quantity Sheet – Soil Cement: Correct embankment.	A(2)	Ok

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
90% Design Submittal

Package: 90% Submittal
Reviewer: Norman Keele, Steve Cross
Documents: Specifications

Date: March 2, 1998
Discipline: Construction
File: EC1080KNK.doc

CON09024	Supplementary Conditions	Page 00800-14, paragraph SC-14.18 list of milestones, shouldn't final CPM and Schedule of Values be first? Also, inconsistent with milestones listed under SC-2.5.	A(1)	Changes made.
CON09025	Measurement and Payment	Page 01025-3 paragraph 1.6A, third line, need to add "be" before measured.	A(2)	Changes made.
CON09026	Measurement and Payment	Page 01025-4 paragraph 1.8A, third line, third word, omitted "i."	A(2)	Changes made.
CON09027	Measurement and payment	Page 01025-4 paragraph 1.8B, fifth line, "road surface for top dam", word misspelled – top dam awkward.	A(2)	Changes made.
CON09028	Measurement & Payment	Page 01025-4 paragraph 1.8A, 10 – 11 lines, section of sentence missing. "...field measurements and the quantities...".	A(1)	Changes made.
CON09029	Measurement & Payment	Page 01025-4 paragraph 1.8A, fifth line, add interval after 50 foot.	A(2)	Changes made.
CON09030	Measurement & Payment	page 01025-4, paragraph 1.10A, add interval	A(2)	Changes made.
CON09031	Measurement & Payment	Page 01025-4, paragraph 1.10A, sentence missing	A(1)	Changes made.
CON09032	QA-QC	page 01400-1 paragraph 1.1B, third line failure to report and...change and to any	A(2)	Changes made.
CON09033	QA-QC	Page 01400-6 paragraph 1.7G, fourth line, The procedures shall prevent...? Prevent is incorrect wording.	A(3)	Wording is consistent with Rev. 7, if change is required please advise.
CON09034	Soil Cement	Page 02203-8, paragraph 3.3.B.6, line 5, conditions are such that "he" change "hc" to "the".	A(2)	Changes made.
CON09035	Plans	Drawing S-4 section A, add diagonal reinforcing around 48" RCP. (see section B drawing C-5, similar)	A(2)	Ok

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
90% Design Report

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
1	01450-1	Part 1.2, Paragraph A. Insert additional text in third sentence as follows: "...conditions, including attending a dust control class, agreement to suspend...". Revise last sentence as follows: "The CONTRACTOR shall, under all circumstances, comply with mitigation requirements for dust control as well as being responsible for any and all Clark County Health District imposed fines which may be assessed to the project for violating the Dust Control permit."	A(1)	Changes made.
2	01450-1	Part 1.2, Paragraph B. Correct typographical error in third sentence "...if cement is trucked...".	A(2)	Changes made.
3	01450-2	Part 1.2, Paragraph E. Insert "Health District APCD" between Clark County and Sand and Gravel in first sentence. In second sentence, revise "...obtained by Clark County..." to "...obtained from Clark County...". Move this paragraph after paragraph B and re-letter subsequent paragraphs.	A(1)	Changes made.
4	01450-2	Part 1.2, Paragraph H. Insert "Utility Services, " after City of Henderson in the first sentence.	A(2)	Changes made.

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
5	01450-2	Part 1.2, Paragraph I. Revise paragraph as follows: "City of Henderson Department of Public Works, Grading Permit. The AUTHORITY has prepared and submitted the permit application, a copy of which follows this section. The CONTRACTOR shall sign the permit, pay the fees of $_____ identified in the application, and comply with all permit conditions." Note: We have not yet seen this application, which is to be prepared by the designer. The designer should anticipate 30 days or more for review and approval of the submittal by the city. The city is likely to have comments on the plans which will need to be addressed by the designer. A copy of the approved application needs to be included in the contract documents.	A(1)	Changes made.
6	01450-2	Part 1.2, Paragraph J. Revise as follows: "City of Henderson, Desert Conservation Plan. A fee of $550 per acre is required prior to construction disturbance of desert tortoise habitat, including material or equipment storage and stockpiling areas. The AUTHORITY has identified that _____ acres of habitat will be disturbed in the City of Henderson. The CONTRACTOR shall pay the fees of $_____ when obtaining the Excavation Permit from the City of Henderson." Note: The designer needs to estimate the acreage that will be disturbed by construction activities. A copy of this estimate shall be provided for Authority review prior to submittal to Henderson.	A(1)	Changes made.

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
90% Design Report

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
7	01450-2	Part 1.2. Delete paragraph K. An Off-Site Permit should not be required for this project.	N	See comments from CCPW.
8	01450-2	Part 1.2. Add new paragraph before paragraph F: Clark County and/or City of Henderson, Temporary Use Permit for Batch Plant, Rock Crusher, or Power Screening. If the CONTRACTOR desires to operate machinery for batching, crushing, or screening as part of their materials processing operations, the CONTRACTOR shall be solely responsible for applying and securing the required permit from Clark County and/or City of Henderson. The CONTRACTOR shall coordinate with the AUTHORITY's Permits Administrator prior to applying for an additional permit(s). The CONTRACTOR shall work with the AUTHORITY to obtain appropriate signatures of authorization from the property owner(s) of record.	A(1)	Changes made.

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
9	01450-3	Part 1.2, Paragraph L. Move this paragraph before paragraph F and re-letter subsequent paragraphs. Revise as follows: "Clark County Building Department, Excavation/Grading Permit. The AUTHORITY has prepared and submitted the permit application, a copy of which follows this section. The AUTHORITY has paid the desert tortoise mitigation fees required under this permit as part of the land acquisition process. The CONTRACTOR shall sign the permit, pay the fees of $_____ identified in the application, and comply with all permit conditions." Note: We have not yet seen this application, which is to be prepared by the designer. The designer should anticipate up to 30 days for review and approval of the submittal by Clark County. The County is likely to have comments on the plans which will need to be addressed by the designer. A copy of the approved application needs to be included in the contract documents.	N	See comments from CCPW. Permit has been sumitted to SNWA.
10	01450-3	Part 1.2, Paragraph M. Revise as follows: State of Nevada Division of Environmental Protection, Temporary Groundwater Discharge Permit. The CONTRACTOR shall obtain this permit prior to discharge of any water.	A(1)	Changes made.

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
11	01450-3	Part 1.2, Paragraph N. Move this paragraph to be under Part 1.3, Summary of Permits Obtained by the Authority, as Paragraph D. Add second sentence as follows: "The AUTHORITY has obtained this permit. As a condition of contract award, the CONTRACTOR shall sign a certification of agreement to comply with the terms and conditions of the permit. Copies of the permit, including the CONTRACTOR's certification, and the Stormwater Pollution Prevention Plan follow this section." Note: The designer is to prepare, submit, and obtain this permit, which must be included in the contract documents. We have not yet seen a copy of the application or the Stormwater Pollution Prevention Plan. A copy of the approved permit needs to be included in the contract documents.	A(1)	Changes made. Permit has been submitted to SNWA.
12	01450-3	Part 1.2. Insert new Paragraph N: "State of Nevada Division of Environmental Protection, Temporary Rolling Stock Permit. This permit is required for work in waters under the jurisdiction of the state, and includes drainageways with a defined bed and bank. The CONTRACTOR shall obtain this permit if necessary."	A(1)	Changes made.

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
13	01450-3	Part 1.3, Revise Paragraph A as follows: "Clark County Desert Conservation Plan. A fee of $550 per acre is required prior to any construction disturbance of desert tortoise habitat, including material or equipment storage and stockpiling areas. The AUTHORITY has paid the fees to Clark County as part of the land acquistion process. A copy of the receipt will be provided to the CONTRACTOR for obtaining the Excavation/Grading permit from Clark County." Note: The designer needs to estimate the acreage that will be disturbed by construction activities and provide it to the Authority.	A(1)	Changes made. Permit has been submitted to SNWA.
14	01450-3	Part 1.3, Revise Paragraph B as follows: "Clark County Use Permit. The AUTHORITY has obtained the Use Permit for this facility, a copy of which follows this section. The CONTRACTOR shall comply with all conditions of the permit." Note: We have not yet obtained this permit, but a copy will be provided to the designer when it is available.	D	Until receive use permit. Ok.
15	01450-3	Part 1.3, Revise Paragraph C as follows: "City of Henderson Use Permit. The AUTHORITY has obtained the Use Permit for this facility, a copy of which follows this section. The CONTRACTOR shall comply with all conditions of the permit." Note: We have not yet obtained this permit, but a copy will be provided to the designer when it is available.	D	Until receive use permit Ok

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
16	01450-3	Part 1.3, Insert new paragraph E: "State of Nevada, Division of Wildlife, Tortoise Handling Permit. This permit has been obtained by the AUTHORITY, and only AUTHORITY biologists are permitted to handle desert tortoises that are found on site."	A(1)	Changes made.
17	01450-3	Part 1.3, Insert new Paragraph F. "State of Nevada Historic Preservation Office. Section 106 consultation for this project has been completed by the AUTHORITY."	A(1)	Changes made.
18	01450-3	Part 1.3, Insert new Paragraph G: "State of Nevada Division of Water Resources, Dam Permit. The AUTHORITY has obtained this permit."	A(1)	Changes made.
19	01450-3	Part 1.3, Insert new Paragraph H: "State of Nevada Division of Water Resources, Impoundment Permit. This permit will be obtained by the AUTHORITY at the completion of construction."	A(1)	Changes made.
20	01520-1	Part 1.1, paragraph 6. Remove brackets.	A(2)	Changes made.
21	01550-1	Part 1.1, Paragraph B. Change speed limit from 25 mph to 15 mph. Note: don't complain to me about this one - it is a stipulation of the Biological Opinion for this project.	A(2)	Changes made.
22	01560-5	Part 1.9, Paragraph D. Delete last two sentences of paragraph.	A(1)	Changes made.
23	01560-6	Part 1.10, Paragraph A. At the end of the first sentence, insert "...a few of ..."before "which are summarized...".	A(2)	Changes made.

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
24	01560-6	Part 1.10, Paragraph A. Delete item number 6 and renumber subsequent items.	A(1)	Changes made.
25	01560-7	Part 1.10, Paragraph B. At the end of the second sentence, delete text in brackets and replace as follows: "...around the entire active construction area."	A(1)	Changes made.
26	01560-7	Part 1.10, Paragraph B. Delete the brackets at the end of the fourth sentence (include the text).	A(2)	Changes made.
27	01560-7	Part 1.10, Paragraph B. Add a new sentence at the end of the first paragraph: "The fencing shall be installed such that there is no ground disturbance outside of the finished fence line."	A(1)	Changes made.
28	01560-7	Part 1.10, Paragraph B. In the last sentence of the second paragraph, revise ..."up to 30 days..." to "... 30 days or more..."	A(1)	Changes made.

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
29	01560-7	Part 1.10, Paragraph B. In the third paragraph, move the third sentence after the first sentence. Revise the end of the second sentence as follows: "...shall notify the CONSTRUCTION MANAGER and one of the AUTHORITY's biological monitors immediately. Work in the area of the damaged fence shall be stopped until the fencing is repaired to the satisfaction of the AUTHORITY's Lead Biologist. If the fencing cannot be immediately repaired, the CONTRACTOR shall secure the services of a biological monitor(s) that meets the required qualifications of the U.S. Fish and Wildlife Service and has been approved by the AUTHORITY's Lead Biologist. The CONTRACTOR's monitor(s) shall remain at the damaged fence area and prevent tortoises from entering the site during all daylight hours until the fence is repaired to the satisfaction of the AUTHORITY's Lead Biologist." End the paragraph and move the remaining text into a new paragraph.	A(1)	Changes made.
30	01560-8	Part 1.10, Paragraph B. At the end of the last sentence of the first paragraph on this page, insert "...one of the..." before "AUTHORITY's" and change "monitor" to "monitors".	A(2)	Changes made.
31	01560-8	Part 1.10, Paragraph B. At the end of the last sentence of item 2, change "monitor" to "monitors"	A(2)	Changes made.
32	01560-8	Part 1.10, Paragraph B, item 4. Change "three working days" to "five working days".	A(1)	Changes made.
33	01560-8	Part 1.10, Delete paragraph C. All work areas and access roads will be enclosed by tortoise fencing.	A(1)	Changes made.

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
90% Design Report

Package: 080-K
Reviewer: L. Luptowitz
Documents: Specifications

Date: February 27, 1998
Discipline: Environmental and Permits

Item No.	Reference	Comment	Resp. Code	Response
34	Design Report, Appendix A	Permits added in comments on section 01450 should be added to this table. Also, please clarify if a USACE 404 permit is really required for this project. Has there been any contact with the USACE to date regarding this project?	A(2)	404 permit submitted.
35	Drawing No. 7	Remove the location of the archaeological site from this and any other drawings.	A(2)	Ok
36	Drawings	Should a note be added to the drawings indicating the requirement for tortoise exclusion fencing around the construction areas?	D	Waiting on BLM and Bureau Reclamation R/W grant.

Southern Nevada Water Authority
East C-1 Detention Basin (080-K)
90% Design Report

Package: 080-K
Reviewer: N. Merrill
Documents: Specifications

Date: April 16, 1998
Discipline: Environmental

Item No.	Reference	Comment	Resp. Code	Response
1	01560-8	Part 1.10, Paragraph B. In the second paragraph, third sentence, replace "...hardware cloth to the ..." with "...1x2 inch mesh material to the chain link..."	A(2)	Changes made.
2	01560-8	Part 1.10, Paragraph B. In the second paragraph, after "...gate to prevent erosion." Add a new sentence: "Add rocks as necessary at natural drainage crossings to prevent undermining of the fence during runoff events."	A(2)	Changes made.
3	01560-11	Drawing Option 2. Delete "t-" from the sentence on posts.	A(2)	Changes made.

Southern Nevada Water Authority
East C-1 Detention Basin
90% Design Submittal

Package: 90% Design Submittal
Reviewer: J. Vicknair
Documents: Drawings

Date: 13 March 1998
Discipline: Constructability

Item No.	Reference	Comment	Resp. Code	Response
CON090 -001	Sheet 30 of 41	Suggest you indicate coating on Ballar?	A(2)	Will be painted.
CON090 -002	Sheet S-3	Does wall to floor construction joint require water stop?	N	The concrete structure are located mostly on the backrock area and the groundwater are deep.
CON090 -003	Sheet S-6	Does the 48" RCP require a weep ring?	N	Controlled by drainage blanket.
CON090 -004	Sheet S-7	Suggest the use of epoxy anchors on Detail 1/s-7	A(2)	Agree
CON090 -005	All Sheets	Suggest lean concrete for some backfill conditions as cost savings.	N	Optional per specification.

Department of Public Works

Mission Statement: "As Partners in Progress our mission is to construct, improve, and maintain the County infrastructure as well as to provide critically needed community services which promote the health, safety and convenience of the general public

500 S. Grand Central Parkway
PO Box 554000
Las Vegas, NV 89155-4000
(702) 455-6000
Fax: (702) 455-6041

COMMISSIONERS

Yvonne Atkinson Gates, Chair
Lorraine T. Hunt, Vice-Chair
Erin Kenny
Mary J. Kincaid
Lance M. Malone
Myrna Williams
Bruce L. Woodbury

Dale W. Askew, County Manager

Director
M. J. Manning
E-Mail: mjm@co.clark.nv.us

Deputy Director
Urban C. Livengood, Jr.
(702) 455-6003
E-Mail: ucl@co.clark.nv.us

Administration & Programs
Nailah T. Raad
Manager
(702) 455-6000
E-Mail: ntr@co.clark.nv.us

Community Development
Carla J. Pearson
Manager
(702) 455-4600
E-Mail: cjp@co.clark.nv.us

Construction Management
Leslie R. Hersey
Manager
(702) 455-6050
E-Mail: lrm@co.clark.nv.us

County Surveyor's Division
Paul N. Lane
County Surveyor
(702) 455-6150
E-Mail: pnl@co.clark.nv.us

Design Engineering
Denis Cederburg
Manager
(702) 455-6050
E-Mail: dlc@co.clark.nv.us

Environmental Control
Charles R. Jenner
Manager
(702) 455-6000
E-Mail: crj@co.clark.nv.us

Traffic Management
Richard T. Romer
Manager
(702) 455-6100
E-Mail: rtr@co.clark.nv.us

FIELD OFFICE

Maintenance Management
John N. Murdoch
Manager
5825 E. Flamingo Road
Las Vegas, NV 89122
(702) 455-7540
E-Mail: jnm@co.clark.nv.us

April 6, 1998

Mr. Curt Chandler, P.E.
City of Henderson Public Works
The City of Henderson City Hall
240 Water Street
Henderson, NV 89015

FINAL PREDESIGN REPORT BY VTN, NEVADA FOR THE EAST C-1 DETENTION BASIN - SEC. 23 & 24, T24S, R61E - HTE-98-9682

We have completed a cursory review of the above-referenced predesign report and have the following comments:

1. It is not clear how the value of 0.89 hour was obtained in the lag time calculation for basin C4CA. Equation 613 in the manual produces a lower value for the lag time. In addition, table 3.0A in the study indicates Lc = 10,000 feet. The equivalent distance in miles is noted as 1.70. However, 10,000 feet is equal to 1.89 miles. Please provide and verify the calculations for the lag time for basin C4CA. The HEC-1 must be revised accordingly;

2. The values shown for the lag time in table 3.0B are incorrect. The amount shown in the TLAG column is the sum of Ti and Tt (divided by 60 to convert from minutes to hours). The 0.6 multiplier necessary to convert Tc to TLAG was not applied. The TLAG must be revised in the UD cards in the HEC-1 for basins C4CB, C4CC, and C4CD;

3. It is unclear how the velocities used in the Tc calculations for basins C4CB, C4CC and C4CD were obtained. Note that the velocities should be obtained by estimating the hydraulic characteristics of the wash in the upstream basin;

4. An offsite basin map with topography should be included in the study;

5. The HEC-2 cross sections shown on Figure 11.3 do not appear to be perpendicular to the direction of flow. The cross sections and HEC-2 must be revised accordingly;

The items listed herein must be thoroughly addressed and resubmitted for review prior to acceptance of the drainage study.

M. J. MANNING
DIRECTOR OF PUBLIC WORKS

BY _____
STEVE PARRISH, P.E.
COMMUNITY DEVELOPMENT

SCP

cc: Ken D. Gilbreth, P.E., VTN, Nevada
Todd Shields, SNWA
Stephen Roberts, P.E., CCRFCD

VTN Nevada

CONSULTING ENGINEERS • PLANNERS • SURVEYORS
PROVIDING QUALITY PROFESSIONAL
SERVICES SINCE 1960

April 17, 1998
W.O.# 5244

Clark County Public Works
500 S. Grand Central Pkwy.
Las Vegas, NV 89155

Attention: Mr. Steve Parrish, P.E.

SUBJECT: RESPONSE TO CCPW COMMENTS ON EAST C-1 DETENTION BASIN BY STEVE PARRISH DATED 04/06/98

1. For the final predesign report, basin C4C from the 1996 MPU was divided into 4 subbasins--C4CA, C4CB, C4CC, and C4CD (see Figure 1.1). After this division, the values for the parameters used to calculate the lag time (slope, Manning's roughness, hydraulic radius, the watershed length and the length along the longest watercourse measured upstream to a point opposite the centroid of the basin) remained the same for subbasin C4CA as their original values for basin C4C. As a result, the lag times for basins C4CA and C4C are the same. Therefore, the same lag time value was used for basin C4CA in this report as was used for basin C4C in the 1991 and 1996 MPU.

2. A revised version of Table 3.0B is attached, comparing the 100-year peak flow values for the original model versus the revised model. Due to the lag time changes for subbasins C4CB and C4CC, the revised peak flows for these basins are higher, but the time-to-peak values are less. The overall result is that the revised value for the combined peak flow is smaller than the value used in the previous report. However, to assure a more conservative design, the original peak flows and associated storage volume will be used for the detention basin design. For the downstream subbasin C4CD, the revised 100-year peak flow (229 cfs) is greater than the original peak (216 cfs). Therefore, the revised peak flow will be used for the downstream levee design to provide a more conservative design.

3. The velocity calculations for subbasins C4CB, C4CC and C4CD were based on "Hydrologic Methodology Memorandum" for the 1996 MPU (January, 1996). The document will be attached in the revised design report.

4. Agreed. This map will be added.

5. The cross-sections shown on Figure 11.3 are to model the PMF condition from the spillway. The HEC-2 cross sections assumed that the levee would fail during the PMP storm. This analysis was used to determine the impact of the PMF to the SNWA-WTP.

If you have any questions please contact me at 247-4020.

Sincerely,

VTN Nevada

Ken D. Gilbreth, P.E.
Principal

cc: Steve Roberts, P.E., CCRFCD
Todd Shields, SNWA
Curt Chandler, P.E., COH
Joe Damiani, P.E., COH

HYDROLOGIC METHODOLOGY MEMORANDUM

General

The hydrologic analysis is to provide facility planning for flood events with a 100-year recurrence interval. The hydrologic methodology used, will be in general accordance with the Clark County Regional Flood Control District "Hydrologic Criteria and Drainage Design Manual" (Criteria Manual), dated 1990. One variance will be the use of the hydrologic methodology of the U.S. Army Corps of Engineers (COE) for the Tropicana/Flamingo Wash Watershed. The flood control facilities for the Tropicana/Flamingo Wash are part of a federally funded project and are to be designed by COE criteria.

GIS Implementation

The hydrologic methodology will incorporate the use of Geographic Information Systems (GIS). Graphical layers for existing drainage facilities, property ownership, land use, soil type, rainfall, basin boundaries, and land topography will be used in the derivation of appropriate parameters.

Computer Modeling

Hydrologic analyses will be performed using the Flood Hydrograph Package HEC-1, September 1990, Version 4.0.

Subbasins

Each watershed planning area will be subdivided into hydrologic subbasins. Subbasins are reasonably homogenous and drain to a single concentration point. Subbasin boundaries will generally be taken from previous hydrologic models. The subbasins will be mapped in a GIS format, with areas recalculated to eliminate overlapping basins or gaps between basins. Further subdivision or adjusments to basin boundaries will be based on effects of existing flood control facilities, proposed facilities, ultimate development, existing drainage features, best available topographic mapping, and field observations.

Precipitation

The rainfall used for hydrologic modeling for the design of master planned facilities is intended to produce runoff discharges with an expected 100-year recurrence interval. A 100-year recurrence interval is defined as having a 1.0 % chance of occurrence in any given year.

It is proposed that the rainfall to be used for the Master Plan Update (MPU) will be in accordance with the Criteria Manual. The Criteria Manual applies a 1.43 factor to the 100-year rainfall depths of the 1973 NOAA Atlas Area 2 (1973 Atlas).

The National Weather Service is in the process of preparing a Precipitation Frequency Atlas for the Semi-Arid Region (NOAA Atlas 3). This document will suppiant the 1973 Atlas. The new publication will utilize 20 years of additional record and data from approximately 50 new rain gauges in the semi-arid region. Preliminary maps for the NOAA Atlas 3 indicate little change from the 1973 Atlas for the rainfall depths in the Las Vegas Valley. This would indicate that the additional rainfall data does not support the application of the 1.43 factor as an adjustment to account for more years of record.

The NOAA Atlas 3 document is not expected to be published within the time frame of the MPU contract, therefore it is recommended that the project proceed based on the present Criteria Manual. The NOAA Atlas maps have met with opposition from agencies performing reviews and are subject to revision.

In the event the NOAA Atlas 3 is published prior to completion of the MPU, and may be included in the MPU hydrology, it is recommended that an adjustment factor be applied to the rainfall depths. The depth adjustment would be based on producing design discharges consistent with presently accepted hydrologic methods in Clark County. The point precipitation storm depths would be taken from the NOAA Atlas 3 maps for Warm Season, 100-Year, 6-Hour Duration Rainfall, with an adjustment to account for local rainfall experience. The isohyetal map from NOAA Atlas 3 may be put into GIS format, the rainfall adjustment made, and an average rainfall depth determined for each subbasin to update the hydrologic model. Since, an adjustment factor would be applied, the hydrologic results would be similar to using the current methodology.

The reasons for using the present Criteria Manual rainfall, with its adjustment factor, or for applying an adjustment to rainfall from NOAA Atlas 3, are further summarized below:

- The discharges based on adjusted rainfall depths are consistent with adopted regulatory discharges as included in the "Las Vegas Valley Flood Insurance Study Hydrology Report," prepared by J. M. Montgomery, August 1991, and with the calibrated flows based on the COE regional analysis of stream gage data as reported in "Hydrologic Documentation for Feasibility Study Las Vegas Wash and Tributaries, Clark County, Nevada, April 1988."

- The present Criteria Manual applies a 1.43 factor to the 100-year rainfall depths of the 1973 NOAA Atlas Area 2 (1973 Atlas). This adjustment was adopted based on rainfall studies performed by Black & Veatch and the COE. It has become the accepted design standard by the community, the Flood Control District, and the city and county entities.

- The CCRFCD Flood Warning System precipitation gage network supports that several severe rainfall events have been recorded in Clark County within the short history of the network. See the included Table, which indicates several events have occurred in Clark County which exceed the preliminary 100-year rainfall of the NOAA Atlas 3 for the McCarran Rainfall Area.

- The high sediment loads and debris, associated with flood events in the desert environment, bulks flows, and creates debris blockages and unpredictable flow patterns. This supports a conservative approach to the design of flood control facilities.

- The limited years of record and number of rainfall gages do not support tight confidence limits on estimated 100-year rainfall values. The nature of the desert and its tendency to severe impacts from extreme events warrant a conservative upward adjustment to the statistically derived 100-year rainfall depth.

- Numerous flood control facilities have been designed in accordance with the Criteria Manual which applies a rainfall adjustment factor, and it is important to maintain equal levels of protection to the entire community.

- The adjustment to rainfall is more compatible with the COE hydrologic methods. COE hydrology will control for the federally funded projects of the Tropicana/Flamingo Wash System.

- The aerial extent of a 100-year rainfall may be relatively small in relation to the aerial extent of Clark County, therefore, there becomes a relatively high probability that some portion of the County will be impacted by a localized 100-year rainfall on a relatively frequent basis. The risk to life, damages, inconvenience, maintenance requirements, and public perception of these highly localized events, is considered a valid argument to continue to apply an adjustment to rainfall for the design of regional flood control facilities.

- As a matter of law the MPU must be updated within a 5 year period. The NOAA Atlas 3 may not be available for consideration within the time frame of the MPU contract. A separate contract to update the Criteria Manual may be warranted after the new atlas has been published. If adjustment factors continue to be applied, then master plan facilities will not be significantly impacted.

Rainfall Distribution

In accordance with the CCRFCD Manual, the 100-year recurrence interval storm will be based on a single event storm with a six-hour duration.

The time distribution of the rainfall will be in accordance with the Criteria Manual. The manual specifies storm distributions established by the Los Angeles District of the Corps of

Engineers For contributing drainage areas less than ten square miles, Storm Distribution 3 (SDN 3) will be used. For contributing drainage areas greater than ten square miles, Storm Distribution 5 (SDN 5) will be used

Point precipitation values will be adjusted based on aerial coverage by applying Depth Area Reduction Factors (DARFs). The DARF adjusts the point rainfall values downward to represent an average depth of rainfall over the entire storm area. Hydrologic models will be run with various DARF ratios and a summary table will be included to interpolate the correct DARF and flow. For computation of flows for drainage areas less than 10 square miles use SDN 3 and ratios for DARFs of 1.00, .93, and .86, corresponding to zero area (a point precipitation), 2 square mile area, and a 10 square mile area, respectively. A sample summary table is attached. For computation of flows for drainage areas greater than 10 square miles, use SDN 5 and ratios for DARFs of .86, .60 and .51 for areas of 10, 100 and 200 square miles respectively.

Hydrograph Development

Design precipitation will be converted to runoff hydrographs for each subbasin using either the Soil Conservation Service (SCS) unit hydrograph method or the kinematic wave method. The SCS method will be used for all mountainous areas and all alluvial fan and valley subbasins which are reanalyzed. The kinematic wave method will be only used for certain urban areas, for which kinematic runoff parameters are available from the COE hydrologic modeling analysis.

The SCS unit hydrograph requires the input of a time parameter called Lag. Lag times from previous models will be used when they are not altered by changed conditions and seem reasonable. Lag times will be calculated for subbasins over 1.0 square mile using the U. S. Bureau of Reclamation method in the Criteria Manual. For subbasins under 1.0 square miles the time of concentration (velocity method) will be used to compute lag time. Each method is further explained below:

USBR Method

The lag time for basins over one square mile is calculated as follows:

$$T_{lag} = 20\ K_n [L\ (L_c/S^{1/2})]^{1/3}$$

Where:

T_{lag} = Lag time (hours)

L = Watershed Length, length of longest watercourse (miles)

L_c = Length along longest watercourse measured upstream to a point opposite the centroid of the basin (miles)

S = Average slope of the longest watercourse (feet per mile)

K_n = Manning's roughness for the basin channels

K_n	Water Course Description
0.015	In urbanized areas, streets, storm drains, improved channels
0.030	Well-defined, unimproved channels or washes, minimal vegetation
0.050	Not well-defined, small rills and braided wash areas
0.050	Mountainous channels with large boulders and flow restrictions
0.070	Shallow overland flow, numerous poorly defined flow paths

Time of Concentration Method

For drainage basins with less than one square mile, the time of concentration is calculated as follows:

$$T_c = T_i + T_t$$

Where:

T_c = Time of concentration (minutes)

T_i = Initial, inlet or overland flow time (minutes)

T_t = Travel time in the ditch, gutter, etc.. (minutes)

The Lag time for basins under one square mile is calculated as follows:

$$T_{lag} = 0.6T_c \text{ (hours)}$$

Initial flow time is calculated as follows:

$$T_i = 1.8(1.1 - K)L_o^{1/2}/S^{1/3}$$

Where:

T_i = Initial overland flow time (minutes)

K = $0.0132 * CN - 0.39$

CN = Curve Number

L_e = Length of overlanc flow (max. 500 ft)

S = Average basin slope (percent)

Travel time is calculated as follows

$T_t = L_t/(60\ V)$

Where:

T_t = Travel time in the ditch, gutter, etc.. (minutes)

L_t = Travel Length (feet)

V = Average velocity of flow (ft/s)

In order to estimate the average velocity of flow for travel time calculations a flow quantity is estimated. The amount of flow has a significant impact on the velocity The following equations have been derived to estimate the flow from a small basin. These equations have been derived by regression analysis of output from hypothetical drainage basins with varying Curve Numbers. The results are consistent with the discharge per square mile curve developed by the Corps of Engineers.

Urban Basins:

$Q = 34\ CN - 1950$

Undeveloped Basins:

$Q = 40\ CN - 2490$

Where:

Q = flow in cfs

CN = SCS Curve Number, with 62 minimum

Sample results from these equations are attached.

After a flow from the total basin is estimated an average depth and velocity of the conveyed flow is estimated.

For Urban areas

$$y = (Q / 7000 S^{1/2})^{3/8}$$

$$V = Q / 100y^{2}$$

Where:

y = Depth of flow

S = Average slope of the main watercourse in ft/ft

Q = Estimated peak flow from the subbasin in cfs

These equations are based on a triangular shaped gutter flow conveyance, typical of a street section with a cross slope of 2%. One fourth of the total basin flow is estimated in a half street section. This assumes the average velocity is associated with half the total flow, and half of that is flowing in each side of a street.

For Undeveloped Areas:

The flow for a small undeveloped basin is assumed to collect gradually in natural water courses. The equations developed by Dr. David Dawdy and adopted by FEMA for single channel flow regimes on alluvial fans are used to estimate depth and velocity. These equations assume that the natural flow will seek minimum energy adjusting its width, depth, and sediment load. The equations for the stabilized width, depth of flow and velocity are as follows:

$$B = 7.2 Q^{.4}$$

$$y = .035 Q^{.4}$$

$$V = 1.3 Q^{.2}$$

Where:

B = Width of flow in ft

y = Depth of flow in feet

V = Velocity in ft/sec

Q = Estimated peak flow from the subbasin in cfs

To determine the average depth and velocity for flow collecting in a basin, the total subbasin flow (Q) is reduced by one half by the above equations

Samples results of these travel time velocity calculations are attached.

Losses

Rainfall losses due to soil infiltration, depression storage, and other factors will be computed using the SCS curve number (CN) method recommended in the Criteria Manual, except where the COE methodology of applying a uniform loss rate will be used for the Tropicana/Flamingo Wash area. The SCS CN is a function of soil type, land cover, and antecedent moisture conditions. Based on the Criteria Manual the average antecedent moisture condition (AMC II) will be used for computing losses. Soils information and land use are put in a GIS format and combined with subbasin boundaries to determine a weighted CN for each subbasin. See additional discussions in soil data and land use sections.

Routing

Channel routing in natural channels, alluvial fans and sheet flow areas will be performed using the Muskingum method. Routing in improved channels or storm drains will be performed using the kinematic method. Routing through detention basins and other storage areas will be modeled using the Modified Puls method.

Muskingum routing requires three input parameters (X, K, and NSTPS).

The X parameter accounts for channel or floodplain storage. A value of 0.15 will be used unless there is a evident amount of large floodplain storage in which case 0.10 will be used.

The K parameter is equal to the travel time through the routing reach.

If the upstream tributary flow area is approximately one square mile or less, determine travel times as described in the time of concentration methodology. However, the total flow is used and not an average flow. Thus the equations are as follows:

$$y = .0467\ Q^{.4}$$

$$V = 1.5\ Q^{.2}$$

Where flows from larger areas are routed, determine an average flow velocity given by Manning's Equation as follows

$$V = 1.49 R^{2/3} S^{1/2} / n$$

Where:

V = Velocity in ft/sec

R = Hydraulic Radius in ft.

S = Slope in ft/ft

n= Roughness Coefficient

Based on typical channel characteristics, adopt R = 2.5 for channels in mountainous areas, and R = 1.5 on the alluvial fans and sheet flow areas.

The K parameter is equal to the travel time in hours given by:

$$K = L / 3600 V$$

Where:

L = Length of the routing reach in feet

The NSTPS parameter is the number of time steps required. It will be determined by using the closest integer given by the following equation:

$$NSTPS = 60 K/\Delta t$$

Where:

Δt = the simulation time step from the IT record in minutes

Kinematic Routing is performed by inputting the characteristics of the channel reach, such as: roughness coefficient, base width, side slope, slope, and reach length.

Reservoir routing is performed by inputting stage, storage, discharge relationships.

Soils Data

The SCS methodology divides soils into four hydrological groups as defined below

A. High infiltration rate, low runoff potential
B. Moderate infiltration rate, moderately low runoff potential
C. Slow infiltration rate, moderately high runoff potential
D. Very slow infiltration rate, high runoff potential

The majority of the study area is covered by the SCS Soil Survey for Las Vegas Valley (1985). The soil survey maps soil types and provides a table relating hydrologic soil group to SCS soil type. Areas not within the soil survey were taken from previous studies which were based in part on unpublished surveys performed by SCS personnel and assumptions based on similarity of soils to mapped areas.

The information was compiled in a GIS format producing a map of soil classifications and a map defining hydrologic soil groups for the study area.

Land Use Data

Land use information will be based on the RTC land use GIS map. This map will be supplemented based on information collected form City of Las Vegas, City of Henderson, City of North Las Vegas, Clark County Comprehensive Planning, and developers of major communities. Recent aerial photographs will also be used to verify or modify the land use map.

The land use map will have approximately 20 categories of land use. Each category will be defined by a specified percentage of amount impervious, amount of ground cover in good hydrologic condition, and amount of desert shrub in poor hydrologic condition. A matrix will define a CN for a given soil classification and a given land use. A sample matrix is included. The land use GIS layer in conjunction with soil type layer and basin boundary layer will be used to automatically determine weighted curve numbers for each subbasin.

SUMMARY TABLE
RAINFALL EXTREMES FOR EVENTS IN CLARK COUNTY EXCEEDING MCCARRAN 5-YEAR RETURN FREQUENCY
5 YEAR PERIOD (1990-1995)

DATE OF EVENT	DEPTH	DURATION	LOCATION
6/10/90	1.06	15 min	Las Vegas Creek at Lamb
	1.54	1 hour	
7/8/90	1.09	3 hours	Valley of Fire State Park
	1.02	3 hours	West of Logandale
7/12/90	1.61	1 hour	Cal-Nev-Ari
7/13/90	1.40	3 hours	Laughlin
7/13/90	1.82	24 hours	Overton Beach
7/14/90	.91	15 min	Jean
	1.66	3 hours	
7/14/90	1.47	1 hour	Beatty
7/14/90	1.35	2 hours	Upper Flamingo 1
7/14/90	2.23	24 hours	Mount Charleston
7/15/90	2.17	3 hours	Lone Mountain/Hualapai
8/14/90	1.81	45 min	Cal-Nev-Ari
8/15/90	2.20	45 min	Logandale
	2.48	1.5 hours	
8/15/90	.91	30 min	Lone Mountain/Hualapai
9/18/90	1.97	1 hour	California Wash - Glendale
7/8/91	1.30	1 hour	The Lakes
8/10/91	1.25	1 hour	Cal-Nev-Ari
	1.65	3 hours	
9/6/91	1.02	30 min	Jean
	1.61	4 hours	
	1.77	24 hours	
2/12/92	1.44	6 hours	Nellis AFB
	1.77	11 hours	
3/27/92	2.56	16 hours	Blue Diamond North
3/30/92	.63	5 min	Cal-Nev-Ari
	1.28	45 min	
	2.13	15 hours	
2/8/93	1.57	6 hours	TIMET Facility - Henderson
	2.40	16 hours	
2/22/93	2.3	6 hours	Katherine's Landing
2/27/93	1.68	6 hours	Laughlin 2
8/8/93	.34	5 min	Tortoise Center
	1.2	30 min	The Lakes
8/8/94	1.57	1 hour	Smoke Ranch & Buffalo
8/22/95	.71	15 min	Oakey Detention Basin

NOTE: Preliminary NOAA Atlas 3 Map for 100-Year, 1-Hour Rainfall is **1.42** inches for the McCarran Rainfall Area.

CALCULATION OF FLOWS AT EACH LOCATION BY INTERPOLATION

NAME	AREA (sq.mi.)	HEC-1 CALCULATED FLOWS FOR AREA/DARF 0/1.00 (cfs)	2/.93 (cfs)	10/.86 (cfs)	DARF	FLOW (cfs)
20	2.4	3427	3129	2831	.927	3,114
20-28A	2.4	3263	2978	2694	.927	2,966
60	.29	648	592	536	.990	640
60-70	.29	523	477	432	.990	516
70	.79	866	788	710	.972	855
N70	1.08	1368	1245	1123	.962	1,302
70-28A	1.08	1337	1217	1097	.962	1,272
28A	1.04	1193	1082	972	.964	1,135
N28A	4.52	5354	4881	4408	.908	4,732
28A-24D	4.52	5300	4830	4361	.908	4,682
24D	.15	167	149	131	.995	166
N24D	4.67	5355	4880	4405	.907	4,721
24D-24C	4.67	5319	4848	4377	.907	4,691
29C	.24	344	311	278	.992	340
29C-24C	.24	319	288	258	.992	315
24C	.57	575	511	448	.980	557
N24C	.81	712	637	563	.972	682
RRD1	5.48	5752	5235	4719	.900	5,011
24C-24B	5.48	5716	5204	4694	.900	4,982
50	.63	1156	1053	951	.978	1,124
50-29B	.63	999	909	819	.978	971
29B	.9	1160	1046	933	.969	1,109
N29B	1.53	1468	1334	1201	.946	1,365
29B-24B	1.53	1435	1303	1172	.946	1,334
24B	.4	387	345	304	.986	379
N24B	1.93	1591	1435	1288	.932	1,440
RRD2	7.61	7297	6639	5982	.883	6,195
24B-24A	7.61	7259	6602	5946	.883	6,158
24A	.32	368	331	295	.989	362
N24A	7.73	7359	6693	6028	.880	6,217
24A-30	7.73	7319	6656	5995	.880	6,183
29A	.41	499	448	397	.986	489
29A-30	.41	462	414	366	.986	452
30B	.95	901	803	707	.967	854
N30B	1.36	998	889	782	.952	924
RRD3	9.09	7945	7221	6498	.868	6,580
30A	.65	728	653	579	.977	704

SAMPLE RESULTS

ESTIMATE OF BASIN FLOW
FOR TIME OF CONCENTRATION CALCULATIONS

URBAN AREA

CN	FLOW (cfs/sq. mi.)
98	1382
93	1212
87	1008
83	872
78	702
72	498
65	260

UNDEVELOPED AREA

CN	FLOW (cfs/sq. mi.)
95	1310
88	1030
83	830
78	630
72	390
65	110

SAMPLE RESULTS

URBAN BASIN

TRAVEL TIME VELOCITY CALCULATION					
GIVEN			CALCULATED		
DRAINAGE AREA (sq. mi.)	CN	SLOPE (ft/ft)	BASIN FLOW Q (cfs)	AVE. DEPTH y (ft)	AVE. VELOCITY V (fps)
1.0000	92	0.0150	1178	1.13	9.28
0.8500	87	0.0200	857	0.95	9.55
0.7500	75	0.0400	450	0.65	10.54
0.6000	80	0.0100	462	0.86	6.31
0.5000	93	0.0050	606	1.08	5.21
0.1250	87	0.0300	126	0.43	6.88
0.0625	72	0.0100	31	0.31	3.21

UNDEVELOPED BASIN

TRAVEL TIME VELOCITY CALCULATION					
GIVEN			CALCULATED		
DRAINAGE AREA (sq. mi.)	CN	SLOPE (ft/ft)	BASIN FLOW Q (cfs)	AVE. DEPTH y (ft)	AVE. VELOCITY V (fps)
1.0000	92	0.1200	1190	0.60	5.38
0.8500	87	0.0800	842	0.52	5.02
0.7500	75	0.0400	383	0.38	4.29
0.6000	80	0.0100	426	0.40	4.38
0.5000	76	0.0050	275	0.33	4.02
0.1250	87	0.1500	124	0.24	3.42
0.0625	72	0.0100	24	0.13	2.47

SAMPLE

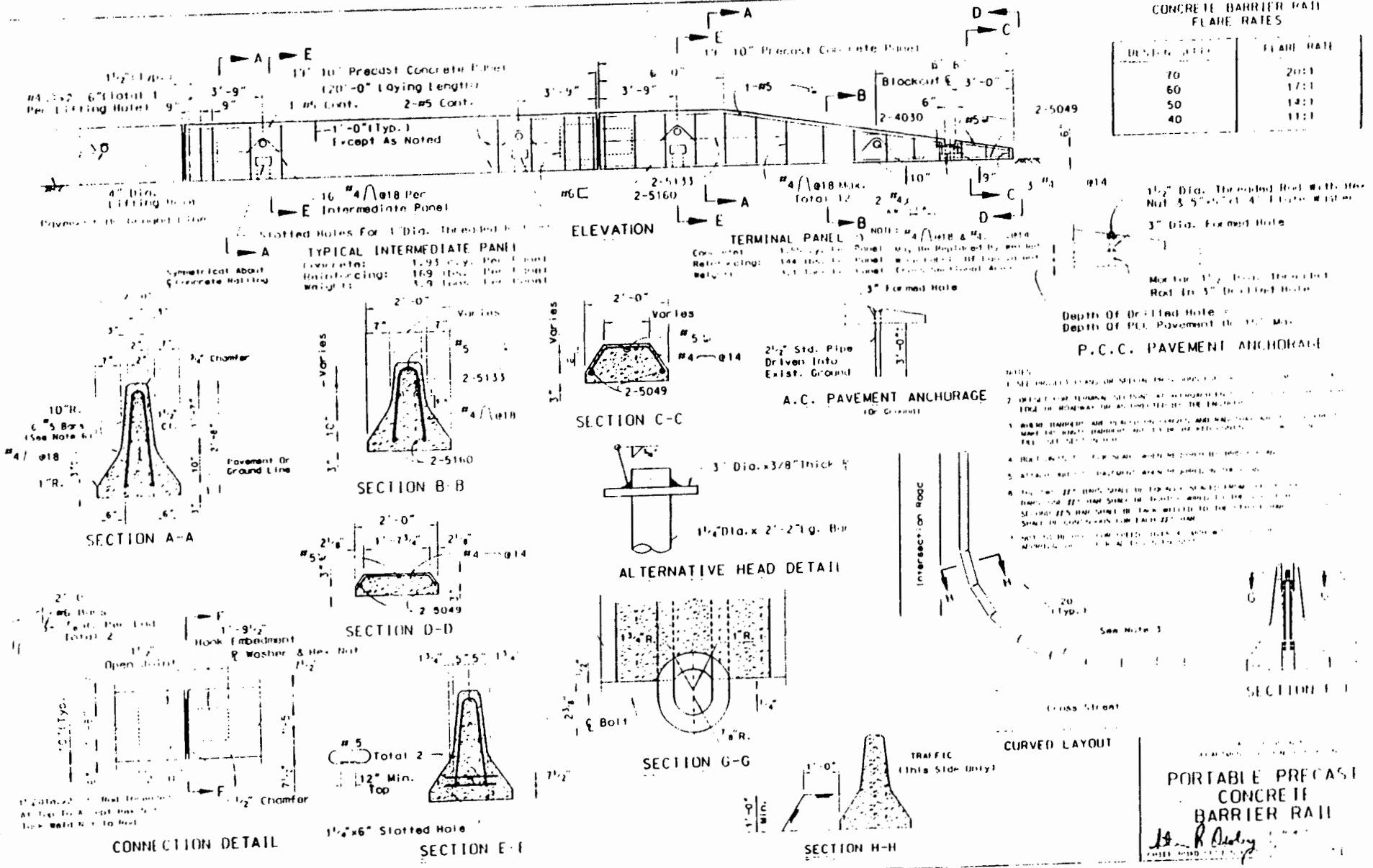
SOIL COMPLEX - LAND USE CURVE NUMBER MATRIX

MAP #	SOIL NAME	LAND USE COMPONENTS			LAND USE CLASSIFICATIONS					
		OPEN NATURAL	OPEN GOOD	IMPER-VIOUS	GOLF	LDR	MDR	HDR	COM	DESERT
		% -->			5	35	0	0	5	100
			% -->		90	40	62	35	20	0
				% -->	5	25	38	65	75	0
117	ARIZO	61	42	98	46	63	63	78	85	61
127	BLUEPOINT	57	41	98	45	61	63	78	85	57
132	BRACKEN	57	41	98	45	61	63	78	85	57
140	CASAGA	80	70	98	72	81	81	88	92	80
184	CALIZA	75	61	98	64	75	75	85	89	75
200	GLENCARB	72	60	98	63	74	74	85	89	72
206	GLENCARB	72	60	98	63	74	74	85	89	72
222	GLENCARB	72	60	98	63	74	74	85	89	72
228	GLENCARB	72	60	98	63	74	74	85	89	72
236	GLENCARB	74	61	98	64	75	75	85	89	74
240	GOODSPRINGS	87	78	98	79	86	86	91	93	87
300	LAS VEGAS	87	78	98	79	86	86	91	93	87
302	LAS VEGAS-MCCARRAN-GRAPEVINE	80	67	98	69	79	79	87	91	80
305	LAS VEGAS-DESTAZO	83	72	98	74	82	82	89	92	83
307	LAS VEGAS-SKYHAVEN	84	76	98	78	84	84	90	93	84
360	ROCK-ST. THOMAS	87	87	98	88	90	91	94	95	87
380	SKYHAVEN	82	73	98	75	82	83	89	92	82
415	AZTEC	77	61	98	64	76	75	85	90	77
419	AZTEC BRACKEN	77	62	98	65	76	76	85	90	77
510	AKELA ROCK	88	88	98	89	91	92	95	96	88
540	WIESER	73	62	98	64	75	76	85	90	73
542	WEISER-AZTEC	77	62	98	65	76	76	85	90	77
545	WIESER-GOODSPRINGS	81	68	98	70	80	79	88	91	81
615	URBAN	83	74	98	76	83	83	90	92	83
635	ROCK	90	90	98	90	92	93	95	96	90

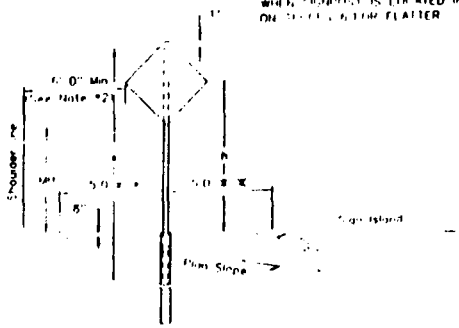
CLASSIFICATION	LAND USE DESCRIPTION
GOLF	GOLF COURSES, PARKS, LAWNS IN GOOD CONDITION
LDR	LOW DENSITY RESIDENTIAL
MDR	MEDIUM DENSITY RESIDENTIAL
HDR	HIGH DENSITY RESIDENTIAL
COM	COMMERCIAL, INDUSTRIAL, NON-PARK PUBLIC FACILITIES
DESERT	OPEN UNDEVELOPED DESERT LAND

APPENDIX E

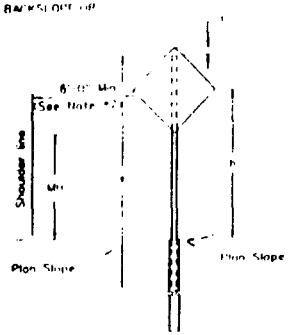
VENDOR DATA


TYPICAL INTERMEDIATE PANEL
ELEVATION
TERMINAL PANEL
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
ALTERNATIVE HEAD DETAIL
A.C. PAVEMENT ANCHORAGE
P.C.C. PAVEMENT ANCHORAGE
CONCRETE BARRIER RAIL FLARE RATES
DESIGN SPEED
FLARE RATE
70
60
50
40
CONNECTION DETAIL
SECTION E-E
SECTION G-G
SECTION H-H
CURVED LAYOUT
PORTABLE PRECAST CONCRETE BARRIER RAIL

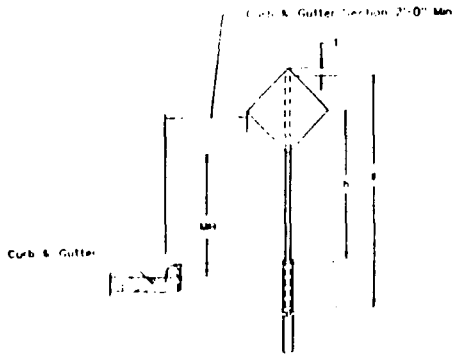
* POST LENGTH AS SHOWN ON SIGN SUMMARY SHEET. POST LENGTH CALCULATIONS ARE BASED ON USE OF SIGN ISLAND. SIGN ISLAND SHALL BE USED EXCEPT WHEN ROADSIDE IS LOCATED IN A BACKSLOPE OR ON [illegible] OR FLATTER.



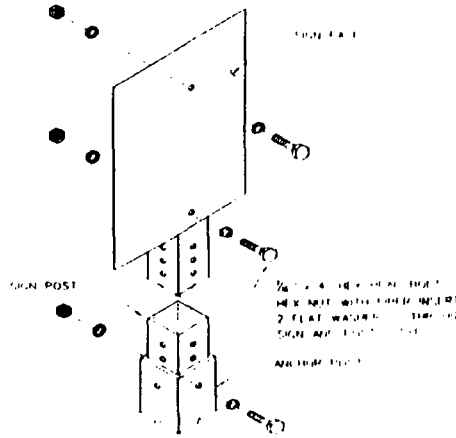
ELEVATION



SIGN ON BACKSLOPE

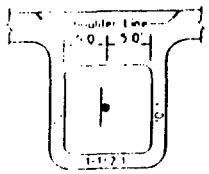


SIGN ON GORE



MINIMUM MOUNTING HEIGHTS FROM EDGE OF SIGNS	ALL SIGNS
FREEWAYS and EXPRESSWAYS	8 FT (M) 5 FT (S)
COMMERCIAL RESIDENTIAL CURB and GUTTER	7 FT (M) 6 FT (S)
RURAL ROADS and INTERCHANGE RAMPS	7 FT (M) 6 FT (S)
FREEWAY ENTRANCE, DO NOT ENTER, WRONG WAY & TURNS	7 FT

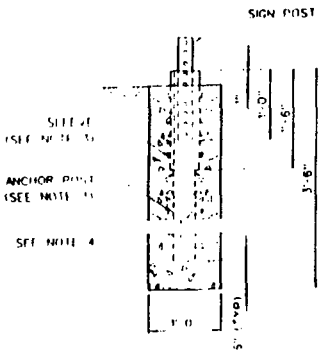
(M) Major Sign (S) Secondary Sign

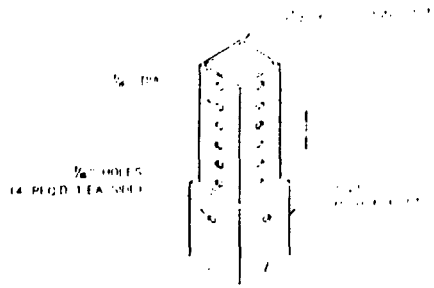


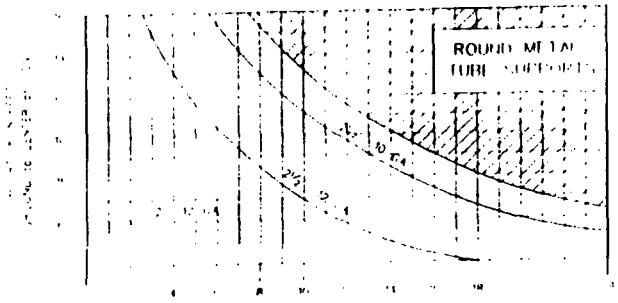
PLAN

SIGN ON SIGN ISLAND

* * 5 Ft Chord Distance From Post(s) To Island Slope(s)







GENERAL NOTES

1 SIGN ISLAND TO BE COMPACTED TO 95%

2 SIGN SHOULD NOT BE CLOSER THAN 6 FT FROM THE EDGE OF THE SHOULDER OR 8 FT FROM THE EDGE OF THE TRAVELWAY. IN AN URBAN AREA, A LESSER CLEARANCE MAY BE USED WHERE [illegible]

3 ANCHOR POST AND SLEEVE ARE TO BE INCLUDED IN THE COST OF POST (S) AS SHOWN ON THE SIGN SUMMARY SHEET.

4 THE ANCHOR AND SLEEVE WHEN NOT [illegible] SHALL BE DRILLED AT [illegible] AND FILLED WITH CLASS A OR CLASS AA CONCRETE AT NO EXTRA COST TO THE STATE.

5 FOR BRACING DETAILS SEE SHEET [illegible]

6 FOR RAILROAD SIGN (RR) D, SEE SHEET [illegible] FOR DETAILS.

7 ISLAND MATERIAL SHALL BE INCLUDED IN THE COST OF THE [illegible]

POST SIZE	ANCHOR POST	SLEEVE
2	2½	2½

GROUND MOUNTED SIGN SUPPORTS (SQUARE METAL TUBE)

P.D. Rice

BURKE

PRODUCT BULLETIN

AQUA RESIN CURE

1. **PRODUCT NAME** Aqua Resin Cure

2. **MANUFACTURED BY** The Burke Company

3. PRODUCT DESCRIPTION

Basic Uses

Aqua Resin Cure provides a hard membrane for interior or exterior concrete surfaces. It may be safely used in areas where use of petroleum-based curing compounds may be hazardous. When applied to fresh concrete, Aqua Resin Cure retains the required mixing water necessary for the concrete to hydrate and cure properly. During a normal oxidation period of 45 to 60 days with exposure to the sun's ultraviolet light, this film will oxidize and disintegrate into a dry powder dust. When used indoors, the residue shall be removed by wire brushing or by washing with a light solution of muriatic acid or trisodium phosphate (TSP). All residue shall be removed before applying paint, floor tile adhesives, coatings, or other flooring materials.

Composition

Aqua Resin Cure is a water based, membrane forming, concrete curing compound. An emulsion of high grade synthetic resinous solids dispersed in water, it contains no waxes, paraffins or oils. Aqua Resin Cure is available in clear and white pigmented versions

Packaging

	Clear	White Pigmented
55 gallon (208 liter) drum	(302) 47-263	(302) 47-265
5 gallon (19 liter) container	(302) 47-262	(302) 47-264

4. TECHNICAL DATA

Appearance Creamy low viscosity liquid

Film Appearance Clear and transparent, or white pigmented

Density Clear: 8.3 pounds per gallon (0.99kg./liter)
White Pigmented: 8.5 pounds per gallon (1.01kg/liter)

5. SPECIFICATIONS

When applied at a specified rate, Aqua Resin Cure conforms to:

Clear	White Pigmented
ASTM C-309, Type I, Class A & B	ASTM C-309, Type II, Class A & B
AASHTO M-148, Type I, Class A & B	AASHTO M-148, Type II, Class A & B
CGSB-90-GP-1a, Type I	CGSB-90-GP-1a, Type II

Modified formulations meet BUREC, Caltrans, Washington D.O.T. and other state and city highway department specifications.

6. APPLICATION INSTRUCTIONS

Stir thoroughly prior to use. Burke recommends a coverage rate of 200 to 300 square feet per gallon (4.9 to 7.4 sq.m/liter). Aqua Resin Cure should be applied to freshly poured concrete surfaces immediately after final finishing when the moisture sheen disappears from the surface. The most effective means of application is with Burke hand or power sprayers, but a brush or roller may be used. Care should be taken to ensure an even film is obtained without over or under applying.

Do not apply over free standing water. Excessive application or puddling will increase oxidation time and may necessitate manual removal of the membrane prior to coating or painting. Any residue remaining can be removed by wire brushing or washing with a light solution of muriatic acid or trisodium phosphate (TSP).

Clean application equipment by flushing with water. Equipment that is caked or coated with dried Aqua Resin Cure should be cleaned thoroughly with mineral spirits.

← 110°C
98aR1

MASTERKURE® 100W

Low Solids, General Purpose, V.O.C. Free, Curing and Sealing Compound For Concrete

DESCRIPTION:

MASTERKURE 100W is a water-based polymer and wax emulsion curing compound for concrete which helps ensure maximum strength of concrete. When applied at 200 ft²/U.S. gallon (4.9 m²/litre), it meets the moisture retention requirements of ASTM C 309-Type 1 specification for liquid membrane forming curing compounds. The product also complies with atmospheric discharge of volatile organic compounds (V.O.C.) and special solvents, Federal Air Quality Regulation 40 CFR 52.254 since it is totally free of organic solvents or alcohols.

RECOMMENDED FOR:

- Curing conventional concrete as well as highways, sidewalks, curbs and other non-critical concrete areas.
- When solvent fumes must be avoided
- When government regulations limit V.O.C. discharge.
- When moisture retention requirements are necessary.
- When it is known in advance the curing membrane must be removed after curing is complete.

FEATURES/BENEFITS:

- Ensures high curing efficiency. Concrete attains its full strength potential.
- Allows for easy removal of the curing compound with low solvent materials (or mineral spirits).
- Non-yellowing.
- Contains no V.O.C.s.
- Eliminates the hazards of solvent fumes.
- Non-toxic.

NOT RECOMMENDED:

- As a non-slip surface while the curing membrane is intact.
- For any architectural concrete.
- For colored concrete or pigmented dry shake surface hardeners.

PACKAGING:

MASTERKURE 100W concrete curing compound is supplied in 5 and 55 U.S. gallon (19 and 208 litre) containers.

COVERAGE:

1 U.S. gallon (3.8 litres) will cover approximately 200 ft² (4.9 m2/litre). For a broomed or floated surface, coverage will be reduced depending on the texture of the surface.

CURING EFFICIENCY:

When applied at a rate of 200 ft²/gal (4.9 m²/litre) MASTERKURE 100W will meet or exceed ASTM C 309 requirements with water loss of 0.40 kg/m² or less. ASTM C 309 sets a limit of .55 kg/m² in 72 hours.

APPLICATION:

Apply one coat of MASTERKURE 100W concrete curing compound by constant pressure sprayer, airless industrial sprayer, garden sprayer or roller at the coverage rate recommended above. See the package label for specific application instructions.

DRYING TIME:

Approximately 1 hour at 70°F (21°C) with the relative humidity at 50%. A higher humidity and/or a lower temperature will increase the drying time.

NOTE: This is only the time it takes for the product to dry. The full strength of the curing membrane will not develop for two to four days.

REMOVAL:

Master Builders curing compounds are designed to adhere to concrete for purposes of retaining vital hydration water. Removal products and methods suggested in current Master Builders literature are based on those which have proven to be successful. However, Master Builders is responsible only for curing efficiency, not for curing compound removal.

IMPORTANT: Ease of curing compound removal is directly related to the length of time that compound is left on a surface. If it is intended that MASTERKURE 100W will be removed, it is best and easiest to remove as soon as curing period is complete (no longer than 28 days) by following the procedures for stripping given on the product packaging. Stripping after 28 days varies from job to job, may be difficult and time consuming, and may leave a residue that is resistant to complete removal. Furthermore, intensified attempts to remove a resistant curing compound can discolor and/or scratch the surface.

Pine-Sol® is a registered trademark of The Clorox Company

Master Builders Technologies

SPEED DOWEL™

PATENTED CONCRETE DOWELING SYSTEM

Speed Dowel, Inc.
829 W. 17th Street, Suite 5
Costa Mesa, CA 92627
Phone (714) 642-3445
Fax (714) 642-0967

SPECIFICATIONS
Divisions 2 Site Concrete Paving
Division 3 Site Concrete

1. PRODUCT NAME

Speed Dowel

2. MANUFACTURER

Aztec Concrete Accessories, Inc.
14760 Santa Ana Avenue
Fontana, CA 92337
Phone (800) 531-3355
(909) 829-2765

3. PRODUCT DESCRIPTION

Basic Use: Speed Dowel all-plastic sleeves are designed for the purpose of assuring proper field positioning and alignment of steel dowels at concrete flatwork construction joints and expansion joints. Speed Dowel places rigid polypropylene sleeves in perfect position perpendicular to the vertical joint edge and parallel to both the horizontal plane and to each other. The Speed Dowel sleeve creates a cavity that will accept either smooth or deformed dowels and will prevent bonding to the initial concrete placement. The potential for cracking and spalling are reduced by allowing free shrinking and expansion of adjacent concrete surfaces, while effectively combatting differential settlement. Speed Dowel sleeves are highly effective in slab on grade construction where laser leveling is required for factory floors and where specialized equipment is installed and motorized vehicles are required to rotate stock and supplies.

Composition and Materials:

The two piece Speed Dowel system is made of polypropylene plastic.

Limitations.

Speed Dowel sleeves are ordinarily utilized with wood forms where they can be attached with a number 8 pan head screw, duplex nail or a self tapping screw with metal forms.

4. TECHNICAL DATA

Code Approvals: The Speed Dowel system is an accepted method to achieve slip dowel alignment by most building officials, architects, engineers, and landscape architects throughout the world.

Environmental Considerations: Speed Dowel is made from 100% recycled plastic. Their use reduces the amount of labor during installation and form removal more than other alternatives, therefore requiring less energy.

5. INSTALLATION

a. Attach the plastic Speed Dowel base to the face of the concrete form. Center the base on the form or locate as directed by the engineer. Attachment should be made with a pan head/hexhead #8 x 2 1/2" wood screw for use with wooden forms or a self tapping metal screw for use with metal forms. (Attachment to wood forms can also be made with a #8 duplex nail, although this method allows limited reuse of form setup).

b. Slip the Speed Dowel sleeve over the plastic base.

c. Place reinforcing steel and concrete according to standard construction practices.

d. Remove the concrete form with Speed Dowel base still attached. Set aside and reuse for the next concrete pour. The Speed Dowel sleeve remains embedded in the concrete, creating a perfectly aligned cavity to receive the steel slip dowel.

e. Insert the reinforcing bar or smooth steel dowel to the full depth of the plastic sleeve. The steel dowel is now in proper position and ready for the next concrete placement. The slip dowel should move freely within the Speed Dowel sleeve. As with any dowel system, bent or badly sheared dowels should not be used.

6. AVAILABILITY AND COST

Availability: Speed Dowel sleeves are manufactured at our factory in Fontana, CA. Warehouses are located in Fontana, CA, Houston, TX, and Atlanta, GA. Speed Dowel is available through construction suppliers throughout the U.S. and Canada. Normally, orders are shipped the same day they are placed.

Costs: Costs vary depending on size and quantity ordered. Check with our factory or a local representative for pricing information.

7. WARRANTY

Aztec Concrete Accessories, Inc. warrants that this product will be free from defects in material and workmanship.

The foregoing warranty is in lieu of and excludes all other warranties not expressly set forth herein, whether express or implied by operation of law or otherwise, including but not limited to any implied warranties of merchantability or fitness.

Aztec Concrete Accessories, Inc. shall not be liable for incidental or consequential losses, damages, or expenses, directly or indirectly arising from the sale, handling or use of the products, or from any other cause relating thereto, and seller's liability hereunder is expressly limited to replacement in the form originally shipped, of goods not complying with this agreement or at Aztec's election, a refund equal to the purchase price of the product.

Specifications and other information contained herein supersedes all previously printed matter and are subject to change without notice.

8. TECHNICAL SERVICES

Speed Dowel trained sales staff are available for consultation on all aspects of technical and design support. Call (714) 642-3445.

ELASTO-THANE 227

Product Data Sheet

1. **PRODUCT NAME**
ELASTO-THANE 227
ELASTO-THANE 227 is a two-component, self-leveling or gun-grade, non-staining, polyurethane sealant which cures at ambient temperatures to a firm, flexible, tear-resistant rubber. It is highly resilient and has excellent recovery characteristics after extended periods of compression or extension.

2. **MANUFACTURER**
PACIFIC POLYMERS, INC.
12271 Monarch Street
Garden Grove, CA 92641
714/898-0025
800/888-8340
FAX (714) 898-5687

3. **PRODUCT DESCRIPTION**
Composition: Polyurethane based joint sealant.

Basic Uses: For sealing and caulking all joints that are subject to movement caused by expansion and contraction of structures with changes in temperature. Bonds to masonry, wood, glass and metal.

Limitations: Containers of Component B that have been opened must be used up within one or two days since it is a moisture-reactive material. It sets up when exposed to air. All surfaces must be completely free of foreign matter.

Shelf Life: 6 months. Store containers in dry places.

Colors: White, Concrete Grey, Tan, Black. Other colors available on order.

Sizes: Packaged in 1 1/2 and 4 1/2 gallon kits.

Standards: Federal Specification TT-S-227e and USASI Specification A 116 1 - 1967.

4. **TECHNICAL DATA**
ASTM C-920
Grade P&NS
Class 25
Type M

Consistency	: Pourable, Type I :Gun-grade, Type II
Tack Free Time	:8 hours at 77° F and 50% R.H
Cure time	: 24 hours at 77 F and 50% R.H.
Potlife	: 1 1/2 - 2 hrs. min. at 77' F
Hardness	: (Shore) 35±5 ASTM D22H0
Elongation	: 800%

Shrinkage · Negligible

Above date are typical properties. Individual batches may vary to a minor degree.

5. INSTALLATION

Joint Design: Suitable for all properly designed joints following accepted engineering practice. Joint width must be a minimum of 4 times the anticipated movement.

Surface Preparation: All joints must be absolutely clean. For concrete, sandblasting is recommended. All curing compounds, old caulks, grease, waterproofing compounds, etc., must be removed. For non-porous surfaces such as glass, metal, etc., cleaning with M.E.K or Toluene is recommended. Polyethylene rod or polyurethane foam is recommended as a joint-filler and back-up material. Filters treated with bituminous products, grease or oil, can not be used. Where present, they must be removed or separated by vinyl tape or polyethylene film. All joint surfaces must be primed with ELASTO-THANE PRIMER.

Application: Apply by caulking gun. Hand or pressure type or pour from container. Bulk sealant can be applied by pumping equipment, trowel or putty knife. Press firmly into joint to assure good contact.

6. AVAILABILITY AND COST

ELASTO-THANE 227 is supplied through building material dealers. Major contractors are supplied directly from PACIFIC POLYMERS, INC. Prices vary with quantity and packaging. Quotations are made on request

7. PRODUCT WARRANTY

All products proven to be defective in manufacture will be replaced at no charge. Since the use of these products is beyond our control we cannot assume any risk or liability for results obtained. Nor can we accept damages in excess of the purchase price of these products.

8. MAINTENANCE

If ELASTO-THANE 227 is damaged and the joint has not been contaminated It can be repaired by cutting out that part and resealing it with ELASTO-THANE 227.

9. TECHNICAL SERVICES

Technical assistance can be obtained by contacting.

PACIFIC POLYMERS, INC.
12271 Monarch Street
Garden Grove CA 92641
714/898-0025
800/888-8340
FAX (714) 898-5687

WIDTH OF JOINT

Depth of Joint	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"
1/4"	308	205	154	123	102	88	77
3/8"		136	102	82	68	58	51
1/2"			77	61	51	44	38
5/8"				49	41	35	30

3/4"	34	29	25
7/8"		25	22
1"			19

Linear feet per gallon

Return to
Pacific Polymers International. Inc.'s:

- On-Line Product Catalog
- Home Page

Reservoir Sealant, Gun Grade/SL - PSI-270
Reservoir Sealant, (Self-Leveling)/SL - PSI-270

Multi-component, medium modulus, polyurethane especially designed for joints exposed to continuous water immersion; approved for water and sewage immersion. It is ideally suited for sealing horizontal joints exposed to continuous water immersion and is recommended for use in potable water applications.

Its principal application is for sealing and caulking concrete joints subject to structural movement. It provides effective water retention in reservoirs, tanks, and containers.

Colors

Off-White
White
Gray
Bronze
Limestone
Black
Tan

Sikaflex®-2c NS/SL

5/96

ISO 9000

Polyurethane elastomeric sealant

DESCRIPTION

Sikaflex-2c NS/SL is a 2-component, premium-grade, polyurethane-based, elastomeric sealant. It is principally a chemical cure in a non-sag and self-leveling consistency. Available in 40 colors with convenient Color-pak. Also available as a pre-pigmented product in both grades in Limestone Gray. Both grades meet ASTM C-920 and Federal Specification TT-S-00227E

WHERE TO USE

- Intended for use in all properly designed working joints with a minimum depth of ¼ in
- Ideal for vertical and horizontal applications.
- Placeable at temperatures as low as 40F.
- Adheres to most substrates commonly found in construction.

ADVANTAGES

- Capable of ±50% joint movement.
- Chemical cure allows the sealant to be placed in joints exceeding ½ in. in depth
- High elasticity with a tough, durable, flexible consistency.
- Exceptional cut- and tear-resistance. Exceptional adhesion to most substrates without priming.
- Available in 40 architectural colors.
- Color uniformity assured via Color-pak system or pre-pigmented Limestone Gray.
- Excellent sag resistance.
- Self-leveling consistency is easy to apply into horizontal joints.
- Jet fuel resistant.
- Paintable with water-, oil-, and rubber-base paints.
- Non-sag is NSF approved for potable water contact.
- USDA-approved.
- Four-hour UL Fire Rating.
- No Color-pak needed in pre-pigmented Limestone.

COVERAGE

1 gal. yields 231 cu. in. or 154 lin. ft. of a ½ in. X ¼ in. joint.

PACKAGING

1.5 gal. unit. Available on special order, 3 gal. units.
Color-pak is purchased separately. Limestone gray color available pre-pigmented

TYPICAL DATA FOR SIKAFLEX 2C NS/SL

(Material and curing conditions 75F (23C) and 50% R.H.)

COLORS	A wide range of architectural colors are available. Special colors available on request. Pre-pigmented available as Limestone
SHELF LIFE	One year in original, unopened containers.
STORAGE CONDITIONS	Store dry at 40-95F (4-35C). **Condition material to 65-75F before using.**
APPLICATION TEMPERATURE	40 to 100F, ambient and substrate temperatures. Sealant should be installed when joint is at mid-range of its anticipated movement.
SERVICE RANGE	-40 to 170F (-40 to 75C)

PROPERTY	Test Method	Non-sag	Self-leveling
Application Life	TT-S-00227E	3-4 hrs	3-4 hrs
Tack-free Time	ASTM C-679	6-8 hrs	6-8 hrs
Final Cure		3 days	3 days
Shore A Hardness	ASTM D-2240	25 ± 5	40 ± 5
Tensile Strength at Break	ASTM D-412	175 psi	175 psi
Tensile Elongation	ASTM D-412	650%	650%
100% Modulus	ASTM D-412	75 psi	100 psi
Tear Strength	ASTM D-624	75 lb./in	100 lb./in.

ADHESION IN PEEL TT-S-00227E

Substrate	Peel Strength	% Adhesion Loss	Peel Strength	%Adhesion Loss
Aluminum	30 lb.	Zero	30 lbs	Zero
Glass	30 lb.	Zero	30 lbs	Zero
Concrete	25 lb.	Zero	30 lbs.	Zero

WEATHERING RESISTANCE	Excellent
CHEMICAL RESISTANCE	Good resistance to water, diluted acids, diluted alkalines, and residential sewage. Consult Technical Service for specific data.

SURFACE PREPARATION

All joint-wall surfaces must be clean, sound, and frost-free. Joint walls must be free of oils, grease, curing compound residues, and any other foreign matter that might prevent bond. Ideally this should be accomplished by mechanical means.
Bond breaker tape or backer rod must be used in bottom of joint to prevent bond.

PRIMING

Priming is typically not necessary. Most substrates only require priming if sealant will be subjected to water immersion after cure. Testing should be done, however, on questionable substrates, to determine if priming is needed.
Consult Technical Service or Sikaflex Primer Technical Data Sheet for additional information on priming.

MIXING

Pour entire contents of Component 'B' into pail of Component 'A'. For tint base: add entire contents of Color-pak into pail and mix with a low-speed drill (400-600 rpm) and Sikaflex paddle.* Mix for 3-5 minutes to achieve a uniform color and consistency. Scrape down sides of pail periodically. Avoid entrapment of air during mixing.
Color-pak must be used with tint base.
Note: When mixing 3 gal. unit two containers of Component 'B' and two Color-paks must be used.

*For pre-pigmented limestone base: just mix with low-speed drill and Sikaflex paddle.

APPLICATION

Recommended application temperatures 40-100 F. Pre-conditioning units to approximately 70 F is necessary when working at extremes. Move pre-conditioned units to work areas just prior to application.

Apply sealant only to clean, sound, dry, and frost-free substrates. Sikaflex-2c should be applied into joints when joint slot is at mid-point of its designed expansion and contraction.

To place NS grade, load directly into bulk gun or use a follower plate loading system. Place nozzle of gun into bottom of joint and fill entire joint. Keeping the nozzle deep in the sealant, continue with a steady flow of sealant preceding nozzle to avoid air entrapment. Pour or extrude the SL grade in one direction and allow it to flow and level as necessary. Also, avoid overlapping of sealant since this also entraps air. Tool as required.

LIMITATIONS

- The ultimate performance of Sikaflex-2c, depends on good joint design and proper application.
- Minimum depth in working joint is ¼ in.
- Maximum expansion and contraction should not exceed 50% of average joint width.
- Do not cure in the presence of curing silicones.
- Avoid contact with alcohol and other solvent cleaners during cure.
- Allow 3-day cure before subjecting sealant to total water immersion. Avoid exposure to high levels of chlorine. (Maximum level is 5ppm).
- Do not apply when moisture vapor transmission exists since this can cause bubbling within the sealant.
- Avoid over-mixing sealant.
- Light color shades tend to yellow over time when exposed to ultraviolet rays.
- When overcoating an on-site test is recommended to determine actual compatability.

CAUTION

Component 'A'; Irritant - Contains Calcium Oxide. Avoid contact. Product is a skin, respiratory and eye irritant. Use of safety goggles and chemical resistant gloves recommended. Use of a NIOSH/MSHA approved respirator required if PELs are exceeded. Use with adequate ventilation.

Component 'B'; Combustible; Sensitizer; Irritant - Contains Xylene. Keep away from heat, sparks and open flame. Use with adequate ventilation. Product is a respiratory and skin sensitizer. Avoid contact. Product is an eye, skin, and respiratory irritant. Use of safety goggles and chemical resistant gloves recommended. Use of a NIOSH/MSHA approved respirator required if PELs are exceeded.

FIRST AID

In case of skin contact wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water for at least 15 minutes, contact physician. For respiratory problems, remove to fresh air. Wash clothing before re-use. Discard contaminated shoes.

CLEAN UP

Uncured material can be removed with approved solvent. Cured material can only be removed mechanically. For spillage, collect, absorb, and dispose of in accordance with current, applicable local, state, and federal regulations.

Product Code 464/465 Sika and Sikaflex are registered trademarks. Made in USA. Printed in USA May, 1995

KEEP CONTAINER TIGHTLY CLOSED **KEEP OUT OF REACH OF CHILDREN**
NOT FOR INTERNAL CONSUMPTION **FOR INDUSTRIAL USE ONLY**
CONSULT MATERIAL SAFETY DATA SHEET FOR MORE INFORMATION

SIKA WARRANTS ITS PRODUCTS TO BE FREE OF MANUFACTURING DEFECTS AND THAT THEY WILL MEET SIKA'S CURRENT PUBLISHED PHYSICAL PROPERTIES WHEN APPLIED IN ACCORDANCE WITH SIKA'S DIRECTIONS AND TESTED IN ACCORDANCE WITH ASTM AND SIKA STANDARDS. THERE ARE NO OTHER WARRANTIES BY SIKA OF ANY NATURE WHATSOEVER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IN CONNECTION WITH THIS PRODUCT. SIKA CORPORATION SHALL NOT BE LIABLE FOR DAMAGES OF ANY SORT, INCLUDING REMOTE OR CONSEQUENTIAL DAMAGES, RESULTING FROM ANY CLAIMED BREACH OF ANY WARRANTY, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR FROM ANY OTHER CAUSE WHATSOEVER. SIKA SHALL ALSO NOT BE RESPONSIBLE FOR USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT HELD BY OTHERS.

1-800-933-SIKA NATIONWIDE
Regional Information and Sales Centers
For the location of your nearest Sika sales office, contact your regional center.

Northeast
201 Polito Avenue
Lyndhurst, NJ 07071
Phone 1-800-933-7452
Fax 201-804-1090

Midwest
2190 Gladstone Court
Suite A
Glendale Heights, IL 60139
Phone 708-924-7900
Fax 708-924-8508

Southern
3778 La Vista Road
Suite100
Tucker, GA 30084
Phone 404-315-0337
Fax 404-315-0117

Western
12767 East Imperial Hwy
Santa Fe Springs, CA 90670
Phone 310-941-0231
Fax 310-941-1762

EAST C-1 DETENTION BASIN

CALCULATION NOTEBOOK

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	- Primary Wash	
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	- HEC-2 Model Output	VTN
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SECTION 1

BASIN PARAMETERS

Monday, February 16, 1998

EAST C-1 DETENTION BASIN
W.O. #5244

WATER SURFACE STAGE STORAGE AREAS:
DESIGN CONFIGURATION D7 w/ EG5FT ("D7EG5.TIN")

Low flow outlet inv. elev. = 2446.00

The elevation = 2448
Area = 59,247, Perimeter = 1549

The elevation = 2450
Area = 80,556, Perimeter = 1934

The elevation = 2452
Area = 102,593, Perimeter = 2313

The elevation = 2454
Area = 128,013, Perimeter = 2469

The elevation = 2456
Area = 176,779, Perimeter = 2913

The elevation = 2458
Area = 213,403, Perimeter = 3173

The elevation = 2460
Area = 237,028, Length = 3291

The elevation = 2462
Area = 262,686, Perimeter = 3381

The elevation = 2464
Area = 292,883, Perimeter = 3599

The elevation = 2466
Area = 328,978, Perimeter = 3937

The elevation = 2468
Area = 368,071, Perimeter = 4269

The elevation = 2470
Area = 424,906, Perimeter = 4698

The elevation = 2472
Area = 523,948, Perimeter = 5350

The elevation = 2474
Area = 576,404, Perimeter = 5563

The elevation = 2476
Area = 636,221, Perimeter = 5948

The elevation = 2478
Area = 692,625, Perimeter = 6236

The elevation = 2480
Area = 763,655, Length = 6740

The elevation = 2482
Area = 850,117, Perimeter = 7349

The elevation = 2484
Area = 1,026,429, Perimeter = 8091

The elevation = 2486
Area = 1,376,688, Perimeter = 8539

The elevation = 2488
Area = 1,468,906, Perimeter = 8128

The elevation = 2490
Area = 1,556,213, Perimeter = 8577

The elevation = 2492
Area = 1,642,175, Perimeter = 8714

The elevation = 2494
Area = 1,742,737, Perimeter = 8907

SPILLWAY APRON:
The elevation = 2496
Area = 1,883,586, Perimeter = 9956

The elevation = 2498
Area = 1,983,825, Perimeter = 10,292

SPILLWAY CREST:
The elevation = 2500
Area = 2,101,331, Perimeter = 11,097

The elevation = 2502
Area = 2,212,269, Perimeter = 11,373

The elevation = 2504
Area = 2,328,224, Perimeter = 11,646

The elevation = 2506
Area = 2,458,776, Perimeter = 11,951

The elevation = 2508
Area = 2,557,185, Perimeter = 12,254

TOP OF DAM EMBANKMENT:
The elevation = 2510
Area = 2,703,080, Perimeter = 12,725

WATER SURFACE STORAGE EXCLUSION FROM LARGE UPSTREAM ROCK PROTRUSION (SUBTRACT FROM ABOVE TOTALS):

The elevation = 2484

Area = 3522, Perimeter = 211
Area = 434, Perimeter = 101
TOTAL AREA = 3956

The elevation = 2486
Area = 2733, Perimeter = 186
Area = 67,539, Perimeter = 1351
TOTAL AREA = 70,272

The elevation = 2488
Area = 2044, Perimeter = 161
Area = 59,840, Perimeter = 1191
TOTAL AREA = 61,884

The elevation = 2490
Area = 1310, Perimeter = 135
Area = 52,371, Length = 1145
TOTAL AREA = 53,681

The elevation = 2492
Area = 43,803, Perimeter = 1104

The elevation = 2494
Area = 34,735, Perimeter = 1061
Area = 405, Perimeter = 95
TOTAL AREA = 35,140

The elevation = 2496
Area = 170, Perimeter = 67
Area = 21,679, Perimeter = 740
TOTAL AREA = 21,849

The elevation = 2498
Area = 15,623, Perimeter = 653

The elevation = 2500
Area = 9986, Perimeter = 409

The elevation = 2502
Area = 7608, Perimeter = 354

The elevation = 2504
Area = 5630, Perimeter = 300

The elevation = 2506
Area = 4053, Perimeter = 257

The elevation = 2508
Area = 2714, Perimeter = 225

The elevation = 2510
Area = 950, Length = 130

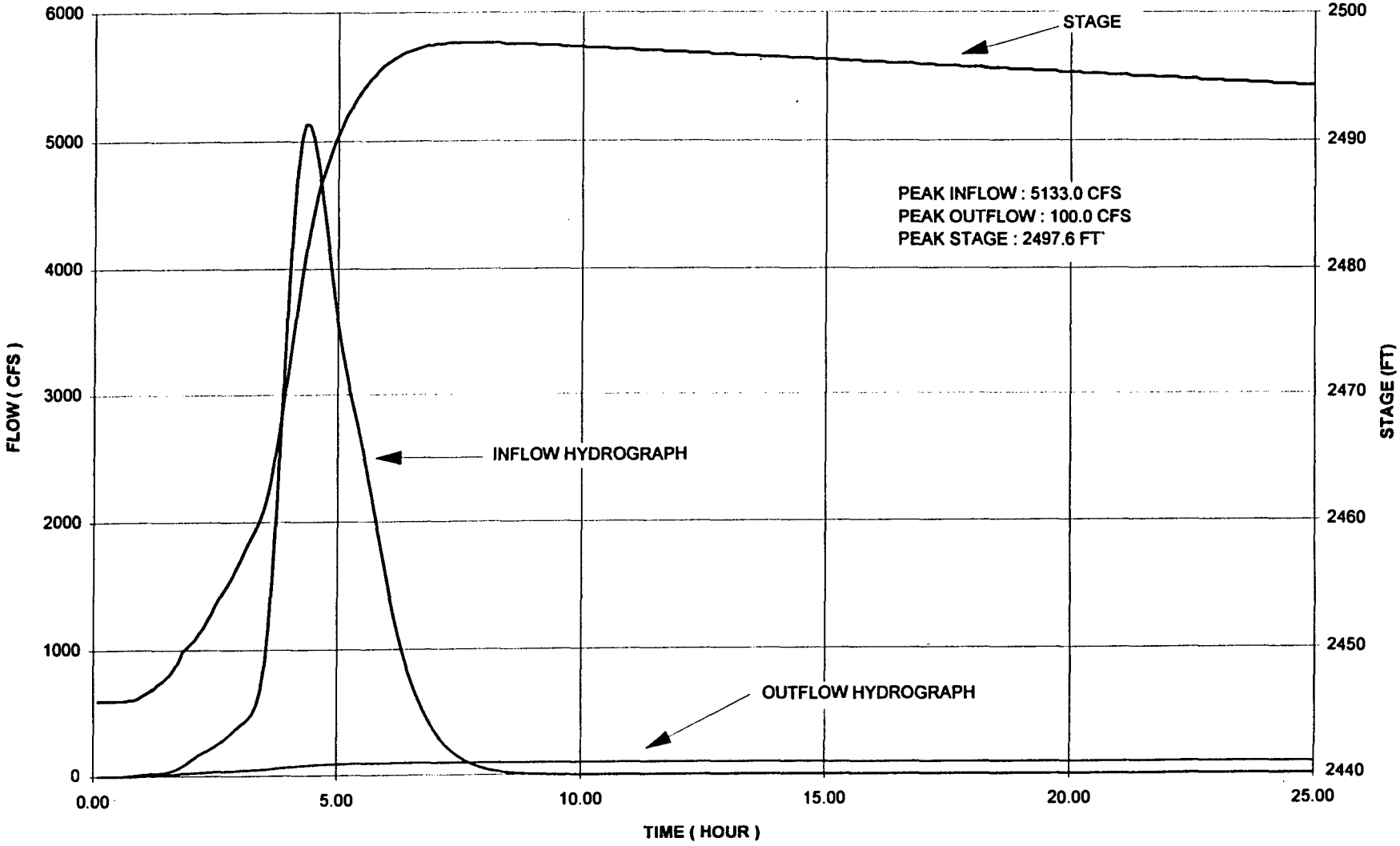
VOLUME AND DISCHARGE TABLES
DESIGN ALTERNATIVE NUMBER 2.0

Base on the correction of the basin area date 02/16/98
Use Orifice Diameter = 1.85 ft, 1 pipes

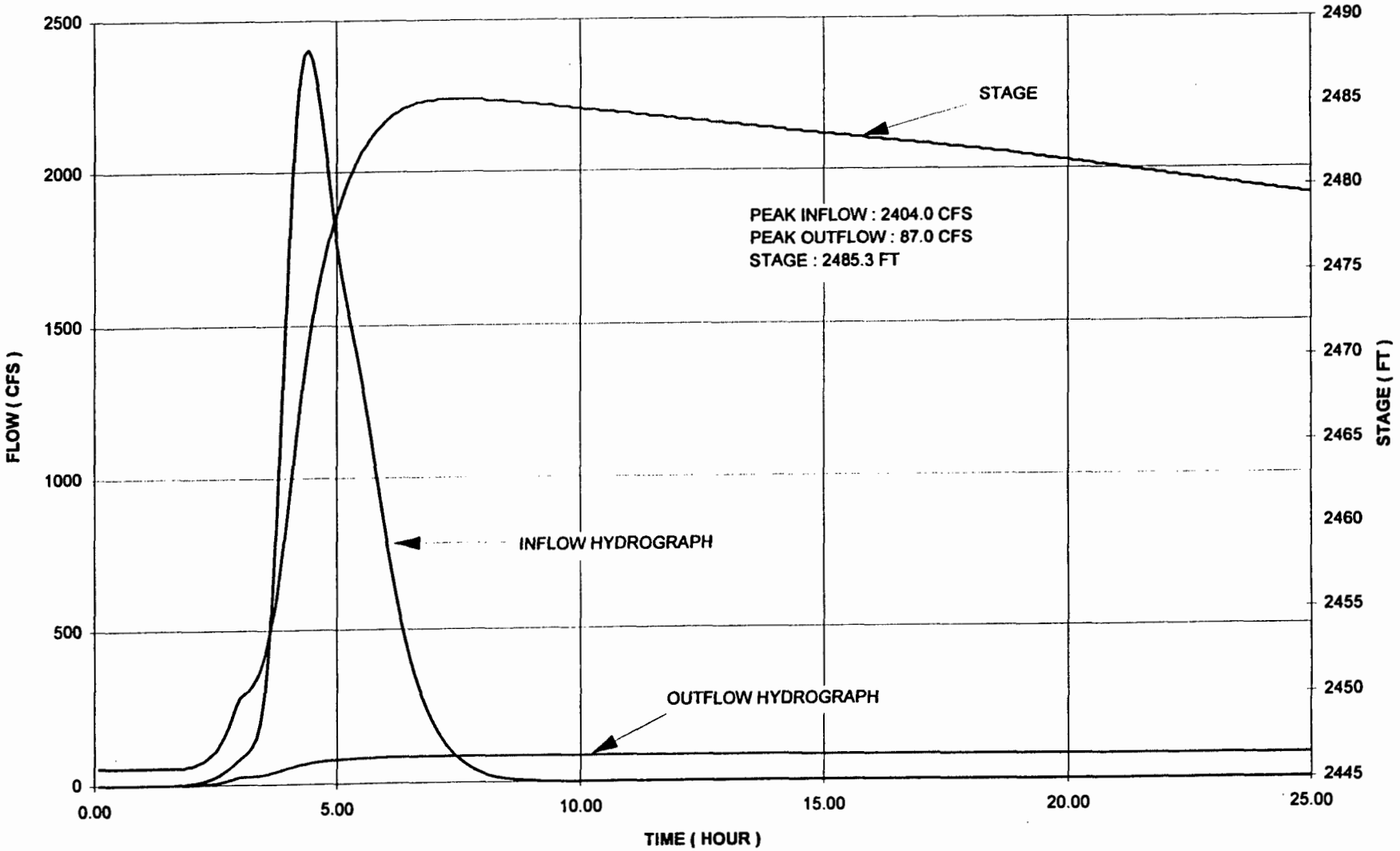
ORIFICE DIA: =	1.85 FT
ORIFICE AREA	2.69 SQ. FT
NUMBER OF PIPES	1
ORIFICE COE.	0.65
ORIFICE INVERT: =	2446.0 FT

AREA	ELEVATION	AREA	Subtract area	Total Area	AVERAGE AREA	VOLUME	CUMULATIVE VOLUME	DISCHARGE LOW LEVEL	
ACRES	FT	FT^2	FT^2	FT^2	FT^2	AC-FT	AC-FT	CFS	
0.0	2446.0	0	0	0	0	0.00	0.00	0.00	
1.4	2448.0	59247	0	59247	29624	1.36	1.36	14.54	
1.8	2450.0	80556	0	80556	40278	1.85	1.85	24.59	
2.4	2452.0	102593	0	102593	80920	3.72	5.56	31.59	
2.9	2454.0	128013	0	128013	104285	4.79	10.35	37.30	
4.1	2456.0	176779	0	176779	139686	6.41	16.77	42.24	
4.9	2458.0	213403	0	213403	170708	7.84	24.60	46.66	
5.4	2460.0	237028	0	237028	206904	9.50	34.10	50.70	
6.0	2462.0	262686	0	262686	238045	10.93	45.03	54.44	
6.7	2464.0	292883	0	292883	264956	12.17	57.20	57.94	
7.6	2466.0	328978	0	328978	295832	13.58	70.78	61.24	
8.4	2468.0	368071	0	368071	330477	30.35	87.55	64.37	
9.8	2470.0	424906	0	424906	376942	17.31	104.85	67.35	
12.0	2472.0	523948	0	523948	446010	20.48	125.33	70.21	
13.2	2474.0	576404	0	576404	500655	22.99	148.32	72.96	
14.6	2476.0	636221	0	636221	580085	26.63	174.95	75.60	
15.9	2478.0	692625	0	692625	634515	29.13	204.08	78.16	
17.5	2480.0	763655	0	763655	699938	32.14	236.22	80.64	
19.5	2482.0	850117	0	850117	771371	35.42	271.64	83.04	
23.6	2484.0	1026429	3956	1022473	893064	41.00	312.64	85.37	
31.6	2486.0	1376688	67539	1309149	1079633	49.57	362.21	87.65	
33.7	2488.0	1468906	59840	1409066	1215770	55.82	418.03	89.86	
35.7	2490.0	1556213	53681	1502532	1405841	64.55	482.58	92.02	
37.7	2492.0	1642175	43803	1598372	1503719	69.04	551.62	94.14	
40.0	2494.0	1742737	35140	1707597	1605065	73.69	625.31	96.20	
43.2	2496.0	1883586	21849	1861737	1730055	79.43	704.75	98.22	Spillway Apron
45.5	2498.0	1983825	15623	1968202	1837900	84.38	789.13	100.21	
48.2	2500.0	2101331	9986	2091345	1976541	90.75	879.88	102.15	Spillway Crest
50.8	2502.0	2212269	7608	2204661	2086432	95.80	975.68	104.06	
53.4	2504.0	2328224	5630	2322594	2206970	101.33	1077.01	105.93	
56.4	2506.0	2458776	4053	2454723	2329692	106.96	1183.97	107.77	
58.7	2508.0	2557185	2714	2554471	2438533	111.96	1295.93	109.58	
62.1	2510.0	2703080	950	2702130	2578427	118.39	1414.32	111.36	

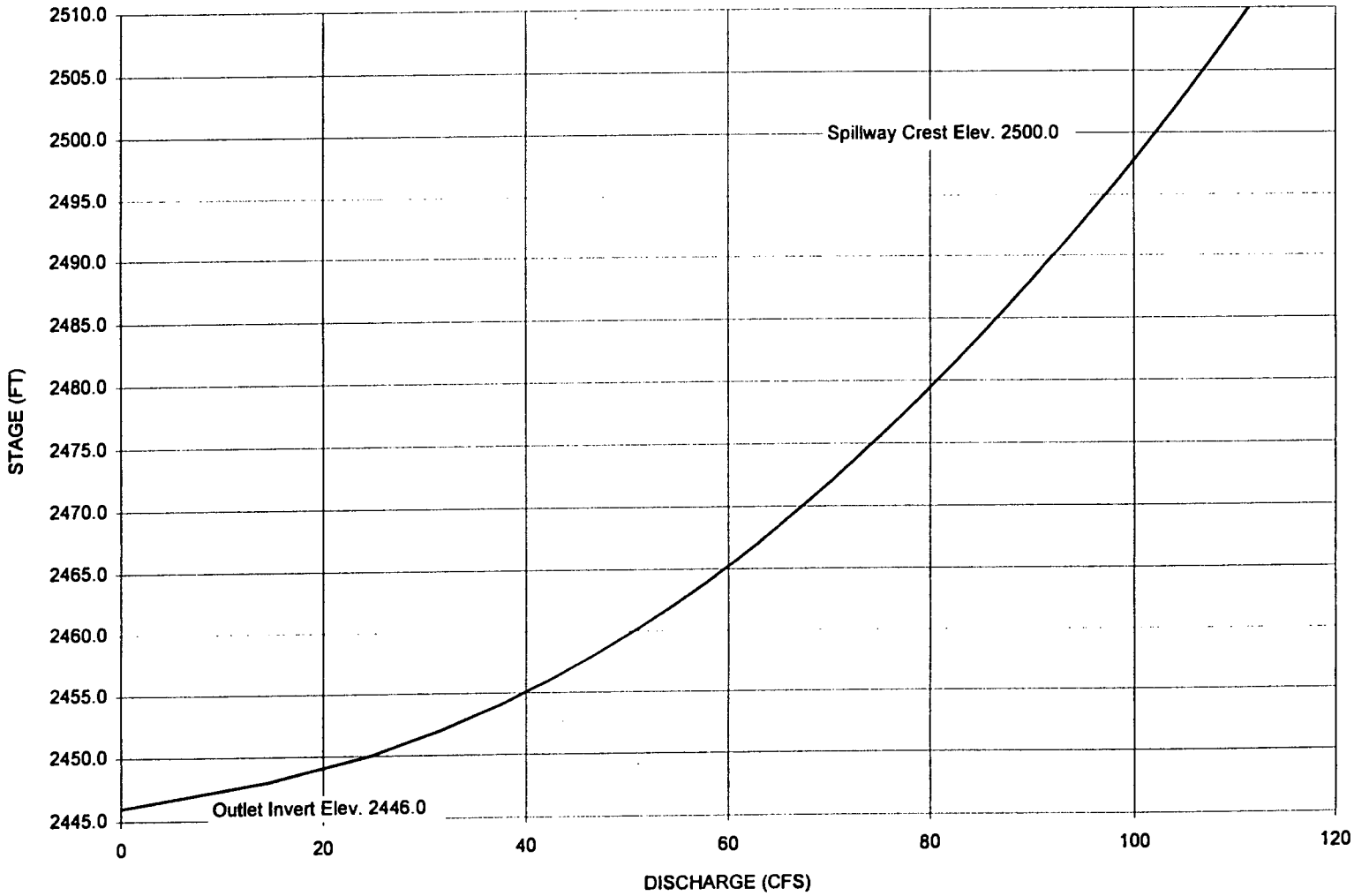
1000 YEAR INFLOW/OUTFLOW HYDROGRAPH & STAGE

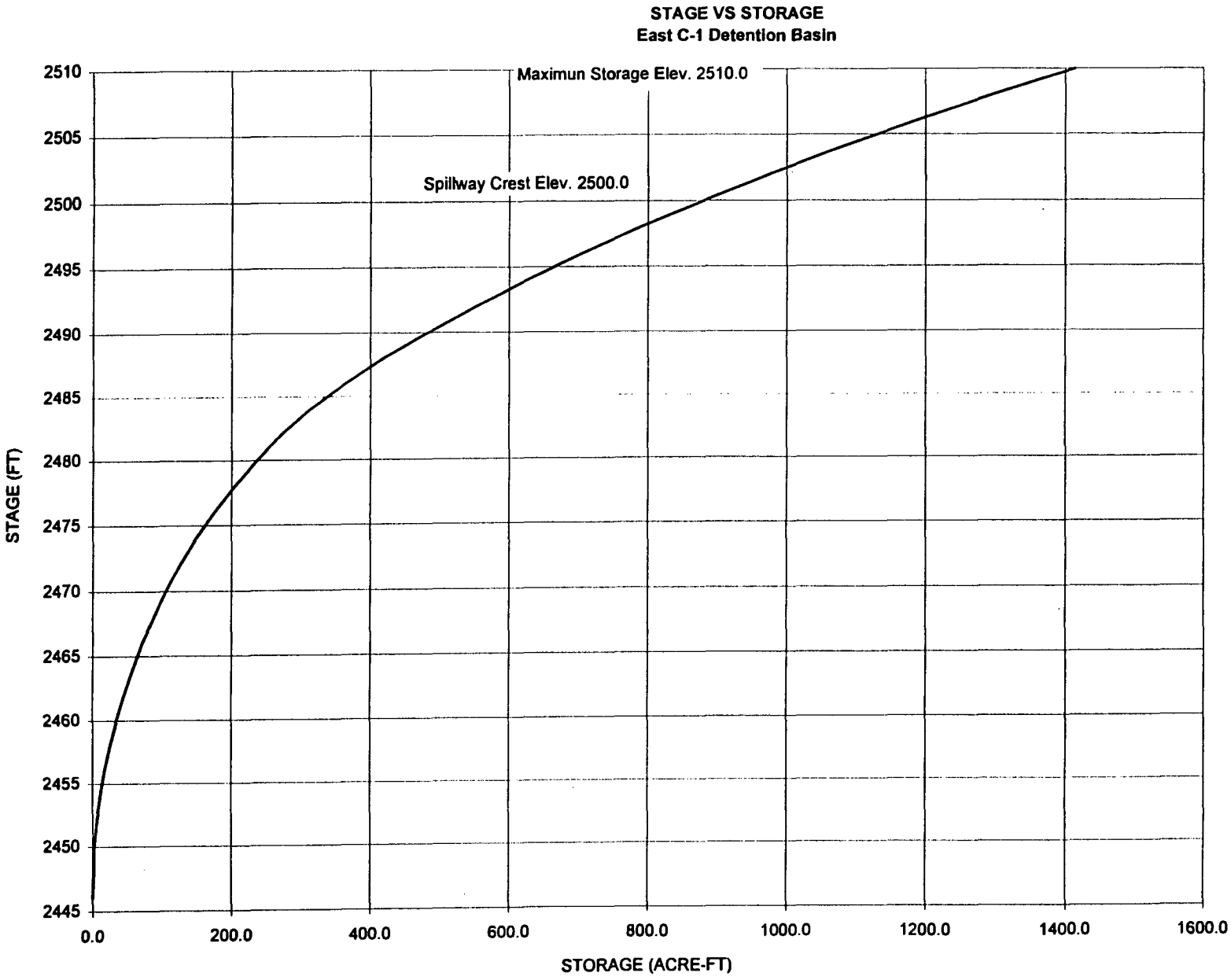


100 YEAR INFLOW/OUTFLOW HYDROGRAPH & STAGE



STAGE VS LOW LEVEL DISCHARGE
EAst C-1 D.B. (1000-yr Design Event)




STAGE VS STORAGE
East C-1 Detention Basin
Maximun Storage Elev. 2510.0
Spillway Crest Elev. 2500.0
2510
2505
2500
2495
2490
2485
2480
2475
2470
2465
2460
2455
2450
2445
STAGE (FT)
0.0
200.0
400.0
600.0
800.0
1000.0
1200.0
1400.0
1600.0
STORAGE (ACRE-FT)

SECTION 2

EXISTING CONDITION HEC-1 OUTPUT

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*         SEPTEMBER 1990                *
*         VERSION 4.0                   *
*                                       *
*  RUN DATE  02/11/1998  TIME  15:57:32 *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*        (916) 756-1104                 *
*                                       *
*****************************************
```


```
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    INPUT FILE = ECDB.DAT
               2    ID    EXISTING CONDITION (ASSUME DETENTION BASIN IS NOT BUILT)
               3    ID    DESIGN STORM EVENTS FROM 5 TO 1000 YEAR EVENT
               4    ID    VTN NEVADA, July 1997
               5    ID
               6    ID    WATERSHED MODEL TAKEN FROM COE HYDROLOGY
               7    ID    KINEMATIC SUBBASINS CONVERTED TO SCS
               8    ID    CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
               9    ID    SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT
              10    ID
*** FREE ***
              11    IT       5       0       0     300
              12    IN       5       0       0
              13    IO       5
                    * ******* USING 100 YEAR JR CARD  *******
              14    JR     PREC    1.90    1.45    1.09   0.905    0.79     .67     .52     .40
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

              15    KK    C4CB WEST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
              16    KM   RUNOFF FOR THE WEST SEDIMENT TRAP DESIGN
              17    BA    2.97
              18    PB    3.43
              19    PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
              20    PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
              21    PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
              22    PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
              23    PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
              24    PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
              25    PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
              26    PC    .998    .999   1.00
              27    LS    0.00   80.0
              28    UD  0.8929

              29    KK    C4CA EAST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
              30    KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
              31    BA    2.56
              32    PB    3.43
              33    LS    0.00    80.0
              34    UD  0.8929

              35    KK     C4C
              36    KM   Combine C4CA and C4CB
              37    HC       2
              38    KO       1
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)
                    *  KK DET_C4C East Detention Basin
                    *  KM Proposed detention basin d/s of subbasin C4C; storage capacity = 1730
                    *  ac-ft;
                    *  KM assume a 48" diameter low-level outlet pipe; spillway elevation set at
                    *  2480' RS 1 STOR -1
                    *  SV    0.0   79.8  498.2  916.6 1544.4 2172.3 2623.4 3074.5 3976.7
                    *  SE 2475.0 2480.0 2490.0 2500.0 2510.0 2520.0 2525.0 2530.0 2540.0
                    *  SL 2472.0 12.57 0.7 0.5
                    *  SS 2530.0 780.0 3.0 1.5
                    *  KO 1
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  39      KK    RC4C
  40      KM   ROUTE DET_C4C outflow THRU C3B3
  41      KM   With 7-7' drop structures
  42      RK    3200   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  43      KK   C3B3B  DISTRICT C AREA 3 SUBBASIN B3B
  44      KM   RUNOFF FROM C3B3B
  45      BA    0.56
  46      PB    3.36
  47      LS    0.00      82
  48      UD    0.42

  49      KK   C3B3B
  50      KM   Combine RC4C & C3B3
  51      HC      2
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  52      KK   R3B3B
  53      KM   ROUTE 3B3B
  54      KM   With 7-7' drop structures
  55      RK    3800   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

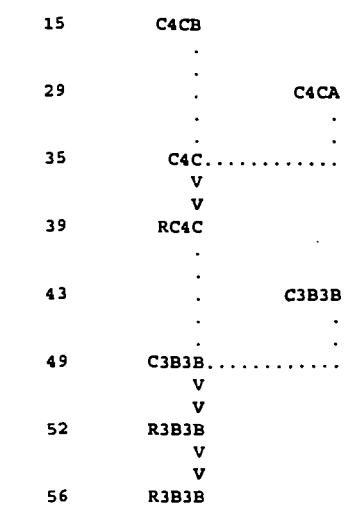
  56      KK   R3B3B
  57      KM   ROUTE R3B3B THRU C3B1
  58      RK    8250   0.015   0.030       0    TRAP      50     3.0
          *
  59      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*        SEPTEMBER 1990              *
*         VERSION 4.0                *
*                                    *
* RUN DATE  02/11/1998  TIME  15:57:32 *
*                                    *
**************************************
```


```
**************************************
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616        *
*       (916) 756-1104               *
*                                    *
**************************************
```


```
INPUT FILE = ECDB.DAT
EXISTING CONDITION (ASSUME DETENTION BASIN IS NOT BUILT)
DESIGN STORM EVENTS FROM 5 TO 1000 YEAR EVENT
VTN NEVADA, July 1997

WATERSHED MODEL TAKEN FROM COE HYDROLOGY
KINEMATIC SUBBASINS CONVERTED TO SCS
CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT

13 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          300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2    0  ENDING DATE
                   NDTIME         0055  ENDING TIME
                    ICENT           19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   24.92 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
                  1.90      1.45      1.09       .90       .79       .67       .52       .40

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
35 KK     *      C4C   *
          *            *
          **************

38 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

37 HC          HYDROGRAPH COMBINATION
                    ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

**********************************************************************************************************************************

                                        HYDROGRAPH AT STATION      C4C
                                          SUM OF  2 HYDROGRAPHS
                                          PLAN 1,   RATIO =  1.90

**********************************************************************************************************************************

  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     0615   76      1550.  *   1     1230  151        0.  *   1     1845  226        0.
```

1	0005	2	0.	*	1	0620	77	1375.	*	1	1235	152	0.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	1220.	*	1	1240	153	0.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	1082.	*	1	1245	154	0.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	957.	*	1	1250	155	0.	*	1	1905	230	0.
1	0025	6	1.	*	1	0640	81	846.	*	1	1255	156	0.	*	1	1910	231	0.
1	0030	7	6.	*	1	0645	82	744.	*	1	1300	157	0.	*	1	1915	232	0.
1	0035	8	13.	*	1	0650	83	653.	*	1	1305	158	0.	*	1	1920	233	0.
1	0040	9	22.	*	1	0655	84	572.	*	1	1310	159	0.	*	1	1925	234	0.
1	0045	10	35.	*	1	0700	85	499.	*	1	1315	160	0.	*	1	1930	235	0.
1	0050	11	51.	*	1	0705	86	434.	*	1	1320	161	0.	*	1	1935	236	0.
1	0055	12	69.	*	1	0710	87	377.	*	1	1325	162	0.	*	1	1940	237	0.
1	0100	13	87.	*	1	0715	88	327.	*	1	1330	163	0.	*	1	1945	238	0.
1	0105	14	103.	*	1	0720	89	283.	*	1	1335	164	0.	*	1	1950	239	0.
1	0110	15	115.	*	1	0725	90	244.	*	1	1340	165	0.	*	1	1955	240	0.
1	0115	16	124.	*	1	0730	91	210.	*	1	1345	166	0.	*	1	2000	241	0.
1	0120	17	130.	*	1	0735	92	180.	*	1	1350	167	0.	*	1	2005	242	0.
1	0125	18	138.	*	1	0740	93	154.	*	1	1355	168	0.	*	1	2010	243	0.
1	0130	19	148.	*	1	0745	94	130.	*	1	1400	169	0.	*	1	2015	244	0.
1	0135	20	163.	*	1	0750	95	110.	*	1	1405	170	0.	*	1	2020	245	0.
1	0140	21	185.	*	1	0755	96	92.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	213.	*	1	0800	97	76.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	247.	*	1	0805	98	64.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	284.	*	1	0810	99	54.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	325.	*	1	0815	100	46.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	366.	*	1	0820	101	39.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	403.	*	1	0825	102	33.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	438.	*	1	0830	103	28.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	471.	*	1	0835	104	24.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	502.	*	1	0840	105	21.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	532.	*	1	0845	106	18.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	565.	*	1	0850	107	15.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	606.	*	1	0855	108	12.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	653.	*	1	0900	109	10.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	699.	*	1	0905	110	8.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	740.	*	1	0910	111	6.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	778.	*	1	0915	112	5.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	822.	*	1	0920	113	3.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	881.	*	1	0925	114	3.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	967.	*	1	0930	115	2.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	1112.	*	1	0935	116	2.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1349.	*	1	0940	117	1.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1720.	*	1	0945	118	1.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	2233.	*	1	0950	119	1.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	2876.	*	1	0955	120	1.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	3649.	*	1	1000	121	0.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	4514.	*	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	5403.	*	1	1010	123	0.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	6230.	*	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	6907.	*	1	1020	125	0.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	7399.	*	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	7694.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	7798.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	7741.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	7535.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	7224.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	6835.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	6389.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	5935.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	5517.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	5162.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	4868.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	4612.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	4386.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	4172.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3950.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	3718.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3476.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3221.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	2967.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2705.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2445.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2196.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	1964.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	1748.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
7798.	4.33		2498.	632.	609.	609.
		(INCHES)	4.200	4.251	4.251	4.251
		(AC-FT)	1239.	1254.	1254.	1254.

CUMULATIVE AREA = 5.53 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = 1.45

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		0615	76	1109.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	985.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	874.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	775.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	686.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	606.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	534.	1		1300	157	0.	1		1915	232	0.
1		0035	8	2.	1		0650	83	468.	1		1305	158	0.	1		1920	233	0.
1		0040	9	3.	1		0655	84	410.	1		1310	159	0.	1		1925	234	0.
1		0045	10	5.	1		0700	85	358.	1		1315	160	0.	1		1930	235	0.
1		0050	11	8.	1		0705	86	312.	1		1320	161	0.	1		1935	236	0.
1		0055	12	11.	1		0710	87	270.	1		1325	162	0.	1		1940	237	0.
1		0100	13	15.	1		0715	88	235.	1		1330	163	0.	1		1945	238	0.
1		0105	14	19.	1		0720	89	203.	1		1335	164	0.	1		1950	239	0.
1		0110	15	22.	1		0725	90	175.	1		1340	165	0.	1		1955	240	0.
1		0115	16	24.	1		0730	91	151.	1		1345	166	0.	1		2000	241	0.
1		0120	17	27.	1		0735	92	129.	1		1350	167	0.	1		2005	242	0.
1		0125	18	31.	1		0740	93	111.	1		1355	168	0.	1		2010	243	0.
1		0130	19	36.	1		0745	94	94.	1		1400	169	0.	1		2015	244	0.
1		0135	20	45.	1		0750	95	79.	1		1405	170	0.	1		2020	245	0.
1		0140	21	57.	1		0755	96	66.	1		1410	171	0.	1		2025	246	0.
1		0145	22	73.	1		0800	97	55.	1		1415	172	0.	1		2030	247	0.
1		0150	23	92.	1		0805	98	46.	1		1420	173	0.	1		2035	248	0.
1		0155	24	113.	1		0810	99	39.	1		1425	174	0.	1		2040	249	0.
1		0200	25	136.	1		0815	100	33.	1		1430	175	0.	1		2045	250	0.
1		0205	26	159.	1		0820	101	28.	1		1435	176	0.	1		2050	251	0.
1		0210	27	180.	1		0825	102	24.	1		1440	177	0.	1		2055	252	0.
1		0215	28	201.	1		0830	103	21.	1		1445	178	0.	1		2100	253	0.
1		0220	29	220.	1		0835	104	18.	1		1450	179	0.	1		2105	254	0.
1		0225	30	240.	1		0840	105	15.	1		1455	180	0.	1		2110	255	0.
1		0230	31	260.	1		0845	106	13.	1		1500	181	0.	1		2115	256	0.
1		0235	32	282.	1		0850	107	11.	1		1505	182	0.	1		2120	257	0.
1		0240	33	309.	1		0855	108	9.	1		1510	183	0.	1		2125	258	0.
1		0245	34	340.	1		0900	109	7.	1		1515	184	0.	1		2130	259	0.
1		0250	35	371.	1		0905	110	5.	1		1520	185	0.	1		2135	260	0.
1		0255	36	399.	1		0910	111	4.	1		1525	186	0.	1		2140	261	0.
1		0300	37	425.	1		0915	112	3.	1		1530	187	0.	1		2145	262	0.
1		0305	38	456.	1		0920	113	2.	1		1535	188	0.	1		2150	263	0.
1		0310	39	495.	1		0925	114	2.	1		1540	189	0.	1		2155	264	0.
1		0315	40	553.	1		0930	115	1.	1		1545	190	0.	1		2200	265	0.
1		0320	41	650.	1		0935	116	1.	1		1550	191	0.	1		2205	266	0.
1		0325	42	809.	1		0940	117	1.	1		1555	192	0.	1		2210	267	0.
1		0330	43	1060.	1		0945	118	1.	1		1600	193	0.	1		2215	268	0.
1		0335	44	1408.	1		0950	119	1.	1		1605	194	0.	1		2220	269	0.
1		0340	45	1848.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	2379.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	2978.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	3598.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	4180.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	4663.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	5019.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	5241.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	5330.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	5308.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	5183.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	4983.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	4729.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	4433.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	4130.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	3850.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	3612.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	3416.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	3245.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	3094.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	2949.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	2799.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	2639.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	2471.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	2293.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	2115.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	1930.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	1746.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	1569.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	1404.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	1251.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			

+ 5330.	4.33		1695.	427.	411.	411.
		(INCHES)	2.849	2.870	2.870	2.870
		(AC-FT)	840.	846.	846.	846.

CUMULATIVE AREA = 5.53 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = 1.09

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		0615	76	758.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	673.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	598.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	531.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	470.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	416.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	366.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	321.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	281.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	245.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	214.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	185.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	161.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	139.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	120.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	103.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	89.	1		1350	167	0.	1		2005	242	0.
1		0125	18	1.	1		0740	93	76.	1		1355	168	0.	1		2010	243	0.
1		0130	19	2.	1		0745	94	65.	1		1400	169	0.	1		2015	244	0.
1		0135	20	3.	1		0750	95	55.	1		1405	170	0.	1		2020	245	0.
1		0140	21	6.	1		0755	96	46.	1		1410	171	0.	1		2025	246	0.
1		0145	22	11.	1		0800	97	38.	1		1415	172	0.	1		2030	247	0.
1		0150	23	17.	1		0805	98	32.	1		1420	173	0.	1		2035	248	0.
1		0155	24	24.	1		0810	99	27.	1		1425	174	0.	1		2040	249	0.
1		0200	25	32.	1		0815	100	23.	1		1430	175	0.	1		2045	250	0.
1		0205	26	41.	1		0820	101	20.	1		1435	176	0.	1		2050	251	0.
1		0210	27	49.	1		0825	102	17.	1		1440	177	0.	1		2055	252	0.
1		0215	28	58.	1		0830	103	14.	1		1445	178	0.	1		2100	253	0.
1		0220	29	68.	1		0835	104	12.	1		1450	179	0.	1		2105	254	0.
1		0225	30	78.	1		0840	105	10.	1		1455	180	0.	1		2110	255	0.
1		0230	31	90.	1		0845	106	9.	1		1500	181	0.	1		2115	256	0.
1		0235	32	102.	1		0850	107	7.	1		1505	182	0.	1		2120	257	0.
1		0240	33	118.	1		0855	108	6.	1		1510	183	0.	1		2125	258	0.
1		0245	34	136.	1		0900	109	5.	1		1515	184	0.	1		2130	259	0.
1		0250	35	154.	1		0905	110	4.	1		1520	185	0.	1		2135	260	0.
1		0255	36	172.	1		0910	111	3.	1		1525	186	0.	1		2140	261	0.
1		0300	37	188.	1		0915	112	2.	1		1530	187	0.	1		2145	262	0.
1		0305	38	207.	1		0920	113	2.	1		1535	188	0.	1		2150	263	0.
1		0310	39	232.	1		0925	114	1.	1		1540	189	0.	1		2155	264	0.
1		0315	40	267.	1		0930	115	1.	1		1545	190	0.	1		2200	265	0.
1		0320	41	327.	1		0935	116	1.	1		1550	191	0.	1		2205	266	0.
1		0325	42	425.	1		0940	117	1.	1		1555	192	0.	1		2210	267	0.
1		0330	43	583.	1		0945	118	1.	1		1600	193	0.	1		2215	268	0.
1		0335	44	804.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	1086.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	1429.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	1818.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	2226.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	2613.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	2940.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	3186.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	3346.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	3419.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	3421.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	3353.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	3237.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	3085.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	2903.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	2716.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	2541.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	2394.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	2272.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	2166.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	2073.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	1982.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	1886.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	1784.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	1674.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	1556.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	1437.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	1313.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	1189.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	1070.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.

1	0605	74	958.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	854.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
3421.	4.42		1083.	272.	262.	262.
		(INCHES)	1.821	1.828	1.828	1.828
		(AC-FT)	537.	539.	539.	539.

CUMULATIVE AREA = 5.53 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .90

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		0615	76	580.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	516.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	458.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	407.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	360.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	319.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	281.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	246.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	216.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	188.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	164.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	142.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	123.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	107.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	92.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	79.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	68.	1		1350	167	0.	1		2005	242	0.
1		0125	18	0.	1		0740	93	59.	1		1355	168	0.	1		2010	243	0.
1		0130	19	0.	1		0745	94	50.	1		1400	169	0.	1		2015	244	0.
1		0135	20	0.	1		0750	95	42.	1		1405	170	0.	1		2020	245	0.
1		0140	21	1.	1		0755	96	35.	1		1410	171	0.	1		2025	246	0.
1		0145	22	1.	1		0800	97	30.	1		1415	172	0.	1		2030	247	0.
1		0150	23	2.	1		0805	98	25.	1		1420	173	0.	1		2035	248	0.
1		0155	24	4.	1		0810	99	21.	1		1425	174	0.	1		2040	249	0.
1		0200	25	6.	1		0815	100	18.	1		1430	175	0.	1		2045	250	0.
1		0205	26	8.	1		0820	101	15.	1		1435	176	0.	1		2050	251	0.
1		0210	27	11.	1		0825	102	13.	1		1440	177	0.	1		2055	252	0.
1		0215	28	14.	1		0830	103	11.	1		1445	178	0.	1		2100	253	0.
1		0220	29	18.	1		0835	104	10.	1		1450	179	0.	1		2105	254	0.
1		0225	30	24.	1		0840	105	8.	1		1455	180	0.	1		2110	255	0.
1		0230	31	30.	1		0845	106	7.	1		1500	181	0.	1		2115	256	0.
1		0235	32	37.	1		0850	107	6.	1		1505	182	0.	1		2120	257	0.
1		0240	33	46.	1		0855	108	5.	1		1510	183	0.	1		2125	258	0.
1		0245	34	57.	1		0900	109	4.	1		1515	184	0.	1		2130	259	0.
1		0250	35	69.	1		0905	110	3.	1		1520	185	0.	1		2135	260	0.
1		0255	36	80.	1		0910	111	2.	1		1525	186	0.	1		2140	261	0.
1		0300	37	91.	1		0915	112	2.	1		1530	187	0.	1		2145	262	0.
1		0305	38	105.	1		0920	113	1.	1		1535	188	0.	1		2150	263	0.
1		0310	39	121.	1		0925	114	1.	1		1540	189	0.	1		2155	264	0.
1		0315	40	146.	1		0930	115	1.	1		1545	190	0.	1		2200	265	0.
1		0320	41	187.	1		0935	116	1.	1		1550	191	0.	1		2205	266	0.
1		0325	42	256.	1		0940	117	1.	1		1555	192	0.	1		2210	267	0.
1		0330	43	368.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	527.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	730.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	980.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	1266.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	1568.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	1858.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	2105.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	2295.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	2421.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	2484.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	2494.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	2454.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	2377.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	2272.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	2146.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	2014.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	1891.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	1787.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	1701.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	1627.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	1561.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.

1	0520	65	1497.	1	1135	140	0.	1	1750	215	0.	2	0005	290	0.
1	0525	66	1428.	1	1140	141	0.	1	1755	216	0.	2	0010	291	0.
1	0530	67	1353.	1	1145	142	0.	1	1800	217	0.	2	0015	292	0.
1	0535	68	1272.	1	1150	143	0.	1	1805	218	0.	2	0020	293	0.
1	0540	69	1184.	1	1155	144	0.	1	1810	219	0.	2	0025	294	0.
1	0545	70	1095.	1	1200	145	0.	1	1815	220	0.	2	0030	295	0.
1	0550	71	1002.	1	1205	146	0.	1	1820	221	0.	2	0035	296	0.
1	0555	72	908.	1	1210	147	0.	1	1825	222	0.	2	0040	297	0.
1	0600	73	817.	1	1215	148	0.	1	1830	223	0.	2	0045	298	0.
1	0605	74	733.	1	1220	149	0.	1	1835	224	0.	2	0050	299	0.
1	0610	75	653.	1	1225	150	0.	1	1840	225	0.	2	0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
	(CFS)				
2494.	4.42	788.	198.	190.	190.
	(INCHES)	1.325	1.329	1.329	1.329
	(AC-FT)	391.	392.	392.	392.

CUMULATIVE AREA = 5.53 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .79

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		0615	76	472.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	419.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	373.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	331.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	293.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	259.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	229.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	201.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	176.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	154.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	134.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	116.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	101.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	87.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	75.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	65.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	56.	1		1350	167	0.	1		2005	242	0.
1		0125	18	0.	1		0740	93	48.	1		1355	168	0.	1		2010	243	0.
1		0130	19	0.	1		0745	94	41.	1		1400	169	0.	1		2015	244	0.
1		0135	20	0.	1		0750	95	35.	1		1405	170	0.	1		2020	245	0.
1		0140	21	0.	1		0755	96	29.	1		1410	171	0.	1		2025	246	0.
1		0145	22	0.	1		0800	97	24.	1		1415	172	0.	1		2030	247	0.
1		0150	23	0.	1		0805	98	20.	1		1420	173	0.	1		2035	248	0.
1		0155	24	0.	1		0810	99	17.	1		1425	174	0.	1		2040	249	0.
1		0200	25	0.	1		0815	100	15.	1		1430	175	0.	1		2045	250	0.
1		0205	26	1.	1		0820	101	12.	1		1435	176	0.	1		2050	251	0.
1		0210	27	1.	1		0825	102	11.	1		1440	177	0.	1		2055	252	0.
1		0215	28	2.	1		0830	103	9.	1		1445	178	0.	1		2100	253	0.
1		0220	29	3.	1		0835	104	8.	1		1450	179	0.	1		2105	254	0.
1		0225	30	6.	1		0840	105	7.	1		1455	180	0.	1		2110	255	0.
1		0230	31	9.	1		0845	106	6.	1		1500	181	0.	1		2115	256	0.
1		0235	32	12.	1		0850	107	5.	1		1505	182	0.	1		2120	257	0.
1		0240	33	17.	1		0855	108	4.	1		1510	183	0.	1		2125	258	0.
1		0245	34	23.	1		0900	109	3.	1		1515	184	0.	1		2130	259	0.
1		0250	35	30.	1		0905	110	2.	1		1520	185	0.	1		2135	260	0.
1		0255	36	37.	1		0910	111	2.	1		1525	186	0.	1		2140	261	0.
1		0300	37	45.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.
1		0305	38	54.	1		0920	113	1.	1		1535	188	0.	1		2150	263	0.
1		0310	39	65.	1		0925	114	1.	1		1540	189	0.	1		2155	264	0.
1		0315	40	83.	1		0930	115	1.	1		1545	190	0.	1		2200	265	0.
1		0320	41	113.	1		0935	116	1.	1		1550	191	0.	1		2205	266	0.
1		0325	42	164.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	250.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	371.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	529.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	723.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	947.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	1184.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	1415.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	1614.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	1769.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	1874.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	1930.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	1944.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	1918.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.

1	0435	56	1864.		1	1050	131	0.		1	1705	206	0.		1	2320	281	0.
1	0440	57	1787.		1	1055	132	0.		1	1710	207	0.		1	2325	282	0.
1	0445	58	1693.		1	1100	133	0.		1	1715	208	0.		1	2330	283	0.
1	0450	59	1593.		1	1105	134	0.		1	1720	209	0.		1	2335	284	0.
1	0455	60	1500.		1	1110	135	0.		1	1725	210	0.		1	2340	285	0.
1	0500	61	1422.		1	1115	136	0.		1	1730	211	0.		1	2345	286	0.
1	0505	62	1357.		1	1120	137	0.		1	1735	212	0.		1	2350	287	0.
1	0510	63	1301.		1	1125	138	0.		1	1740	213	0.		1	2355	288	0.
1	0515	64	1252.		1	1130	139	0.		1	1745	214	0.		2	0000	289	0.
1	0520	65	1203.		1	1135	140	0.		1	1750	215	0.		2	0005	290	0.
1	0525	66	1150.		1	1140	141	0.		1	1755	216	0.		2	0010	291	0.
1	0530	67	1091.		1	1145	142	0.		1	1800	217	0.		2	0015	292	0.
1	0535	68	1027.		1	1150	143	0.		1	1805	218	0.		2	0020	293	0.
1	0540	69	958.		1	1155	144	0.		1	1810	219	0.		2	0025	294	0.
1	0545	70	887.		1	1200	145	0.		1	1815	220	0.		2	0030	295	0.
1	0550	71	812.		1	1205	146	0.		1	1820	221	0.		2	0035	296	0.
1	0555	72	736.		1	1210	147	0.		1	1825	222	0.		2	0040	297	0.
1	0600	73	663.		1	1215	148	0.		1	1830	223	0.		2	0045	298	0.
1	0605	74	595.		1	1220	149	0.		1	1835	224	0.		2	0050	299	0.
1	0610	75	531.		1	1225	150	0.		1	1840	225	0.		2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
	(CFS)				
1944.	4.42	616.	154.	148.	148.
	(INCHES)	1.035	1.037	1.037	1.037
	(AC-FT)	305.	306.	306.	306.

CUMULATIVE AREA = 5.53 SQ MI

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HYDROGRAPH AT STATION C4C
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .67

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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		0615	76	361.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	321.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	286.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	254.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	225.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	199.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	176.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	154.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	135.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	118.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	103.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	89.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	77.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	67.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	58.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	50.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	43.	1		1350	167	0.	1		2005	242	0.
1		0125	18	0.	1		0740	93	37.	1		1355	168	0.	1		2010	243	0.
1		0130	19	0.	1		0745	94	31.	1		1400	169	0.	1		2015	244	0.
1		0135	20	0.	1		0750	95	27.	1		1405	170	0.	1		2020	245	0.
1		0140	21	0.	1		0755	96	22.	1		1410	171	0.	1		2025	246	0.
1		0145	22	0.	1		0800	97	19.	1		1415	172	0.	1		2030	247	0.
1		0150	23	0.	1		0805	98	16.	1		1420	173	0.	1		2035	248	0.
1		0155	24	0.	1		0810	99	13.	1		1425	174	0.	1		2040	249	0.
1		0200	25	0.	1		0815	100	11.	1		1430	175	0.	1		2045	250	0.
1		0205	26	0.	1		0820	101	10.	1		1435	176	0.	1		2050	251	0.
1		0210	27	0.	1		0825	102	8.	1		1440	177	0.	1		2055	252	0.
1		0215	28	0.	1		0830	103	7.	1		1445	178	0.	1		2100	253	0.
1		0220	29	0.	1		0835	104	6.	1		1450	179	0.	1		2105	254	0.
1		0225	30	0.	1		0840	105	5.	1		1455	180	0.	1		2110	255	0.
1		0230	31	1.	1		0845	106	4.	1		1500	181	0.	1		2115	256	0.
1		0235	32	1.	1		0850	107	4.	1		1505	182	0.	1		2120	257	0.
1		0240	33	3.	1		0855	108	3.	1		1510	183	0.	1		2125	258	0.
1		0245	34	4.	1		0900	109	2.	1		1515	184	0.	1		2130	259	0.
1		0250	35	6.	1		0905	110	2.	1		1520	185	0.	1		2135	260	0.
1		0255	36	9.	1		0910	111	1.	1		1525	186	0.	1		2140	261	0.
1		0300	37	12.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.
1		0305	38	16.	1		0920	113	1.	1		1535	188	0.	1		2150	263	0.
1		0310	39	22.	1		0925	114	1.	1		1540	189	0.	1		2155	264	0.
1		0315	40	32.	1		0930	115	1.	1		1545	190	0.	1		2200	265	0.
1		0320	41	51.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	85.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	143.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	228.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	339.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	478.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.

1	0350	47	640.		1	1005	122	0.		1	1620	197	0.		1	2235	272	0.	
1	0355	48	814.		1	1010	123	0.		1	1625	198	0.		1	2240	273	0.	
1	0400	49	985.		1	1015	124	0.		1	1630	199	0.		1	2245	274	0.	
1	0405	50	1135.		1	1020	125	0.		1	1635	200	0.		1	2250	275	0.	
1	0410	51	1253.		1	1025	126	0.		1	1640	201	0.		1	2255	276	0.	
1	0415	52	1336.		1	1030	127	0.		1	1645	202	0.		1	2300	277	0.	
1	0420	53	1384.		1	1035	128	0.		1	1650	203	0.		1	2305	278	0.	
1	0425	54	1401.		1	1040	129	0.		1	1655	204	0.		1	2310	279	0.	
1	0430	55	1388.		1	1045	130	0.		1	1700	205	0.		1	2315	280	0.	
1	0435	56	1355.		1	1050	131	0.		1	1705	206	0.		1	2320	281	0.	
1	0440	57	1305.		1	1055	132	0.		1	1710	207	0.		1	2325	282	0.	
1	0445	58	1241.		1	1100	133	0.		1	1715	208	0.		1	2330	283	0.	
1	0450	59	1174.		1	1105	134	0.		1	1720	209	0.		1	2335	284	0.	
1	0455	60	1110.		1	1110	135	0.		1	1725	210	0.		1	2340	285	0.	
1	0500	61	1056.		1	1115	136	0.		1	1730	211	0.		1	2345	286	0.	
1	0505	62	1012.		1	1120	137	0.		1	1735	212	0.		1	2350	287	0.	
1	0510	63	974.		1	1125	138	0.		1	1740	213	0.		1	2355	288	0.	
1	0515	64	940.		1	1130	139	0.		1	1745	214	0.		2	0000	289	0.	
1	0520	65	906.		1	1135	140	0.		1	1750	215	0.		2	0005	290	0.	
1	0525	66	869.		1	1140	141	0.		1	1755	216	0.		2	0010	291	0.	
1	0530	67	827.		1	1145	142	0.		1	1800	217	0.		2	0015	292	0.	
1	0535	68	780.		1	1150	143	0.		1	1805	218	0.		2	0020	293	0.	
1	0540	69	728.		1	1155	144	0.		1	1810	219	0.		2	0025	294	0.	
1	0545	70	675.		1	1200	145	0.		1	1815	220	0.		2	0030	295	0.	
1	0550	71	619.		1	1205	146	0.		1	1820	221	0.		2	0035	296	0.	
1	0555	72	562.		1	1210	147	0.		1	1825	222	0.		2	0040	297	0.	
1	0600	73	507.		1	1215	148	0.		1	1830	223	0.		2	0045	298	0.	
1	0605	74	455.		1	1220	149	0.		1	1835	224	0.		2	0050	299	0.	
1	0610	75	406.		1	1225	150	0.		1	1840	225	0.		2	0055	300	0.	

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
1401.	4.42	447.	112.	108.	108.
		(INCHES) .752	.752	.752	.752
		(AC-FT) 222.	222.	222.	222.

CUMULATIVE AREA = 5.53 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .52

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		0615	76	230.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	204.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	182.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	162.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	144.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	127.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	112.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	99.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	86.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	75.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	66.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	57.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	49.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	43.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	37.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	32.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	28.	1		1350	167	0.	1		2005	242	0.
1		0125	18	0.	1		0740	93	24.	1		1355	168	0.	1		2010	243	0.
1		0130	19	0.	1		0745	94	20.	1		1400	169	0.	1		2015	244	0.
1		0135	20	0.	1		0750	95	17.	1		1405	170	0.	1		2020	245	0.
1		0140	21	0.	1		0755	96	15.	1		1410	171	0.	1		2025	246	0.
1		0145	22	0.	1		0800	97	12.	1		1415	172	0.	1		2030	247	0.
1		0150	23	0.	1		0805	98	10.	1		1420	173	0.	1		2035	248	0.
1		0155	24	0.	1		0810	99	9.	1		1425	174	0.	1		2040	249	0.
1		0200	25	0.	1		0815	100	7.	1		1430	175	0.	1		2045	250	0.
1		0205	26	0.	1		0820	101	6.	1		1435	176	0.	1		2050	251	0.
1		0210	27	0.	1		0825	102	5.	1		1440	177	0.	1		2055	252	0.
1		0215	28	0.	1		0830	103	5.	1		1445	178	0.	1		2100	253	0.
1		0220	29	0.	1		0835	104	4.	1		1450	179	0.	1		2105	254	0.
1		0225	30	0.	1		0840	105	3.	1		1455	180	0.	1		2110	255	0.
1		0230	31	0.	1		0845	106	3.	1		1500	181	0.	1		2115	256	0.
1		0235	32	0.	1		0850	107	2.	1		1505	182	0.	1		2120	257	0.
1		0240	33	0.	1		0855	108	2.	1		1510	183	0.	1		2125	258	0.
1		0245	34	0.	1		0900	109	2.	1		1515	184	0.	1		2130	259	0.
1		0250	35	0.	1		0905	110	1.	1		1520	185	0.	1		2135	260	0.
1		0255	36	0.	1		0910	111	1.	1		1525	186	0.	1		2140	261	0.
1		0300	37	0.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.

1	0305	38	0.		1	0920	113	1.		1	1535	188	0.		1	2150	263	0.
1	0310	39	1.		1	0925	114	0.		1	1540	189	0.		1	2155	264	0.
1	0315	40	3.		1	0930	115	0.		1	1545	190	0.		1	2200	265	0.
1	0320	41	9.		1	0935	116	0.		1	1550	191	0.		1	2205	266	0.
1	0325	42	23.		1	0940	117	0.		1	1555	192	0.		1	2210	267	0.
1	0330	43	50.		1	0945	118	0.		1	1600	193	0.		1	2215	268	0.
1	0335	44	93.		1	0950	119	0.		1	1605	194	0.		1	2220	269	0.
1	0340	45	150.		1	0955	120	0.		1	1610	195	0.		1	2225	270	0.
1	0345	46	224.		1	1000	121	0.		1	1615	196	0.		1	2230	271	0.
1	0350	47	314.		1	1005	122	0.		1	1620	197	0.		1	2235	272	0.
1	0355	48	413.		1	1010	123	0.		1	1625	198	0.		1	2240	273	0.
1	0400	49	513.		1	1015	124	0.		1	1630	199	0.		1	2245	274	0.
1	0405	50	604.		1	1020	125	0.		1	1635	200	0.		1	2250	275	0.
1	0410	51	679.		1	1025	126	0.		1	1640	201	0.		1	2255	276	0.
1	0415	52	734.		1	1030	127	0.		1	1645	202	0.		1	2300	277	0.
1	0420	53	769.		1	1035	128	0.		1	1650	203	0.		1	2305	278	0.
1	0425	54	786.		1	1040	129	0.		1	1655	204	0.		1	2310	279	0.
1	0430	55	787.		1	1045	130	0.		1	1700	205	0.		1	2315	280	0.
1	0435	56	775.		1	1050	131	0.		1	1705	206	0.		1	2320	281	0.
1	0440	57	754.		1	1055	132	0.		1	1710	207	0.		1	2325	282	0.
1	0445	58	724.		1	1100	133	0.		1	1715	208	0.		1	2330	283	0.
1	0450	59	691.		1	1105	134	0.		1	1720	209	0.		1	2335	284	0.
1	0455	60	659.		1	1110	135	0.		1	1725	210	0.		1	2340	285	0.
1	0500	61	632.		1	1115	136	0.		1	1730	211	0.		1	2345	286	0.
1	0505	62	611.		1	1120	137	0.		1	1735	212	0.		1	2350	287	0.
1	0510	63	592.		1	1125	138	0.		1	1740	213	0.		1	2355	288	0.
1	0515	64	576.		1	1130	139	0.		1	1745	214	0.		2	0000	289	0.
1	0520	65	559.		1	1135	140	0.		1	1750	215	0.		2	0005	290	0.
1	0525	66	539.		1	1140	141	0.		1	1755	216	0.		2	0010	291	0.
1	0530	67	515.		1	1145	142	0.		1	1800	217	0.		2	0015	292	0.
1	0535	68	488.		1	1150	143	0.		1	1805	218	0.		2	0020	293	0.
1	0540	69	457.		1	1155	144	0.		1	1810	219	0.		2	0025	294	0.
1	0545	70	425.		1	1200	145	0.		1	1815	220	0.		2	0030	295	0.
1	0550	71	391.		1	1205	146	0.		1	1820	221	0.		2	0035	296	0.
1	0555	72	355.		1	1210	147	0.		1	1825	222	0.		2	0040	297	0.
1	0600	73	321.		1	1215	148	0.		1	1830	223	0.		2	0045	298	0.
1	0605	74	289.		1	1220	149	0.		1	1835	224	0.		2	0050	299	0.
1	0610	75	258.		1	1225	150	0.		1	1840	225	0.		2	0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)	(CFS)			
787.	4.50	259.	65.	62.	62.
		(INCHES) .435	.435	.435	.435
		(AC-FT) 128.	128.	128.	128.

CUMULATIVE AREA = 5.53 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .40

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		0615	76	134.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	120.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	107.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	95.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	84.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	75.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	66.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	58.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	51.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	44.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	39.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	34.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	29.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	25.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	22.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	19.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	16.	1		1350	167	0.	1		2005	242	0.
1		0125	18	0.	1		0740	93	14.	1		1355	168	0.	1		2010	243	0.
1		0130	19	0.	1		0745	94	12.	1		1400	169	0.	1		2015	244	0.
1		0135	20	0.	1		0750	95	10.	1		1405	170	0.	1		2020	245	0.
1		0140	21	0.	1		0755	96	9.	1		1410	171	0.	1		2025	246	0.
1		0145	22	0.	1		0800	97	7.	1		1415	172	0.	1		2030	247	0.
1		0150	23	0.	1		0805	98	6.	1		1420	173	0.	1		2035	248	0.
1		0155	24	0.	1		0810	99	5.	1		1425	174	0.	1		2040	249	0.
1		0200	25	0.	1		0815	100	5.	1		1430	175	0.	1		2045	250	0.
1		0205	26	0.	1		0820	101	4.	1		1435	176	0.	1		2050	251	0.
1		0210	27	0.	1		0825	102	3.	1		1440	177	0.	1		2055	252	0.
1		0215	28	0.	1		0830	103	3.	1		1445	178	0.	1		2100	253	0.

1	0220	29	0.	*	1	0835	104	2.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	2.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	0.	•	1	0845	106	2.	*	1	1500	181	0.	•	1	2115	256	0.
1	0235	32	0.	•	1	0850	107	1.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	0.	•	1	0855	108	1.	*	1	1510	183	0.	•	1	2125	258	0.
1	0245	34	0.	•	1	0900	109	1.	*	1	1515	184	0.	•	1	2130	259	0.
1	0250	35	0.	•	1	0905	110	1.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	0.	•	1	0910	111	1.	*	1	1525	186	0.	•	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	0.	*	1	1530	187	0.	•	1	2145	262	0.
1	0305	38	0.	•	1	0920	113	0.	*	1	1535	188	0.	•	1	2150	263	0.
1	0310	39	0.	•	1	0925	114	0.	*	1	1540	189	0.	•	1	2155	264	0.
1	0315	40	0.	•	1	0930	115	0.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	1.	•	1	0935	116	0.	*	1	1550	191	0.	•	1	2205	266	0.
1	0325	42	5.	*	1	0940	117	0.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	15.	•	1	0945	118	0.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	31.	*	1	0950	119	0.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	54.	•	1	0955	120	0.	*	1	1610	195	0.	•	1	2225	270	0.
1	0345	46	86.	•	1	1000	121	0.	*	1	1615	196	0.	•	1	2230	271	0.
1	0350	47	126.	•	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	173.	*	1	1010	123	0.	*	1	1625	198	0.	•	1	2240	273	0.
1	0400	49	223.	•	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	270.	*	1	1020	125	0.	*	1	1635	200	0.	•	1	2250	275	0.
1	0410	51	311.	•	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	343.	•	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	365.	•	1	1035	128	0.	*	1	1650	203	0.	•	1	2305	278	0.
1	0425	54	379.	•	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	385.	•	1	1045	130	0.	*	1	1700	205	0.	•	1	2315	280	0.
1	0435	56	385.	*	1	1050	131	0.	*	1	1705	206	0.	•	1	2320	281	0.
1	0440	57	380.	•	1	1055	132	0.	*	1	1710	207	0.	•	1	2325	282	0.
1	0445	58	371.	•	1	1100	133	0.	*	1	1715	208	0.	•	1	2330	283	0.
1	0450	59	359.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	347.	•	1	1110	135	0.	*	1	1725	210	0.	•	1	2340	285	0.
1	0500	61	338.	•	1	1115	136	0.	*	1	1730	211	0.	•	1	2345	286	0.
1	0505	62	331.	•	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	324.	•	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	319.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	312.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	303.	•	1	1140	141	0.	*	1	1755	216	0.	•	2	0010	291	0.
1	0530	67	292.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	278.	*	1	1150	143	0.	*	1	1805	218	0.	•	2	0020	293	0.
1	0540	69	262.	*	1	1155	144	0.	*	1	1810	219	0.	•	2	0025	294	0.
1	0545	70	245.	•	1	1200	145	0.	*	1	1815	220	0.	•	2	0030	295	0.
1	0550	71	226.	•	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	206.	•	1	1210	147	0.	*	1	1825	222	0.	•	2	0040	297	0.
1	0600	73	187.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	168.	•	1	1220	149	0.	*	1	1835	224	0.	•	2	0050	299	0.
1	0610	75	150.	•	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				•					*					•				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 385.	4.50		134.	34.	32.	32.
		(INCHES)	.225	.225	.225	.225
		(AC-FT)	66.	67.	67.	67.

CUMULATIVE AREA = 5.53 SQ MI

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

ERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.90	RATIO 2 1.45	RATIO 3 1.09	RATIO 4 .90	RATIO 5 .79	RATIO 6 .67	RATIO 7 .52	RATIO 8 .40
HYDROGRAPH AT												
+	C4CB	2.97	1	FLOW	4188.	2863.	1837.	1340.	1044.	752.	423.	207.
				TIME	4.33	4.33	4.42	4.42	4.42	4.42	4.50	4.50
HYDROGRAPH AT												
+	C4CA	2.56	1	FLOW	3610.	2468.	1583.	1155.	900.	648.	364.	178.
				TIME	4.33	4.33	4.42	4.42	4.42	4.42	4.50	4.50
2 COMBINED AT												
+	C4C	5.53	1	FLOW	7798.	5330.	3421.	2494.	1944.	1401.	787.	385.
				TIME	4.33	4.33	4.42	4.42	4.42	4.42	4.50	4.50
ROUTED TO												
+	RC4C	5.53	1	FLOW	7771.	5315.	3420.	2490.	1938.	1394.	787.	385.
				TIME	4.33	4.42	4.42	4.42	4.42	4.50	4.50	4.58
HYDROGRAPH AT												
+	C3B3B	.56	1	FLOW	1282.	890.	583.	430.	340.	251.	148.	76.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	C3B3B	6.09	1	FLOW	8365.	5726.	3679.	2676.	2085.	1504.	848.	418.
				TIME	4.33	4.33	4.33	4.33	4.42	4.42	4.50	4.58
ROUTED TO												
+	R3B3B	6.09	1	FLOW	8355.	5710.	3667.	2674.	2083.	1498.	846.	417.
				TIME	4.33	4.33	4.42	4.42	4.42	4.50	4.50	4.67
ROUTED TO												
+	R3B3B	6.09	1	FLOW	8329.	5704.	3660.	2668.	2080.	1497.	845.	417.
				TIME	4.42	4.42	4.42	4.50	4.50	4.58	4.67	4.83

*** NORMAL END OF HEC-1 ***

SECTION 3

DESIGN HEC-1 MODEL OUTPUT

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990               *
*           VERSION 4.0                 *
*                                       *
*  RUN DATE  02/16/1998  TIME  13:44:26 *
*                                       *
*****************************************
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*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*        (916) 756-1104                 *
*                                       *
*****************************************
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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

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
              1     ID    INPUT FILE = ALT3A.DAT
              2     ID    RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
              3     ID    100-YEAR 6-HR STORM (SDN#3)
              4     ID    VTN NEVADA, July 1997
              5     ID
              6     ID    WATERSHED MODEL TAKEN FROM COE HYDROLOGY
              7     ID    KINEMATIC SUBBASINS CONVERTED TO SCS
              8     ID    CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
              9     ID    SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT
             10     ID
*** FREE ***
             11     IT       5       0       0     300
             12     IN       5       0       0
             13     IO       5
                    * ******* USING 100 YEAR JR CARD  *******
                    *  JR    PREC 0.905
             14     JR    PREC   0.905    1.45
                    *  100-YEAR DARF=0.905, 1000-YEAR DARF=1.45
                    *  JR PREC 0.40 0.52 0.67 0.79 0.905
                    *  JR PREC 0.98 0.97 0.93 0.905
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)
                    *
             15     KK    C4CA WEST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
             16     KM   RUNOFF FOR THE WEST SEDIMENT TRAP DESIGN
             17     BA    4.59
             18     PB    3.43
             19     PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
             20     PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
             21     PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
             22     PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
             23     PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
             24     PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
             25     PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
             26     PC    .998    .999   1.00
             27     LS   0.00    80.0
             28     UD  0.8929

             29     KK    C4CBMIDDLE TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
             30     KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
             31     BA    0.38
             32     PB    3.43
             33     LS    0.00    80.0
             34     UD    0.66
                    *
             35     KK    C4CCEAST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
             36     KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
             37     BA    0.35
             38     PB    3.43
             39     LS    0.00    80.0
             40     UD    0.49
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  41      KK     C4C
  42      KM   COMBINE FLOW BEFORE DETENTION BASIN
  43      HC       3
  44      KO       1
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  45      KK DET_C4CEast Detention Basin
          *
  46      KM   1000-YR DESIGN EVENT STORAGE AND PMF SPILLWAY, MPU LEVEE
          *
  47      KM   Proposed detention basin d/s of subbasin C4C; storage capacity = 845.ac-ft;
  48      KM   assume a 48" diameter low-level outlet pipe;invert elevation 2446.0 ft
  49      RS       1    STOR      -1
  50      SV     0.0     1.85   10.35   24.60   45.03   70.78  104.85  148.32  204.08  271.64
  51      SV  362.21   482.58  551.62  625.31  704.75  789.13  879.88  975.68  1183.9  1414.3
  52      SE  2446.0   2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  53      SE  2486.0   2490.0  2492.0  2494.0  2496.0  2498.0  2500.0  2502.2  2506.0  2510.0
  54      SQ     0.0    24.59   37.30   46.66   54.44   61.24   67.35   72.96   78.16   83.04
  55      SQ   87.65    92.02   94.14   96.20   98.22  100.21  102.15  104.06  107.77  111.36
  56      SE  2446.0   2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  57      SE  2486.0   2490.0  2492.0  2494.0  2496.0  2498.0  2500.0  2502.2  2506.0  2510.0
  58      KO       1
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  59      KK    RC4C
  60      KM   ROUTE DET_C4C outflow THRU C3B3
  61      KM   With 7-7' drop structures
  62      RK    3200   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  63      KK    C4CD TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
  64      KM   RUNOFF FROM C4CD
  65      BA    0.17
  66      PB    3.34
  67      LS    0.00      82
  68      UD    0.20

  69      KK     C4C
  70      KM   COMBINE DETENTION BASIN OUTFALL AND SUBBASIN C4CD
  71      HC       2

  72      KK   C3B3B  DISTRICT C AREA 3 SUBBASIN B3B
  73      KM   RUNOFF FROM C3B3B
  74      BA    0.56
  75      PB    3.36
  76      LS    0.00      82
  77      UD    0.42

  78      KK   C3B3B
  79      KM   Combine RC4C & C3B3
  80      HC       2
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)
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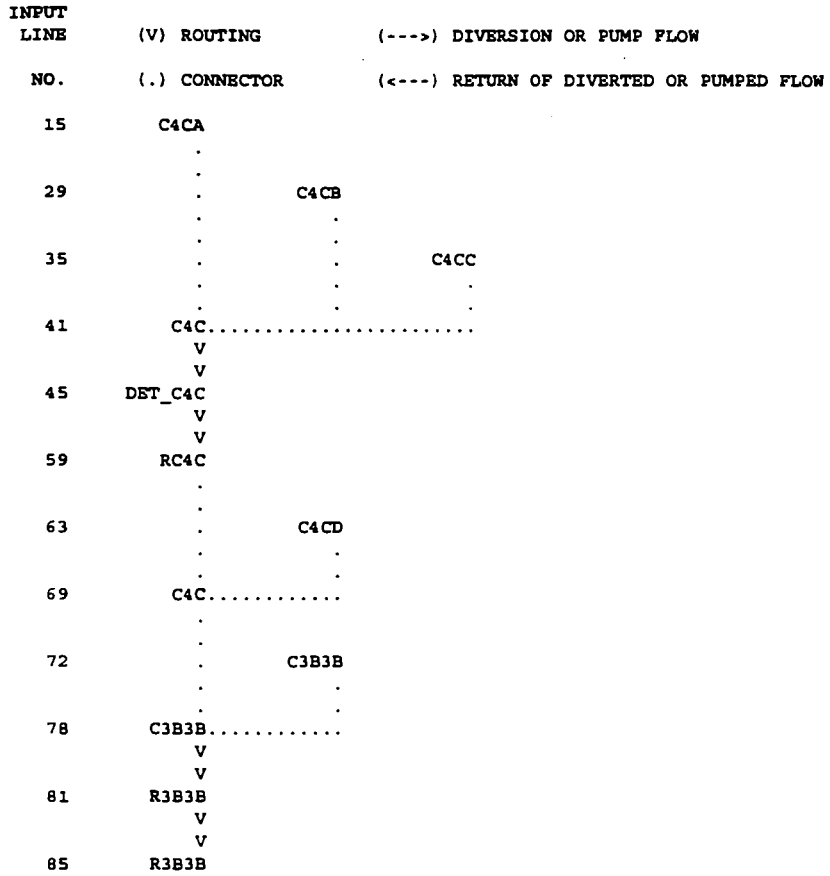
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  81      KK   R3B3B
  82      KM   ROUTE 3B3B
  83      KM   With 7-7' drop structures
  84      RK    3800   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  85      KK   R3B3B
  86      KM   ROUTE R3B3B THRU C3B1
  87      RK    8250   0.015   0.030       0    TRAP      50     3.0
          *
  88      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



'***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*          SEPTEMBER 1990                    *
*           VERSION 4.0                      *
*                                            *
*  RUN DATE  02/16/1998  TIME  13:44:26      *
*                                            *
**********************************************
```

```
**********************************************
*                                            *
*    U.S. ARMY CORPS OF ENGINEERS            *
*    HYDROLOGIC ENGINEERING CENTER           *
*          609 SECOND STREET                 *
*        DAVIS, CALIFORNIA 95616             *
*           (916) 756-1104                   *
*                                            *
**********************************************
```

INPUT FILE = ALT3A.DAT
RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
100-YEAR 6-HR STORM (SDN#3)
VTN NEVADA, July 1997

WATERSHED MODEL TAKEN FROM COE HYDROLOGY
KINEMATIC SUBBASINS CONVERTED TO SCS
CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT

```
13 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          300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      2     0  ENDING DATE
                  NDTIME         0055  ENDING TIME
                  ICENT            19  CENTURY MARK

                COMPUTATION INTERVAL      .08 HOURS
                    TOTAL TIME BASE   24.92 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
                   .90      1.45
```

*** ***

```
          **************
          *            *
41 KK     *      C4C   *
          *            *
          **************

44 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

43 HC          HYDROGRAPH COMBINATION
                    ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
```

***

****

HYDROGRAPH AT STATION C4C
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .90

****

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		0615	76	515.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	457.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	405.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	358.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	316.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	279.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	245.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	214.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	187.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	162.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	141.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	122.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	106.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	91.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	79.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	68.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	58.	1		1350	167	0.	1		2005	242	0.
1		0125	18	0.	1		0740	93	50.	1		1355	168	0.	1		2010	243	0.
1		0130	19	0.	1		0745	94	42.	1		1400	169	0.	1		2015	244	0.
1		0135	20	0.	1		0750	95	36.	1		1405	170	0.	1		2020	245	0.
1		0140	21	1.	1		0755	96	30.	1		1410	171	0.	1		2025	246	0.
1		0145	22	2.	1		0800	97	25.	1		1415	172	0.	1		2030	247	0.
1		0150	23	3.	1		0805	98	21.	1		1420	173	0.	1		2035	248	0.
1		0155	24	5.	1		0810	99	18.	1		1425	174	0.	1		2040	249	0.
1		0200	25	7.	1		0815	100	15.	1		1430	175	0.	1		2045	250	0.
1		0205	26	9.	1		0820	101	13.	1		1435	176	0.	1		2050	251	0.
1		0210	27	12.	1		0825	102	11.	1		1440	177	0.	1		2055	252	0.
1		0215	28	16.	1		0830	103	9.	1		1445	178	0.	1		2100	253	0.
1		0220	29	20.	1		0835	104	8.	1		1450	179	0.	1		2105	254	0.
1		0225	30	26.	1		0840	105	7.	1		1455	180	0.	1		2110	255	0.
1		0230	31	33.	1		0845	106	6.	1		1500	181	0.	1		2115	256	0.
1		0235	32	41.	1		0850	107	5.	1		1505	182	0.	1		2120	257	0.
1		0240	33	51.	1		0855	108	4.	1		1510	183	0.	1		2125	258	0.
1		0245	34	62.	1		0900	109	3.	1		1515	184	0.	1		2130	259	0.
1		0250	35	74.	1		0905	110	2.	1		1520	185	0.	1		2135	260	0.
1		0255	36	85.	1		0910	111	2.	1		1525	186	0.	1		2140	261	0.
1		0300	37	96.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.
1		0305	38	108.	1		0920	113	1.	1		1535	188	0.	1		2150	263	0.
1		0310	39	126.	1		0925	114	1.	1		1540	189	0.	1		2155	264	0.
1		0315	40	152.	1		0930	115	1.	1		1545	190	0.	1		2200	265	0.
1		0320	41	201.	1		0935	116	1.	1		1550	191	0.	1		2205	266	0.
1		0325	42	285.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	421.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	613.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	852.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	1131.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	1427.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	1716.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	1974.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	2176.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	2313.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	2387.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	2404.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	2375.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	2307.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	2215.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	2108.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	1989.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	1872.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	1766.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	1675.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	1600.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	1531.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	1467.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	1400.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	1328.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	1249.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	1166.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	1078.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	991.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	901.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	813.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	730.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	653.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	581.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
2404.	4.33		758.	190.	183.	183.
		(INCHES)	1.325	1.329	1.329	1.329
		(AC-FT)	376.	377.	377.	377.

CUMULATIVE AREA = 5.32 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 1.45

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		0615	76	984.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	871.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	772.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	682.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	602.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	530.	1		1255	156	0.	1		1910	231	0.
1		0030	7	1.	1		0645	82	465.	1		1300	157	0.	1		1915	232	0.
1		0035	8	2.	1		0650	83	406.	1		1305	158	0.	1		1920	233	0.
1		0040	9	4.	1		0655	84	354.	1		1310	159	0.	1		1925	234	0.
1		0045	10	7.	1		0700	85	308.	1		1315	160	0.	1		1930	235	0.
1		0050	11	10.	1		0705	86	268.	1		1320	161	0.	1		1935	236	0.
1		0055	12	14.	1		0710	87	231.	1		1325	162	0.	1		1940	237	0.
1		0100	13	17.	1		0715	88	200.	1		1330	163	0.	1		1945	238	0.
1		0105	14	20.	1		0720	89	173.	1		1335	164	0.	1		1950	239	0.
1		0110	15	22.	1		0725	90	149.	1		1340	165	0.	1		1955	240	0.
1		0115	16	25.	1		0730	91	128.	1		1345	166	0.	1		2000	241	0.
1		0120	17	27.	1		0735	92	110.	1		1350	167	0.	1		2005	242	0.
1		0125	18	31.	1		0740	93	94.	1		1355	168	0.	1		2010	243	0.
1		0130	19	38.	1		0745	94	80.	1		1400	169	0.	1		2015	244	0.
1		0135	20	48.	1		0750	95	67.	1		1405	170	0.	1		2020	245	0.
1		0140	21	63.	1		0755	96	56.	1		1410	171	0.	1		2025	246	0.
1		0145	22	81.	1		0800	97	47.	1		1415	172	0.	1		2030	247	0.
1		0150	23	102.	1		0805	98	39.	1		1420	173	0.	1		2035	248	0.
1		0155	24	125.	1		0810	99	33.	1		1425	174	0.	1		2040	249	0.
1		0200	25	147.	1		0815	100	28.	1		1430	175	0.	1		2045	250	0.
1		0205	26	168.	1		0820	101	24.	1		1435	176	0.	1		2050	251	0.
1		0210	27	186.	1		0825	102	20.	1		1440	177	0.	1		2055	252	0.
1		0215	28	203.	1		0830	103	17.	1		1445	178	0.	1		2100	253	0.
1		0220	29	221.	1		0835	104	15.	1		1450	179	0.	1		2105	254	0.
1		0225	30	241.	1		0840	105	13.	1		1455	180	0.	1		2110	255	0.
1		0230	31	263.	1		0845	106	11.	1		1500	181	0.	1		2115	256	0.
1		0235	32	288.	1		0850	107	9.	1		1505	182	0.	1		2120	257	0.
1		0240	33	316.	1		0855	108	7.	1		1510	183	0.	1		2125	258	0.
1		0245	34	347.	1		0900	109	6.	1		1515	184	0.	1		2130	259	0.
1		0250	35	377.	1		0905	110	5.	1		1520	185	0.	1		2135	260	0.
1		0255	36	404.	1		0910	111	4.	1		1525	186	0.	1		2140	261	0.
1		0300	37	428.	1		0915	112	3.	1		1530	187	0.	1		2145	262	0.
1		0305	38	457.	1		0920	113	2.	1		1535	188	0.	1		2150	263	0.
1		0310	39	497.	1		0925	114	2.	1		1540	189	0.	1		2155	264	0.
1		0315	40	561.	1		0930	115	1.	1		1545	190	0.	1		2200	265	0.
1		0320	41	676.	1		0935	116	1.	1		1550	191	0.	1		2205	266	0.
1		0325	42	868.	1		0940	117	1.	1		1555	192	0.	1		2210	267	0.
1		0330	43	1174.	1		0945	118	1.	1		1600	193	0.	1		2215	268	0.
1		0335	44	1591.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	2103.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	2689.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	3301.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	3885.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	4393.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	4775.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	5021.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	5133.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	5127.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	5029.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	4851.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	4624.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	4369.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	4092.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	3822.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	3577.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	3370.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	3196.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	3039.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	2893.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	2747.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	2593.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	2430.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	2259.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	2082.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	1909.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	1733.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	1561.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	1399.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	1249.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.

```
  1     0610   75     1111.  •    1     1225  150        0.  •    1     1840  225        0.  •    2     0055  300        0.
                                •                             •                             •
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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	24.92-HR	
(CFS)	(HR)					
		(CFS)				
+ 5133.	4.25	1631.	411.	395.	395.	
		(INCHES)	2.850	2.870	2.870	2.870
		(AC-FT)	809.	814.	814.	814.

CUMULATIVE AREA = 5.32 SQ MI

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          **************
          •            *
45 KK     •   DET_C4C  •     East Detention Basin
          •            •
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58 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

49 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

50 SV	STORAGE	.0	1.9	10.4	24.6	45.0	70.8	104.8	148.3	204.1	271.6
		362.2	482.6	551.6	625.3	704.8	789.1	879.9	975.7	1183.9	1414.3
52 SE	ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
		2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.20	2506.00	2510.00
54 SQ	DISCHARGE	0.	25.	37.	47.	54.	61.	67.	73.	78.	83.
		88.	92.	94.	96.	98.	100.	102.	104.	108.	111.
56 SE	ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
		2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.20	2506.00	2510.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.85	10.35	24.60	45.03	70.78	104.85	148.32	204.08	271.64
OUTFLOW	.00	24.59	37.30	46.66	54.44	61.24	67.35	72.96	78.16	83.04
ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
STORAGE	362.21	482.58	551.62	625.31	704.75	789.13	879.88	975.68	1183.90	1414.30
OUTFLOW	87.65	92.02	94.14	96.20	98.22	100.21	102.15	104.06	107.77	111.36
ELEVATION	2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.20	2506.00	2510.00

HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = .90

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	2446.0	1		0820	101	87.	343.0	2485.2	1		1640	201	84.	284.8	2482.6
1		0005	2	0.	.0	2446.0	1		0825	102	87.	342.5	2485.1	1		1645	202	84.	284.2	2482.6
1		0010	3	0.	.0	2446.0	1		0830	103	87.	342.0	2485.1	1		1650	203	84.	283.7	2482.5
1		0015	4	0.	.0	2446.0	1		0835	104	87.	341.4	2485.1	1		1655	204	84.	283.1	2482.5
1		0020	5	0.	.0	2446.0	1		0840	105	87.	340.9	2485.1	1		1700	205	84.	282.5	2482.5
1		0025	6	0.	.0	2446.0	1		0845	106	87.	340.3	2485.0	1		1705	206	84.	281.9	2482.5
1		0030	7	0.	.0	2446.0	1		0850	107	87.	339.8	2485.0	1		1710	207	84.	281.4	2482.4
1		0035	8	0.	.0	2446.0	1		0855	108	86.	339.2	2485.0	1		1715	208	84.	280.8	2482.4
1		0040	9	0.	.0	2446.0	1		0900	109	86.	338.6	2485.0	1		1720	209	83.	280.2	2482.4
1		0045	10	0.	.0	2446.0	1		0905	110	86.	338.1	2484.9	1		1725	210	83.	279.6	2482.4
1		0050	11	0.	.0	2446.0	1		0910	111	86.	337.5	2484.9	1		1730	211	83.	279.1	2482.3
1		0055	12	0.	.0	2446.0	1		0915	112	86.	336.9	2484.9	1		1735	212	83.	278.5	2482.3
1		0100	13	0.	.0	2446.0	1		0920	113	86.	336.3	2484.9	1		1740	213	83.	277.9	2482.3
1		0105	14	0.	.0	2446.0	1		0925	114	86.	335.7	2484.8	1		1745	214	83.	277.3	2482.3

1	0110	15	0.	.0	2446.0	•	1	0930	115	86.	335.1	2484.8	•	1	1750	215	83.	276.8	2482.2
1	0115	16	0.	.0	2446.0	*	1	0935	116	86.	334.5	2484.8	•	1	1755	216	83.	276.2	2482.2
1	0120	17	0.	.0	2446.0	•	1	0940	117	86.	334.0	2484.8	•	1	1800	217	83.	275.6	2482.2
1	0125	18	0.	.0	2446.0	*	1	0945	118	86.	333.4	2484.7	*	1	1805	218	83.	275.0	2482.2
1	0130	19	0.	.0	2446.0	•	1	0950	119	86.	332.8	2484.7	•	1	1810	219	83.	274.5	2482.1
1	0135	20	0.	.0	2446.0	*	1	0955	120	86.	332.2	2484.7	*	1	1815	220	83.	273.9	2482.1
1	0140	21	0.	.0	2446.0	•	1	1000	121	86.	331.6	2484.6	•	1	1820	221	83.	273.3	2482.1
1	0145	22	0.	.0	2446.0	*	1	1005	122	86.	331.0	2484.6	•	1	1825	222	83.	272.8	2482.0
1	0150	23	0.	.0	2446.1	*	1	1010	123	86.	330.4	2484.6	•	1	1830	223	83.	272.2	2482.0
1	0155	24	1.	.1	2446.1	*	1	1015	124	86.	329.8	2484.6	•	1	1835	224	83.	271.6	2482.0
1	0200	25	1.	.1	2446.2	•	1	1020	125	86.	329.2	2484.5	*	1	1840	225	83.	271.0	2482.0
1	0205	26	2.	.1	2446.3	•	1	1025	126	86.	328.6	2484.5	•	1	1845	226	83.	270.5	2481.9
1	0210	27	3.	.2	2446.4	*	1	1030	127	86.	328.0	2484.5	•	1	1850	227	83.	269.9	2481.9
1	0215	28	4.	.3	2446.6	•	1	1035	128	86.	327.4	2484.5	•	1	1855	228	83.	269.3	2481.9
1	0220	29	5.	.4	2446.8	•	1	1040	129	86.	326.9	2484.4	•	1	1900	229	83.	268.8	2481.8
1	0225	30	6.	.5	2447.0	*	1	1045	130	86.	326.3	2484.4	•	1	1905	230	83.	268.2	2481.8
1	0230	31	8.	.6	2447.4	•	1	1050	131	86.	325.7	2484.4	•	1	1910	231	83.	267.6	2481.8
1	0235	32	11.	.8	2447.8	•	1	1055	132	86.	325.1	2484.4	*	1	1915	232	83.	267.0	2481.7
1	0240	33	14.	1.1	2448.3	•	1	1100	133	86.	324.5	2484.3	•	1	1920	233	83.	266.5	2481.7
1	0245	34	18.	1.3	2448.9	•	1	1105	134	86.	323.9	2484.3	•	1	1925	234	83.	265.9	2481.7
1	0250	35	22.	1.7	2449.6	•	1	1110	135	86.	323.3	2484.3	•	1	1930	235	83.	265.3	2481.6
1	0255	36	25.	2.0	2450.1	*	1	1115	136	86.	322.7	2484.3	•	1	1935	236	83.	264.8	2481.6
1	0300	37	26.	2.5	2450.3	•	1	1120	137	86.	322.1	2484.2	*	1	1940	237	83.	264.2	2481.6
1	0305	38	26.	3.0	2450.5	•	1	1125	138	86.	321.5	2484.2	*	1	1945	238	82.	263.6	2481.5
1	0310	39	27.	3.6	2450.8	•	1	1130	139	86.	321.0	2484.2	*	1	1950	239	82.	263.1	2481.5
1	0315	40	28.	4.4	2451.2	•	1	1135	140	86.	320.4	2484.2	•	1	1955	240	82.	262.5	2481.5
1	0320	41	30.	5.4	2451.7	*	1	1140	141	85.	319.8	2484.1	*	1	2000	241	82.	261.9	2481.4
1	0325	42	32.	6.9	2452.4	•	1	1145	142	85.	319.2	2484.1	•	1	2005	242	82.	261.4	2481.4
1	0330	43	35.	9.1	2453.4	*	1	1150	143	85.	318.6	2484.1	•	1	2010	243	82.	260.8	2481.4
1	0335	44	39.	12.4	2454.6	*	1	1155	144	85.	318.0	2484.0	•	1	2015	244	82.	260.2	2481.3
1	0340	45	42.	17.2	2455.9	•	1	1200	145	85.	317.4	2484.0	•	1	2020	245	82.	259.7	2481.3
1	0345	46	46.	23.7	2457.7	•	1	1205	146	85.	316.8	2484.0	•	1	2025	246	82.	259.1	2481.3
1	0350	47	50.	32.2	2459.5	•	1	1210	147	85.	316.2	2484.0	*	1	2030	247	82.	258.5	2481.2
1	0355	48	54.	42.6	2461.5	•	1	1215	148	85.	315.7	2483.9	•	1	2035	248	82.	258.0	2481.2
1	0400	49	57.	55.0	2463.5	*	1	1220	149	85.	315.1	2483.9	•	1	2040	249	82.	257.4	2481.2
1	0405	50	61.	68.8	2465.7	•	1	1225	150	85.	314.5	2483.9	*	1	2045	250	82.	256.8	2481.1
1	0410	51	64.	83.9	2467.5	*	1	1230	151	85.	313.9	2483.9	•	1	2050	251	82.	256.3	2481.1
1	0415	52	66.	99.6	2469.4	•	1	1235	152	85.	313.3	2483.8	•	1	2055	252	82.	255.7	2481.1
1	0420	53	69.	115.6	2471.0	•	1	1240	153	85.	312.7	2483.8	•	1	2100	253	82.	255.1	2481.0
1	0425	54	71.	131.6	2472.5	•	1	1245	154	85.	312.1	2483.8	•	1	2105	254	82.	254.6	2481.0
1	0430	55	73.	147.2	2473.9	•	1	1250	155	85.	311.6	2483.8	•	1	2110	255	82.	254.0	2481.0
1	0435	56	74.	162.3	2475.0	•	1	1255	156	85.	311.0	2483.7	*	1	2115	256	82.	253.5	2480.9
1	0440	57	76.	176.7	2476.0	•	1	1300	157	85.	310.4	2483.7	*	1	2120	257	82.	252.9	2480.9
1	0445	58	77.	190.3	2477.0	*	1	1305	158	85.	309.8	2483.7	*	1	2125	258	82.	252.3	2480.9
1	0450	59	78.	203.0	2477.9	•	1	1310	159	85.	309.2	2483.7	•	1	2130	259	82.	251.8	2480.8
1	0455	60	79.	215.0	2478.6	•	1	1315	160	85.	308.6	2483.6	•	1	2135	260	82.	251.2	2480.8
1	0500	61	80.	226.3	2479.3	•	1	1320	161	85.	308.0	2483.6	•	1	2140	261	82.	250.6	2480.8
1	0505	62	81.	237.0	2480.0	•	1	1325	162	85.	307.5	2483.6	•	1	2145	262	81.	250.1	2480.7
1	0510	63	81.	247.3	2480.6	*	1	1330	163	85.	306.9	2483.6	•	1	2150	263	81.	249.5	2480.7
1	0515	64	82.	257.0	2481.1	•	1	1335	164	85.	306.3	2483.5	•	1	2155	264	81.	249.0	2480.7
1	0520	65	83.	266.3	2481.7	*	1	1340	165	85.	305.7	2483.5	•	1	2200	265	81.	248.4	2480.6
1	0525	66	83.	275.2	2482.2	•	1	1345	166	85.	305.1	2483.5	•	1	2205	266	81.	247.8	2480.6
1	0530	67	84.	283.5	2482.5	•	1	1350	167	85.	304.5	2483.5	•	1	2210	267	81.	247.3	2480.6
1	0535	68	84.	291.2	2482.9	•	1	1355	168	85.	304.0	2483.4	•	1	2215	268	81.	246.7	2480.5
1	0540	69	84.	298.3	2483.2	•	1	1400	169	85.	303.4	2483.4	*	1	2220	269	81.	246.2	2480.5
1	0545	70	85.	304.9	2483.5	•	1	1405	170	85.	302.8	2483.4	•	1	2225	270	81.	245.6	2480.5
1	0550	71	85.	310.8	2483.7	•	1	1410	171	85.	302.2	2483.3	*	1	2230	271	81.	245.0	2480.4
1	0555	72	85.	316.1	2484.0	•	1	1415	172	85.	301.6	2483.3	•	1	2235	272	81.	244.5	2480.4
1	0600	73	86.	320.9	2484.2	•	1	1420	173	85.	301.0	2483.3	•	1	2240	273	81.	243.9	2480.4
1	0605	74	86.	325.0	2484.4	•	1	1425	174	85.	300.5	2483.3	•	1	2245	274	81.	243.4	2480.3
1	0610	75	86.	328.7	2484.5	*	1	1430	175	84.	299.9	2483.2	•	1	2250	275	81.	242.8	2480.3
1	0615	76	86.	331.9	2484.7	•	1	1435	176	84.	299.3	2483.2	•	1	2255	276	81.	242.3	2480.3
1	0620	77	86.	334.6	2484.8	•	1	1440	177	84.	298.7	2483.2	•	1	2300	277	81.	241.7	2480.2
1	0625	78	86.	337.0	2484.9	*	1	1445	178	84.	298.1	2483.2	*	1	2305	278	81.	241.1	2480.2
1	0630	79	86.	339.0	2485.0	*	1	1450	179	84.	297.6	2483.1	•	1	2310	279	81.	240.6	2480.2
1	0635	80	87.	340.8	2485.1	*	1	1455	180	84.	297.0	2483.1	•	1	2315	280	81.	240.0	2480.1
1	0640	81	87.	342.2	2485.1	•	1	1500	181	84.	296.4	2483.1	•	1	2320	281	81.	239.5	2480.1
1	0645	82	87.	343.4	2485.2	•	1	1505	182	84.	295.8	2483.1	*	1	2325	282	81.	238.9	2480.1
1	0650	83	87.	344.4	2485.2	•	1	1510	183	84.	295.2	2483.0	•	1	2330	283	81.	238.4	2480.0
1	0655	84	87.	345.2	2485.2	*	1	1515	184	84.	294.6	2483.0	•	1	2335	284	81.	237.8	2480.0
1	0700	85	87.	345.8	2485.3	•	1	1520	185	84.	294.1	2483.0	•	1	2340	285	81.	237.3	2480.0
1	0705	86	87.	346.2	2485.3	•	1	1525	186	84.	293.5	2483.0	•	1	2345	286	81.	236.7	2479.9
1	0710	87	87.	346.5	2485.3	•	1	1530	187	84.	292.9	2482.9	•	1	2350	287	80.	236.1	2479.9
1	0715	88	87.	346.7	2485.3	*	1	1535	188	84.	292.3	2482.9	•	1	2355	288	80.	235.6	2479.9
1	0720	89	87.	346.8	2485.3	•	1	1540	189	84.	291.8	2482.9	•	2	0000	289	80.	235.0	2479.8
1	0725	90	87.	346.8	2485.3	•	1	1545	190	84.	291.2	2482.9	•	2	0005	290	80.	234.5	2479.8
1	0730	91	87.	346.7	2485.3	•	1	1550	191	84.	290.6	2482.8	•	2	0010	291	80.	233.9	2479.8
1	0735	92	87.	346.5	2485.3	*	1	1555	192	84.	290.0	2482.8	•	2	0015	292	80.	233.4	2479.7
1	0740	93	87.	346.3	2485.3	*	1	1600	193	84.	289.4	2482.8	*	2	0020	293	80.	232.8	2479.7
1	0745	94	87.	346.0	2485.3	•	1	1605	194	84.	288.9	2482.8	•	2	0025	294	80.	232.3	2479.7
1	0750	95	87.	345.7	2485.3	*	1	1610	195	84.	288.3	2482.7	•	2	0030	295	80.	231.7	2479.6
1	0755	96	87.	345.3	2485.3	•	1	1615	196	84.	287.7	2482.7	•	2	0035	296	80.	231.2	2479.6
1	0800	97	87.	344.9	2485.2	*	1	1620	197	84.	287.1	2482.7	•	2	0040	297	80.	230.6	2479.6
1	0805	98	87.	344.5	2485.2	*	1	1625	198	84.	286.5	2482.7	*	2	0045	298	80.	230.1	2479.5
1	0810	99	87.	344.0	2485.2	*	1	1630	199	84.	286.0	2482.6	*	2	0050	299	80.	229.5	2479.5
1	0815	100	87.	343.5	2485.2	•	1	1635	200	84.	285.4	2482.6	*	2	0055	300	80.	229.0	2479.5

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
87.	7.33		86.	75.	72.	72.
		(INCHES)	.151	.522	.522	.522
		(AC-FT)	43.	148.	148.	148.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
347.	7.33	335.	249.	240.	240.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2485.32	7.33	2484.80	2478.09	2476.90	2476.90

CUMULATIVE AREA = 5.32 SQ MI

HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = 1.45

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	2446.0	1		0820	101	100.	770.1	2497.5	1		1640	201	98.	702.8	2496.0
1		0005	2	0.	.0	2446.0	1		0825	102	100.	769.5	2497.5	1		1645	202	98.	702.1	2495.9
1		0010	3	0.	.0	2446.0	1		0830	103	100.	769.0	2497.5	1		1650	203	98.	701.4	2495.9
1		0015	4	0.	.0	2446.0	1		0835	104	100.	768.4	2497.5	1		1655	204	98.	700.8	2495.9
1		0020	5	0.	.0	2446.0	1		0840	105	100.	767.8	2497.5	1		1700	205	98.	700.1	2495.9
1		0025	6	0.	.0	2446.0	1		0845	106	100.	767.2	2497.5	1		1705	206	98.	699.4	2495.9
1		0030	7	0.	.0	2446.0	1		0850	107	100.	766.6	2497.5	1		1710	207	98.	698.7	2495.8
1		0035	8	0.	.0	2446.0	1		0855	108	100.	765.9	2497.5	1		1715	208	98.	698.1	2495.8
1		0040	9	0.	.0	2446.1	1		0900	109	100.	765.3	2497.4	1		1720	209	98.	697.4	2495.8
1		0045	10	1.	.1	2446.1	1		0905	110	100.	764.6	2497.4	1		1725	210	98.	696.7	2495.8
1		0050	11	2.	.1	2446.2	1		0910	111	100.	764.0	2497.4	1		1730	211	98.	696.0	2495.8
1		0055	12	2.	.2	2446.4	1		0915	112	100.	763.3	2497.4	1		1735	212	98.	695.3	2495.8
1		0100	13	4.	.3	2446.6	1		0920	113	100.	762.7	2497.4	1		1740	213	98.	694.7	2495.7
1		0105	14	5.	.4	2446.8	1		0925	114	100.	762.0	2497.4	1		1745	214	98.	694.0	2495.7
1		0110	15	6.	.5	2447.0	1		0930	115	100.	761.3	2497.3	1		1750	215	98.	693.3	2495.7
1		0115	16	8.	.6	2447.3	1		0935	116	100.	760.6	2497.3	1		1755	216	98.	692.7	2495.7
1		0120	17	9.	.7	2447.5	1		0940	117	100.	759.9	2497.3	1		1800	217	98.	692.0	2495.7
1		0125	18	11.	.8	2447.8	1		0945	118	100.	759.3	2497.3	1		1805	218	98.	691.3	2495.7
1		0130	19	13.	1.0	2448.1	1		0950	119	99.	758.6	2497.3	1		1810	219	98.	690.6	2495.6
1		0135	20	16.	1.2	2448.6	1		0955	120	99.	757.9	2497.3	1		1815	220	98.	690.0	2495.6
1		0140	21	19.	1.5	2449.1	1		1000	121	99.	757.2	2497.2	1		1820	221	98.	689.3	2495.6
1		0145	22	24.	1.8	2449.9	1		1005	122	99.	756.5	2497.2	1		1825	222	98.	688.6	2495.6
1		0150	23	25.	2.3	2450.2	1		1010	123	99.	755.9	2497.2	1		1830	223	98.	687.9	2495.6
1		0155	24	26.	2.9	2450.5	1		1015	124	99.	755.2	2497.2	1		1835	224	98.	687.3	2495.6
1		0200	25	27.	3.6	2450.8	1		1020	125	99.	754.5	2497.2	1		1840	225	98.	686.6	2495.5
1		0205	26	29.	4.5	2451.3	1		1025	126	99.	753.8	2497.2	1		1845	226	98.	685.9	2495.5
1		0210	27	30.	5.5	2451.7	1		1030	127	99.	753.1	2497.1	1		1850	227	98.	685.2	2495.5
1		0215	28	32.	6.7	2452.3	1		1035	128	99.	752.4	2497.1	1		1855	228	98.	684.6	2495.5
1		0220	29	34.	7.9	2452.8	1		1040	129	99.	751.7	2497.1	1		1900	229	98.	683.9	2495.5
1		0225	30	36.	9.2	2453.5	1		1045	130	99.	751.1	2497.1	1		1905	230	98.	683.2	2495.5
1		0230	31	38.	10.7	2454.1	1		1050	131	99.	750.4	2497.1	1		1910	231	98.	682.6	2495.4
1		0235	32	39.	12.4	2454.6	1		1055	132	99.	749.7	2497.1	1		1915	232	98.	681.9	2495.4
1		0240	33	40.	14.2	2455.1	1		1100	133	99.	749.0	2497.0	1		1920	233	98.	681.2	2495.4
1		0245	34	41.	16.2	2455.6	1		1105	134	99.	748.3	2497.0	1		1925	234	98.	680.5	2495.4
1		0250	35	43.	18.4	2456.3	1		1110	135	99.	747.6	2497.0	1		1930	235	98.	679.9	2495.4
1		0255	36	44.	20.8	2456.9	1		1115	136	99.	747.0	2497.0	1		1935	236	98.	679.2	2495.4
1		0300	37	46.	23.3	2457.6	1		1120	137	99.	746.3	2497.0	1		1940	237	98.	678.5	2495.3
1		0305	38	47.	26.1	2458.3	1		1125	138	99.	745.6	2497.0	1		1945	238	98.	677.8	2495.3
1		0310	39	48.	29.0	2458.9	1		1130	139	99.	744.9	2497.0	1		1950	239	98.	677.2	2495.3
1		0315	40	50.	32.3	2459.5	1		1135	140	99.	744.2	2496.9	1		1955	240	98.	676.5	2495.3
1		0320	41	51.	36.2	2460.3	1		1140	141	99.	743.5	2496.9	1		2000	241	97.	675.8	2495.3
1		0325	42	53.	41.2	2461.2	1		1145	142	99.	742.9	2496.9	1		2005	242	97.	675.2	2495.3
1		0330	43	55.	47.9	2462.4	1		1150	143	99.	742.2	2496.9	1		2010	243	97.	674.5	2495.2
1		0335	44	58.	57.0	2463.9	1		1155	144	99.	741.5	2496.9	1		2015	244	97.	673.8	2495.2
1		0340	45	61.	69.3	2465.8	1		1200	145	99.	740.8	2496.9	1		2020	245	97.	673.1	2495.2
1		0345	46	64.	85.4	2467.7	1		1205	146	99.	740.1	2496.8	1		2025	246	97.	672.5	2495.2
1		0350	47	67.	105.5	2470.1	1		1210	147	99.	739.5	2496.8	1		2030	247	97.	671.8	2495.2
1		0355	48	71.	129.8	2472.3	1		1215	148	99.	738.8	2496.8	1		2035	248	97.	671.1	2495.2
1		0400	49	74.	157.8	2474.7	1		1220	149	99.	738.1	2496.8	1		2040	249	97.	670.5	2495.1
1		0405	50	77.	188.9	2476.9	1		1225	150	99.	737.4	2496.8	1		2045	250	97.	669.8	2495.1
1		0410	51	79.	222.1	2479.1	1		1230	151	99.	736.7	2496.8	1		2050	251	97.	669.1	2495.1
1		0415	52	82.	256.5	2481.1	1		1235	152	99.	736.0	2496.7	1		2055	252	97.	668.5	2495.1
1		0420	53	84.	291.2	2482.9	1		1240	153	99.	735.4	2496.7	1		2100	253	97.	667.8	2495.1
1		0425	54	86.	325.6	2484.4	1		1245	154	99.	734.7	2496.7	1		2105	254	97.	667.1	2495.1
1		0430	55	87.	359.0	2485.9	1		1250	155	99.	734.0	2496.7	1		2110	255	97.	666.4	2495.0

1	0435	56	89.	391.1	2487.0	•	1	1255	156	99.	733.3	2496.7	•	1	2115	256	97.	665.8	2495.0
1	0440	57	90.	421.4	2488.0	•	1	1300	157	99.	732.6	2496.7	•	1	2120	257	97.	665.1	2495.0
1	0445	58	91.	449.9	2488.9	•	1	1305	158	99.	732.0	2496.6	•	1	2125	258	97.	664.4	2495.0
1	0450	59	92.	476.6	2489.8	•	1	1310	159	99.	731.3	2496.6	•	1	2130	259	97.	663.8	2495.0
1	0455	60	93.	501.4	2490.5	•	1	1315	160	99.	730.6	2496.6	•	1	2135	260	97.	663.1	2495.0
1	0500	61	93.	524.7	2491.2	•	1	1320	161	99.	729.9	2496.6	•	1	2140	261	97.	662.4	2494.9
1	0505	62	94.	546.7	2491.9	•	1	1325	162	99.	729.2	2496.6	•	1	2145	262	97.	661.8	2494.9
1	0510	63	95.	567.5	2492.4	•	1	1330	163	99.	728.6	2496.6	•	1	2150	263	97.	661.1	2494.9
1	0515	64	95.	587.3	2493.0	•	1	1335	164	99.	727.9	2496.5	•	1	2155	264	97.	660.4	2494.9
1	0520	65	96.	606.0	2493.5	•	1	1340	165	99.	727.2	2496.5	•	1	2200	265	97.	659.8	2494.9
1	0525	66	96.	623.7	2494.0	•	1	1345	166	99.	726.5	2496.5	•	1	2205	266	97.	659.1	2494.9
1	0530	67	97.	640.4	2494.4	•	1	1350	167	99.	725.8	2496.5	•	1	2210	267	97.	658.4	2494.8
1	0535	68	97.	655.9	2494.8	•	1	1355	168	99.	725.2	2496.5	•	1	2215	268	97.	657.7	2494.8
1	0540	69	97.	670.1	2495.1	•	1	1400	169	99.	724.5	2496.5	•	1	2220	269	97.	657.1	2494.8
1	0545	70	98.	683.2	2495.5	•	1	1405	170	99.	723.8	2496.5	•	1	2225	270	97.	656.4	2494.8
1	0550	71	98.	695.1	2495.8	•	1	1410	171	99.	723.1	2496.4	•	1	2230	271	97.	655.7	2494.8
1	0555	72	98.	705.7	2496.0	•	1	1415	172	99.	722.4	2496.4	•	1	2235	272	97.	655.1	2494.7
1	0600	73	98.	715.3	2496.2	•	1	1420	173	99.	721.8	2496.4	•	1	2240	273	97.	654.4	2494.7
1	0605	74	99.	723.7	2496.4	•	1	1425	174	99.	721.1	2496.4	•	1	2245	274	97.	653.7	2494.7
1	0610	75	99.	731.1	2496.6	•	1	1430	175	99.	720.4	2496.4	•	1	2250	275	97.	653.1	2494.7
1	0615	76	99.	737.7	2496.8	•	1	1435	176	99.	719.7	2496.4	•	1	2255	276	97.	652.4	2494.7
1	0620	77	99.	743.4	2496.9	•	1	1440	177	99.	719.0	2496.3	•	1	2300	277	97.	651.7	2494.7
1	0625	78	99.	748.4	2497.0	•	1	1445	178	99.	718.4	2496.3	•	1	2305	278	97.	651.1	2494.6
1	0630	79	99.	752.7	2497.1	•	1	1450	179	99.	717.7	2496.3	•	1	2310	279	97.	650.4	2494.6
1	0635	80	99.	756.4	2497.2	•	1	1455	180	99.	717.0	2496.3	•	1	2315	280	97.	649.7	2494.6
1	0640	81	100.	759.6	2497.3	•	1	1500	181	98.	716.3	2496.3	•	1	2320	281	97.	649.1	2494.6
1	0645	82	100.	762.4	2497.4	•	1	1505	182	98.	715.6	2496.3	•	1	2325	282	97.	648.4	2494.6
1	0650	83	100.	764.7	2497.4	•	1	1510	183	98.	715.0	2496.2	•	1	2330	283	97.	647.7	2494.6
1	0655	84	100.	766.6	2497.5	•	1	1515	184	98.	714.3	2496.2	•	1	2335	284	97.	647.1	2494.5
1	0700	85	100.	768.2	2497.5	•	1	1520	185	98.	713.6	2496.2	•	1	2340	285	97.	646.4	2494.5
1	0705	86	100.	769.5	2497.5	•	1	1525	186	98.	712.9	2496.2	•	1	2345	286	97.	645.7	2494.5
1	0710	87	100.	770.5	2497.6	•	1	1530	187	98.	712.3	2496.2	•	1	2350	287	97.	645.1	2494.5
1	0715	88	100.	771.3	2497.6	•	1	1535	188	98.	711.6	2496.2	•	1	2355	288	97.	644.4	2494.5
1	0720	89	100.	771.9	2497.6	•	1	1540	189	98.	710.9	2496.1	•	2	0000	289	97.	643.7	2494.5
1	0725	90	100.	772.3	2497.6	•	1	1545	190	98.	710.2	2496.1	•	2	0005	290	97.	643.1	2494.4
1	0730	91	100.	772.6	2497.6	•	1	1550	191	98.	709.5	2496.1	•	2	0010	291	97.	642.4	2494.4
1	0735	92	100.	772.7	2497.6	•	1	1555	192	98.	708.9	2496.1	•	2	0015	292	97.	641.7	2494.4
1	0740	93	100.	772.8	2497.6	•	1	1600	193	98.	708.2	2496.1	•	2	0020	293	97.	641.1	2494.4
1	0745	94	100.	772.7	2497.6	•	1	1605	194	98.	707.5	2496.1	•	2	0025	294	97.	640.4	2494.4
1	0750	95	100.	772.5	2497.6	•	1	1610	195	98.	706.8	2496.0	•	2	0030	295	97.	639.7	2494.4
1	0755	96	100.	772.2	2497.6	•	1	1615	196	98.	706.2	2496.0	•	2	0035	296	97.	639.1	2494.3
1	0800	97	100.	771.9	2497.6	•	1	1620	197	98.	705.5	2496.0	•	2	0040	297	97.	638.4	2494.3
1	0805	98	100.	771.5	2497.6	•	1	1625	198	98.	704.8	2496.0	•	2	0045	298	97.	637.8	2494.3
1	0810	99	100.	771.0	2497.6	•	1	1630	199	98.	704.1	2496.0	•	2	0050	299	96.	637.1	2494.3
1	0815	100	100.	770.6	2497.6	•	1	1635	200	98.	703.5	2496.0	•	2	0055	300	96.	636.4	2494.3
						•							•						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 100.	7.58		99.	90.	86.	86.
		(INCHES)	.174	.627	.627	.627
		(AC-FT)	49.	178.	178.	178.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
773.	7.67	759.	604.	582.	582.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2497.61	7.67	2497.28	2490.31	2488.68	2488.68

CUMULATIVE AREA = 5.32 SQ MI

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
					.90	1.45
HYDROGRAPH AT						
+	C4CA	4.59	1	FLOW	2070.	4424.
				TIME	4.42	4.33
HYDROGRAPH AT						
+	C4CB	.38	1	FLOW	211.	449.
				TIME	4.17	4.08
HYDROGRAPH AT						
+	C4CC	.35	1	FLOW	233.	497.
				TIME	3.92	3.92
3 COMBINED AT						
+	C4C	5.32	1	FLOW	2404.	5133.
				TIME	4.33	4.25
ROUTED TO						
+	DET_C4C	5.32	1	FLOW	87.	100.
				TIME	7.33	7.58
			** PEAK STAGES IN FEET **			
			1	STAGE	2485.32	2497.61
				TIME	7.33	7.67
ROUTED TO						
+	RC4C	5.32	1	FLOW	87.	100.
				TIME	7.42	7.67
HYDROGRAPH AT						
+	C4CD	.17	1	FLOW	179.	370.
				TIME	3.67	3.58
2 COMBINED AT						
+	C4C	5.49	1	FLOW	216.	424.
				TIME	3.67	3.58
HYDROGRAPH AT						
+	C3B3B	.56	1	FLOW	430.	890.
				TIME	3.83	3.83
2 COMBINED AT						
+	C3B3B	6.05	1	FLOW	599.	1211.
				TIME	3.83	3.75
ROUTED TO						
+	R3B3B	6.05	1	FLOW	596.	1206.
				TIME	3.83	3.83
ROUTED TO						
+	R3B3B	6.05	1	FLOW	594.	1190.
				TIME	4.00	3.92

*** NORMAL END OF HEC-1 ***

MODIFIED DESIGN HEC-1 MODEL OUTPUT

(LAG TIME REVISED : C4CB, C4CC, C4CD)

EAST C-1 DETENTION BASIN WATERSHED

SUBBASIN LAG TIMES AND ROUTING PARAMETERS - AREAS UNDER 1 SQ. MILE

SUBBASIN	AREA (SQMI)	INITIAL LENGTH (FT)	TOTAL LENGTH (FT)	SLOPE (%)	CN	HYDR. RAD	VELOCITY (FT/S)	K (CN)	Ti (MINUTES)	Tt (MINUTES)	TLAG (HOURS)
C4CB	0.38	500	7650	2.2	80	1.5	4.83	0.67	13.43	26.38	**0.40**
C4CC	0.35	400	5200	2.5	80	1.5	4.83	0.67	11.51	17.93	**0.29**
C4CD	0.17	200	1300	2.5	80	1.5	4.83	0.67	8.14	4.48	**0.13**
C3B3B (No change from Master Plan)				82							**0.42**

EAST C-1 DETENTION BASIN WATERSHED

SUBBASIN LAG TIMES AND ROUTING PARAMETERS - AREAS OVER 1 SQ. MILE

STUDY	BASIN ID	AREA (SQMI)	CN	TLAG (HR)	Precip (IN/6HR)
1996 MPU	C4C	**5.53**	80	0.89	3.43
EAST C-1 D.B. STUDY	C4CA	**4.59**	80	0.89*	3.43

*: Watershed length and length along longest watercourse measured upstream to a point opposite the centroid of the basin is not changed from the 1996 MPU study.

	AREA	LAG TIME		1,000 YR STORM						100 YR STORM					
		ORIGINAL	MODIFIED	ORIGINAL	TIME TO	MODIFIED	TIME TO	ORIGINAL	MODIFIED	ORIGINAL	TIME TO	MODIFIED	TIME TO	ORIGINAL	MODIFIED
	(SQMI)	(HR)	(HR)	(CFS)	PEAK (HR)	(CFS)	PEAK (HR)			(CFS)	PEAK (HR)	(CFS)	PEAK (HR)		
C4CA	4.59	0.89	0.89	4424	4.33	4424	4.33			2070	4.42	2070	4.42		
C4CB	0.38	0.66	0.40	449	4.08	604	3.83			211	4.17	284	3.83		
C4CC	0.35	0.49	0.29	497	3.92	646	3.75	REQUIRED STORAGE		233	3.92	307	3.75	REQUIRED STORAGE	
Detention Basin	5.32			5133	4.25	4879	4.25	(AC-FT)		2404	4.33	2281	4.33	(AC-FT)	
OUTFLOW	5.32			100	7.58	100	7.58	773	772	87	7.33	87	7.33	347	346
RC4C	5.32			100	7.67	100	7.67			87	7.42	87	7.42		
C4CD	0.17	0.20	0.13	370	3.58	406	3.58			179	3.67	194	3.58		
C4C	5.49			424	3.58	462	3.58			216	3.67	229	3.58		
C3B3B	0.56			890	3.83	890	3.83			430	3.83	430	3.83		
TOTAL	6.05			1211	3.75	1143	3.75			599	3.83	568	3.83		

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*        *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)  *
*        SEPTEMBER 1990              *
*        VERSION 4.0                 *
*                                    *
*  RUN DATE 04/08/1998 TIME 08:05:19 *
*        *
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*        *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*        609 SECOND STREET           *
*     DAVIS, CALIFORNIA 95616        *
*        (916) 756-1104              *
*        *
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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

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
                1   ID    INPUT FILE = ALT3B.DAT
                2   ID    RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
                3   ID    100-YEAR 6-HR STORM (SDN#3)
                4   ID    VTN NEVADA, July 1997
                5   ID
                6   ID    THE LAG TIME OF SUBBASIN C4CB, C4CC, C4CD HAVE BEEN REVISED
                7   ID    BASED ON COMMENTS RECEIVED FROM CLARK COUNTY PUBLIC WORKS.
                8   ID
                9   ID    WATERSHED MODEL TAKEN FROM COE HYDROLOGY
               10   ID    KINEMATIC SUBBASINS CONVERTED TO SCS
               11   ID    CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
               12   ID    SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT
               13   ID
*** FREE ***
               14   IT       5       0       0     300
               15   IN       5       0       0
               16   IO       5
                    * ******* USING 100 YEAR JR CARD  *******
                    *  JR    PREC 0.905
               17   JR    PREC   0.905    1.45
                    *  100-YEAR DARF=0.905, 1000-YEAR DARF=1.45
                    *  JR PREC 2.10 1.78 1.45 1.09 0.905 0.79 0.67 0.52 0.40
                    *  JR PREC 0.98 0.97 0.93 0.905
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)
                    *

               18   KK    C4CA WEST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
               19   KM   RUNOFF FOR THE WEST SEDIMENT TRAP DESIGN
               20   BA    4.59
               21   PB    3.43
               22   PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
               23   PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
               24   PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
               25   PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
               26   PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
               27   PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
               28   PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
               29   PC    .998    .999    1.00
               30   LS    0.00    80.0
               31   UD  0.8929

               32   KK    C4CBMIDDLE TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
               33   KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
               34   BA    0.38
               35   PB    3.43
               36   LS    0.00    80.0
               37   UD    0.40
                    *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  38      KK    C4CCEAST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
  39      KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
  40      BA    0.35
  41      PB    3.43
  42      LS    0.00    80.0
  43      UD    0.29

  44      KK     C4C
  45      KM   COMBINE FLOW BEFORE DETENTION BASIN
  46      HC       3
  47      KO       1
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  48      KK DET_C4CEast Detention Basin
          *
  49      KM   1000-YR DESIGN EVENT STORAGE AND PMF SPILLWAY, MPU LEVEE
          *
  50      KM   Proposed detention basin d/s of subbasin C4C; storage capacity = 845.ac-ft;
  51      KM   assume a 48" diameter low-level outlet pipe;invert elevation 2446.0 ft
  52      RS       1    STOR      -1
  53      SV     0.0    1.85   10.35   24.60   45.03   70.78  104.85  148.32  204.08  271.64
  54      SV  362.21  482.58  551.62  625.31  704.75  789.13  879.88  975.68 1183.9  1414.3
  55      SE  2446.0  2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  56      SE  2486.0  2490.0  2492.0  2494.0  2496.0  2498.0  2500.0  2502.2  2506.0  2510.0
  57      SQ     0.0   24.59   37.30   46.66   54.44   61.24   67.35   72.96   78.16   83.04
  58      SQ   87.65   92.02   94.14   96.20   98.22  100.21  102.15  104.06  107.77  111.36
  59      SE  2446.0  2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  60      SE  2486.0  2490.0  2492.0  2494.0  2496.0  2498.0  2500.0  2502.2  2506.0  2510.0
  61      KO       1
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  62      KK     RC4C
  63      KM   ROUTE DET_C4C outflow THRU C3B3
  64      KM   With 7-7' drop structures
  65      RK    3200   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  66      KK    C4CD TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
  67      KM   RUNOFF FROM C4CD
  68      BA    0.17
  69      PB    3.34
  70      LS    0.00      80
  71      UD    0.13

  72      KK     C4C
  73      KM   COMBINE DETENTION BASIN OUTFALL AND SUBBASIN C4CD
  74      HC       2

  75      KK   C3B3B  DISTRICT C AREA 3 SUBBASIN B3B
  76      KM   RUNOFF FROM C3B3B
  77      BA    0.56
  78      PB    3.36
  79      LS    0.00      82
  80      UD    0.42
```

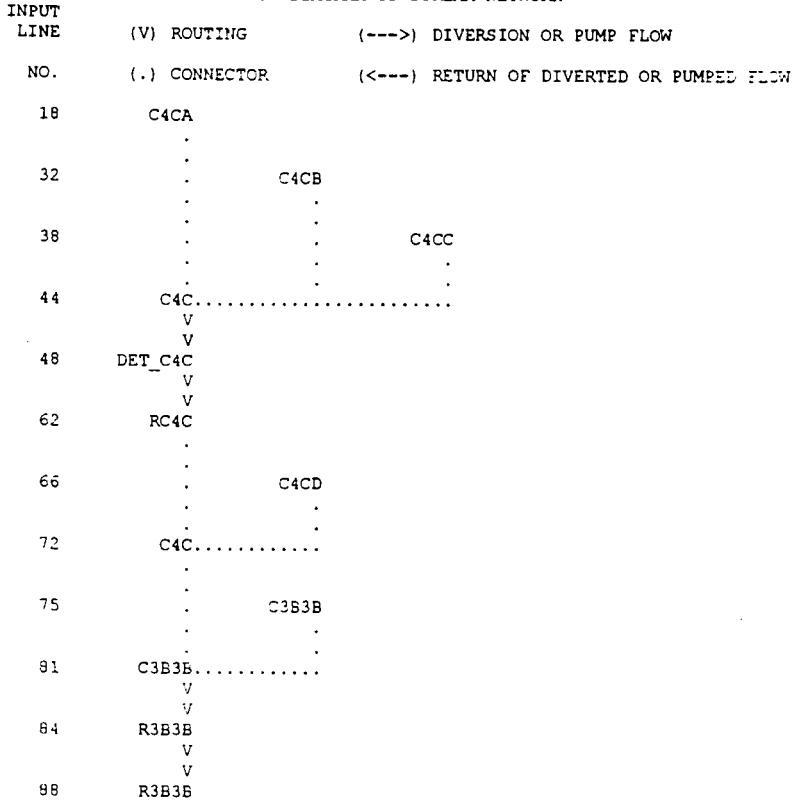
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   81     KK   C3B3B
   82     KM   Combine RC4C & C3B3
   83     HC        2
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

   84     KK   R3B3B
   85     KM   ROUTE 3B3B
   86     KM   With 7-7' drop structures
   87     RK     3800   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

   88     KK   R3B3B
   89     KM   ROUTE R3B3B THRU C3B1
   90     RK     8250   0.015   0.030       0    TRAP      50     3.0
          *
   91     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*        SEPTEMBER 1990              *
*         VERSION 4.0                *
*                                    *
*  RUN DATE  04/08/1998  TIME  08:05:19 *
*                                    *
**************************************
```


```
**************************************
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*    DAVIS, CALIFORNIA 95616         *
*       (916) 756-1104               *
*                                    *
**************************************
```


```
INPUT FILE = ALT3B.DAT
RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
100-YEAR 6-HR STORM (SDN#3)
VTN NEVADA, July 1997

THE LAG TIME OF SUBBASIN C4CB, C4CC, C4CD HAVE BEEN REVISED
BASED ON COMMENTS RECEIVED FROM CLARK COUNTY PUBILC WORKS.

WATERSHED MODEL TAKEN FROM COE HYDROLOGY
KINEMATIC SUBBASINS CONVERTED TO SCS
CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT

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        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME       0055  ENDING TIME
                    ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 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
                   .90      1.45

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
44 KK       *      C4C   *
            *            *
            **************

47 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

46 HC          HYDROGRAPH COMBINATION
                    ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

**********************************************************************************************************************************

                                        HYDROGRAPH AT STATION      C4C
                                             SUM OF  3 HYDROGRAPHS
                                           PLAN 1,   RATIO =   .90

**********************************************************************************************************************************

  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     0615   76      496.    *   1     1230  151       0.    *   1     1845  226       0.
   1     0005    2       0.    *   1     0620   77      439.    *   1     1235  152       0.    *   1     1850  227       0.
   1     0010    3       0.    *   1     0625   78      388.    *   1     1240  153       0.    *   1     1855  228       0.
   1     0015    4       0.    *   1     0630   79      344.    *   1     1245  154       0.    *   1     1900  229       0.
```

1	0020	5	0.	*	1	0635	80	303.	*	1	1250	155	0.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	267.	*	1	1255	156	0.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	235.	*	1	1300	157	0.	*	1	1915	232	0.
1	0035	8	0.	*	1	0650	83	206.	*	1	1305	158	0.	*	1	1920	233	0.
1	0040	9	0.	*	1	0655	84	180.	*	1	1310	159	0.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	157.	*	1	1315	160	0.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	137.	*	1	1320	161	0.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	118.	*	1	1325	162	0.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	103.	*	1	1330	163	0.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	89.	*	1	1335	164	0.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	77.	*	1	1340	165	0.	*	1	1955	240	0.
1	0115	16	0.	*	1	0730	91	66.	*	1	1345	166	0.	*	1	2000	241	0.
1	0120	17	0.	*	1	0735	92	57.	*	1	1350	167	0.	*	1	2005	242	0.
1	0125	18	0.	*	1	0740	93	49.	*	1	1355	168	0.	*	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	41.	*	1	1400	169	0.	*	1	2015	244	0.
1	0135	20	0.	*	1	0750	95	35.	*	1	1405	170	0.	*	1	2020	245	0.
1	0140	21	1.	*	1	0755	96	29.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	3.	*	1	0800	97	25.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	5.	*	1	0805	98	21.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	7.	*	1	0810	99	17.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	9.	*	1	0815	100	15.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	11.	*	1	0820	101	13.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	13.	*	1	0825	102	11.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	17.	*	1	0830	103	9.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	24.	*	1	0835	104	8.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	32.	*	1	0840	105	7.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	41.	*	1	0845	106	6.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	49.	*	1	0850	107	5.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	58.	*	1	0855	108	4.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	69.	*	1	0900	109	3.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	80.	*	1	0905	110	2.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	91.	*	1	0910	111	2.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	101.	*	1	0915	112	1.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	114.	*	1	0920	113	1.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	137.	*	1	0925	114	1.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	178.	*	1	0930	115	1.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	254.	*	1	0935	116	1.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	384.	*	1	0940	117	0.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	590.	*	1	0945	118	0.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	849.	*	1	0950	119	0.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1127.	*	1	0955	120	0.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1387.	*	1	1000	121	0.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1620.	*	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1826.	*	1	1010	123	0.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1997.	*	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2134.	*	1	1020	125	0.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2227.	*	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2275.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	2281.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2253.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	2200.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	2132.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	2052.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	1954.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	1850.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	1750.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	1662.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	1580.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	1500.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	1423.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	1347.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	1269.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	1190.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	1109.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	1026.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	944.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	862.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	780.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	702.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	629.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	560.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2281.	4.33		758.	190.	183.	183.
		(INCHES)	1.325	1.329	1.329	1.329
		(AC-FT)	376.	377.	377.	377.

CUMULATIVE AREA = 5.32 SQ MI

HYDROGRAPH AT STATION C4C
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = 1.45

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 0615	76	947.	*	1 1230	151	0.	*	1 1845	226	0.

1	0005	2	0.	*	1	0620	77	838.	*	1	1235	152	0.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	741.	*	1	1240	153	0.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	655.	*	1	1245	154	0.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	577.	*	1	1250	155	0.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	509.	*	1	1255	156	0.	*	1	1910	231	0.
1	0030	7	1.	*	1	0645	82	447.	*	1	1300	157	0.	*	1	1915	232	0.
1	0035	8	4.	*	1	0650	83	392.	*	1	1305	158	0.	*	1	1920	233	0.
1	0040	9	7.	*	1	0655	84	342.	*	1	1310	159	0.	*	1	1925	234	0.
1	0045	10	11.	*	1	0700	85	298.	*	1	1315	160	0.	*	1	1930	235	0.
1	0050	11	14.	*	1	0705	86	260.	*	1	1320	161	0.	*	1	1935	236	0.
1	0055	12	16.	*	1	0710	87	225.	*	1	1325	162	0.	*	1	1940	237	0.
1	0100	13	18.	*	1	0715	88	195.	*	1	1330	163	0.	*	1	1945	238	0.
1	0105	14	19.	*	1	0720	89	169.	*	1	1335	164	0.	*	1	1950	239	0.
1	0110	15	22.	*	1	0725	90	145.	*	1	1340	165	0.	*	1	1955	240	0.
1	0115	16	25.	*	1	0730	91	125.	*	1	1345	166	0.	*	1	2000	241	0.
1	0120	17	29.	*	1	0735	92	107.	*	1	1350	167	0.	*	1	2005	242	0.
1	0125	18	35.	*	1	0740	93	92.	*	1	1355	168	0.	*	1	2010	243	0.
1	0130	19	45.	*	1	0745	94	78.	*	1	1400	169	0.	*	1	2015	244	0.
1	0135	20	60.	*	1	0750	95	66.	*	1	1405	170	0.	*	1	2020	245	0.
1	0140	21	80.	*	1	0755	96	55.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	101.	*	1	0800	97	46.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	123.	*	1	0805	98	38.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	142.	*	1	0810	99	32.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	158.	*	1	0815	100	27.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	171.	*	1	0820	101	23.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	184.	*	1	0825	102	20.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	202.	*	1	0830	103	17.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	228.	*	1	0835	104	15.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	259.	*	1	0840	105	12.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	287.	*	1	0845	106	11.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	312.	*	1	0850	107	9.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	335.	*	1	0855	108	7.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	363.	*	1	0900	109	6.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	392.	*	1	0905	110	5.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	416.	*	1	0910	111	4.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	437.	*	1	0915	112	3.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	466.	*	1	0920	113	2.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	521.	*	1	0925	114	2.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	622.	*	1	0930	115	1.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	803.	*	1	0935	116	1.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1101.	*	1	0940	117	1.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1550.	*	1	0945	118	1.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	2098.	*	1	0950	119	0.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	2673.	*	1	0955	120	0.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	3200.	*	1	1000	121	0.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	3666.	*	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	4071.	*	1	1010	123	0.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	4401.	*	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	4654.	*	1	1020	125	0.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	4813.	*	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	4879.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	4857.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	4766.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	4621.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	4444.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	4242.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	4008.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	3765.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	3535.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	3333.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	3149.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	2973.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	2805.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	2642.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	2479.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2314.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2151.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	1983.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	1821.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	1658.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	1498.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	1346.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	1203.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	1071.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4879.	4.25		1630.	411.	395.	395.
		(INCHES)	2.848	2.870	2.870	2.870
		(AC-FT)	808.	814.	814.	814.

CUMULATIVE AREA = 5.32 SQ MI

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* *
48 KK * DET_C4C * East Detention Basin

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61 KO          OUTPUT CONTROL VARIABLES
                    IPRNT         1  PRINT CONTROL
                    IPLOT         0  PLOT CONTROL
                    PSCAL         0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

52 RS          STORAGE ROUTING
                    NSTPS         1  NUMBER OF SUBREACHES
                     ITYP      STOR  TYPE OF INITIAL CONDITION
                   RSVRIC     -1.00  INITIAL CONDITION
                        X       .00 WORKING R AND D COEFFICIENT

53 SV            STORAGE        .0       1.9      10.4      24.6      45.0      70.8     104.8     148.3     204.1     271.6
                              362.2     482.6     551.6     625.3     704.8     789.1     879.9     975.7    1183.9    1414.3

55 SE            ELEVATION  2446.00   2450.00   2454.00   2458.00   2462.00   2466.00   2470.00   2474.00   2478.00   2482.00
                            2486.00   2490.00   2492.00   2494.00   2496.00   2498.00   2500.00   2502.20   2506.00   2510.00

57 SQ            DISCHARGE        0.       25.       37.       47.       54.       61.       67.       73.       78.       83.
                                88.       92.       94.       96.       98.      100.      102.      104.      108.      111.

59 SE            ELEVATION  2446.00   2450.00   2454.00   2458.00   2462.00   2466.00   2470.00   2474.00   2478.00   2482.00
                            2486.00   2490.00   2492.00   2494.00   2496.00   2498.00   2500.00   2502.20   2506.00   2510.00

                                                      ***

                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

     STORAGE        .00      1.85     10.35     24.60     45.03     70.78    104.85    148.32    204.08    271.64
     OUTFLOW        .00     24.59     37.30     46.66     54.44     61.24     67.35     72.96     78.16     83.04
   ELEVATION   2446.00   2450.00   2454.00   2458.00   2462.00   2466.00   2470.00   2474.00   2478.00   2482.00

     STORAGE     362.21    482.58    551.62    625.31    704.75    789.13    879.88    975.68   1183.90   1414.30
     OUTFLOW      87.65     92.02     94.14     96.20     98.22    100.21    102.15    104.06    107.77    111.36
   ELEVATION   2486.00   2490.00   2492.00   2494.00   2496.00   2498.00   2500.00   2502.20   2506.00   2510.00

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                        HYDROGRAPH AT STATION  DET_C4C
                             PLAN 1,    RATIO =   .90

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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  2446.0 *    1   0820 101      87.     342.6  2485.1 *    1   1640 201      84.     284.4  2482.6
  1   0005   2       0.       .0  2446.0 *    1   0825 102      87.     342.1  2485.1 *    1   1645 202      84.     283.9  2482.5
  1   0010   3       0.       .0  2446.0 *    1   0830 103      87.     341.6  2485.1 *    1   1650 203      84.     283.3  2482.5
  1   0015   4       0.       .0  2446.0 *    1   0835 104      87.     341.0  2485.1 *    1   1655 204      84.     282.7  2482.5
  1   0020   5       0.       .0  2446.0 *    1   0840 105      87.     340.5  2485.0 *    1   1700 205      84.     282.1  2482.5
  1   0025   6       0.       .0  2446.0 *    1   0845 106      87.     339.9  2485.0 *    1   1705 206      84.     281.6  2482.4
  1   0030   7       0.       .0  2446.0 *    1   0850 107      86.     339.4  2485.0 *    1   1710 207      84.     281.0  2482.4
  1   0035   8       0.       .0  2446.0 *    1   0855 108      86.     338.8  2485.0 *    1   1715 208      83.     280.4  2482.4
  1   0040   9       0.       .0  2446.0 *    1   0900 109      86.     338.2  2484.9 *    1   1720 209      83.     279.8  2482.4
  1   0045  10       0.       .0  2446.0 *    1   0905 110      86.     337.7  2484.9 *    1   1725 210      83.     279.3  2482.3
  1   0050  11       0.       .0  2446.0 *    1   0910 111      86.     337.1  2484.9 *    1   1730 211      83.     278.7  2482.3
  1   0055  12       0.       .0  2446.0 *    1   0915 112      86.     336.5  2484.9 *    1   1735 212      83.     278.1  2482.3
  1   0100  13       0.       .0  2446.0 *    1   0920 113      86.     335.9  2484.8 *    1   1740 213      83.     277.5  2482.3
  1   0105  14       0.       .0  2446.0 *    1   0925 114      86.     335.3  2484.8 *    1   1745 214      83.     277.0  2482.2
  1   0110  15       0.       .0  2446.0 *    1   0930 115      86.     334.7  2484.8 *    1   1750 215      83.     276.4  2482.2
  1   0115  16       0.       .0  2446.0 *    1   0935 116      86.     334.2  2484.8 *    1   1755 216      83.     275.8  2482.2
  1   0120  17       0.       .0  2446.0 *    1   0940 117      86.     333.6  2484.7 *    1   1800 217      83.     275.2  2482.2
  1   0125  18       0.       .0  2446.0 *    1   0945 118      86.     333.0  2484.7 *    1   1805 218      83.     274.7  2482.1
  1   0130  19       0.       .0  2446.0 *    1   0950 119      86.     332.4  2484.7 *    1   1810 219      83.     274.1  2482.1
  1   0135  20       0.       .0  2446.0 *    1   0955 120      86.     331.8  2484.7 *    1   1815 220      83.     273.5  2482.1
  1   0140  21       0.       .0  2446.0 *    1   1000 121      86.     331.2  2484.6 *    1   1820 221      83.     273.0  2482.1
  1   0145  22       0.       .0  2446.0 *    1   1005 122      86.     330.6  2484.6 *    1   1825 222      83.     272.4  2482.0
  1   0150  23       1.       .0  2446.1 *    1   1010 123      86.     330.0  2484.6 *    1   1830 223      83.     271.8  2482.0
  1   0155  24       1.       .1  2446.2 *    1   1015 124      86.     329.4  2484.6 *    1   1835 224      83.     271.2  2482.0
  1   0200  25       2.       .1  2446.3 *    1   1020 125      86.     328.8  2484.5 *    1   1840 225      83.     270.7  2481.9
  1   0205  26       2.       .2  2446.4 *    1   1025 126      86.     328.2  2484.5 *    1   1845 226      83.     270.1  2481.9
  1   0210  27       3.       .2  2446.5 *    1   1030 127      86.     327.6  2484.5 *    1   1850 227      83.     269.5  2481.9
  1   0215  28       4.       .3  2446.7 *    1   1035 128      86.     327.1  2484.4 *    1   1855 228      83.     269.0  2481.8
  1   0220  29       6.       .4  2446.9 *    1   1040 129      86.     326.5  2484.4 *    1   1900 229      83.     268.4  2481.8
  1   0225  30       8.       .6  2447.3 *    1   1045 130      86.     325.9  2484.4 *    1   1905 230      83.     267.8  2481.8
  1   0230  31      10.       .8  2447.7 *    1   1050 131      86.     325.3  2484.4 *    1   1910 231      83.     267.2  2481.7
  1   0235  32      13.      1.0  2448.2 *    1   1055 132      86.     324.7  2484.3 *    1   1915 232      83.     266.7  2481.7
  1   0240  33      17.      1.3  2448.7 *    1   1100 133      86.     324.1  2484.3 *    1   1920 233      83.     266.1  2481.7
  1   0245  34      21.      1.6  2449.4 *    1   1105 134      86.     323.5  2484.3 *    1   1925 234      83.     265.5  2481.6
  1   0250  35      25.      1.9  2450.0 *    1   1110 135      86.     322.9  2484.3 *    1   1930 235      83.     265.0  2481.6
  1   0255  36      25.      2.3  2450.2 *    1   1115 136      86.     322.3  2484.2 *    1   1935 236      83.     264.4  2481.6
  1   0300  37      26.      2.8  2450.5 *    1   1120 137      86.     321.7  2484.2 *    1   1940 237      82.     263.8  2481.5
  1   0305  38      27.      3.4  2450.7 *    1   1125 138      86.     321.2  2484.2 *    1   1945 238      82.     263.3  2481.5
  1   0310  39      28.      4.1  2451.0 *    1   1130 139      86.     320.6  2484.2 *    1   1950 239      82.     262.7  2481.5
  1   0315  40      29.      4.9  2451.5 *    1   1135 140      86.     320.0  2484.1 *    1   1955 240      82.     262.1  2481.4
  1   0320  41      31.      6.2  2452.1 *    1   1140 141      85.     319.4  2484.1 *    1   2000 241      82.     261.6  2481.4
  1   0325  42      34.      8.2  2453.0 *    1   1145 142      85.     318.8  2484.1 *    1   2005 242      82.     261.0  2481.4
  1   0330  43      38.     11.3  2454.3 *    1   1150 143      85.     318.2  2484.1 *    1   2010 243      82.     260.4  2481.3
  1   0335  44      41.     16.0  2455.6 *    1   1155 144      85.     317.6  2484.0 *    1   2015 244      82.     259.9  2481.3
  1   0340  45      45.     22.5  2457.4 *    1   1200 145      85.     317.0  2484.0 *    1   2020 245      82.     259.3  2481.3
  1   0345  46      49.     30.8  2459.2 *    1   1205 146      85.     316.4  2484.0 *    1   2025 246      82.     258.7  2481.2
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1	0350	47	53.	40.8	2461.2	*	1	1210	147	85.	315.9	2484.0	*	1	2030	247	82.	258.2	2481.2
1	0355	48	56.	52.3	2463.1	*	1	1215	148	85.	315.3	2483.9	*	1	2035	248	82.	257.6	2481.2
1	0400	49	60.	65.1	2465.1	*	1	1220	149	85.	314.7	2483.9	*	1	2040	249	82.	257.0	2481.1
1	0405	50	63.	78.9	2467.0	*	1	1225	150	85.	314.1	2483.9	*	1	2045	250	82.	256.5	2481.1
1	0410	51	65.	93.5	2468.7	*	1	1230	151	85.	313.5	2483.8	*	1	2050	251	82.	255.9	2481.1
1	0415	52	68.	108.5	2470.3	*	1	1235	152	85.	312.9	2483.8	*	1	2055	252	82.	255.3	2481.0
1	0420	53	70.	123.7	2471.7	*	1	1240	153	85.	312.3	2483.8	*	1	2100	253	82.	254.8	2481.0
1	0425	54	72.	138.9	2473.1	*	1	1245	154	85.	311.8	2483.8	*	1	2105	254	82.	254.2	2481.0
1	0430	55	73.	153.7	2474.4	*	1	1250	155	85.	311.2	2483.7	*	1	2110	255	82.	253.6	2480.9
1	0435	56	75.	168.1	2475.4	*	1	1255	156	85.	310.6	2483.7	*	1	2115	256	82.	253.1	2480.9
1	0440	57	76.	182.0	2476.4	*	1	1300	157	85.	310.0	2483.7	*	1	2120	257	82.	252.5	2480.9
1	0445	58	77.	195.3	2477.4	*	1	1305	158	85.	309.4	2483.7	*	1	2125	258	82.	252.0	2480.8
1	0450	59	78.	207.8	2478.2	*	1	1310	159	85.	308.8	2483.6	*	1	2130	259	82.	251.4	2480.8
1	0455	60	79.	219.7	2478.9	*	1	1315	160	85.	308.2	2483.6	*	1	2135	260	82.	250.8	2480.8
1	0500	61	80.	230.9	2479.6	*	1	1320	161	85.	307.7	2483.6	*	1	2140	261	81.	250.3	2480.7
1	0505	62	81.	241.5	2480.2	*	1	1325	162	85.	307.1	2483.6	*	1	2145	262	81.	249.7	2480.7
1	0510	63	82.	251.5	2480.8	*	1	1330	163	85.	306.5	2483.5	*	1	2150	263	81.	249.2	2480.7
1	0515	64	82.	261.0	2481.4	*	1	1335	164	85.	305.9	2483.5	*	1	2155	264	81.	248.6	2480.6
1	0520	65	83.	270.0	2481.9	*	1	1340	165	85.	305.3	2483.5	*	1	2200	265	81.	248.0	2480.6
1	0525	66	83.	278.4	2482.3	*	1	1345	166	85.	304.7	2483.5	*	1	2205	266	81.	247.5	2480.6
1	0530	67	84.	286.3	2482.6	*	1	1350	167	85.	304.2	2483.4	*	1	2210	267	81.	246.9	2480.5
1	0535	68	84.	293.7	2483.0	*	1	1355	168	85.	303.6	2483.4	*	1	2215	268	81.	246.4	2480.5
1	0540	69	85.	300.4	2483.3	*	1	1400	169	85.	303.0	2483.4	*	1	2220	269	81.	245.8	2480.5
1	0545	70	85.	306.6	2483.5	*	1	1405	170	85.	302.4	2483.4	*	1	2225	270	81.	245.2	2480.4
1	0550	71	85.	312.3	2483.8	*	1	1410	171	85.	301.8	2483.3	*	1	2230	271	81.	244.7	2480.4
1	0555	72	85.	317.3	2484.0	*	1	1415	172	85.	301.2	2483.3	*	1	2235	272	81.	244.1	2480.4
1	0600	73	86.	321.9	2484.2	*	1	1420	173	85.	300.7	2483.3	*	1	2240	273	81.	243.6	2480.3
1	0605	74	86.	325.8	2484.4	*	1	1425	174	84.	300.1	2483.3	*	1	2245	274	81.	243.0	2480.3
1	0610	75	86.	329.3	2484.5	*	1	1430	175	84.	299.5	2483.2	*	1	2250	275	81.	242.4	2480.3
1	0615	76	86.	332.4	2484.7	*	1	1435	176	84.	298.9	2483.2	*	1	2255	276	81.	241.9	2480.2
1	0620	77	86.	335.0	2484.8	*	1	1440	177	84.	298.3	2483.2	*	1	2300	277	81.	241.3	2480.2
1	0625	78	86.	337.3	2484.9	*	1	1445	178	84.	297.7	2483.2	*	1	2305	278	81.	240.8	2480.2
1	0630	79	86.	339.2	2485.0	*	1	1450	179	84.	297.2	2483.1	*	1	2310	279	81.	240.2	2480.1
1	0635	80	87.	340.8	2485.1	*	1	1455	180	84.	296.6	2483.1	*	1	2315	280	81.	239.7	2480.1
1	0640	81	87.	342.2	2485.1	*	1	1500	181	84.	296.0	2483.1	*	1	2320	281	81.	239.1	2480.1
1	0645	82	87.	343.3	2485.2	*	1	1505	182	84.	295.4	2483.1	*	1	2325	282	81.	238.5	2480.0
1	0650	83	87.	344.3	2485.2	*	1	1510	183	84.	294.8	2483.0	*	1	2330	283	81.	238.0	2480.0
1	0655	84	87.	345.0	2485.2	*	1	1515	184	84.	294.3	2483.0	*	1	2335	284	81.	237.4	2480.0
1	0700	85	87.	345.6	2485.3	*	1	1520	185	84.	293.7	2483.0	*	1	2340	285	81.	236.9	2479.9
1	0705	86	87.	346.0	2485.3	*	1	1525	186	84.	293.1	2482.9	*	1	2345	286	80.	236.3	2479.9
1	0710	87	87.	346.2	2485.3	*	1	1530	187	84.	292.5	2482.9	*	1	2350	287	80.	235.8	2479.9
1	0715	88	87.	346.4	2485.3	*	1	1535	188	84.	291.9	2482.9	*	1	2355	288	80.	235.2	2479.8
1	0720	89	87.	346.5	2485.3	*	1	1540	189	84.	291.4	2482.9	*	2	0000	289	80.	234.7	2479.8
1	0725	90	87.	346.4	2485.3	*	1	1545	190	84.	290.8	2482.8	*	2	0005	290	80.	234.1	2479.8
1	0730	91	87.	346.3	2485.3	*	1	1550	191	84.	290.2	2482.8	*	2	0010	291	80.	233.6	2479.7
1	0735	92	87.	346.2	2485.3	*	1	1555	192	84.	289.6	2482.8	*	2	0015	292	80.	233.0	2479.7
1	0740	93	87.	345.9	2485.3	*	1	1600	193	84.	289.1	2482.8	*	2	0020	293	80.	232.5	2479.7
1	0745	94	87.	345.6	2485.3	*	1	1605	194	84.	288.5	2482.7	*	2	0025	294	80.	231.9	2479.6
1	0750	95	87.	345.3	2485.3	*	1	1610	195	84.	287.9	2482.7	*	2	0030	295	80.	231.4	2479.6
1	0755	96	87.	344.9	2485.2	*	1	1615	196	84.	287.3	2482.7	*	2	0035	296	80.	230.8	2479.6
1	0800	97	87.	344.5	2485.2	*	1	1620	197	84.	286.7	2482.7	*	2	0040	297	80.	230.2	2479.5
1	0805	98	87.	344.1	2485.2	*	1	1625	198	84.	286.2	2482.6	*	2	0045	298	80.	229.7	2479.5
1	0810	99	87.	343.6	2485.2	*	1	1630	199	84.	285.6	2482.6	*	2	0050	299	80.	229.1	2479.5
1	0815	100	87.	343.1	2485.2	*	1	1635	200	84.	285.0	2482.6	*	2	0055	300	80.	228.6	2479.5

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 87.	7.33		86.	75.	72.	72.
		(INCHES)	.151	.523	.523	.523
		(AC-FT)	43.	148.	148.	148.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
346.	7.33	335.	249.	240.	240.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2485.30	7.33	2484.78	2478.15	2476.97	2476.97

CUMULATIVE AREA = 5.32 SQ MI

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HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = 1.45

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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	2446.0	*	1		0820	101	100.	769.6	2497.5	*	1		1640	201	98.	702.4	2495.9
1		0005	2	0.	.0	2446.0	*	1		0825	102	100.	769.1	2497.5	*	1		1645	202	98.	701.7	2495.9
1		0010	3	0.	.0	2446.0	*	1		0830	103	100.	768.5	2497.5	*	1		1650	203	98.	701.0	2495.9
1		0015	4	0.	.0	2446.0	*	1		0835	104	100.	768.0	2497.5	*	1		1655	204	98.	700.3	2495.9
1		0020	5	0.	.0	2446.0	*	1		0840	105	100.	767.4	2497.5	*	1		1700	205	98.	699.7	2495.9
1		0025	6	0.	.0	2446.0	*	1		0845	106	100.	766.8	2497.5	*	1		1705	206	98.	699.0	2495.9
1		0030	7	0.	.0	2446.0	*	1		0850	107	100.	766.1	2497.5	*	1		1710	207	98.	698.3	2495.8
1		0035	8	0.	.0	2446.0	*	1		0855	108	100.	765.5	2497.4	*	1		1715	208	98.	697.6	2495.8
1		0040	9	1.	.1	2446.1	*	1		0900	109	100.	764.9	2497.4	*	1		1720	209	98.	696.9	2495.8

1	0045	10	1.	.1	2446.2	*	1	0905	110	100.	764.2	2497.4	*	1	1725	210	98.	696.3	2495.8
1	0050	11	2.	.2	2446.4	*	1	0910	111	100.	763.6	2497.4	*	1	1730	211	98.	695.6	2495.8
1	0055	12	4.	.3	2446.6	*	1	0915	112	100.	762.9	2497.4	*	1	1735	212	98.	694.9	2495.8
1	0100	13	5.	.4	2446.8	*	1	0920	113	100.	762.2	2497.4	*	1	1740	213	98.	694.3	2495.7
1	0105	14	6.	.4	2447.0	*	1	0925	114	100.	761.5	2497.3	*	1	1745	214	98.	693.6	2495.7
1	0110	15	7.	.5	2447.2	*	1	0930	115	100.	760.9	2497.3	*	1	1750	215	98.	692.9	2495.7
1	0115	16	9.	.6	2447.4	*	1	0935	116	100.	760.2	2497.3	*	1	1755	216	98.	692.2	2495.7
1	0120	17	10.	.8	2447.7	*	1	0940	117	100.	759.5	2497.3	*	1	1800	217	98.	691.6	2495.7
1	0125	18	12.	.9	2448.0	*	1	0945	118	99.	758.8	2497.3	*	1	1805	218	98.	690.9	2495.7
1	0130	19	15.	1.1	2448.4	*	1	0950	119	99.	758.2	2497.3	*	1	1810	219	98.	690.2	2495.6
1	0135	20	18.	1.4	2448.9	*	1	0955	120	99.	757.5	2497.2	*	1	1815	220	98.	689.5	2495.6
1	0140	21	23.	1.7	2449.7	*	1	1000	121	99.	756.8	2497.2	*	1	1820	221	98.	688.9	2495.6
1	0145	22	25.	2.2	2450.1	*	1	1005	122	99.	756.1	2497.2	*	1	1825	222	98.	688.2	2495.6
1	0150	23	26.	2.7	2450.4	*	1	1010	123	99.	755.4	2497.2	*	1	1830	223	98.	687.5	2495.6
1	0155	24	27.	3.5	2450.8	*	1	1015	124	99.	754.7	2497.2	*	1	1835	224	98.	686.8	2495.5
1	0200	25	28.	4.3	2451.2	*	1	1020	125	99.	754.1	2497.2	*	1	1840	225	98.	686.2	2495.5
1	0205	26	30.	5.3	2451.6	*	1	1025	126	99.	753.4	2497.2	*	1	1845	226	98.	685.5	2495.5
1	0210	27	31.	6.3	2452.1	*	1	1030	127	99.	752.7	2497.1	*	1	1850	227	98.	684.8	2495.5
1	0215	28	33.	7.4	2452.6	*	1	1035	128	99.	752.0	2497.1	*	1	1855	228	98.	684.1	2495.5
1	0220	29	35.	8.6	2453.2	*	1	1040	129	99.	751.3	2497.1	*	1	1900	229	98.	683.5	2495.5
1	0225	30	37.	10.1	2453.9	*	1	1045	130	99.	750.6	2497.1	*	1	1905	230	98.	682.8	2495.4
1	0230	31	38.	11.7	2454.4	*	1	1050	131	99.	749.9	2497.1	*	1	1910	231	98.	682.1	2495.4
1	0235	32	39.	13.5	2454.9	*	1	1055	132	99.	749.3	2497.1	*	1	1915	232	98.	681.5	2495.4
1	0240	33	41.	15.4	2455.4	*	1	1100	133	99.	748.6	2497.0	*	1	1920	233	98.	680.8	2495.4
1	0245	34	42.	17.5	2456.0	*	1	1105	134	99.	747.9	2497.0	*	1	1925	234	98.	680.1	2495.4
1	0250	35	44.	19.8	2456.7	*	1	1110	135	99.	747.2	2497.0	*	1	1930	235	98.	679.4	2495.4
1	0255	36	45.	22.3	2457.4	*	1	1115	136	99.	746.5	2497.0	*	1	1935	236	98.	678.8	2495.3
1	0300	37	47.	24.9	2458.1	*	1	1120	137	99.	745.8	2497.0	*	1	1940	237	98.	678.1	2495.3
1	0305	38	48.	27.7	2458.6	*	1	1125	138	99.	745.2	2497.0	*	1	1945	238	98.	677.4	2495.3
1	0310	39	49.	30.8	2459.2	*	1	1130	139	99.	744.5	2496.9	*	1	1950	239	98.	676.8	2495.3
1	0315	40	50.	34.4	2459.9	*	1	1135	140	99.	743.8	2496.9	*	1	1955	240	97.	676.1	2495.3
1	0320	41	52.	38.9	2460.8	*	1	1140	141	99.	743.1	2496.9	*	1	2000	241	97.	675.4	2495.3
1	0325	42	54.	45.1	2462.0	*	1	1145	142	99.	742.4	2496.9	*	1	2005	242	97.	674.7	2495.2
1	0330	43	57.	53.9	2463.4	*	1	1150	143	99.	741.8	2496.9	*	1	2010	243	97.	674.1	2495.2
1	0335	44	60.	66.0	2465.3	*	1	1155	144	99.	741.1	2496.9	*	1	2015	244	97.	673.4	2495.2
1	0340	45	63.	82.0	2467.3	*	1	1200	145	99.	740.4	2496.8	*	1	2020	245	97.	672.7	2495.2
1	0345	46	67.	101.8	2469.6	*	1	1205	146	99.	739.7	2496.8	*	1	2025	246	97.	672.1	2495.2
1	0350	47	70.	125.0	2471.9	*	1	1210	147	99.	739.0	2496.8	*	1	2030	247	97.	671.4	2495.2
1	0355	48	73.	151.1	2474.2	*	1	1215	148	99.	738.3	2496.8	*	1	2035	248	97.	670.7	2495.1
1	0400	49	76.	179.8	2476.3	*	1	1220	149	99.	737.7	2496.8	*	1	2040	249	97.	670.0	2495.1
1	0405	50	79.	210.5	2478.4	*	1	1225	150	99.	737.0	2496.8	*	1	2045	250	97.	669.4	2495.1
1	0410	51	81.	242.5	2480.3	*	1	1230	151	99.	736.3	2496.7	*	1	2050	251	97.	668.7	2495.1
1	0415	52	83.	275.3	2482.2	*	1	1235	152	99.	735.6	2496.7	*	1	2055	252	97.	668.0	2495.1
1	0420	53	85.	308.3	2483.6	*	1	1240	153	99.	734.9	2496.7	*	1	2100	253	97.	667.4	2495.1
1	0425	54	87.	340.8	2485.1	*	1	1245	154	99.	734.3	2496.7	*	1	2105	254	97.	666.7	2495.0
1	0430	55	88.	372.5	2486.3	*	1	1250	155	99.	733.6	2496.7	*	1	2110	255	97.	666.0	2495.0
1	0435	56	89.	403.1	2487.4	*	1	1255	156	99.	732.9	2496.7	*	1	2115	256	97.	665.4	2495.0
1	0440	57	90.	432.4	2488.3	*	1	1300	157	99.	732.2	2496.7	*	1	2120	257	97.	664.7	2495.0
1	0445	58	91.	460.2	2489.3	*	1	1305	158	99.	731.5	2496.6	*	1	2125	258	97.	664.0	2495.0
1	0450	59	92.	486.4	2490.1	*	1	1310	159	99.	730.8	2496.6	*	1	2130	259	97.	663.3	2495.0
1	0455	60	93.	510.9	2490.8	*	1	1315	160	99.	730.2	2496.6	*	1	2135	260	97.	662.7	2494.9
1	0500	61	94.	533.9	2491.5	*	1	1320	161	99.	729.5	2496.6	*	1	2140	261	97.	662.0	2494.9
1	0505	62	94.	555.6	2492.1	*	1	1325	162	99.	728.8	2496.6	*	1	2145	262	97.	661.3	2494.9
1	0510	63	95.	576.0	2492.7	*	1	1330	163	99.	728.1	2496.6	*	1	2150	263	97.	660.7	2494.9
1	0515	64	95.	595.2	2493.2	*	1	1335	164	99.	727.4	2496.5	*	1	2155	264	97.	660.0	2494.9
1	0520	65	96.	613.3	2493.7	*	1	1340	165	99.	726.8	2496.5	*	1	2200	265	97.	659.3	2494.9
1	0525	66	96.	630.3	2494.1	*	1	1345	166	99.	726.1	2496.5	*	1	2205	266	97.	658.7	2494.8
1	0530	67	97.	646.1	2494.5	*	1	1350	167	99.	725.4	2496.5	*	1	2210	267	97.	658.0	2494.8
1	0535	68	97.	660.8	2494.9	*	1	1355	168	99.	724.7	2496.5	*	1	2215	268	97.	657.3	2494.8
1	0540	69	97.	674.4	2495.2	*	1	1400	169	99.	724.0	2496.5	*	1	2220	269	97.	656.7	2494.8
1	0545	70	98.	686.8	2495.5	*	1	1405	170	99.	723.4	2496.4	*	1	2225	270	97.	656.0	2494.8
1	0550	71	98.	698.1	2495.8	*	1	1410	171	99.	722.7	2496.4	*	1	2230	271	97.	655.3	2494.8
1	0555	72	98.	708.3	2496.1	*	1	1415	172	99.	722.0	2496.4	*	1	2235	272	97.	654.7	2494.7
1	0600	73	99.	717.4	2496.3	*	1	1420	173	99.	721.3	2496.4	*	1	2240	273	97.	654.0	2494.7
1	0605	74	99.	725.5	2496.5	*	1	1425	174	99.	720.6	2496.4	*	1	2245	274	97.	653.3	2494.7
1	0610	75	99.	732.7	2496.7	*	1	1430	175	99.	720.0	2496.4	*	1	2250	275	97.	652.7	2494.7
1	0615	76	99.	739.0	2496.8	*	1	1435	176	99.	719.3	2496.3	*	1	2255	276	97.	652.0	2494.7
1	0620	77	99.	744.4	2496.9	*	1	1440	177	99.	718.6	2496.3	*	1	2300	277	97.	651.3	2494.7
1	0625	78	99.	749.2	2497.1	*	1	1445	178	99.	717.9	2496.3	*	1	2305	278	97.	650.6	2494.6
1	0630	79	99.	753.3	2497.2	*	1	1450	179	99.	717.3	2496.3	*	1	2310	279	97.	650.0	2494.6
1	0635	80	99.	756.9	2497.2	*	1	1455	180	98.	716.6	2496.3	*	1	2315	280	97.	649.3	2494.6
1	0640	81	100.	759.9	2497.3	*	1	1500	181	98.	715.9	2496.3	*	1	2320	281	97.	648.6	2494.6
1	0645	82	100.	762.5	2497.4	*	1	1505	182	98.	715.2	2496.2	*	1	2325	282	97.	648.0	2494.6
1	0650	83	100.	764.7	2497.4	*	1	1510	183	98.	714.5	2496.2	*	1	2330	283	97.	647.3	2494.6
1	0655	84	100.	766.6	2497.5	*	1	1515	184	98.	713.9	2496.2	*	1	2335	284	97.	646.6	2494.5
1	0700	85	100.	768.1	2497.5	*	1	1520	185	98.	713.2	2496.2	*	1	2340	285	97.	646.0	2494.5
1	0705	86	100.	769.3	2497.5	*	1	1525	186	98.	712.5	2496.2	*	1	2345	286	97.	645.3	2494.5
1	0710	87	100.	770.3	2497.6	*	1	1530	187	98.	711.8	2496.2	*	1	2350	287	97.	644.7	2494.5
1	0715	88	100.	771.1	2497.6	*	1	1535	188	98.	711.2	2496.2	*	1	2355	288	97.	644.0	2494.5
1	0720	89	100.	771.6	2497.6	*	1	1540	189	98.	710.5	2496.1	*	2	0000	289	97.	643.3	2494.5
1	0725	90	100.	772.0	2497.6	*	1	1545	190	98.	709.8	2496.1	*	2	0005	290	97.	642.7	2494.4
1	0730	91	100.	772.3	2497.6	*	1	1550	191	98.	709.1	2496.1	*	2	0010	291	97.	642.0	2494.4
1	0735	92	100.	772.4	2497.6	*	1	1555	192	98.	708.4	2496.1	*	2	0015	292	97.	641.3	2494.4
1	0740	93	100.	772.4	2497.6	*	1	1600	193	98.	707.8	2496.1	*	2	0020	293	97.	640.7	2494.4
1	0745	94	100.	772.3	2497.6	*	1	1605	194	98.	707.1	2496.1	*	2	0025	294	97.	640.0	2494.4
1	0750	95	100.	772.1	2497.6	*	1	1610	195	98.	706.4	2496.0	*	2	0030	295	97.	639.3	2494.4
1	0755	96	100.	771.8	2497.6	*	1	1615	196	98.	705.7	2496.0	*	2	0035	296	97.	638.7	2494.3
1	0800	97	100.	771.5	2497.6	*	1	1620	197	98.	705.1	2496.0	*	2	0040	297	97.	638.0	2494.3
1	0805	98	100.	771.1	2497.6	*	1	1625	198	98.	704.4	2496.0	*	2	0045	298	97.	637.3	2494.3
1	0810	99	100.	770.6	2497.6	*	1	1630	199	98.	703.7	2496.0	*	2	0050	299	96.	636.7	2494.3
1	0815	100	100.	770.1	2497.5	*	1	1635	200	98.	703.0	2496.0	*	2	0055	300	96.	636.0	2494.3

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

6-HR 24-HR 72-HR 24.92-HR

+	(CFS)	(HR)					
			(CFS)				
+	100.	7.58		99.	90.	87.	87.
			(INCHES)	.174	.628	.628	.628
			(AC-FT)	49.	178.	178.	178.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)					
772.	7.58		758.	605.	583.	583.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)					
2497.60	7.58		2497.27	2490.40	2488.77	2488.77

CUMULATIVE AREA = 5.32 SQ MI

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
					.90	1.45
HYDROGRAPH AT						
+	C4CA	4.59	1	FLOW	2070.	4424.
				TIME	4.42	4.33
HYDROGRAPH AT						
+	C4CB	.38	1	FLOW	284.	604.
				TIME	3.83	3.83
HYDROGRAPH AT						
+	C4CC	.35	1	FLOW	307.	646.
				TIME	3.75	3.75
3 COMBINED AT						
+	C4C	5.32	1	FLOW	2281.	4879.
				TIME	4.33	4.25
ROUTED TO						
+	DET_C4C	5.32	1	FLOW	87.	100.
				TIME	7.33	7.58
			** PEAK STAGES IN FEET **			
			1	STAGE	2485.30	2497.60
				TIME	7.33	7.58
ROUTED TO						
+	RC4C	5.32	1	FLOW	87.	100.
				TIME	7.42	7.67
HYDROGRAPH AT						
+	C4CD	.17	1	FLOW	194.	406.
				TIME	3.58	3.58
2 COMBINED AT						
+	C4C	5.49	1	FLOW	229.	462.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	C3B3B	.56	1	FLOW	430.	890.
				TIME	3.83	3.83
2 COMBINED AT						
+	C3B3B	6.05	1	FLOW	568.	1143.
				TIME	3.83	3.75
ROUTED TO						
+	R3B3B	6.05	1	FLOW	563.	1140.
				TIME	3.83	3.83
ROUTED TO						
+	R3B3B	6.05	1	FLOW	562.	1129.
				TIME	4.00	3.92

*** NORMAL END OF HEC-1 ***

SECTION 4

PMF STUDY

LOCAL STORM PMF COMPUTATION

LOCAL PMP BASED ON HMR 49 FOR LAS VEGAS VALLEY

Drainage Watershe EC1 Detention Basin
Latitude:
Longtitude:
Drainage Area: 5.32 sq mi
Minimum Elevation: 2400 feet

PMP PRECEDURE

1. Average 1-hr 1-sq mile PMP for drainage 10.6 inches
2. a. Rainfall Depth Ajustment for Elevation 100 %
   b. Net 1-hr 1-sq mile PMP 10.6 inches
3. a. Ratio of 6-hr to 1 hr Precipitation Ratio 1.3
   b. 6-hr PMP in inches 13.78 inches

Steps to Determine PMP	15-minutes Rainfall in First Hour				Duration for Six Hours					
	0.25	0.50	0.75	1.00	1.00	2.00	3.00	4.00	5.00	6.00
	in hours				in hours					
4. Percentage of Rainfall Distribution for 6 to 1 Precipitation Ratio in % (Table 4.4)	74.00	89.00	95.00	100.00	100.00	114.00	121.00	125.00	128.00	130.00
5. 1-sq mile PMP for the Durations in inches	7.84	9.43	10.07	10.60	10.60	12.08	12.83	13.25	13.57	13.78
6. Areal Reduction (Figure 4.9)	0.82	0.86	0.87	0.89	0.89	0.90	0.91	0.92	0.92	0.93
7. Areal Reduced PMP in inches	6.43	8.11	8.76	9.43	9.43	10.88	11.67	12.12	12.48	12.75
8. Incremental PMP in inches	6.43	1.68	0.65	0.67	9.43	1.44	0.80	0.45	0.36	0.26
9. Time Sequence pf incremental PMP in inches	Four 15-minute rainfall blocks				Six hourly rainfall blocks					
	2.25 hr	2.5.0 hr	2.75 hr	3.0 hr	1st hr	2nd hr	3rd hr	4th hr	5th hr	6th hr
a. Hourly Increments					0.76	9.43	1.46	0.53	0.34	0.25
b. Four Largest 15-minutes Increments	0.70	6.40	1.69	0.65						

Six hour PMP Rainfall Distribution
five minutes increments

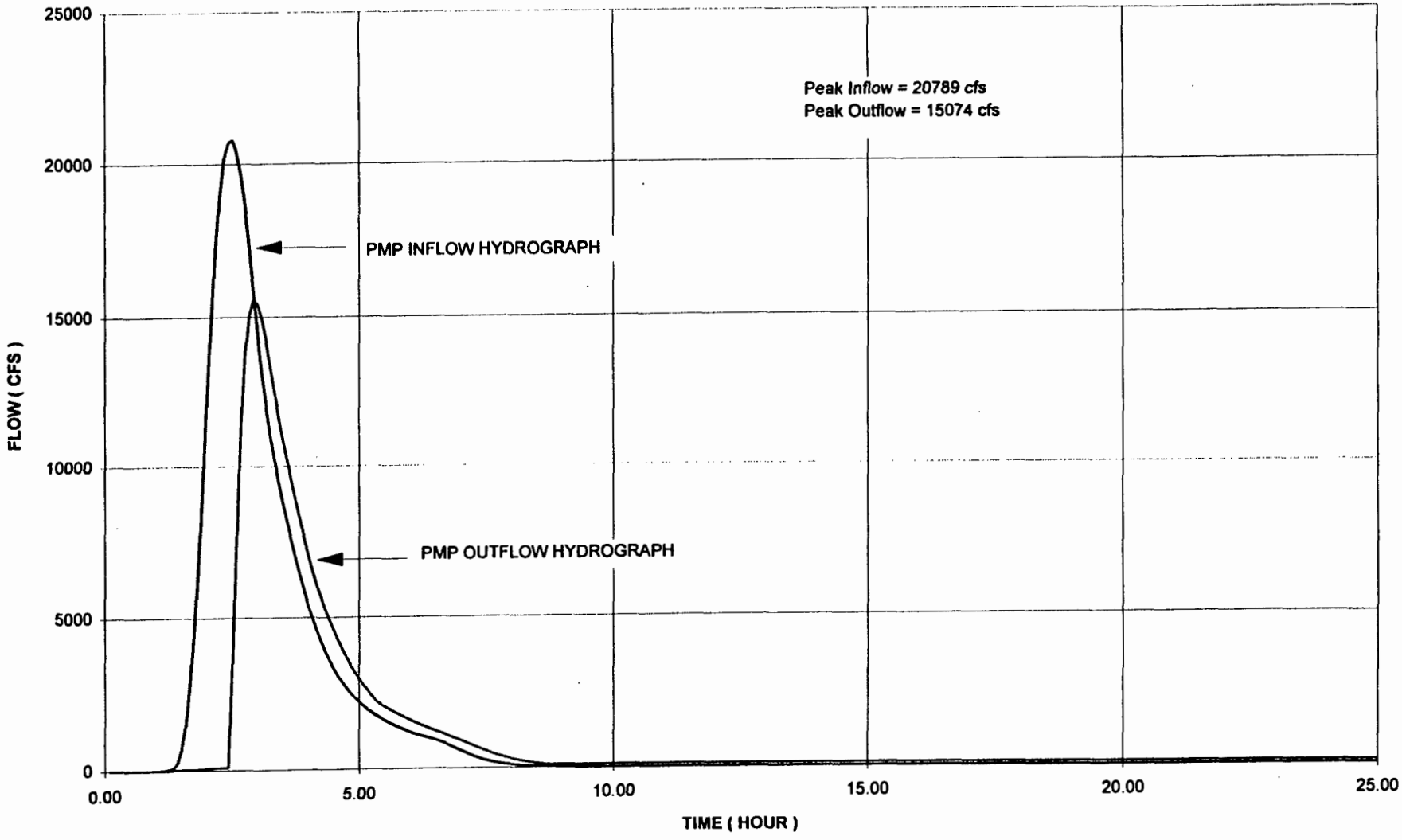
Hourly Precipitation Increments		5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	Check Sum
1st hr	**0.76**	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	**0.76**
2nd hr	**9.43**	0.23	0.23	0.23	2.13	2.13	2.13	0.56	0.56	0.56	0.22	0.22	0.22	**9.44**
3rd hr	**1.46**	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	**1.46**
4th hr	**0.53**	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	**0.53**
5th hr	**0.34**	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	**0.34**
6th hr	**0.25**	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	**0.25**
											Total Precipitation			**12.78**

Accumulative 5-minute Precipitation Percentage Curve

Hourly Precipitation Increments		5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00
1st hr	**0.76**	0.005	0.010	0.015	0.020	0.025	0.030	0.035	0.040	0.045	0.050	0.055	0.059
2nd hr	**9.43**	0.078	0.096	0.114	0.281	0.448	0.615	0.659	0.703	0.747	0.764	0.781	0.798
3rd hr	**1.46**	0.808	0.817	0.827	0.836	0.846	0.855	0.865	0.874	0.884	0.893	0.903	0.912
4th hr	**0.53**	0.916	0.919	0.923	0.926	0.930	0.933	0.937	0.940	0.943	0.947	0.950	0.954
5th hr	**0.34**	0.956	0.958	0.960	0.963	0.965	0.967	0.969	0.972	0.974	0.976	0.978	0.980
6th hr	**0.25**	0.982	0.984	0.985	0.987	0.989	0.990	0.992	0.993	0.995	0.997	0.998	1.000

PMP HEC-1 MODEL OUTPUT

SIX HOUR PMF INFLOW/OUTFLOW HYDROGRAPH



```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990               *
*           VERSION 4.0                 *
*                                       *
*  RUN DATE  02/16/1998  TIME  14:39:58 *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104               *
*                                       *
*****************************************
```


```
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    INPUT FILE = ECDBPMP.DAT
            2       ID    RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
            3       ID    PMF EVENT
            4       ID    VTN NEVADA, July 1997
            5       ID
            6       ID    WATERSHED MODEL TAKEN FROM COE HYDROLOGY
            7       ID    KINEMATIC SUBBASINS CONVERTED TO SCS
            8       ID    CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
            9       ID    SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT
           10       ID
*** FREE ***
           11       IT       5       0       0     300
           12       IN       5       0       0
           13       IO       5
                    * ******* USING PMP  *******
                    *  JR PREC 1.0 0.99 0.975 0.905
           14       JR    PREC     1.0
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)
                    *

           15       KK    C4CB WEST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
           16       KM   RUNOFF FOR THE WEST SEDIMENT TRAP DESIGN
           17       BA    2.97
           18       PB   12.77
           19       PC    .000    .005    .010    .015    .020    .025    .030    .035    .040    .045
           20       PC    .050    .055    .059    .078    .096    .114    .281    .448    .615    .659
           21       PC    .703    .747    .764    .781    .798    .808    .817    .827    .836    .846
           22       PC    .855    .865    .874    .884    .893    .903    .912    .916    .919    .923
           23       PC    .926    .930    .933    .937    .940    .943    .947    .950    .954    .956
           24       PC    .958    .960    .963    .965    .967    .969    .972    .974    .976    .978
           25       PC    .980    .982    .984    .985    .987    .989    .990    .992    .993    .995
           26       PC    .997    .998   1.00
           27       LS    0.00   80.0
           28       UD    0.89

           29       KK    C4CA EAST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
           30       KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
           31       BA    2.56
           32       PB   12.77
           33       LS    0.00    80.0
           34       UD    0.89

           35       KK     C4C
           36       KM   Combine C4CA and C4CB
           37       HC       2
           38       KO       1
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

           39       KK DET_C4CEast Detention Basin
           40       KM   Proposed detention basin d/s of subbasin C4C; storage capacity =  840 ac-ft;
           41       KM   assume a 48" diameter low-level outlet pipe;invert elevation 2447.5 ft
           42       RS       1    STOR      -1
           43       SV     0.0    1.85   10.35   24.60   45.03   70.78  104.85  148.32  204.08  271.64
           44       SV  362.21  482.58  551.62  625.31  704.75  789.13  879.88  975.68  1183.9  1414.3
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  45      SE  2446.0  2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  46      SE  2486.0  2490.0  2492.0  2494.0  2496.0  2498.0  2500.0  2502.2  2506.0  2510.0
  47      SQ     0.0   24.59   37.30   46.66   54.44   61.24   67.35   72.96   78.16   83.04
  48      SQ   87.65   92.02   94.14   98.22  102.15  2194.8  6208.0  11404.  17558.  24539.
  49      SE  2446.0  2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  50      SE  2486.0  2490.0  2492.0  2496.0  2500.0  2502.0  2504.0  2506.0  2508.0  2510.0
  51      KO       1
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  52      KK    RC4C
  53      KM   ROUTE DET_C4C outflow THRU C3B3
  54      KM   With 7-7' drop structures
  55      RK    3200   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  56      KK    C4CD TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
  57      KM   RUNOFF FROM C4CD
  58      BA    0.17
  59      PB    3.34
  60      LS    0.00       82
  61      UD    0.20

  62      KK     C4C
  63      KM   COMBINE DETENTION BASIN OUTFALL AND SUBBASIN C4CD
  64      HC       2

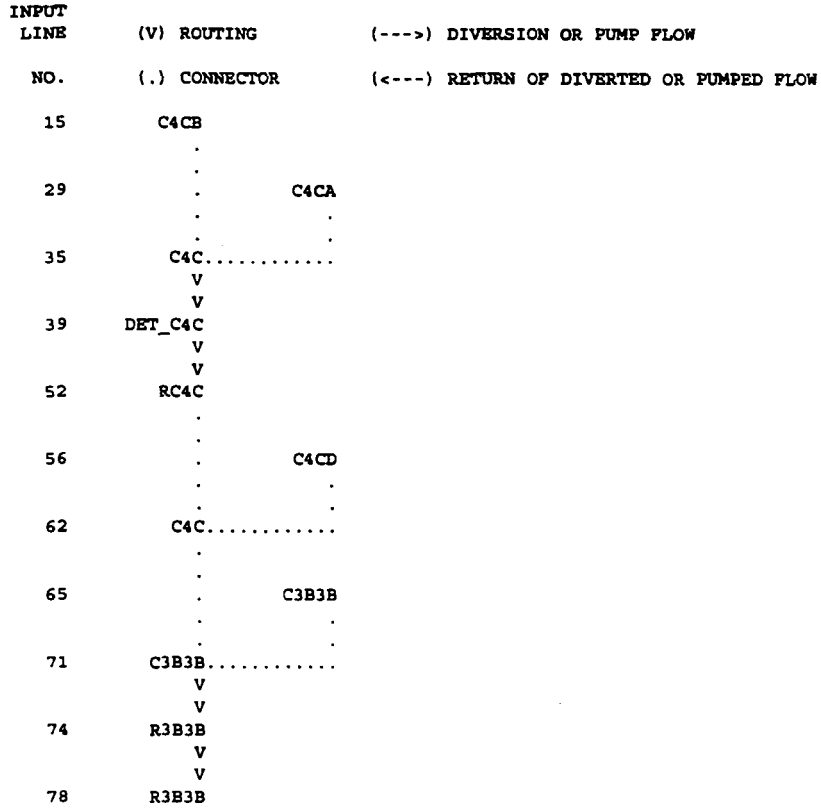
  65      KK   C3B3B  DISTRICT C AREA 3 SUBBASIN B3B
  66      KM   RUNOFF FROM C3B3B
  67      BA    0.56
  68      PB    3.36
  69      LS    0.00       82
  70      UD    0.42

  71      KK   C3B3B
  72      KM   Combine RC4C & C3B3
  73      HC       2
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  74      KK   R3B3B
  75      KM   ROUTE 3B3B
  76      KM   With 7-7' drop structures
  77      RK    3800   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  78      KK   R3B3B
  79      KM   ROUTE R3B3B THRU C3B1
  80      RK    8250   0.015   0.030       0    TRAP      50     3.0
          *
  81      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*         SEPTEMBER 1990             *
*          VERSION 4.0               *
*                                    *
*  RUN DATE  02/16/1998  TIME  14:39:58*
*                                    *
**************************************
```


```
**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*        (916) 756-1104              *
*                                    *
**************************************
```


```
INPUT FILE = ECDBPMP.DAT
RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
PMF EVENT
VTN NEVADA, July 1997

WATERSHED MODEL TAKEN FROM COE HYDROLOGY
KINEMATIC SUBBASINS CONVERTED TO SCS
CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT

13 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        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME       0055  ENDING TIME
                    ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                     TOTAL TIME BASE    24.92 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
                  1.00

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
35 KK     *      C4C   *
          *            *
          **************

38 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

37 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                    ***

**********************************************************************************************************************************

                                        HYDROGRAPH AT STATION      C4C
                                           SUM OF  2 HYDROGRAPHS
                                          PLAN 1,    RATIO =  1.00

**********************************************************************************************************************************
```

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		0615	76	1033.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	992.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	946.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	896.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	839.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	777.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	712.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	643.	1		1305	158	0.	1		1920	233	0.
1		0040	9	0.	1		0655	84	577.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	512.	1		1315	160	0.	1		1930	235	0.
1		0050	11	1.	1		0705	86	450.	1		1320	161	0.	1		1935	236	0.
1		0055	12	3.	1		0710	87	392.	1		1325	162	0.	1		1940	237	0.
1		0100	13	7.	1		0715	88	339.	1		1330	163	0.	1		1945	238	0.
1		0105	14	16.	1		0720	89	291.	1		1335	164	0.	1		1950	239	0.
1		0110	15	39.	1		0725	90	250.	1		1340	165	0.	1		1955	240	0.
1		0115	16	82.	1		0730	91	214.	1		1345	166	0.	1		2000	241	0.
1		0120	17	254.	1		0735	92	185.	1		1350	167	0.	1		2005	242	0.
1		0125	18	711.	1		0740	93	160.	1		1355	168	0.	1		2010	243	0.
1		0130	19	1575.	1		0745	94	138.	1		1400	169	0.	1		2015	244	0.
1		0135	20	2853.	1		0750	95	119.	1		1405	170	0.	1		2020	245	0.
1		0140	21	4552.	1		0755	96	103.	1		1410	171	0.	1		2025	246	0.
1		0145	22	6740.	1		0800	97	89.	1		1415	172	0.	1		2030	247	0.
1		0150	23	9364.	1		0805	98	76.	1		1420	173	0.	1		2035	248	0.
1		0155	24	12184.	1		0810	99	66.	1		1425	174	0.	1		2040	249	0.
1		0200	25	14882.	1		0815	100	56.	1		1430	175	0.	1		2045	250	0.
1		0205	26	17177.	1		0820	101	48.	1		1435	176	0.	1		2050	251	0.
1		0210	27	18913.	1		0825	102	42.	1		1440	177	0.	1		2055	252	0.
1		0215	28	20088.	1		0830	103	36.	1		1445	178	0.	1		2100	253	0.
1		0220	29	20690.	1		0835	104	31.	1		1450	179	0.	1		2105	254	0.
1		0225	30	20789.	1		0840	105	26.	1		1455	180	0.	1		2110	255	0.
1		0230	31	20419.	1		0845	106	23.	1		1500	181	0.	1		2115	256	0.
1		0235	32	19701.	1		0850	107	19.	1		1505	182	0.	1		2120	257	0.
1		0240	33	18685.	1		0855	108	17.	1		1510	183	0.	1		2125	258	0.
1		0245	34	17367.	1		0900	109	14.	1		1515	184	0.	1		2130	259	0.
1		0250	35	15880.	1		0905	110	12.	1		1520	185	0.	1		2135	260	0.
1		0255	36	14436.	1		0910	111	10.	1		1525	186	0.	1		2140	261	0.
1		0300	37	13163.	1		0915	112	9.	1		1530	187	0.	1		2145	262	0.
1		0305	38	12058.	1		0920	113	7.	1		1535	188	0.	1		2150	263	0.
1		0310	39	11077.	1		0925	114	6.	1		1540	189	0.	1		2155	264	0.
1		0315	40	10228.	1		0930	115	5.	1		1545	190	0.	1		2200	265	0.
1		0320	41	9481.	1		0935	116	4.	1		1550	191	0.	1		2205	266	0.
1		0325	42	8786.	1		0940	117	4.	1		1555	192	0.	1		2210	267	0.
1		0330	43	8128.	1		0945	118	3.	1		1600	193	0.	1		2215	268	0.
1		0335	44	7516.	1		0950	119	2.	1		1605	194	0.	1		2220	269	0.
1		0340	45	6935.	1		0955	120	2.	1		1610	195	0.	1		2225	270	0.
1		0345	46	6397.	1		1000	121	1.	1		1615	196	0.	1		2230	271	0.
1		0350	47	5886.	1		1005	122	1.	1		1620	197	0.	1		2235	272	0.
1		0355	48	5415.	1		1010	123	1.	1		1625	198	0.	1		2240	273	0.
1		0400	49	4977.	1		1015	124	1.	1		1630	199	0.	1		2245	274	0.
1		0405	50	4576.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	4212.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	3881.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	3587.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	3321.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	3088.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	2878.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	2688.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	2514.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	2357.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	2214.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	2085.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	1970.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	1868.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	1776.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	1689.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	1608.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	1534.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	1464.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	1398.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	1333.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	1272.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	1214.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	1162.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	1116.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	1074.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
20789.	2.42		6032.	1516.	1460.	1460.
		(INCHES)	10.142	10.193	10.193	10.193
		(AC-FT)	2991.	3006.	3006.	3006.

CUMULATIVE AREA = 5.53 SQ MI

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          *            *
39 KK     *  DET_C4C   *     East Detention Basin
          *            *
          **************

51 KO          OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

42 RS          STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       STOR  TYPE OF INITIAL CONDITION
                   RSVRIC      -1.00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

43 SV            STORAGE         .0        1.9       10.4       24.6       45.0       70.8      104.8      148.3      204.1      271.6
                               362.2      482.6      551.6      625.3      704.8      789.1      879.9      975.7     1183.9     1414.3

45 SE            ELEVATION  2446.00    2450.00    2454.00    2458.00    2462.00    2466.00    2470.00    2474.00    2478.00    2482.00
                            2486.00    2490.00    2492.00    2494.00    2496.00    2498.00    2500.00    2502.20    2506.00    2510.00

47 SQ            DISCHARGE       0.       25.        37.        47.        54.        61.        67.        73.        78.        83.
                               88.        92.        94.        98.       102.      2195.      6208.     11404.     17558.     24539.

49 SE            ELEVATION  2446.00    2450.00    2454.00    2458.00    2462.00    2466.00    2470.00    2474.00    2478.00    2482.00
                            2486.00    2490.00    2492.00    2496.00    2500.00    2502.00    2504.00    2506.00    2508.00    2510.00
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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.85	10.35	24.60	45.03	70.78	104.85	148.32	204.08	271.64
OUTFLOW	.00	24.59	37.30	46.66	54.44	61.24	67.35	72.96	78.16	83.04
ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
STORAGE	362.21	482.58	551.62	625.31	704.75	789.13	879.88	966.97	975.68	1074.31
OUTFLOW	87.65	92.02	94.14	96.18	98.22	100.18	102.15	2194.80	2596.02	6208.00
ELEVATION	2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.00	2502.20	2504.00
STORAGE	1183.90	1299.10	1414.30							
OUTFLOW	11404.00	17558.00	24539.00							
ELEVATION	2506.00	2508.00	2510.00							

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HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = 1.00

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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	2446.0	1		0820	101	175.	882.9	2500.1	1		1640	201	101.	814.1	2498.5
1		0005	2	0.	.0	2446.0	1		0825	102	155.	882.1	2500.1	1		1645	202	101.	813.4	2498.5
1		0010	3	0.	.0	2446.0	1		0830	103	137.	881.4	2500.0	1		1650	203	101.	812.7	2498.5
1		0015	4	0.	.0	2446.0	1		0835	104	122.	880.7	2500.0	1		1655	204	101.	812.0	2498.5
1		0020	5	0.	.0	2446.0	1		0840	105	107.	880.1	2500.0	1		1700	205	101.	811.3	2498.5
1		0025	6	0.	.0	2446.0	1		0845	106	102.	879.5	2500.0	1		1705	206	101.	810.6	2498.5
1		0030	7	0.	.0	2446.0	1		0850	107	102.	879.0	2500.0	1		1710	207	101.	809.9	2498.5
1		0035	8	0.	.0	2446.0	1		0855	108	102.	878.4	2500.0	1		1715	208	101.	809.2	2498.4
1		0040	9	0.	.0	2446.0	1		0900	109	102.	877.8	2500.0	1		1720	209	101.	808.5	2498.4
1		0045	10	0.	.0	2446.0	1		0905	110	102.	877.2	2499.9	1		1725	210	101.	807.8	2498.4
1		0050	11	0.	.0	2446.0	1		0910	111	102.	876.6	2499.9	1		1730	211	101.	807.1	2498.4
1		0055	12	0.	.0	2446.0	1		0915	112	102.	875.9	2499.9	1		1735	212	101.	806.4	2498.4
1		0100	13	1.	.0	2446.1	1		0920	113	102.	875.3	2499.9	1		1740	213	101.	805.8	2498.4
1		0105	14	2.	.1	2446.3	1		0925	114	102.	874.6	2499.9	1		1745	214	101.	805.1	2498.4
1		0110	15	4.	.3	2446.6	1		0930	115	102.	874.0	2499.9	1		1750	215	101.	804.4	2498.3
1		0115	16	9.	.7	2447.4	1		0935	116	102.	873.3	2499.9	1		1755	216	100.	803.7	2498.3
1		0120	17	23.	1.7	2449.7	1		0940	117	102.	872.6	2499.8	1		1800	217	100.	803.0	2498.3
1		0125	18	29.	4.9	2451.4	1		0945	118	102.	871.9	2499.8	1		1805	218	100.	802.3	2498.3
1		0130	19	39.	12.5	2454.6	1		0950	119	102.	871.2	2499.8	1		1810	219	100.	801.6	2498.3
1		0135	20	48.	27.4	2458.6	1		0955	120	102.	870.6	2499.8	1		1815	220	100.	800.9	2498.3
1		0140	21	56.	52.6	2463.2	1		1000	121	102.	869.9	2499.8	1		1820	221	100.	800.2	2498.2
1		0145	22	65.	91.1	2468.4	1		1005	122	102.	869.2	2499.8	1		1825	222	100.	799.5	2498.2
1		0150	23	73.	146.0	2473.8	1		1010	123	102.	868.5	2499.7	1		1830	223	100.	798.8	2498.2

1	0155	24	79.	219.7	2478.9	•	1	1015	124	102.	867.8	2499.7	•	1	1835	224	100.	798.1	2498.2
1	0200	25	85.	312.4	2483.8	•	1	1020	125	102.	867.1	2499.7	•	1	1840	225	100.	797.4	2498.2
1	0205	26	90.	422.1	2488.0	•	1	1025	126	102.	866.4	2499.7	•	1	1845	226	100.	796.8	2498.2
1	0210	27	94.	545.8	2491.8	•	1	1030	127	102.	865.7	2499.7	•	1	1850	227	100.	796.1	2498.2
1	0215	28	98.	679.4	2495.4	•	1	1035	128	102.	865.0	2499.7	•	1	1855	228	100.	795.4	2498.1
1	0220	29	101.	819.2	2498.7	•	1	1040	129	102.	864.3	2499.7	•	1	1900	229	100.	794.7	2498.1
1	0225	30	1909.	955.1	2501.7	•	1	1045	130	102.	863.6	2499.6	•	1	1905	230	100.	794.0	2498.1
1	0230	31	6036.	1069.6	2503.9	•	1	1050	131	102.	862.9	2499.6	•	1	1910	231	100.	793.3	2498.1
1	0235	32	9929.	1152.8	2505.4	•	1	1055	132	102.	862.2	2499.6	•	1	1915	232	100.	792.6	2498.1
1	0240	33	12650.	1207.2	2506.4	•	1	1100	133	102.	861.5	2499.6	•	1	1920	233	100.	791.9	2498.1
1	0245	34	14320.	1238.5	2506.9	•	1	1105	134	102.	860.8	2499.6	•	1	1925	234	100.	791.2	2498.0
1	0250	35	15036.	1251.9	2507.2	•	1	1110	135	102.	860.1	2499.6	•	1	1930	235	100.	790.5	2498.0
1	0255	36	15074.	1252.6	2507.2	•	1	1115	136	102.	859.4	2499.5	•	1	1935	236	100.	789.9	2498.0
1	0300	37	14678.	1245.2	2507.1	•	1	1120	137	102.	858.7	2499.5	•	1	1940	237	100.	789.2	2498.0
1	0305	38	14035.	1233.2	2506.9	•	1	1125	138	102.	858.0	2499.5	•	1	1945	238	100.	788.5	2498.0
1	0310	39	13268.	1218.8	2506.6	•	1	1130	139	102.	857.3	2499.5	•	1	1950	239	100.	787.8	2498.0
1	0315	40	12456.	1203.6	2506.3	•	1	1135	140	102.	856.6	2499.5	•	1	1955	240	100.	787.1	2498.0
1	0320	41	11647.	1188.5	2506.1	•	1	1140	141	102.	855.9	2499.5	•	1	2000	241	100.	786.4	2497.9
1	0325	42	10918.	1173.7	2505.8	•	1	1145	142	102.	855.2	2499.5	•	1	2005	242	100.	785.7	2497.9
1	0330	43	10227.	1159.1	2505.5	•	1	1150	143	102.	854.5	2499.4	•	1	2010	243	100.	785.0	2497.9
1	0335	44	9552.	1144.8	2505.3	•	1	1155	144	102.	853.8	2499.4	•	1	2015	244	100.	784.3	2497.9
1	0340	45	8899.	1131.1	2505.0	•	1	1200	145	102.	853.1	2499.4	•	1	2020	245	100.	783.6	2497.9
1	0345	46	8272.	1117.8	2504.8	•	1	1205	146	102.	852.4	2499.4	•	1	2025	246	100.	783.0	2497.9
1	0350	47	7674.	1105.2	2504.6	•	1	1210	147	102.	851.7	2499.4	•	1	2030	247	100.	782.3	2497.8
1	0355	48	7106.	1093.3	2504.3	•	1	1215	148	102.	851.0	2499.4	•	1	2035	248	100.	781.6	2497.8
1	0400	49	6570.	1081.9	2504.1	•	1	1220	149	102.	850.3	2499.3	•	1	2040	249	100.	780.9	2497.8
1	0405	50	6095.	1071.2	2503.9	•	1	1225	150	101.	849.6	2499.3	•	1	2045	250	100.	780.2	2497.8
1	0410	51	5714.	1060.8	2503.8	•	1	1230	151	101.	848.9	2499.3	•	1	2050	251	100.	779.5	2497.8
1	0415	52	5341.	1050.6	2503.6	•	1	1235	152	101.	848.2	2499.3	•	1	2055	252	100.	778.8	2497.8
1	0420	53	4981.	1040.8	2503.4	•	1	1240	153	101.	847.5	2499.3	•	1	2100	253	100.	778.1	2497.7
1	0425	54	4639.	1031.5	2503.2	•	1	1245	154	101.	846.8	2499.3	•	1	2105	254	100.	777.4	2497.7
1	0430	55	4318.	1022.7	2503.1	•	1	1250	155	101.	846.1	2499.3	•	1	2110	255	100.	776.8	2497.7
1	0435	56	4019.	1014.5	2502.9	•	1	1255	156	101.	845.4	2499.2	•	1	2115	256	100.	776.1	2497.7
1	0440	57	3742.	1007.0	2502.8	•	1	1300	157	101.	844.7	2499.2	•	1	2120	257	100.	775.4	2497.7
1	0445	58	3486.	1000.0	2502.6	•	1	1305	158	101.	844.0	2499.2	•	1	2125	258	100.	774.7	2497.7
1	0450	59	3251.	993.6	2502.5	•	1	1310	159	101.	843.3	2499.2	•	1	2130	259	100.	774.0	2497.6
1	0455	60	3035.	987.7	2502.4	•	1	1315	160	101.	842.6	2499.2	•	1	2135	260	100.	773.3	2497.6
1	0500	61	2837.	982.2	2502.3	•	1	1320	161	101.	841.9	2499.2	•	1	2140	261	100.	772.6	2497.6
1	0505	62	2655.	977.3	2502.2	•	1	1325	162	101.	841.2	2499.1	•	1	2145	262	100.	771.9	2497.6
1	0510	63	2467.	972.9	2502.1	•	1	1330	163	101.	840.5	2499.1	•	1	2150	263	100.	771.3	2497.6
1	0515	64	2290.	969.0	2502.0	•	1	1335	164	101.	839.8	2499.1	•	1	2155	264	100.	770.6	2497.6
1	0520	65	2163.	965.6	2502.0	•	1	1340	165	101.	839.1	2499.1	•	1	2200	265	100.	769.9	2497.5
1	0525	66	2084.	962.4	2501.9	•	1	1345	166	101.	838.4	2499.1	•	1	2205	266	100.	769.2	2497.5
1	0530	67	2006.	959.1	2501.8	•	1	1350	167	101.	837.7	2499.1	•	1	2210	267	100.	768.5	2497.5
1	0535	68	1928.	955.9	2501.7	•	1	1355	168	101.	837.0	2499.1	•	1	2215	268	100.	767.8	2497.5
1	0540	69	1852.	952.7	2501.7	•	1	1400	169	101.	836.3	2499.0	•	1	2220	269	100.	767.1	2497.5
1	0545	70	1778.	949.6	2501.6	•	1	1405	170	101.	835.6	2499.0	•	1	2225	270	100.	766.5	2497.5
1	0550	71	1705.	946.6	2501.5	•	1	1410	171	101.	834.9	2499.0	•	1	2230	271	100.	765.8	2497.4
1	0555	72	1635.	943.7	2501.5	•	1	1415	172	101.	834.2	2499.0	•	1	2235	272	100.	765.1	2497.4
1	0600	73	1566.	940.8	2501.4	•	1	1420	173	101.	833.5	2499.0	•	1	2240	273	100.	764.4	2497.4
1	0605	74	1501.	938.1	2501.3	•	1	1425	174	101.	832.8	2499.0	•	1	2245	274	100.	763.7	2497.4
1	0610	75	1439.	935.5	2501.3	•	1	1430	175	101.	832.1	2498.9	•	1	2250	275	100.	763.0	2497.4
1	0615	76	1380.	933.1	2501.2	•	1	1435	176	101.	831.4	2498.9	•	1	2255	276	100.	762.3	2497.4
1	0620	77	1324.	930.7	2501.2	•	1	1440	177	101.	830.7	2498.9	•	1	2300	277	100.	761.6	2497.3
1	0625	78	1270.	928.5	2501.1	•	1	1445	178	101.	830.0	2498.9	•	1	2305	278	100.	761.0	2497.3
1	0630	79	1216.	926.3	2501.1	•	1	1450	179	101.	829.4	2498.9	•	1	2310	279	100.	760.3	2497.3
1	0635	80	1163.	924.0	2501.0	•	1	1455	180	101.	828.7	2498.9	•	1	2315	280	99.	759.6	2497.3
1	0640	81	1109.	921.8	2501.0	•	1	1500	181	101.	828.0	2498.9	•	1	2320	281	99.	758.9	2497.3
1	0645	82	1053.	919.5	2500.9	•	1	1505	182	101.	827.3	2498.8	•	1	2325	282	99.	758.2	2497.3
1	0650	83	996.	917.1	2500.9	•	1	1510	183	101.	826.6	2498.8	•	1	2330	283	99.	757.5	2497.3
1	0655	84	937.	914.6	2500.8	•	1	1515	184	101.	825.9	2498.8	•	1	2335	284	99.	756.9	2497.2
1	0700	85	877.	912.1	2500.7	•	1	1520	185	101.	825.2	2498.8	•	1	2340	285	99.	756.2	2497.2
1	0705	86	816.	909.6	2500.7	•	1	1525	186	101.	824.5	2498.8	•	1	2345	286	99.	755.5	2497.2
1	0710	87	756.	907.1	2500.6	•	1	1530	187	101.	823.8	2498.8	•	1	2350	287	99.	754.8	2497.2
1	0715	88	696.	904.6	2500.6	•	1	1535	188	101.	823.1	2498.7	•	1	2355	288	99.	754.1	2497.2
1	0720	89	638.	902.2	2500.5	•	1	1540	189	101.	822.4	2498.7	•	2	0000	289	99.	753.4	2497.2
1	0725	90	582.	899.9	2500.5	•	1	1545	190	101.	821.7	2498.7	•	2	0005	290	99.	752.7	2497.1
1	0730	91	529.	897.6	2500.4	•	1	1550	191	101.	821.0	2498.7	•	2	0010	291	99.	752.1	2497.1
1	0735	92	478.	895.5	2500.4	•	1	1555	192	101.	820.3	2498.7	•	2	0015	292	99.	751.4	2497.1
1	0740	93	432.	893.6	2500.3	•	1	1600	193	101.	819.6	2498.7	•	2	0020	293	99.	750.7	2497.1
1	0745	94	388.	891.8	2500.3	•	1	1605	194	101.	818.9	2498.7	•	2	0025	294	99.	750.0	2497.1
1	0750	95	349.	890.1	2500.2	•	1	1610	195	101.	818.2	2498.6	•	2	0030	295	99.	749.3	2497.1
1	0755	96	312.	888.6	2500.2	•	1	1615	196	101.	817.5	2498.6	•	2	0035	296	99.	748.6	2497.0
1	0800	97	279.	887.3	2500.2	•	1	1620	197	101.	816.8	2498.6	•	2	0040	297	99.	748.0	2497.0
1	0805	98	249.	886.0	2500.1	•	1	1625	198	101.	816.1	2498.6	•	2	0045	298	99.	747.3	2497.0
1	0810	99	222.	884.9	2500.1	•	1	1630	199	101.	815.5	2498.6	•	2	0050	299	99.	746.6	2497.0
1	0815	100	197.	883.8	2500.1	•	1	1635	200	101.	814.8	2498.6	•	2	0055	300	99.	745.9	2497.0
						•							•						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 15074.	2.92		4266.	1140.	1098.	1098.
		(INCHES)	7.173	7.664	7.664	7.664
		(AC-FT)	2116.	2260.	2260.	2260.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
1253.	2.92	1005.	824.	794.	794.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)				
2507.19	2.92	2502.59	2497.62	2495.72	2495.72

CUMULATIVE AREA = 5.53 SQ MI

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
					1.00
HYDROGRAPH AT					
+	C4CB	2.97	1	FLOW	11165.
				TIME	2.42
HYDROGRAPH AT					
+	C4CA	2.56	1	FLOW	9624.
				TIME	2.42
2 COMBINED AT					
+	C4C	5.53	1	FLOW	20789.
				TIME	2.42
ROUTED TO					
+	DET_C4C	5.53	1	FLOW	15074.
				TIME	2.92
			** PEAK STAGES IN FEET **		
			1	STAGE	2507.19
				TIME	2.92
ROUTED TO					
+	RC4C	5.53	1	FLOW	15066.
				TIME	2.92
HYDROGRAPH AT					
+	C4CD	.17	1	FLOW	233.
				TIME	1.67
2 COMBINED AT					
+	C4C	5.70	1	FLOW	15099.
				TIME	2.92
HYDROGRAPH AT					
+	C3B3B	.56	1	FLOW	526.
				TIME	1.92
2 COMBINED AT					
+	C3B3B	6.26	1	FLOW	15232.
				TIME	2.92
ROUTED TO					
+	R3B3B	6.26	1	FLOW	15191.
				TIME	2.92
ROUTED TO					
+	R3B3B	6.26	1	FLOW	15096.
				TIME	3.00

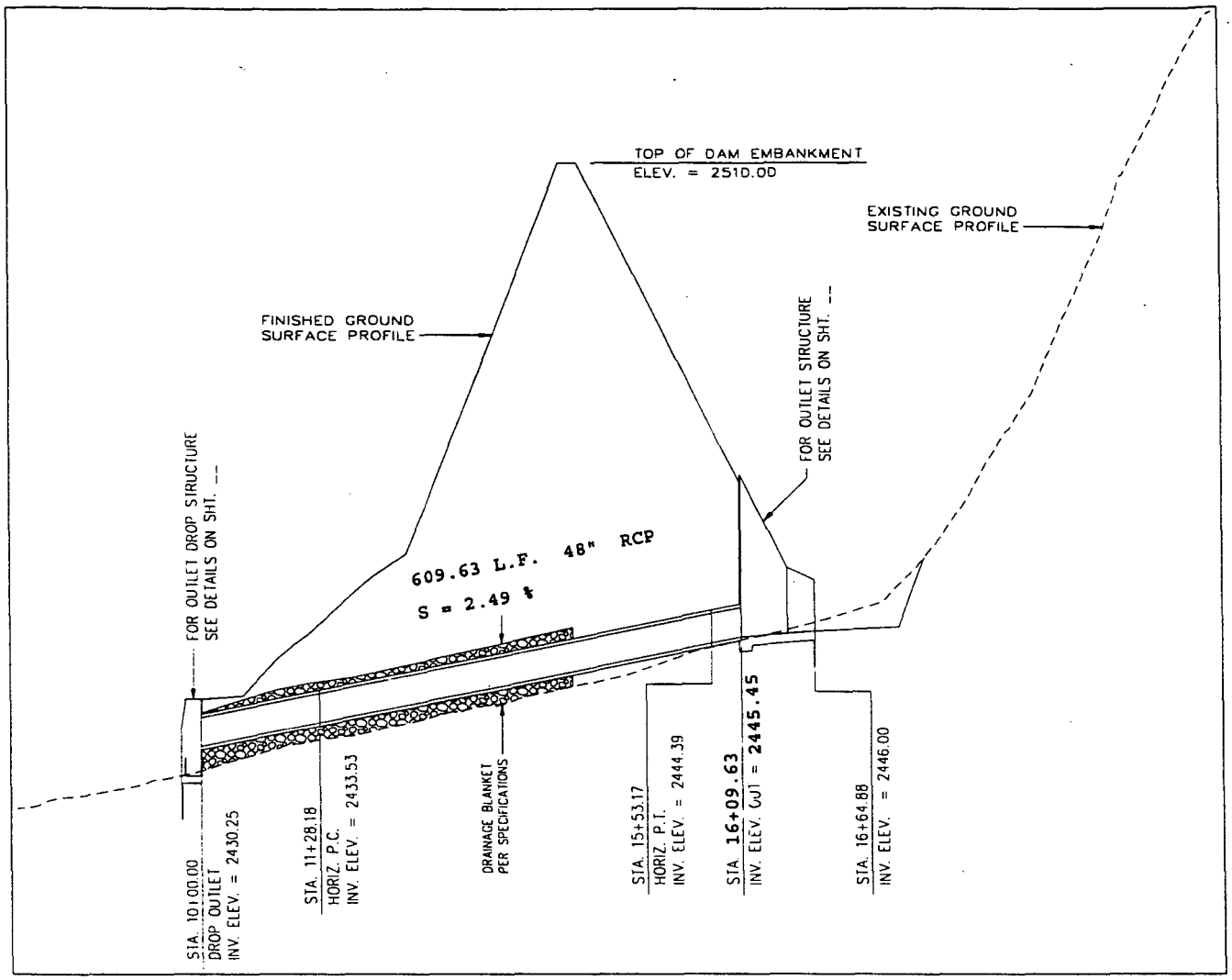
*** NORMAL END OF HEC-1 ***

SECTION 5

LOW LEVEL OUTLET CALCULATION

TRASHRACK CALCULATION

Trashrack Calculation (Reference : Design Of Small Dam, by Bureau of Reclamation)



Orifice Diameter :D = 1.85 ft

Totsl Head H = (2510 - 2446 + (1.85/2))
= 64.93 (ft) — to the center of the orifuce

I. FInd Head Loss

*i. Trashrack Losses ht = Kt*vn^2/2g*

where Kt = 1.45-0.45*(An/Ag)-(An/Ag)^2
Kt = the trashrack loss coefficient
An = the net area through the rack bars
Ag = the gross area of the racks and supports
vn = the velocity through the net trashrack area

Ag = 12.75*40
= 510 (ft^2)

An = 510 - 73.3 - 110.0
= 326.7 (ft^2)
Use 50% of clogging factor
An = 326.7*0.5
= 163.35 (ft^2)

Kt = 0.75

vn = 100/163.35
= 0.61 ft/sec

ht = 0.0044 ft

*ii. Entrance Losses he = Ke*ve^2/2g*
where Ke = ((1/C^2) - 1)
ve = entrance velocity

C = 0.65
Ke = 1.37
he = 27.43 ft

II. Total Head @ Entrance of Low Level Outlet
Ht = 64.93 - 0.0044 - 27.43
= 37.50 ft

Minimum area required for Q = 100.0 cfs with
50% of clogging factor
Amin = Q/(C*(2*32.2*H)^(0.5))
Amin = 2.38 ft^2 < 2.69 ft^2 OK

WSPG MODEL OUTPUT

LOW LEVEL DESIGN DISCHARGE = 100.0 CFS
ORIFICE DIAMETER = 1.85 FT

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4			4.00														
CD	2	4			1.85														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

FLOODPROOF STUDY FOR SNWA - WATER TREATMENT FACILITY

HEADING LINE NO 2 IS -

1000-YR DESIGN Design Flow = 100.0 CFS

HEADING LINE NO 3 IS -

EAST C-1 DETENTION BASIN OUTLET PIPE DESIGN

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.00	2430.25	1	2432.75

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	128.18	2433.53	1	0.015	800.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	553.17	2444.39	1	0.015	800.00	0.00	0.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	609.63	2445.45	1	0.015	0.00	0.00	0.00	0

ELEMENT NO 5 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	609.63	2445.45	2

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	609.63	2445.45	2	2500.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

WATER SURFACE PROFILE LISTING

FLOODPROOF STUDY FOR SNWA - WATER TREATMENT FACILITY
1000-YR DESIGN Design Flow = 100.0 CFS
EAST C-1 DETENTION BASIN OUTLET PIPE DESIGN

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
0.00	2430.25	2.004	2432.254	100.0	15.87	3.911	2436.165	0.00	3.030		4.00	0.00	0.00	0	0.00
128.18	0.02559					.025750	3.30			2.005			0.00		
128.18	2433.53	1.998	2435.528	100.0	15.93	3.941	2439.469	0.00	3.030		4.00	0.00	0.00	0	0.00
149.34	0.02555					.027457	4.10			2.005			0.00		
277.52	2437.35	1.932	2439.278	100.0	16.63	4.296	2443.574	0.00	3.030		4.00	0.00	0.00	0	0.00
65.79	0.02555					.031019	2.04			2.005			0.00		
343.31	2439.03	1.862	2440.889	100.0	17.45	4.726	2445.615	0.00	3.030		4.00	0.00	0.00	0	0.00
41.74	0.02555					.035269	1.47			2.005			0.00		
385.05	2440.09	1.795	2441.889	100.0	18.29	5.197	2447.086	0.00	3.030		4.00	0.00	0.00	0	0.00
31.28	0.02555					.040125	1.26			2.005			0.00		
416.33	2440.89	1.731	2442.624	100.0	19.19	5.718	2448.342	0.00	3.030		4.00	0.00	0.00	0	0.00
25.35	0.02555					.045664	1.16			2.005			0.00		
441.68	2441.54	1.669	2443.210	100.0	20.12	6.289	2449.499	0.00	3.030		4.00	0.00	0.00	0	0.00
21.58	0.02555					.052005	1.12			2.005			0.00		
463.26	2442.09	1.611	2443.703	100.0	21.11	6.917	2450.620	0.00	3.030		4.00	0.00	0.00	0	0.00
18.84	0.02555					.059250	1.12			2.005			0.00		
482.10	2442.57	1.554	2444.128	100.0	22.14	7.611	2451.739	0.00	3.030		4.00	0.00	0.00	0	0.00
16.85	0.02555					.067521	1.14			2.005			0.00		
498.95	2443.00	1.500	2444.504	100.0	23.22	8.371	2452.875	0.00	3.030		4.00	0.00	0.00	0	0.00
15.26	0.02555					.076986	1.17			2.005			0.00		
514.21	2443.39	1.448	2444.842	100.0	24.35	9.210	2454.052	0.00	3.030		4.00	0.00	0.00	0	0.00
13.99	0.02555					.087804	1.23			2.005			0.00		

WATER SURFACE PROFILE LISTING
FLOODPROOF STUDY FOR SNWA - WATER TREATMENT FACILITY
1000-YR DESIGN Design Flow = 100.0 CFS
EAST C-1 DETENTION BASIN OUTLET PIPE DESIGN

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
528.20	2443.75	1.398	2445.150	100.0	25.54	10.131	2455.281	0.00	3.030		4.00	0.00	0.00	0	0.00
12.93	0.02555					.100172	1.30			2.005			0.00		
541.13	2444.08	1.350	2445.432	100.0	26.79	11.143	2456.575	0.00	3.030		4.00	0.00	0.00	0	0.00
12.04	0.02555					.114349	1.38			2.005			0.00		
553.17	2444.39	1.305	2445.695	100.0	28.10	12.259	2457.954	0.00	3.030		4.00	0.00	0.00	0	0.00
0.58	0.01877					.122387	0.07			2.201			0.00		
553.75	2444.40	1.302	2445.703	100.0	28.17	12.321	2458.024	0.00	3.030		4.00	0.00	0.00	0	0.00
10.53	0.01877					.131522	1.38			2.201			0.00		
564.28	2444.60	1.257	2445.856	100.0	29.54	13.552	2459.408	0.00	3.030		4.00	0.00	0.00	0	0.00
10.00	0.01877					.150180	1.50			2.201			0.00		
574.28	2444.79	1.215	2446.001	100.0	30.99	14.911	2460.912	0.00	3.030		4.00	0.00	0.00	0	0.00
9.49	0.01877					.171558	1.63			2.201			0.00		
583.77	2444.96	1.174	2446.138	100.0	32.50	16.401	2462.539	0.00	3.030		4.00	0.00	0.00	0	0.00
9.03	0.01877					.195953	1.77			2.201			0.00		
592.80	2445.13	1.134	2446.268	100.0	34.08	18.038	2464.306	0.00	3.030		4.00	0.00	0.00	0	0.00
8.61	0.01877					.223871	1.93			2.201			0.00		
601.41	2445.30	1.096	2446.392	100.0	35.75	19.849	2466.241	0.00	3.030		4.00	0.00	0.00	0	0.00
8.22	0.01877					.255918	2.10			2.201			0.00		
609.63	2445.45	1.060	2446.510	100.0	37.50	21.831	2468.341	0.00	3.030		4.00	0.00	0.00	0	0.00
WALL EXIT													0.00		
609.63	2445.45	1.849	2447.299	100.0	37.20	21.491	2468.790	0.00	1.849		1.85	0.00	0.00	0	0.00

OUTLET DROP STRUCTURE CALCULATION

East C-1 Detention Basin Low Level Outfall Design

Reference : Open Channel Hydraulics
Design of Small Dam (Bureau of Reclamation)

Design Design Q = 100 cfs
Pipe Diameter = 48 inches
Equilibrium Width = 3.545 ft
Unit Discharge q = Q / w
= 28.21 cfs/ft

Height of Drop h = 4 ft

Based on flow geometry found by Moore, Bakhmeteff, Feodoroff and Rand, the straight drop can be described by function of the Drop number

Drop Number D = q^2/gh^3
= 0.39

Drop Length Ld = 4.30*D^0.27*h
= 13.30 ft

Pool Length Yp = 1.00*D^0.22*h
= 3.24 ft

Depth at toe Y1 = 0.54*D^0.425*h
= 1.44 ft

Sequent Depth Y2 = 1.66*D^0.27*h
= 5.14 ft

Compare Sequent Depth by using Frude Number
Frude Number at Y1
Fr = 2.21

Sequent Depth Y2 = 3.84 ft

Y2 = **5.14 ft**
is selected for Hydraulic jump calculation

Design Straight Drop with Impact Blocks

Location of Impact Blocks
B = Ld+0.8 Dc
= 15.63 ft
Use 16.0 ft

Minimum Basin Length

Lb = Ld+2.55 Dc

= 20.72 ft

Use 21.0 ft

Minimum Tail Water Depth

Dtw = 2.15 Dc

= 6.26 ft

Use 6.50 ft

Optimum Baffle Block Height

Bb = 0.80 Dc

= 2.33 ft

Use 2.5 ft

Optimum Height of End Sill

Be = 0.40 Dc

= 1.16 ft

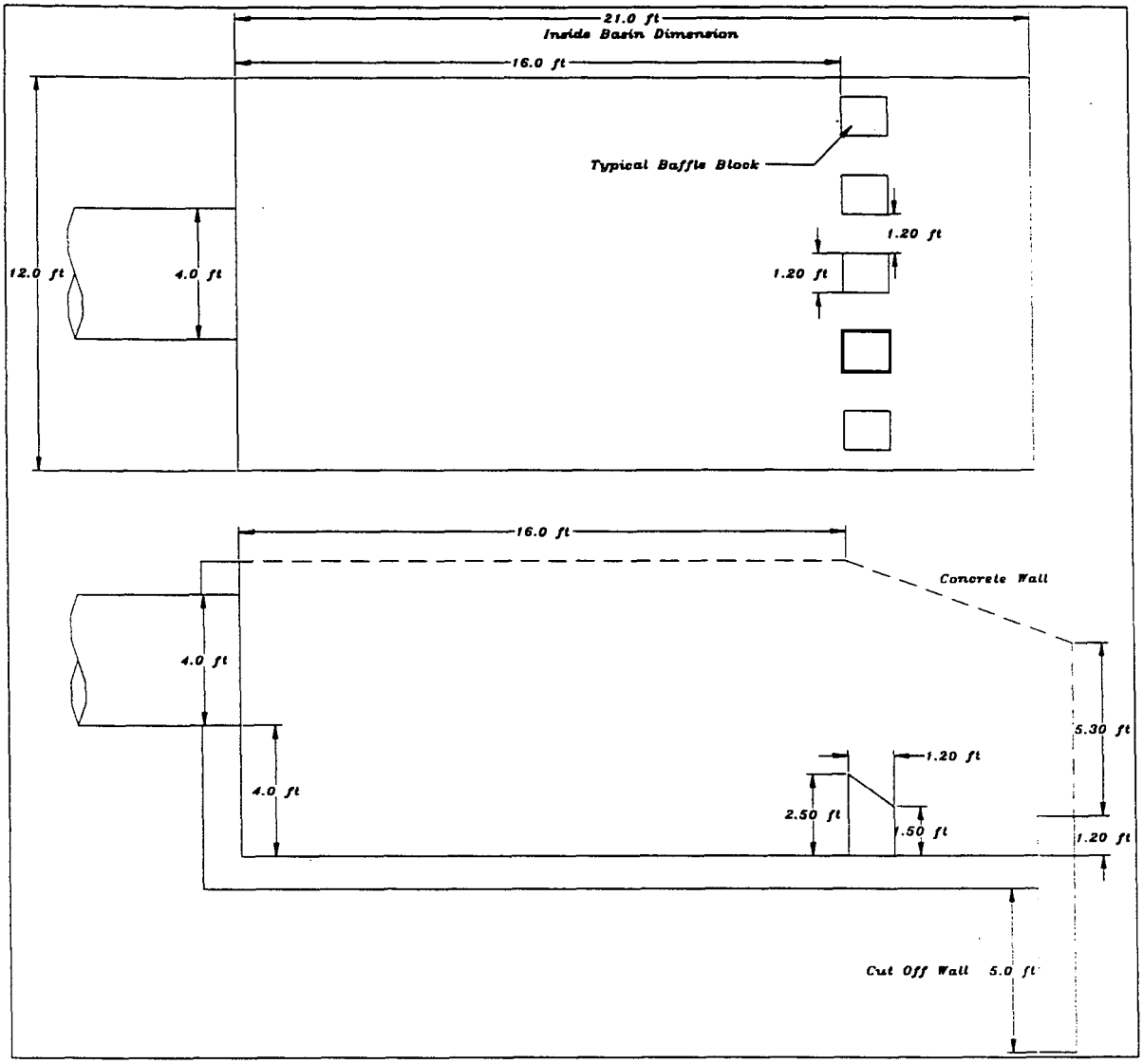
Use 1.2 ft

Width and spacing of baffle blocks

Bw = 0.40 Dc

= 1.16 ft

Use 1.2 ft


21.0 ft
Inside Basin Dimension
16.0 ft
Typical Baffle Block
1.20 ft
1.20 ft
12.0 ft
4.0 ft
16.0 ft
Concrete Wall
4.0 ft
5.30 ft
1.20 ft
4.0 ft
2.50 ft
1.50 ft
1.20 ft
Cut Off Wall 5.0 ft

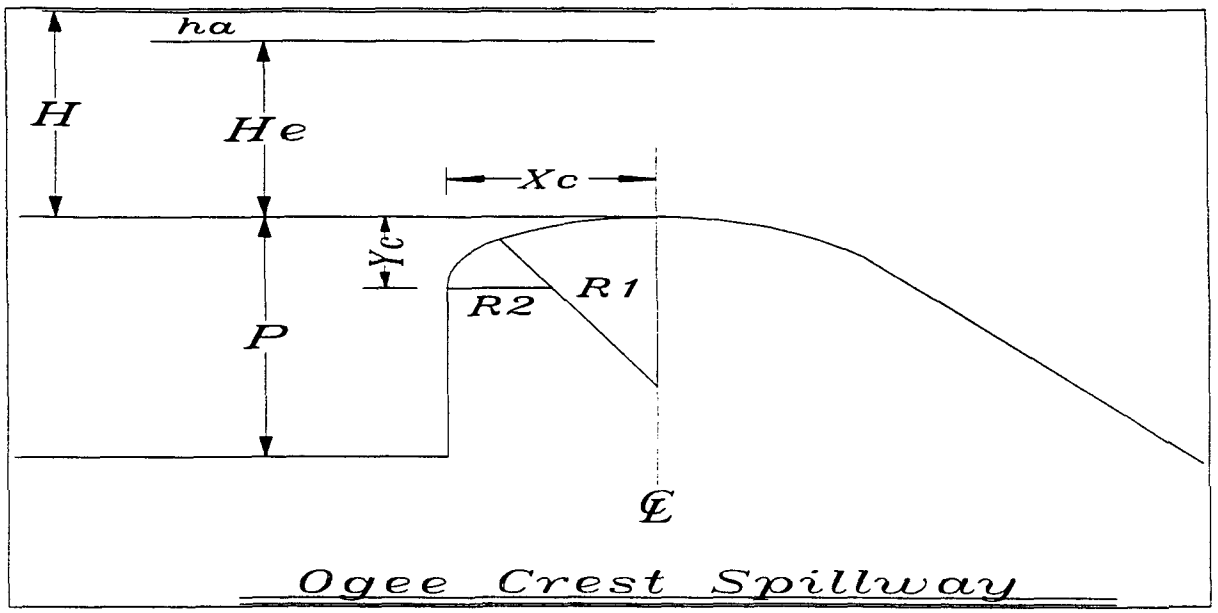
SECTION 6

PMF SPILLWAY HYDRAULIC DESIGN

Ogee Crest Spillway Design

Design Head and Approach

Design Discharge Q= 20800 cfs



Assume Approach Head P = 4 ft

Discharge over Ogee Crest = C*L*He^1.5

where C = a variable coef. of discharge

L = effective length of crest

H = total head (including velocity approach)

Assume

He = 8 ft P/He = 4/8

C = 3.81

He = 9 ft P/He = 4/9

C = 3.78

He = 10 ft P/He = 4/10

C = 3.75

(Reference " Design of Small Dam " p-378)

Calculate Spillway Length

He = 8 ft

L = Q/(C*H^1.5)

= 241.27 ft **Use** 250 ft

He = 9 ft

L = Q/(C*H^1.5)

= 203.80 ft **Use** 200 ft

He = 10 ft

L = Q/(C*H^1.5)

= 175.40 ft **Use** 180 ft

Design Spillway for 4 feet Approach Head

Shape for Uncontroll Ogee Crest

The portion downstream is defined by

$Y/Ho = -k(X/Ho)^n$

(Reference " Design of Small Dam " p-378)

Unit Discharge q = C*H^1.5 = 104.00 cfs/ft
Approach Velocity = q/(P+ho)=
Velocity Head = q^2/(2*g*(P+ho)^2)

Assume

ho =	7.6	ft
Approach Velocity =	8.97	ft/sec
Velocity Head =	1.25	ft
Total Head H =	8.85	ft

ho =	7.7	ft
Approach Velocity =	8.89	ft/sec
Velocity Head =	1.23	ft
Total Head H =	8.93	ft

ho =	7.8	ft	
Approach Velocity =	8.81	ft/sec	
Velocity Head =	1.21	ft	
Total Head H =	9.01	ft	***OK***

Find Design Value k and n

(Reference " Design of Small Dam " p-374)

ha/H =	0.1339
k =	0.492
n =	1.83

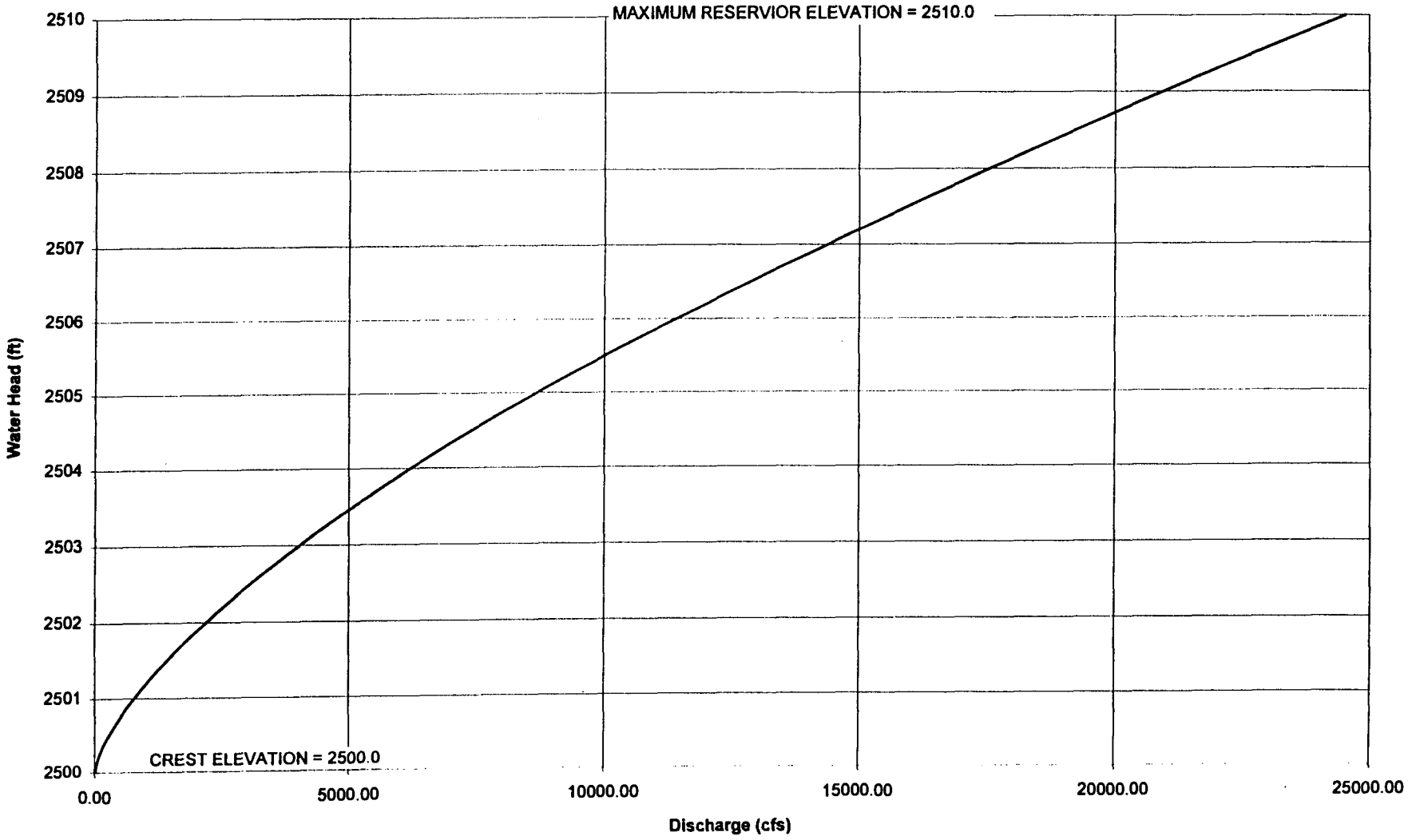
Xc/Ho =	0.214	Xc =	0.86 ft
Yc/Ho =	0.071	Yc =	0.28 ft
R1/Ho =	0.455	R1 =	1.82 ft
R2/Ho =	0.19	R1 =	0.76 ft

Ogee Spillway Crest Rating Curve

Q = C*L*H^1.5
Q = 20800 cfs
C = 3.78
L = 200 ft

H	STAGE	Q
0.00	2500.00	0.00
0.25	2500.25	97.00
0.50	2500.50	274.36
0.75	2500.75	504.03
1.00	2501.00	776.00
1.25	2501.25	1084.49
1.50	2501.50	1425.60
1.75	2501.75	1796.47
2.00	2502.00	2194.86
2.25	2502.25	2619.00
2.50	2502.50	3067.41
2.75	2502.75	3538.84
3.00	2503.00	4032.21
3.25	2503.25	4546.60
3.50	2503.50	5081.17
3.75	2503.75	5635.19
4.00	2504.00	6208.00
4.25	2504.25	6799.00
4.50	2504.50	7407.65
4.75	2504.75	8033.45
5.00	2505.00	8675.94
5.25	2505.25	9334.71
5.50	2505.50	10009.35
5.75	2505.75	10699.50
6.00	2506.00	11404.82
6.25	2506.25	12125.00
6.50	2506.50	12859.73
6.75	2506.75	13608.72
7.00	2507.00	14371.72
7.25	2507.25	15148.47
7.50	2507.50	15938.73
7.75	2507.75	16742.27
8.00	2508.00	17558.88
8.25	2508.25	18388.35
8.50	2508.50	19230.48
8.75	2508.75	20085.09
9.00	2509.00	20952.00
9.25	2509.25	21831.03
9.50	2509.50	22722.03
9.75	2509.75	23624.83
10.00	2510.00	24539.27

Ogee Spillway Crest Rating Curve



Flow Characteristics over Spillway

Given

Design Discharge	20800	cfs
Width of Spillway	200	ft
Manning's n	0.015	
S1	0.25	ft/ft

Unit Width Discharge 104.00 cfs/ft

From Manning's Equation Q= AV

= A*1.486*R^(2/3)*S^(0.5)/n

By trial and error, find the normal depth Y

Y	Q		A*R^(2/3)	A	R	R^(2/3)	A*R^(2/3)
0.90	9092.85		419.92	198.00	0.89	0.93	183.57
0.95	9947.29			209.00	0.94	0.96	200.82
1.00	10831.82			220.00	0.99	0.99	218.68
1.30	16742.71			286.00	1.28	1.18	338.01
1.49	20876.13			326.70	1.47	1.29	421.45

Find the Critical Depth of the channel Ycr= 6.95 ft

Vcr= 14.96 ft/sec

From Back Water Curve, find the depth, D1, before jump

D1= 2.38 ft

Velocity at D1, V1= 43.70 ft/sec

Froude Number at D1

Fr= 4.99 ***TYPEIII*** BASIN *Reference :p-387-p-395*

Design of Small Dam

Conjugate Depth D2 *Bureau of Reclamation*

D2= 15.65 ft

Basin Depression (Height of the Jump)

D2-D1= 13.27 ft

From Henry W. Morris, James M. Wigg "Applied Hydraulics in Engineering"
pages 281-283

q = 104.00 cfs/ft

Dc = 6.95 ft

Vc = 14.96 ft/sec

For cubical roughness elements, with cubes in adjacent row staggered and with a maximum traverse element spacing of 1.5h.

Block Height h = 0.7Dc

=	5	ft
use	7	ft

Traverse spacing = 1.5h

=	10.5	ft

Spacing Height Ratio

Range 7.5h to 12.0h

Desired	52.5	ft	to	84	ft

Force on the Block Fd

Fd = 1.94*Af*V1^2

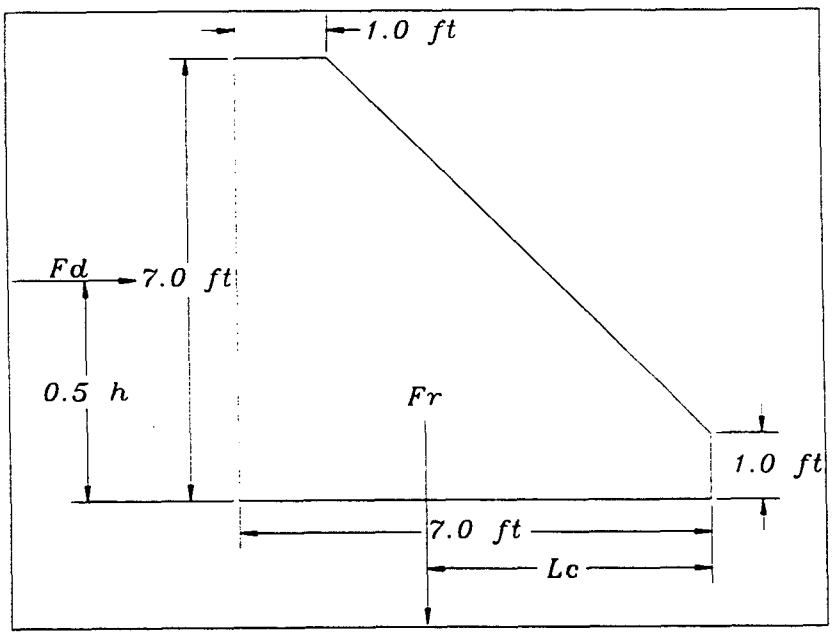
= 272271.3 lbs

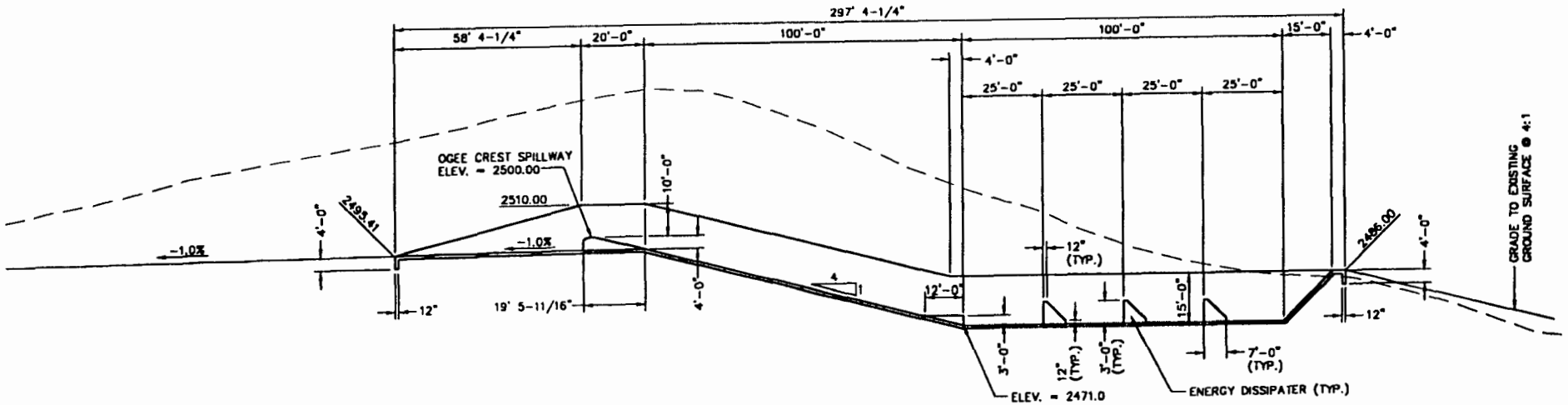
Reference :p-VII-A-1 to p-VII-A-2
Hydraulic Design of Stilling Basins and Engery Dissipators

Anchor force necessary to resist overturning Fa

Fa = 0.97*(H/Lc)*Af*V1^2

= 272271.3 lbs





SPILLWAY TYPICAL CROSS-SECTION

Direct Step Method : Calculate flow depth at end of spillway lab
Assume critical flow depth at top of ogee crest spillway

SPILLWAY WIDTH = 200 FT
SPILLWAY HEIGHT= 10 FT
CHANNEL SLOPE = 0.25 FT/FT
MANNING'S n = 0.015
DISCHARGE = 20800 CFS

CRITICAL DEPTH:= 6.95 FT

DEPTH	AREA	Rh	Rh^(2/3)	V	Vh	E	DELTA E	Sf	AVG Sf	So-AVG S	DELTA X	X
6.95	1390	6.498	3.482	14.964	3.477	10.427		0.0019				
6.80	1360	6.367	3.435	15.294	3.632	10.432	0.005	0.0020	0.0020	0.25	0.02	0.02
6.50	1300	6.103	3.340	16.000	3.975	10.475	0.043	0.0023	0.0022	0.25	0.17	0.19
6.20	1240	5.838	3.242	16.774	4.369	10.569	0.094	0.0027	0.0025	0.25	0.38	0.57
5.90	1180	5.571	3.143	17.627	4.825	10.725	0.156	0.0032	0.0030	0.25	0.63	1.20
5.60	1120	5.303	3.041	18.571	5.356	10.956	0.231	0.0038	0.0035	0.25	0.94	2.14
5.30	1060	5.033	2.937	19.623	5.979	11.279	0.323	0.0045	0.0042	0.25	1.32	3.46
5.00	1000	4.762	2.830	20.800	6.718	11.718	0.439	0.0055	0.0050	0.24	1.79	5.25
4.70	940	4.489	2.721	22.128	7.603	12.303	0.585	0.0067	0.0061	0.24	2.40	7.65
4.40	880	4.215	2.609	23.636	8.675	13.075	0.772	0.0084	0.0075	0.24	3.18	10.83
4.10	820	3.939	2.494	25.366	9.991	14.091	1.016	0.0105	0.0095	0.24	4.22	15.05
3.90	780	3.754	2.415	26.667	11.042	14.942	0.851	0.0124	0.0115	0.24	3.57	18.62
3.70	740	3.568	2.335	28.108	12.268	15.968	1.026	0.0148	0.0136	0.24	4.34	22.96
3.50	700	3.382	2.253	29.714	13.710	17.210	1.242	0.0177	0.0162	0.23	5.31	28.28
3.30	660	3.195	2.169	31.515	15.422	18.722	1.512	0.0215	0.0196	0.23	6.56	34.84
3.10	620	3.007	2.083	33.548	17.477	20.577	1.854	0.0264	0.0240	0.23	8.20	43.04
2.90	580	2.818	1.995	35.862	19.970	22.870	2.294	0.0329	0.0297	0.22	10.41	53.45
2.70	540	2.629	1.905	38.519	23.038	25.738	2.868	0.0417	0.0373	0.21	13.48	66.94
2.50	500	2.439	1.812	41.600	26.872	29.372	3.634	0.0537	0.0477	0.20	17.96	84.90
2.45	490	2.391	1.788	42.449	27.980	30.430	1.058	0.0574	0.0556	0.19	5.44	90.34
2.40	480	2.344	1.764	43.333	29.158	31.558	1.128	0.0615	0.0594	0.19	5.92	96.26
2.38	476	2.325	1.755	43.697	29.650	32.030	0.472	0.0632	0.0623	0.19	2.52	98.77

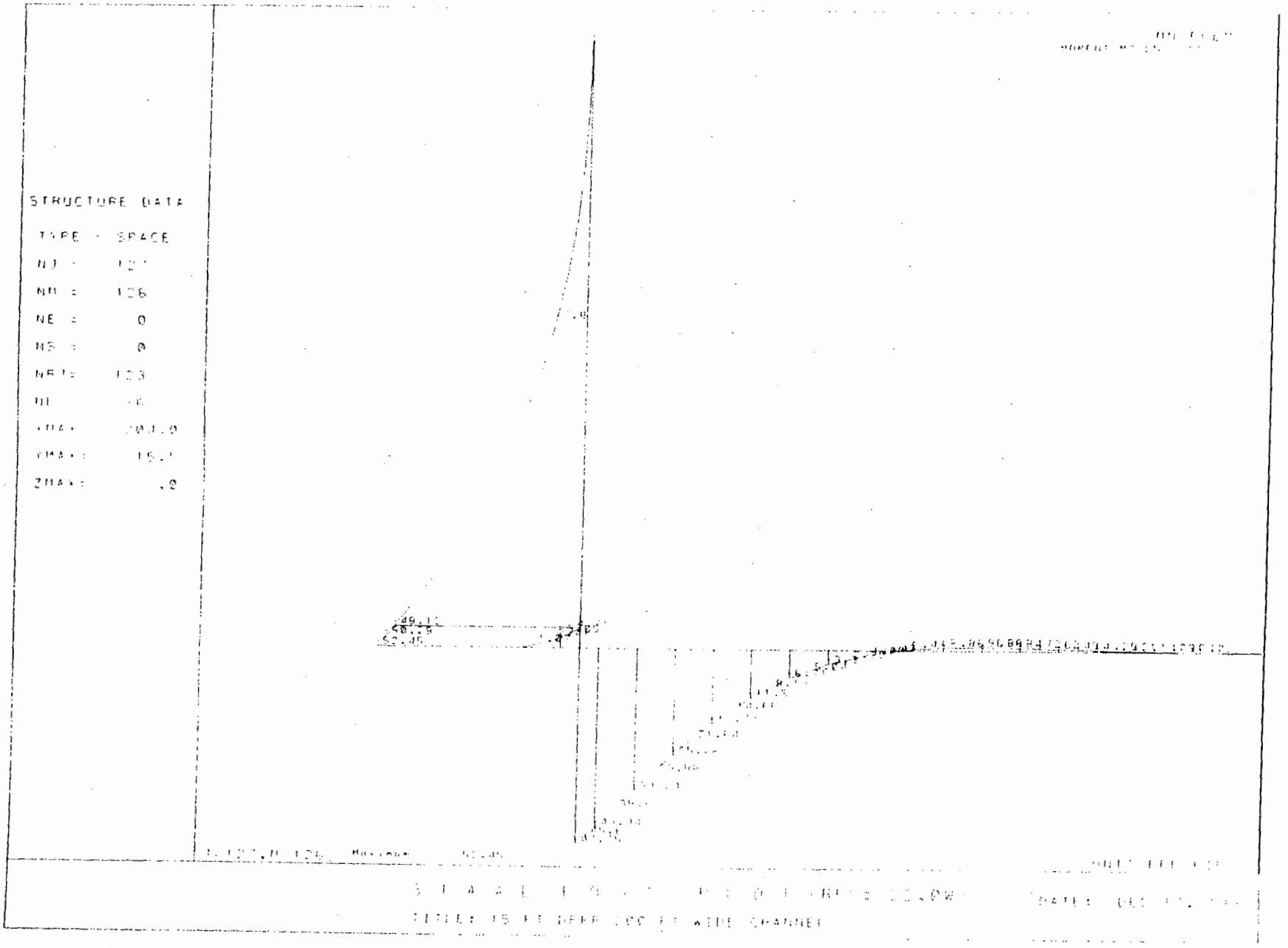
SECTION 7

STRUCTURE DESIGN
(LOW LEVEL OUTLET, SPILLWAY)

BY - R2H

2

Minimum Load Cos. 1



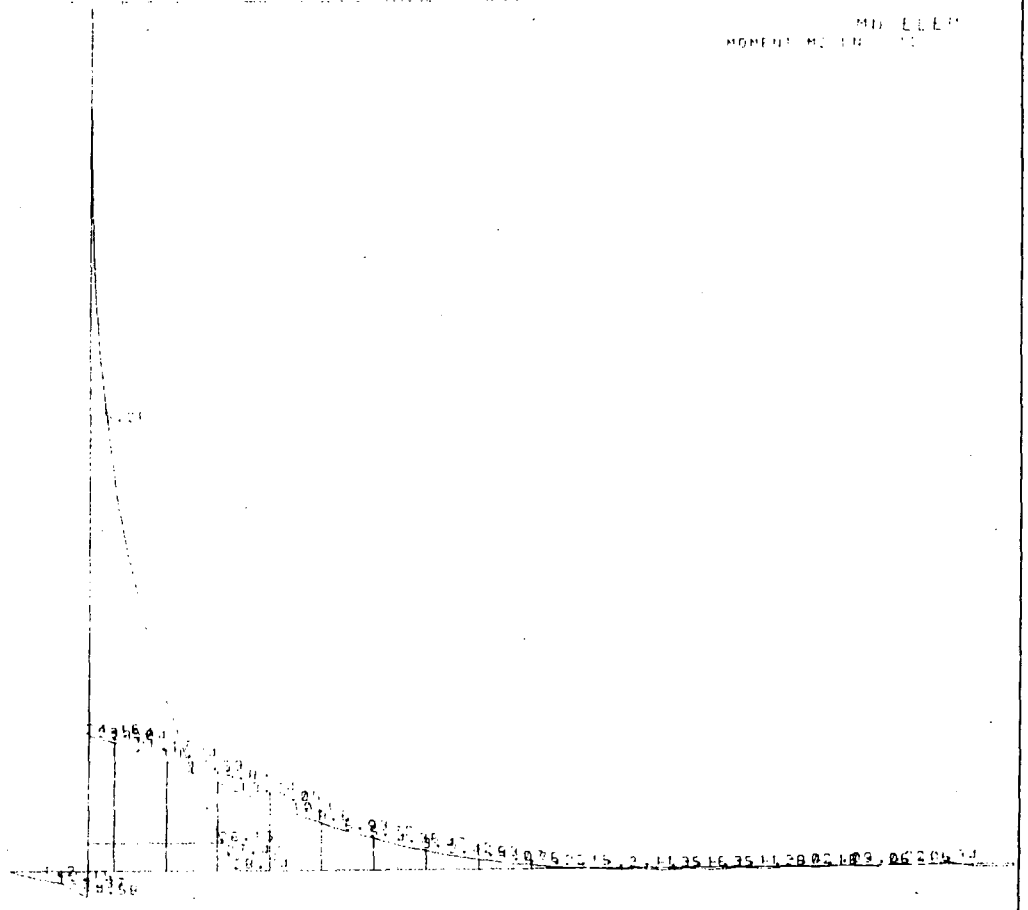
(7)

Channels loop sec 2

User ID: R3H ENGINEERING

STRUCTURE DATA

TYPE = SPACE
NJ = 127
NM = 126
NC = 0
NS = 0
NR = 129
NI = 0
XMAX = 200.0
YMAX = 15.5
ZMAX = .0



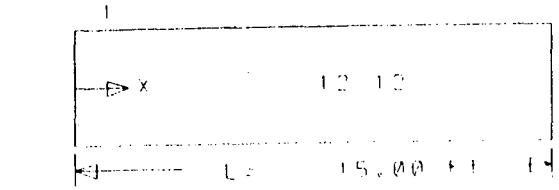
SLAB FROST FOOTING: 22.0W DATE: DEC

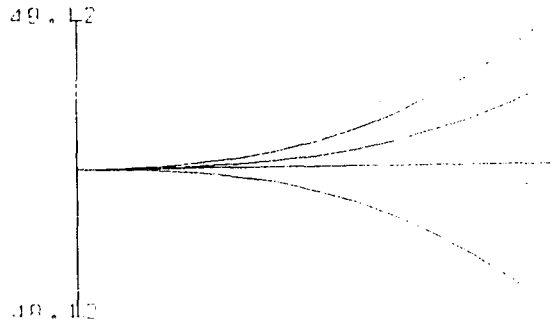
TITLE: 15 FT DEEP 200 FT WIDE CHANNEL

User ID: RSH ENGINEERING

Moment Envelope For M2.F

ENVELOPE FOR MEMBER= 1





M2 Envelope Units (FT-KIP)

		High M2 Load	Low M2 Load	
Top	.0000L=	.00	12	.00
	.0833=	.00	12	-.10
	.1667L	.10	12	-.53
	.2500L	.31	12	-1.31
	.3333=	.63	12	-2.49
	.4167=	1.04	12	-4.08
	.5000L	1.54	12	-6.09
	.5833=	2.10	12	-8.41
	.6667L	2.65	12	-10.86
	.7501	11.67	12	-13.31
	.8334=	15.00	12	-15.41
	.9167=	20.00	12	-17.20
Bottom	1.0001	24.13	12	-18.61

Ten I.F. Top S.F.

AE= Max High Low

Maximum Force Moments Summary Units= KIP,FT

	Axial	Shear 1	Shear 2	Moment 1	Moment 2
Value=	.00	9.67	.00	.00	18.61
Location=	15.00	15.00	15.00	15.00	15.00
Loading=	11	11	11	11	11

TABLE [illegible] DATE: [illegible]

TITLE: [illegible] DEEP 200 FT WIDE CHANNEL

Max. Moment at Base of Wall O.F.
= 48.12 ft-K for a 12" wall with d = 9.5 in
As = 1.25 in² use #8 @ 6" As = 1.58 in²

@ 6.25 ft above base Mu = 11.5 'K
As = .27 in² use #5 @ 12"

Max. Moment I.F.
= 26.13 ft-K As = .64 in² use #6 @ 6" I.F.

@ 3.75 ft above base Mu = 11 'K As = .26 in²
Lap #6 with #5 @ 12"

Horizontal Steel

.003 (12)12 = .43 in²
use #5 @ 12" E.F.

Max Moment in Slab (Bottom)

Mu = 43.4 ft-K for 12" slab w/ d = 8.5"

As = 1.28 in² use #8 @ 6" Bott

@ 4.5 ft from face of wall

Mu = 9.1 'K As = .24 in²

Discontinue #8 and use #5 @ 12"

Max Mu (Top)

= 23.0 'K for d = 8.5" As = .64 in²

use #6 @ 6"

@ 3 ft from face of wall

Mu = 12 'K As = .32 in²

Splice #6 with #5 @ 12"

7

```
*****************************************************
*                                                   *
*           S T A A D - III                         *
*           Revision 22.0W                          *
*           Proprietary Program of                  *
*           Research Engineers, Inc.                *
*           Date=    JAN 21, 1998                   *
*           Time=    10:53:53                       *
*                                                   *
*     USER ID: R2H ENGINEERING                      *
*****************************************************
```

```
 1. STAAD SPACE 15 FT DEEP 200 FT WIDE CHANNEL
 2. INPUT WIDTH 72
 3. UNIT FEET KIP
 4. JOINT COORDINATES
 5.      1         .000        15.500         .000
 6.      2         .000          .500         .000
 7.      3         .000          .000         .000
 8.      4       201.000        15.500         .000
 9.      5       201.000          .500         .000
10.      6       201.000          .000         .000
11.      7          .500          .000         .000
12.      8       200.500          .000         .000
13.      9        50.500          .000         .000
14.     10       100.500          .000         .000
15.     11       150.500          .000         .000
16.     12         2.500          .000         .000
17.     13         4.500          .000         .000
18.     14         6.500          .000         .000
19.     15         8.500          .000         .000
20.     16        10.500          .000         .000
21.     17        12.500          .000         .000
22.     18        14.500          .000         .000
23.     19        16.500          .000         .000
24.     20        18.50           .000         .000
25.     21        20.500          .000         .000
26.     22        22.500          .000         .000
27.     23        24.500          .000         .000
28.     24        26.500          .000         .000
29.     25        28.500          .000         .000
30.     26        30.500          .000         .000
31.     27        32.500          .000         .000
32.     28        34.500          .000         .000
33.     29        36.500          .000         .000
34.     30        38.500          .000         .000
35.     31        40.500          .000         .000
36.     32        42.500          .000         .000
37.     33        44.500          .000         .000
38.     34        46.500          .000         .000
39.     35        48.500          .000         .000
40.     36        52.500          .000         .000
41.     37        54.500          .000         .000
```

File Spillway.std

8

STAAD-III DEMO VERSION - NO COMMERCIAL USE.

42.	38	56.500	.000	.000
43.	39	58.500	.000	.000
44.	40	60.500	.000	.000
45.	41	62.500	.000	.000
46.	42	64.500	.000	.000
47.	43	66.500	.000	.000
48.	44	68.500	.000	.000
49.	45	70.500	.000	.000
50.	46	72.500	.000	.000
51.	47	74.500	.000	.000
52.	48	76.500	.000	.000
53.	49	78.500	.000	.000
54.	50	80.500	.000	.000
55.	51	82.500	.000	.000
56.	52	84.500	.000	.000
57.	53	86.500	.000	.000
58.	54	88.500	.000	.000
59.	55	90.500	.000	.000
60.	56	92.500	.000	.000
61.	57	94.500	.000	.000
62.	58	96.500	.000	.000
63.	59	98.500	.000	.000
64.	60	102.500	.000	.000
65.	61	104.500	.000	.000
66.	62	106.500	.000	.000
67.	63	108.500	.000	.000
68.	64	110.500	.000	.000
69.	65	112.500	.000	.000
70.	66	114.500	.000	.000
71.	67	116.500	.000	.000
72.	68	118.500	.000	.000
73.	69	120.500	.000	.000
74.	70	122.500	.000	.000
75.	71	124.500	.000	.000
76.	72	126.500	.000	.000
77.	73	128.500	.000	.000
78.	74	130.500	.000	.000
79.	75	132.500	.000	.000
80.	76	134.500	.000	.000
81.	77	136.500	.000	.000
82.	78	138.500	.000	.000
83.	79	140.500	.000	.000
84.	80	142.500	.000	.000
85.	81	144.500	.000	.000
86.	82	146.500	.000	.000
87.	83	148.500	.000	.000
88.	84	152.500	.000	.000
89.	85	154.500	.000	.000
90.	86	156.500	.000	.000
91.	87	158.500	.000	.000
92.	88	160.500	.000	.000
93.	89	162.500	.000	.000
94.	90	164.500	.000	.000
95.	91	166.500	.000	.000
96.	92	168.500	.000	.000
97.	93	170.500	.000	.000

STAAD-III DEMO VERSION - NO COMMERCIAL USE.

98.	94	172.500	.000	.000
99.	95	174.500	.000	.000
100.	96	176.500	.000	.000
101.	97	178.500	.000	.000
102.	98	180.500	.000	.000
103.	99	182.500	.000	.000
104.	100	184.500	.000	.000
105.	101	186.500	.000	.000
106.	102	188.500	.000	.000
107.	103	190.500	.000	.000
108.	104	192.500	.000	.000
109.	105	194.500	.000	.000
110.	106	196.500	.000	.000
111.	107	198.500	.000	.000
112.	108	1.500	.000	.000
113.	109	3.500	.000	.000
114.	110	5.500	.000	.000
115.	111	7.500	.000	.000
116.	112	9.500	.000	.000
117.	113	11.500	.000	.000
118.	114	13.500	.000	.000
119.	115	15.500	.000	.000
120.	116	199.500	.000	.000
121.	117	197.500	.000	.000
122.	118	195.500	.000	.000
123.	119	193.500	.000	.000
124.	120	191.500	.000	.000
125.	121	189.500	.000	.000
126.	122	187.500	.000	.000
127.	123	185.500	.000	.000
128.	124	-.500	.000	.000
129.	125	-1.500	.000	.000
130.	126	201.500	.000	.000
131.	127	202.500	.000	.000

132. MEMBER INCIDENCES

133.	1	1	2
134.	2	2	3
135.	3	4	5
136.	4	5	6
137.	5	7	7
138.	6	8	6
139.	7	[illegible]	108
140.	8	9	36
141.	9	10	60
142.	10	11	84
143.	11	12	109
144.	12	13	110
145.	13	14	111
146.	14	15	112
147.	15	16	113
148.	16	17	114
149.	17	18	115
150.	18	19	20
151.	19	20	21
152.	20	21	22
153.	21	22	23

STAAD-III DEMO VERSION - NO COMMERCIAL USE.

154.	22	23	24
155.	23	24	25
156.	24	25	26
157.	25	26	27
158.	26	27	28
159.	27	28	29
160.	28	29	30
161.	29	30	31
162.	30	31	32
163.	31	32	33
164.	32	33	34
165.	33	34	35
166.	34	35	9
167.	35	36	37
168.	36	37	38
169.	37	38	39
170.	38	39	40
171.	39	40	41
172.	40	41	42
173.	41	42	43
174.	42	43	44
175.	43	44	45
176.	44	45	46
177.	45	46	47
178.	46	47	48
179.	47	48	49
180.	49	49	50
181.	49	50	51
182.	50	51	52
183.	51	52	53
184.	52	53	54
185.	53	54	55
186.	54	55	56
187.	55	56	57
188.	56	57	58
189.	57	58	59
190.	58	59	10
191.	59	10	61
192.	60	61	61
193.	61	62	63
194.	62	63	64
195.	63	64	65
196.	64	65	66
197.	65	66	67
198.	66	67	68
199.	67	68	69
200.	68	69	70
201.	69	70	71
202.	71	71	72
203.	71	72	73
204.	72	73	74
205.	73	74	75
206.	74	75	76
207.	75	76	77
208.	76	77	78
209.	77	78	79

11

STAAD-III DEMO VERSION - NO COMMERCIAL USE.

```
210.          78         79         80
211.          79         80         81
212.          80         81         82
213.          81         82         83
214.          82         83         11
215.          83         84         85
216.          84         85         86
217.          85         86         87
218.          86         87         88
219.          87         88         89
220.          88         89         90
221.          89         90         91
222.          90         91         92
223.          91         92         93
224.          92         93         94
225.          93         94         95
226.          94         95         96
227.          95         96         97
228.          96         97         98
229.          97         98         99
230.          98         99        100
231.          99        100        123
232.         100        101        122
233.         101        102        121
234.         102        103        120
235.         103        104        119
236.         104        105        118
237.         105        106        117
238.         106        107        116
239.         107        108         12
240.         108        109         13
241.         109        110         14
242.         110        111         15
243.         111        112         16
244.         112        113         17
245.         113        114         18
246.         114        115         19
247.         115        116          8
248.         116        117        107
249.         117        118        106
250.         118        119        105
251.         119        120        104
252.         120        121        103
253.         121        122        102
254.         122        123        101
255.         123          5        124
256.         124        124        125
257.         125          6        126
258.         126        126        127
259. UNIT INCHES KIP
260. MEMBER PROPERTY AMERICAN
261. 1 TO 4 PRI YD 12. ZD 12.
262. 5 7 11 TO 14 107 TO 110 PRI YD 13. ZD 12.
263. 111 PRI YD 10. ZD 12.
264. 15 TO 17 112 TO 114 PRI YD 7. ZD 12.
265. 6 103 TO 106 115 TO 119 PRI YD 13. ZD 12.
```

Wall 12 ft high or less

Max. Moment at Base of Wall O.F.
= 26.3 ft-K for a 12" wall w/d = 9.5 in
As = .65 in²
use # 7 @ 12"

@ 2'-6" above base Mu = 14 'K As = .33 in²
lap #7 with #5 @ 12"

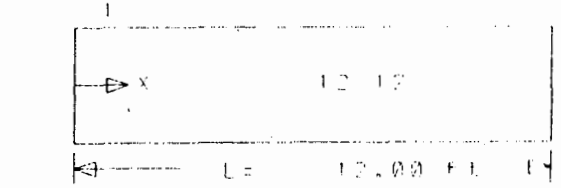
Max. Moment I.F.
= 13.5 ft-K As = .32 in²
use #5 @ 12"

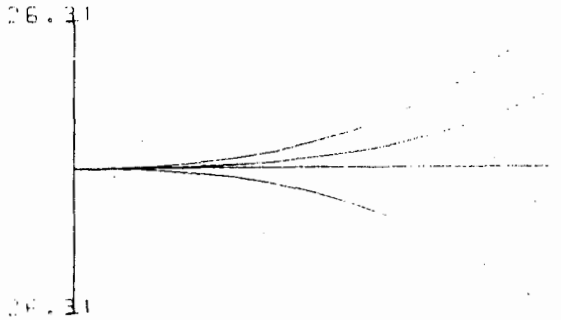
use same steel in Bottom Slab

Moment Envelope - with 12 ft high or less

User ID: RJH ENGINEERING

ENVELOPE FOR MEMBER 1





Abs Max High Low

MZ Envelope Units: Kip ft, Kip

		High MZ Load		Low MZ Load	
Top	.0001	.00	11	.00	11
	.083L	.00	12	-.06	11
	.16?L	.05	12	-.??	11
	.25?L	.?1	12	-.??	11
	.33?L	.4?	12	-.??	11
	.41?L	.9?	12	?.??	11
	.500L	1.60	12	-1.??	11
	.58?L	?.??	12	-?.??	11
	.66?L	3.94	12	-9.??	11
	.750L	5.68	12	-12.??	11
	.8?3L	?.??	12	-??.??	11
	.91?L	10.30	12	-?.??	11
Bottom	1.00L	13.??	12	-?.??	11

Ten I.F. Ten O.F

Maximum Force/Moment Summary, Units: Kip ft, Kip

	Axial	Shear Y	Shear Z	Moment Y	Moment Z
Value=	.00	5.81	.00	.00	-?1.??
Location=	12.00	12.00	12.00	12.00	12.00
Loading=	11	11	11	11	11

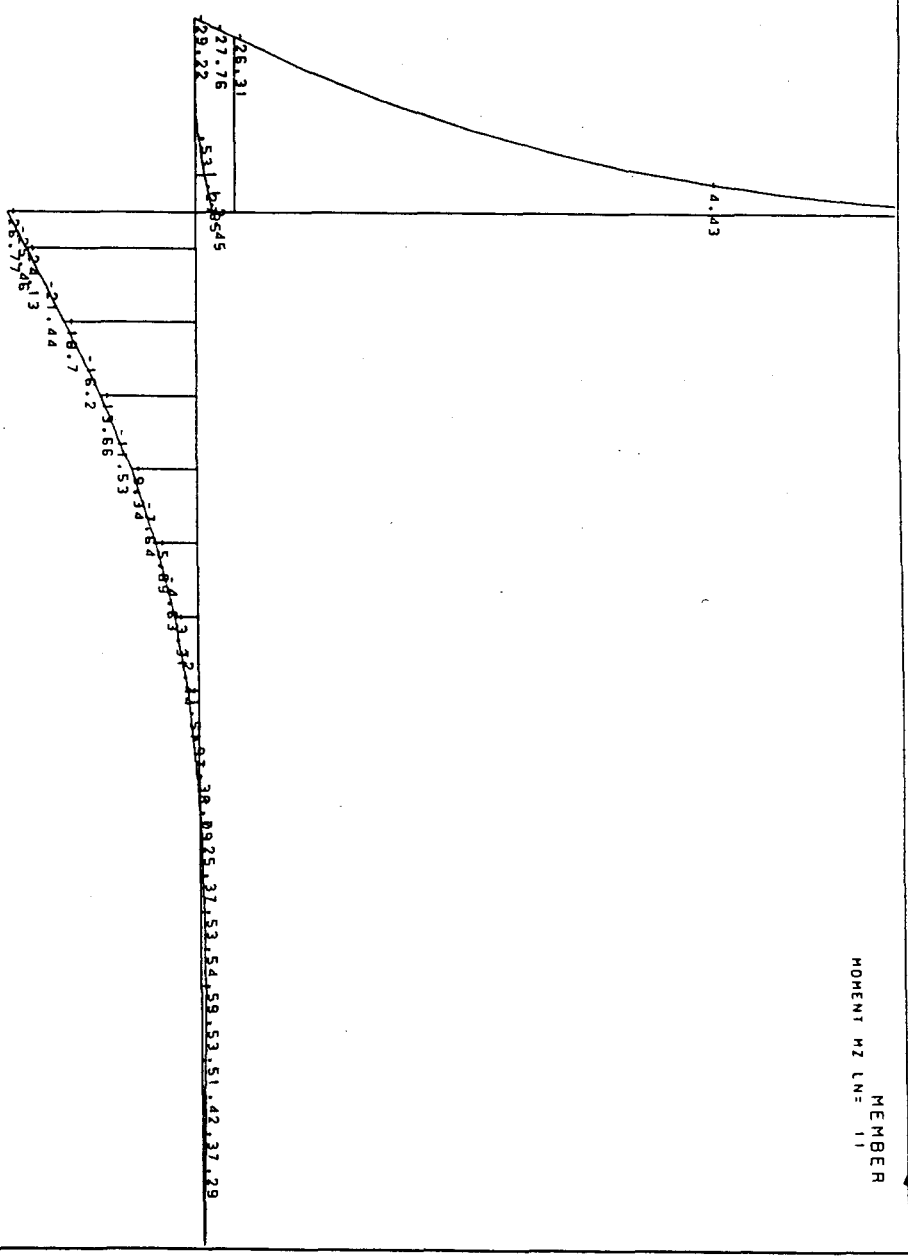
STAAD.III OPTIONS SPEC: ?.?? DATE: DEC ??, ????
TITLE: 15 FT DEEP 200 FT WIDE CHANNEL

16

17

STRUCTURE DATA

TYPE = SPACE
NJ = 127
NM = 126
NE = 0
NS = 0
NRJ= 123
NL = 6
XMAX= 204.0
YMAX= 12.5
ZMAX= .0



Load Case 1 for wall 12ft high or less

all
or less

:td

42.	38	56.500	.000	.000
43.	39	58.500	.000	.000
44.	40	60.500	.000	.000
45.	41	62.500	.000	.000
46.	42	64.500	.000	.000
47.	43	66.500	.000	.000
48.	44	68.500	.000	.000
49.	45	70.500	.000	.000
50.	46	72.500	.000	.000
51.	47	74.500	.000	.000
52.	48	76.500	.000	.000
53.	49	78.500	.000	.000
54.	50	80.500	.000	.000
55.	51	82.500	.000	.000
56.	52	84.500	.000	.000
57.	53	86.500	.000	.000
58.	54	88.500	.000	.000
59.	55	90.500	.000	.000
60.	56	92.500	.000	.000
61.	57	94.500	.000	.000
62.	58	96.500	.000	.000
63.	59	98.500	.000	.000
64.	60	102.500	.000	.000
65.	61	104.500	.000	.000
66.	62	106.500	.000	.000
67.	63	108.500	.000	.000
68.	64	110.500	.000	.000
69.	65	112.500	.000	.000
70.	66	114.500	.000	.000
71.	67	116.500	.000	.000
72.	68	118.500	.000	.000
73.	69	120.500	.000	.000
74.	70	122.500	.000	.000
75.	71	124.500	.000	.000
76.	72	126.500	.000	.000
77.	73	128.500	.000	.000
78.	74	130.500	.000	.000
79.	75	132.500	.000	.000
80.	76	134.500	.000	.000
81.	77	136.500	.000	.000
82.	78	138.500	.000	.000
83.	79	140.500	.000	.000
84.	80	142.500	.000	.000
85.	81	144.500	.000	.000
86.	82	146.500	.000	.000
87.	83	148.500	.000	.000
88.	84	152.500	.000	.000
89.	85	154.500	.000	.000
90.	86	156.500	.000	.000
91.	87	158.500	.000	.000
92.	88	160.500	.000	.000
93.	89	162.500	.000	.000
94.	90	164.500	.000	.000
95.	91	166.500	.000	.000
96.	92	168.500	.000	.000
97.	93	170.500	.000	.000

154.	22	23	24
155.	23	24	25
156.	24	25	26
157.	25	26	27
158.	26	27	28
159.	27	28	29
160.	28	29	30
161.	29	30	31
162.	30	31	32
163.	31	32	33
164.	32	33	34
165.	33	34	35
166.	34	35	9
167.	35	36	37
168.	36	37	38
169.	37	38	39
170.	38	39	40
171.	39	40	41
172.	40	41	42
173.	41	42	43
174.	42	43	44
175.	43	44	45
176.	44	45	46
177.	45	46	47
178.	46	47	48
179.	47	48	49
180.	48	49	50
181.	49	50	51
182.	50	51	52
183.	51	52	53
184.	52	53	54
185.	53	54	55
186.	54	55	56
187.	55	56	57
188.	56	57	58
189.	57	58	59
190.	58	59	10
191.	59	60	61
192.	60	61	62
193.	61	62	63
194.	62	63	64
195.	63	64	65
196.	64	65	66
197.	65	66	67
198.	66	67	68
199.	67	68	69
200.	68	69	70
201.	69	70	71
202.	70	71	72
203.	71	72	73
204.	72	73	74
205.	73	74	75
206.	74	75	76
207.	75	76	77
208.	76	77	78
209.	77	78	79

```
266. 102 PRI YD 10. ZD 12.
267. 99 TO 101 120 TO 126 PRI YD 7. ZD 12.
268. 18 TO 20 PRI YD 7. ZD 12.
269. 8 TO 10 21 TO 98 PRI YD 7. ZD 12.
270. CONSTANT
271. E CONCRETE ALL
272. DENSITY CONCRETE ALL
273. UNIT FEET KIP
274. SUPPORT
275. 12 TO 18 108 TO 115 FIXED BUT MZ KFY 691.
276. 7 FIXED BUT MZ KFY 518.
277. 124 FIXED BUT MZ KFY 518.
278. 3 125 FIXED BUT MZ KFY 346.
279. 19 FIXED BUT MZ KFY 1037.
280. 20 FIXED BUT MZ KFY 1382.
281. 101 TO 107 116 TO 123 FIXED BUT MZ KFY 691.
282. 8 126 FIXED BUT MZ KFY 518.
283. 6 127 FIXED BUT MZ KFY 346.
284. 100 FIXED BUT MZ KFY 1.5
285. 99 FIXED BUT MZ KFY 1382.
286. 9 TO 11 21 TO 98 FIXED BUT MZ KFY 1382.
287. LOAD 1 WEIGHT OF CONCRETE
288. SELFWEIGHT Y -1.
289. LOAD 2 EARTH PRESSURE
290. MEMBER LOAD
291. 1 TRAP GX 0. .42
292. 124 UNI GY -.42
293. 126 UNI GY -.42
294. 3 TRAP GX 0. -.42
295. LOAD 3 LIVE LOAD SURCHARGE
296. MEMBER LOAD
297. 1 UNI GX .075
298. 3 UNI GX -.075
299. LOAD 4 HYDROSTATIC
300. MEMBER LOAD
301. 1 TRAP GX 0. -.75
302. 3 TRAP GX 0. .75
303. 2 4 TO 122 UNI GY -.75
304. LOAD COMB 11 CASE 1 CHANNEL EMPTY
305. 1 1.4 2 1.7 3 1.7
306. LOAD COMB 12 CASE 2 CHANNEL FULL
307. 1 1.4 2 1.7 4 1.7
308. PERFORM ANALYSIS
```

P R O B L E M S T A T I S T I C S

```
NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =   127/  126/  123
ORIGINAL/FINAL BAND-WIDTH =  121/    2
TOTAL PRIMARY LOAD CASES  =    4, TOTAL DEGREES OF FREEDOM =   270
SIZE OF STIFFNESS MATRIX =    3780 DOUBLE PREC. WORDS
REQRD/AVAIL. DISK SPACE =  12.23/  234.7 MB,  EXMEM = 1984.6 MB

++ Processing Element Stiffness Matrix.            11:16:50
```

```
++ Processing Global Stiffness Matrix.          11:16:50
++ Processing Triangular Factorization.         11:16:50
++ Calculating Joint Displacements.             11:16:50
++ Calculating Member  Forces.                  11:16:50

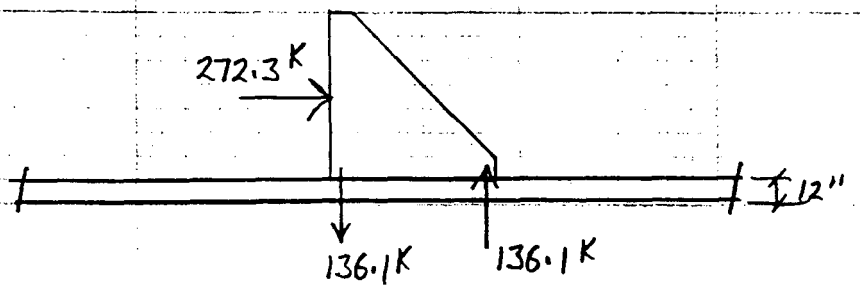
 309. FINISH

          ********** END OF STAAD-III **********

            **** DATE= DEC 19,1997   TIME= 11:16:51 ****

      ***********************************************************
      *        For questions on  STAAD-III,   contact:          *
      *              Research Engineers, Inc at                 *
      *  West Coast: Ph- (714) 974-2500  Fax- (714) 921-2543    *
      *  East Coast: Ph- (508) 688-3626  Fax- (508) 685-7230    *
      ***********************************************************
```

Enery Dissipater Baffle Blocks



ultimate tensile force in reinf in front of block

$= 1.7(136.1) = 231.4^K$ Ast req'd $= \frac{231.4}{60\,KSI} = 3.9\ in^2$

use ~~10~~ 13 #6 5 Bars As = ~~4.4~~ 4.03 in^2

Moments in slab (see computer output)

Tension in Top Mu = 52 ft-K/ft in longitudinal dir.

for a 12" slab w/d = 9.5 As = 1.36 in^2

Normal reinf = #5 @ 12" 1.36 − .31 = 1.05 in^2

Add 2-#7 between each set of #5's Top

As = .6 + .6 + .31 = 1.51 in^2/ft

Tension in Bottom Mu = 56.4 ft-K in longitudinal dir

for a 12" slab w/d = 8.5" As = 1.73 in^2/ft

Add 2-#8 between #5's Bott

As = .79 + .79 + .31 = 1.89 in^2

extend bars 7 ft past edge of block each side

Moments in Transverse Direction

Mu Top = 39.9 ft-K for d = 9.5 As = 1.01 in²

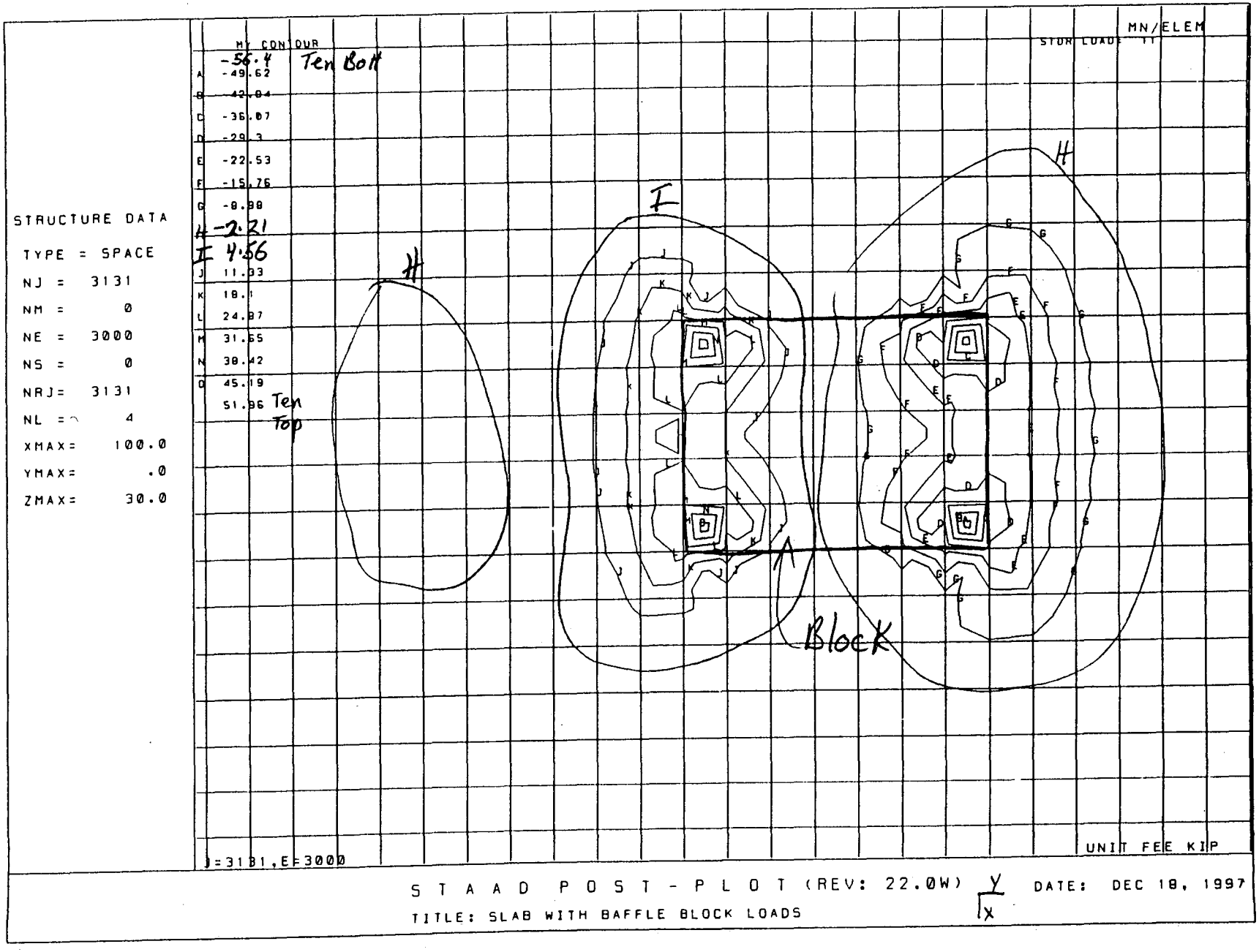
use ~~2 #6 between #5's Top~~ use #7@6"

Mu Bott = 44.8 ft-K for d = 8.5 As = 1.32 in²

use ~~2 - #7 between #5's Bott~~ #8@6"

extend bars 5 ft past edge of block each side

User ID: R2H ENGINEERING



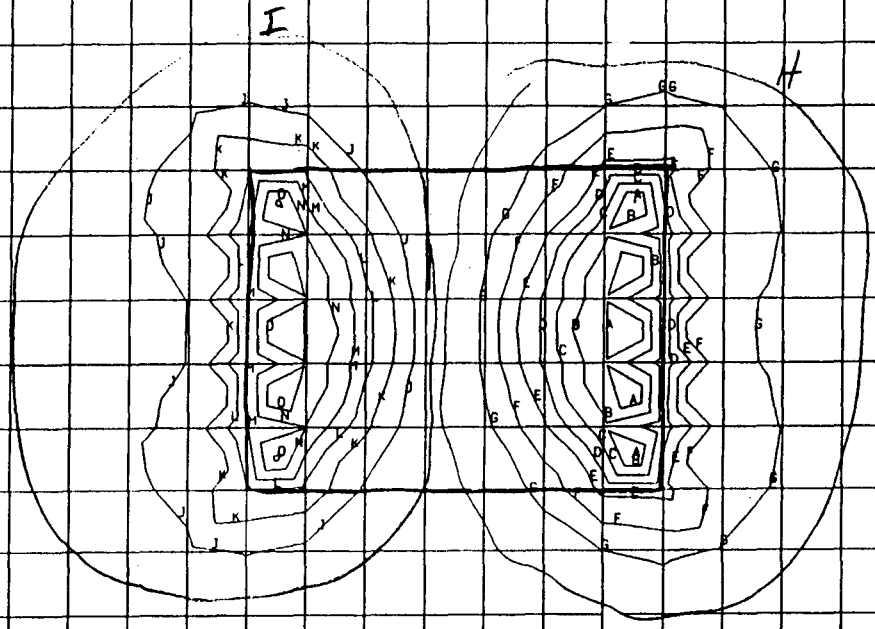
User ID: R2H ENGINEERING

STRUCTURE DATA

TYPE = SPACE
NJ = 3131
NM = 0
NE = 3000
NS = 0
NRJ= 3131
NL = 4
XMAX= 100.0
YMAX= .0
ZMAX= 30.0

MK CONTOUR
-44.84 Ten Bott
A -39.55
B -34.26
C -28.96
D -23.67
E -18.38
F -13.08
G -7.79
H -2.5
I 2.79
J 8.08
K 13.38
L 18.67
M 23.97
N 29.26
O 34.55
39.85
Ten Top

MN/ELEM
STDH LOADE 11



J=3131,E=3000

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W) DATE: DEC 18, 1997

TITLE: SLAB WITH BAFFLE BLOCK LOADS

User ID: R2H ENGINEERING

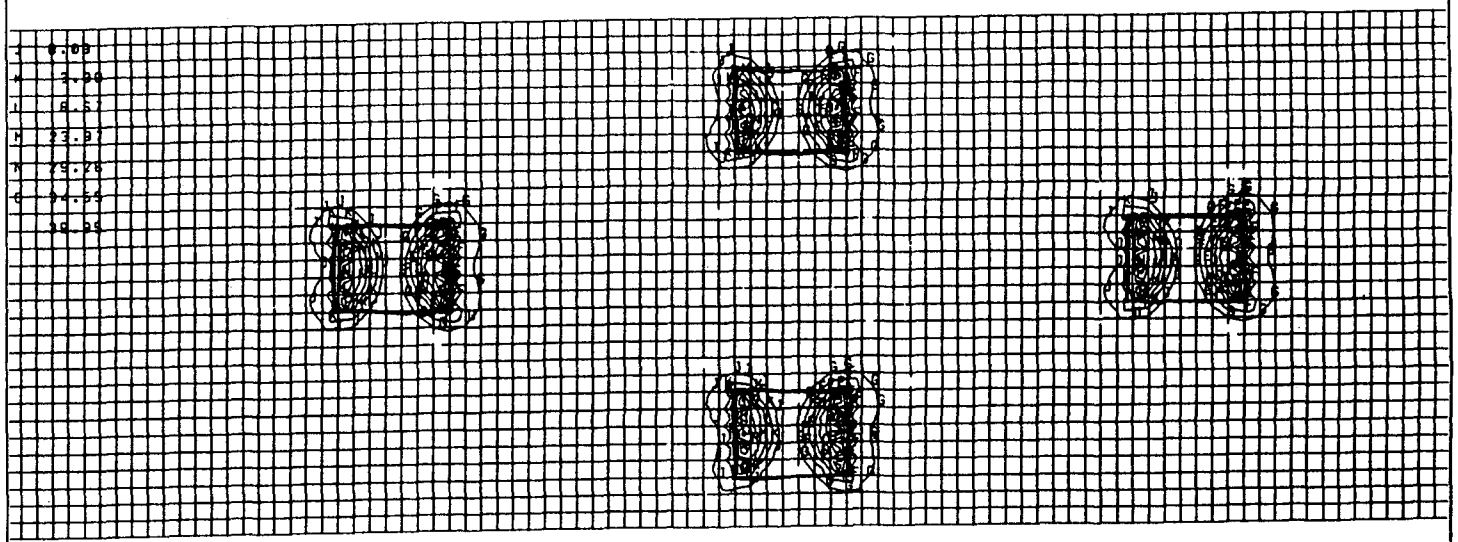
STRUCTURE DATA

TYPE = SPACE
NJ = 3131
NM = 0
NE = 3000
NS = 0
NRJ= 3131
NL = 4
XMAX= 100.0
YMAX= .0
ZMAX= 30.0

Mx CONTOUR

MN/ELEM
STOR LOAD= 11

A -39.55
B -34.26
C -28.96
D -23.67
E -18.38
F -13.08
G -7.79



J=3131,E=3000

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W) DATE: DEC 18, 1997

TITLE: SLAB WITH BAFFLE BLOCK LOADS

vtn nevada

FAX TRANSMITTAL

TO: R&H Fax: 738-3797

ATTN: David Seeley Date: 12/18/97

FROM: Eric Hsu W.O.#: 5266

REGARDING PROJECT/SUBJECT: Structure Parameters

5 NUMBER OF PAGES INCLUDING THIS COVER SHEET.

COMMENTS:

Attached is the design calc. of East C-1 Detention Basin spillway. Please feel free to call if you have any question.

COPY TO FOLLOW BY MESSENGER - NO

Spillway Chac.

Flow Charactaristics over Spillway

Given

Design Discharge	20800	cfs
Width of Spillway	200	ft
Manning's n	0.015	
S1	0.25	ft/ft
Unit Width Discharge	104.00	cfs/ft

From Manning's Equation Q= AV

= A*1.486*R^(2/3)*S^(0.5)/n

By trial and error, find the normal depth Y

Y	Q		A*R^(2/3)	A	R	R^(2/3)	A*R^(2/3)
0.90	9092.85		419.92	198.00	0.89	0.93	183.57
0.95	9947.29			209.00	0.94	0.96	200.82
1.00	10831.82			220.00	0.99	0.99	218.68
1.30	16742.71			286.00	1.28	1.18	338.01
1.49	20876.13			326.70	1.47	1.29	421.45

Find the Critical Depth of the channel Ycr= 6.95 ft

Vcr= 14.96 ft/sec

From Back Water Curve, find the depth, D1, before jump

D1= 2.38 ft

Velocity at D1, V1= 43.70 ft/sec

Froude Number at D1

Fr= 4.99 *TYPEIII* BASIN *Reference :p-387-p-395*

Design of Small Dam

Conjugate Depth D2 *Bureau of Reclamation*

D2= 15.65 ft

Basin Depression (Height of the Jump)

D2-D1= 13.27 ft

From Henry W. Morris, James M. Wigg "Applied Hydraulics in Engineering" pages 281-283

q = 104.00 cfs/ft

Dc = 6.95 ft

Vc = 14.96 ft/sec

Spillway Chac.

For cubical roughness elements, with cubes in adjacent row staggered and with a maximum traverse element spacing of 1.5h.

Block Height h = 0.7Dc

= 5 ft

use 7 ft

Traverse spacing = 1.5h

= 10.5 ft

Spacing Height Ratio

Range 7.5h to 12.0h

Desired 52.5 ft to 84 ft

Force on the Block Fd

Fd = 1.94*Af*V1^2

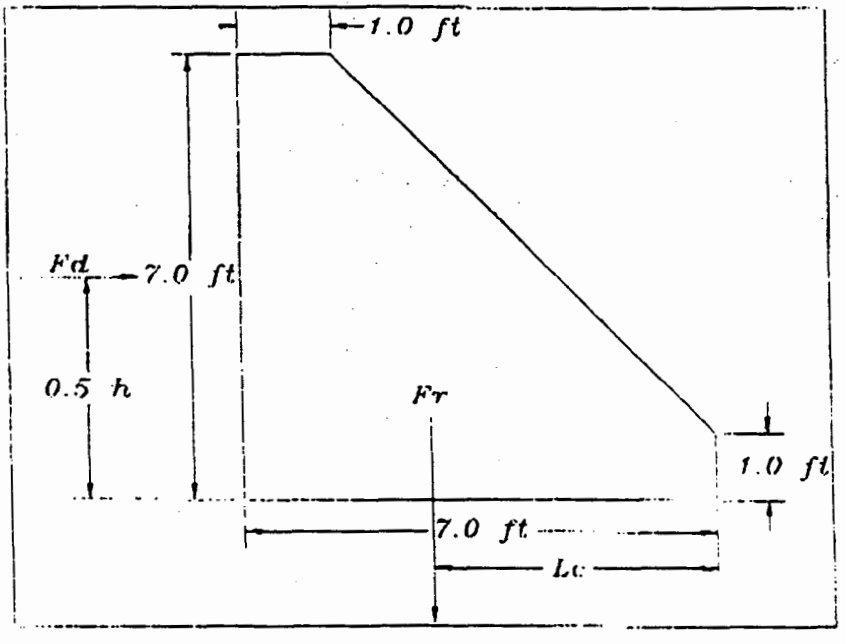
= 272271.3 lbs

Reference :p-VII-A-1 to p-VII-A-2
Hydraulic Design of Stilling Basins and Engery Dissipators

Anchor force necessary to resist overturning Fa

Fa = 0.97*(H/Lc)*Af*V1^2

= 272271.3 lbs



East C-1 Detention Basin Low Level Outfall Design

Reference : Open Channel Hydraulics
Design of Small Dam (Bureau of Reclamation)

Design Design Q = 100 cfs
Pipe Diameter = 48 inches
Equilibrium Width = 3.545 ft
Unit Discharge q = Q / w
= 28.21 cfs/ft

Height of Drop h = 4 ft

Based on flow geometry found by Moore, Bakhmeteff, Feodoroff and Rand, the straight drop can be described by function of the Drop number

Drop Number D = q^2/gh^3
= 0.39

Drop Length Ld = 4.30*D^0.27*h
= 13.30 ft

Pool Length Yp = 1.00*D^0.22*h
= 3.24 ft

Depth at toe Y1 = 0.54*D^0.425*h
= 1.44 ft

Sequent Depth Y2 = 1.66*D^0.27*h
= 5.14 ft

Compare Sequent Depth by using Frude Number
Frude Number at Y1
Fr = 2.21

Sequent Depth Y2 = 3.84 ft

Y2 = **5.14 ft**
is selected for Hydraulic jump calculation

Design Straight Drop with Impact Blocks

Location of Impact Blocks
B = Ld+0.8 Dc
= 15.63 ft

Use 16.0 ft

Sheet1

Minimum Basin Length

Lb = Ld+2.55 Dc

= 20.72 ft

Use 21.0 ft

Minimum Tail Water Depth

Dtw = 2.15 Dc

= 6.26 ft

Use 6.50 ft

Optimum Baffle Block Height

Bb = 0.80 Dc

= 2.33 ft

Use 2.5 ft

Optimum Height of End Sill

Be = 0.40 Dc

= 1.16 ft

Use 1.2 ft

Width and spacing of baffle blocks

Bw = 0.40 Dc

= 1.16 ft

Use 1.2 ft

Velocity to the impact Block: 15 ft/sec

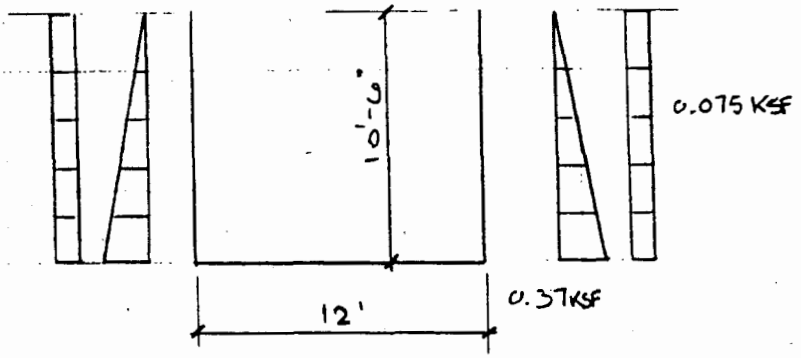
LOADS

ALLOWABLE BEARING = 5000 psf, SUBGRADE MODULUS = 400 K/ft3 ASSUMED
COEFF. OF FRICTION = 0.40
ACTIVE EARTH PRESSURE = 35 PCF,
PASSIVE EARTH PRESSURE 600 PCF
LIVE LOAD SURCHARGE (AASHTO 5.5.2)
= 2(125)0.3 = 75 PSF

LOAD FACTORS - ACI 1.4DL+1.7H

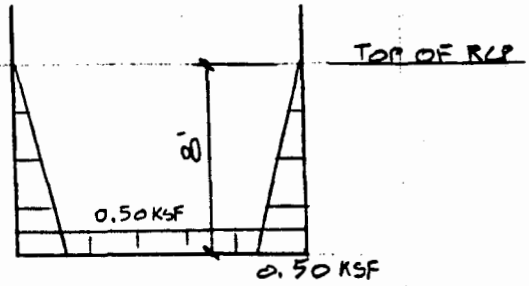
TYPICAL CHANNEL SECTION

CASE I - STRUCTURE EMPTY



seismic load case same as case I loads see p. 1a

CASE II - STRUCTURE FULL



SUMMARY OF ULTIMATE MOMENTS FROM STAAD ANALYSIS

		MOMENT (KIP-FT)	TENS. @	LOAD COMB.
SIDEWALLS:				
HORIZ. AT CORNER	=	8.1	F.F.	6
" " "	=	4.4	I.F.	7
" " BOTTOM	=	5.9	F.F.	6
" " "	=	3.2	I.F	7
" " MIDHEIGHT	=	2.3	I.F	6
" " "	=	1.7	F.F.	7
VERT. " CORNER	=	1.3	I.F.	6
" " "	=	1.5	F.F.	7
" " BOTTOM	=	11.4	F.F.	6
" " "	=	3.6	I.F	7
" " MIDHEIGHT	=	1.3	I.F	6
" " "	=	1.9	F.F.	7
BACK WALL:				
HORIZ. AT CORNER	=	10.	F.F	6
" " "	=	5.	I.F	7
" " BOTTOM	=	-	-	6
" " "	=	1.6	I.F.	7
" " MIDHEIGHT	=	-	-	6
" " "	=	3.3/1.4	I.F/F.F.	7
VERT. " CORNER	=	1.3	F.F.	6
" " "	=	1.1	F.F.	7
" " BOTTOM	=	-	-	6
" " "	=	7.2	F.F	7
" " MIDHEIGHT	=	1.5	I.F	6
" " "	=	-	-	7

SUMMARY OF ULTIMATE MOMENTS FROM STAAD ANALYSIS (CONT.)

BOTTOM SLAB:			MOMENT (K-FT)	TENS @	LOAD COMB.
TRANSVERSE	AT	CORNER	= 12.1	BOT.	6
"	"	"	= 5.2	TOP	7
"	"	MIDSPAN	= 4.5	BOT	6
"	"	"	= 9.5	TOP	7
LONGITUDINAL	"	CORNER	= 1.9/1.4	BOT/TOP	6
"	"	"	= 1.7/1.1	TOP/BOT	7
"	"	MIDSPAN	= 1.4/0.6	TOP/BOT	6
"	"	"	= 2.9	TOP	7

FLEXURAL REINFORCEMENT.

$A_{s\,min} = 0.003(12)(12)/2 = 0.22\ in^2$

For $d = 12 - 2 - (5/8) = 9.4"$ & #5 @12"

$a = 0.46"$

$\phi M_n = 0.9 \times 0.31 \times 60(9.4 - 0.46/2)/12 = 12.8^{k} > M_{u\,max}$

∴ USE #5 @12" E.F., E.W. FOR WALLS & SLAB.

```
STAAD SPACE OUTLET DROP STRUCTURE
INPUT WIDTH 72
INPUT NODESIGN
UNIT FEET KIP
JOINT COORDINATES
    1        .000          .000          .000
    2       1.000          .000          .000
    3       2.000          .000          .000
    4       3.000          .000          .000
    5       4.000          .000          .000
    6       5.000          .000          .000
    7       6.000          .000          .000
    8       7.000          .000          .000
    9       8.000          .000          .000
   10       9.000          .000          .000
   11      10.000          .000          .000
   12      11.000          .000          .000
□.
□.□
  919      15.000         11.000         13.000
  920      16.000         11.000         13.000
  921      17.000         11.000         13.000
  922      18.000         11.000         13.000
  923      19.000         11.000         13.000
  924      20.000         11.000         13.000
ELEMENT INCIDENCES
        1        1        23        24         2
        2        2        24        25         3
        3        3        25        26         4
        4        4        26        27         5
        5        5        27        28         6
        6        6        28        29         7
        7        7        29        30         8
        8        8        30        31         9
        9        9        31        32        10
       10       10        32        33        11
       11       11        33        34        12
□□.
□□.□
      873      898       899       920       919
      874      899       900       921       920
      875      900       901       922       921
      876      901       902       923       922
      877      902       903       924       923
      878      903       692       693       924
ELEMENT PROPERTY
1 TO 878 THICKNESS 1.
CONSTANT
E CONCRETE ALL
DENSITY CONCRETE ALL
POISSON CONCRETE ALL
SUPPORT
24 TO 43 46 TO 65 68 TO 87 90 TO 109 112 TO 131 134 TO 153 156 TO 175 -
178 TO 197 200 TO 219 222 TO 241 244 TO 263 266 TO 284 -
285 FIXED BUT MX MZ KFY 57.6
2 TO 21 23 44 45 66 67 88 89 110 111 132 133 154 155 176 177 198 199 -
220 221 242 243 264 265 286 288 TO 307 FIXED BUT MX MZ KFY 28.8
1 22 287 308 FIXED BUT MX MZ KFY 14.4
LOAD 1 SELF WT.
SELFWEIGHT Y -1.
LOAD 2 LATERAL EARTH
ELEMENT LOAD
274 TO 504 PR GZ .075
648 TO 878 PR GZ -.075
505 TO 647 PR GX -.075
274 TO 294 TRAP Y .37 .336
295 TO 315 TRAP Y .336 .303
316 TO 336 TRAP Y .303 .269
337 TO 357 TRAP Y .269 .235
358 TO 378 TRAP Y .235 .202
379 TO 399 TRAP Y .202 .168
400 TO 420 TRAP Y .168 .135
421 TO 441 TRAP Y .135 .101
442 TO 462 TRAP Y .101 .067
463 TO 483 TRAP Y .067 .034
484 TO 504 TRAP Y .034 0.
648 TO 668 TRAP Y -.37 -.336
669 TO 689 TRAP Y -.336 -.303
690 TO 710 TRAP Y -.303 -.269
711 TO 731 TRAP Y -.269 -.235
732 TO 752 TRAP Y -.235 -.202
753 TO 773 TRAP Y -.202 -.168
774 TO 794 TRAP Y -.168 -.135
```

```
795 TO 815 TRAP Y -.135 -.101
816 TO 836 TRAP Y -.101 -.067
837 TO 857 TRAP Y -.067 -.034
858 TO 878 TRAP Y -.034 0.
505 516 527 538 549 560 571 582 593 604 615 626 637 TRAP X -.37 -.336
506 517 528 539 550 561 572 583 594 605 616 627 638 TRAP X -.336 -.303
507 518 529 540 551 562 573 584 595 606 617 628 639 TRAP X -.303 -.269
508 519 530 541 552 563 574 585 596 607 618 629 640 TRAP X -.269 -.235
509 520 531 542 553 564 575 586 597 608 619 630 641 TRAP X -.235 -.202
510 521 532 543 554 565 576 587 598 609 620 631 642 TRAP X -.202 -.168
511 522 533 544 555 566 577 588 599 610 621 632 643 TRAP X -.168 -.135
512 523 534 545 556 567 578 589 600 611 622 633 644 TRAP X -.135 -.101
513 524 535 546 557 568 579 590 601 612 623 634 645 TRAP X -.101 -.067
514 525 536 547 558 569 580 591 602 613 624 635 646 TRAP X -.067 -.034
515 526 537 548 559 570 581 592 603 614 625 636 647 TRAP X -.034 0.
LOAD 3 STRUCTURE FULL
ELEMENT LOAD
1 TO 273 PR GY -.5
505 516 527 538 549 560 571 582 593 604 615 626 637 TRAP X -.37 -.336
506 517 528 539 550 561 572 583 594 605 616 627 638 TRAP X -.336 -.303
507 518 529 540 551 562 573 584 595 606 617 628 639 TRAP X -.303 -.269
508 519 530 541 552 563 574 585 596 607 618 629 640 TRAP X -.269 -.235
509 520 531 542 553 564 575 586 597 608 619 630 641 TRAP X -.235 -.202
510 521 532 543 554 565 576 587 598 609 620 631 642 TRAP X -.202 -.168
511 522 533 544 555 566 577 588 599 610 621 632 643 TRAP X -.168 -.135
512 523 534 545 556 567 578 589 600 611 622 633 644 TRAP X -.135 -.101
513 524 535 546 557 568 579 590 601 612 623 634 645 TRAP X -.101 -.067
514 525 536 547 558 569 580 591 602 613 624 635 646 TRAP X -.067 -.034
515 526 537 548 559 570 581 592 603 614 625 636 647 TRAP X -.034 0.
274 TO 294 TRAP Y -.5 -.438
295 TO 315 TRAP Y -.438 -.375
316 TO 336 TRAP Y -.375 -.313
337 TO 357 TRAP Y -.313 -.25
358 TO 378 TRAP Y -.25 -.188
379 TO 399 TRAP Y -.188 -.125
400 TO 420 TRAP Y -.125 -.063
421 TO 441 TRAP Y -.063 0.
648 TO 668 TRAP Y .5 .438
669 TO 689 TRAP Y .438 .375
690 TO 710 TRAP Y .375 .313
711 TO 731 TRAP Y .313 .25
732 TO 752 TRAP Y .25 .188
753 TO 773 TRAP Y .188 .125
774 TO 794 TRAP Y .125 .063
795 TO 815 TRAP Y .063 0.
505 516 527 538 549 560 571 582 593 604 615 626 637 TRAP X .5 .438
506 517 528 539 550 561 572 583 594 605 616 627 638 TRAP X .438 .375
507 518 529 540 551 562 573 584 595 606 617 628 639 TRAP X .375 .313
508 519 530 541 552 563 574 585 596 607 618 629 640 TRAP X .313 .25
509 520 531 542 553 564 575 586 597 608 619 630 641 TRAP X .25 .188
510 521 532 543 554 565 576 587 598 609 620 631 642 TRAP X .188 .125
511 522 533 544 555 566 577 588 599 610 621 632 643 TRAP X .125 .063
512 523 534 545 556 567 578 589 600 611 622 633 644 TRAP X .063 0.
LOAD COMB 4 SELF WT. + LAT. EARTH (UNFACT)
1 1. 2 1.
LOAD COMB 5 SELF WT.+FULL STRUCT. (UNFACT)
1 1. 3 1.
LOAD COMB 6 SELF WT.+LAT. EARTH (FACT)
1 1.4 2 1.7
LOAD COMB 7 SELF WT.+FULL STRUCT. (FACT)
1 1.4 3 1.7
PERFORM ANALYSIS
PLOT DISPLACEMENT FILE
PLOT STRESS FILE
PRINT SUPPORT REACTIONS
FINISH
```

User ID:

STRUCTURE DATA

TYPE = SPACE

NJ = 924

NM = 0

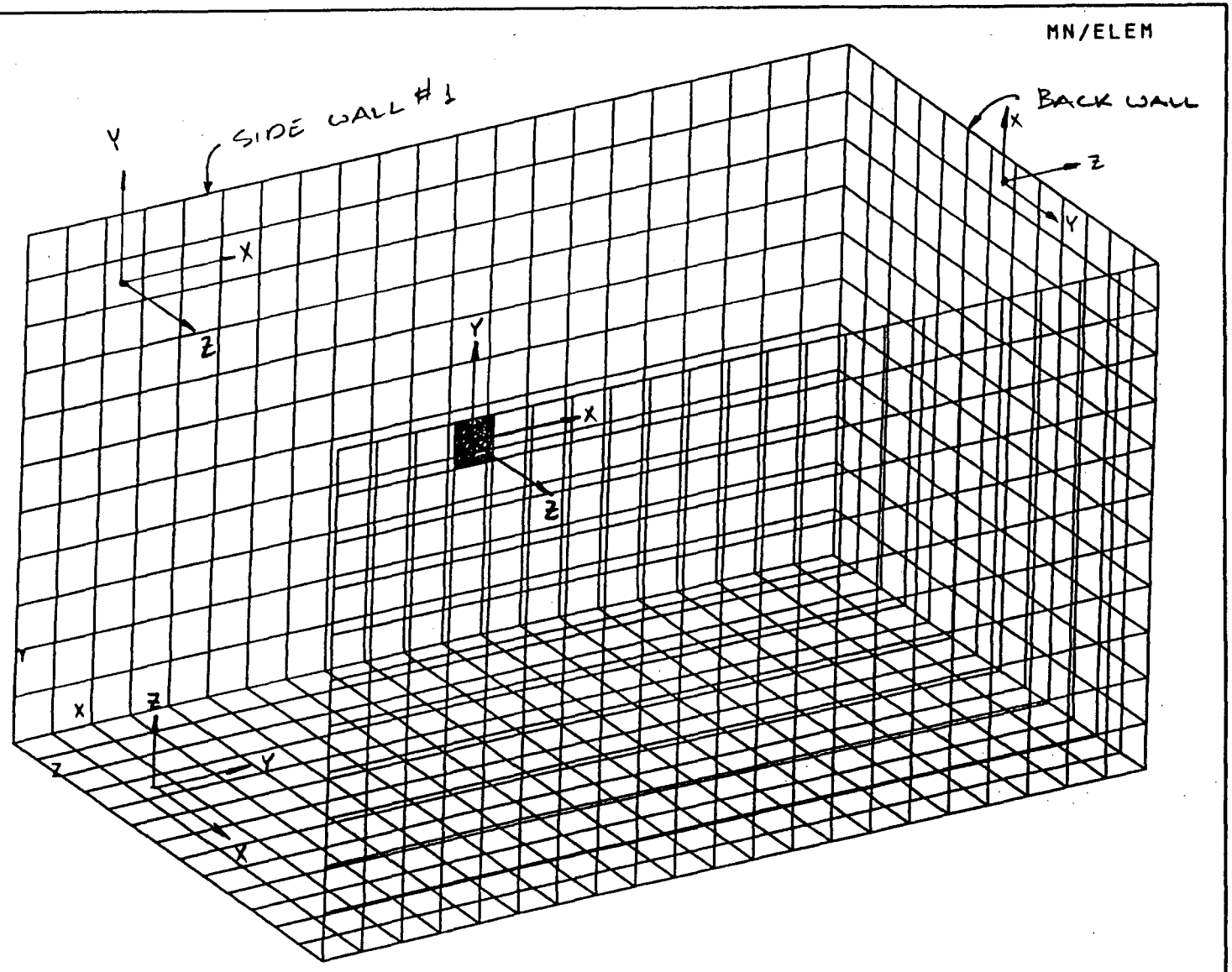
NE = 878

NS = 0

XMAX= 21.0

YMAX= 11.0

ZMAX= 13.0



S T A A D P R E - P L O T (VERSION 22.0) DATE: DEC 22, 1997

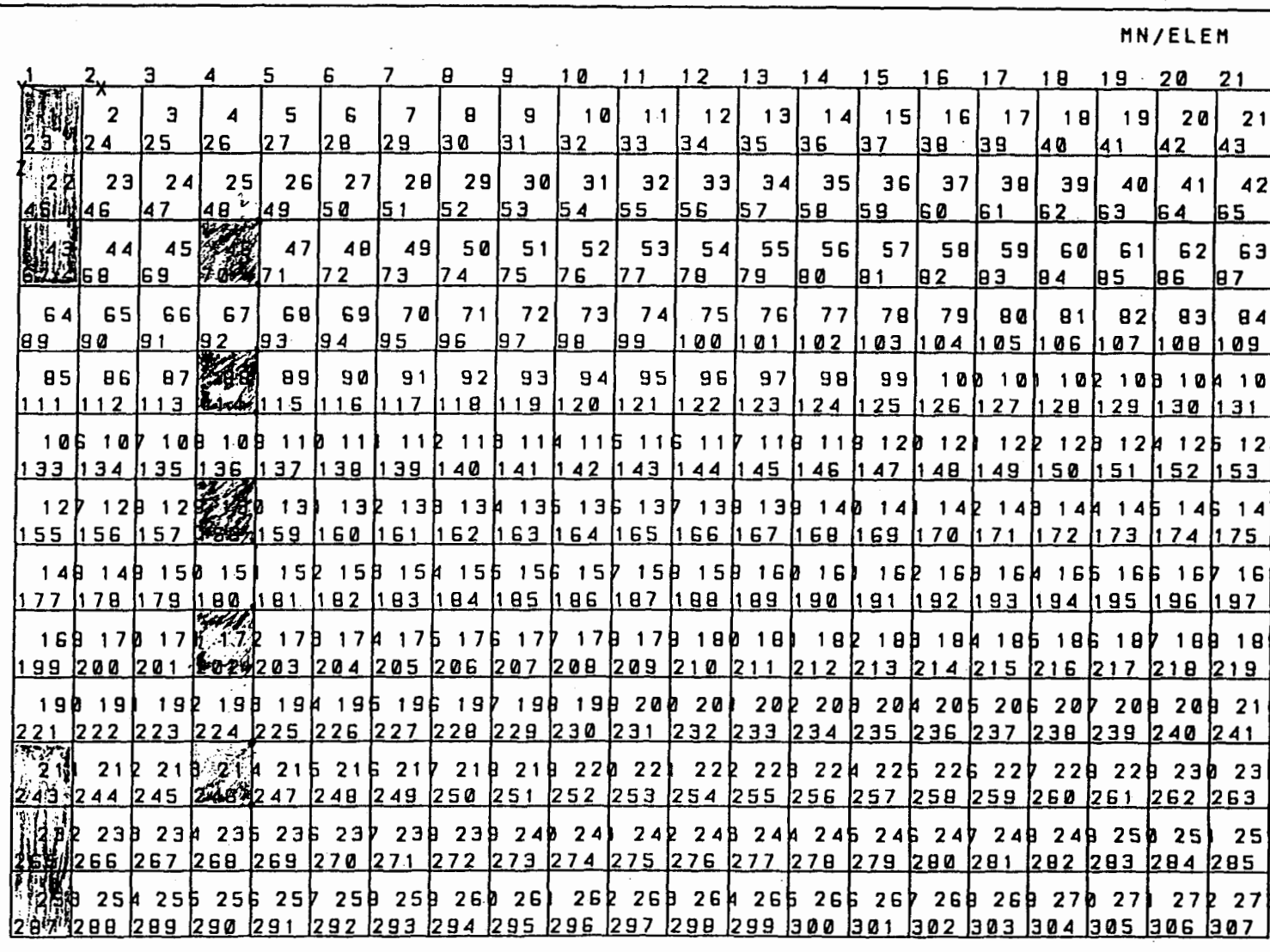
TITLE: OUTLET DROP STRUCTURE

User ID:

STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0

XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0



BOTTOM SLAB

UNIT FE KIP

S T A A D P R E - P L O T (VERSION 22.0) DATE: DEC 22, 1997

TITLE: OUTLET DROP STRUCTURE

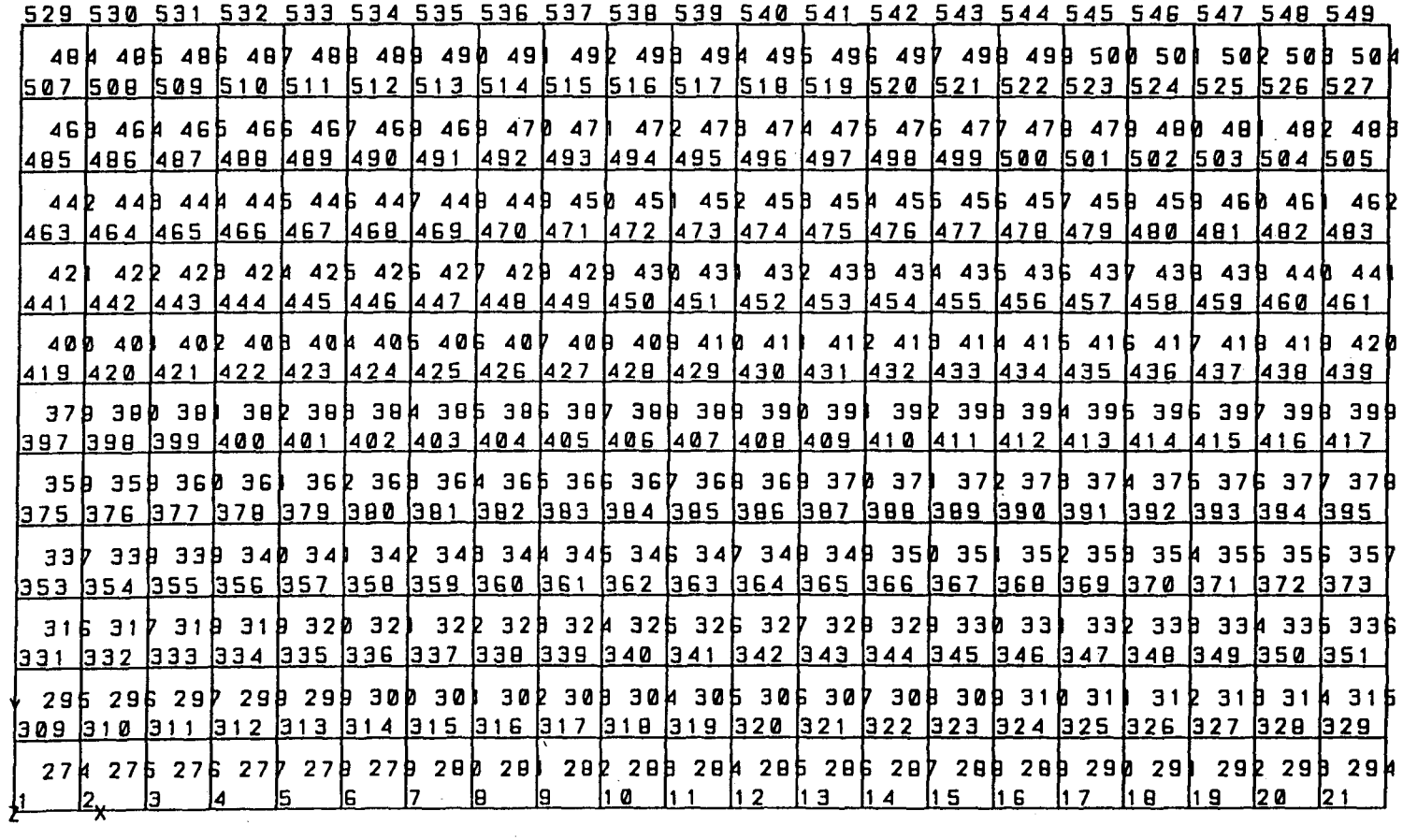
User ID:

STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0

XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

MN/ELEM



SIDE WALL #1

UNIT FE KIP

S T A A D P R E - P L O T (VERSION 22.0) DATE: DEC 22, 1997

TITLE: OUTLET DROP STRUCTURE

14

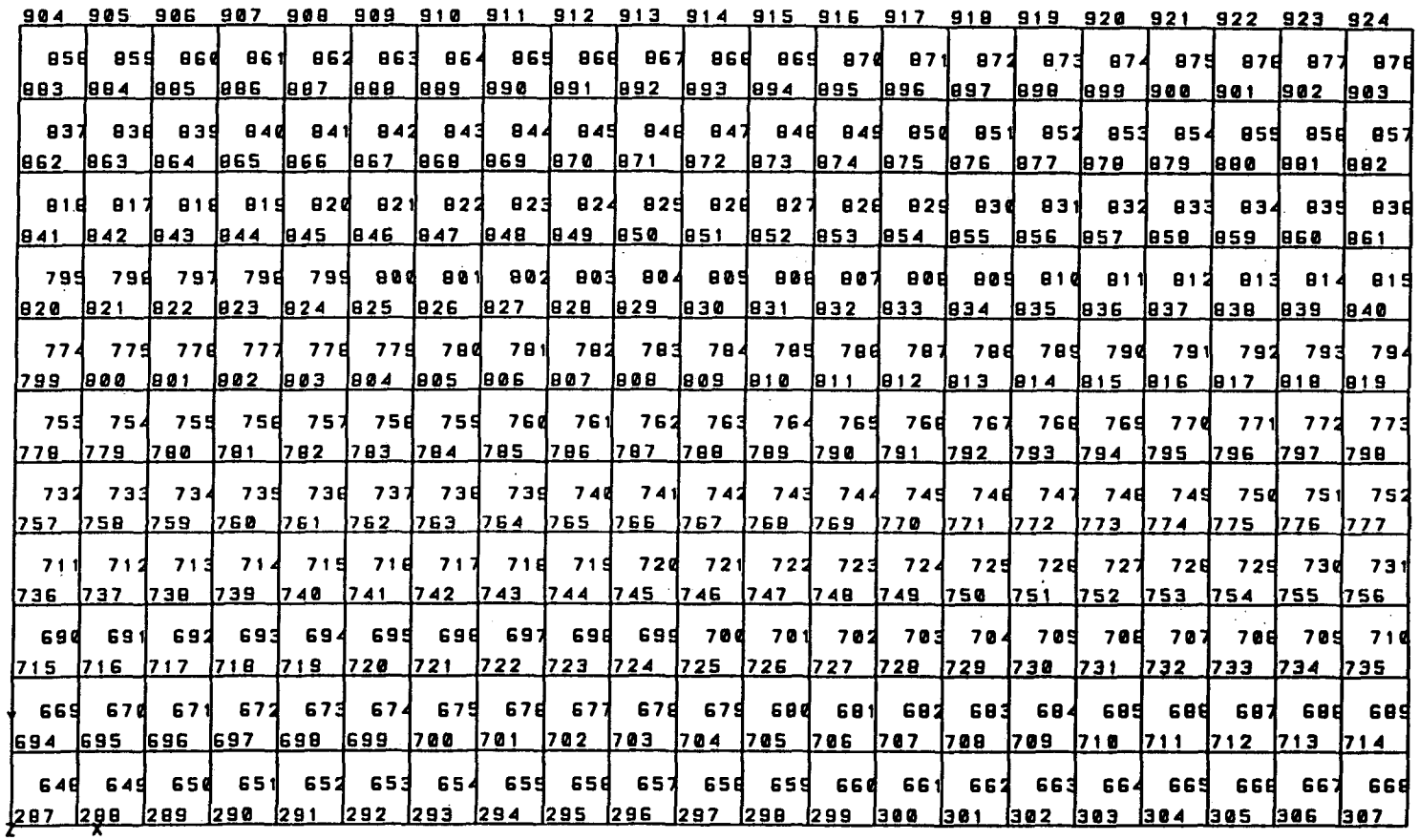
User ID:

STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0

XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

MN/ELEM



SIDE WALL #2

UNIT FE KIP

S T A A D P R E - P L O T (VERSION 22.0) DATE: DEC 22, 1997

TITLE: OUTLET DROP STRUCTURE

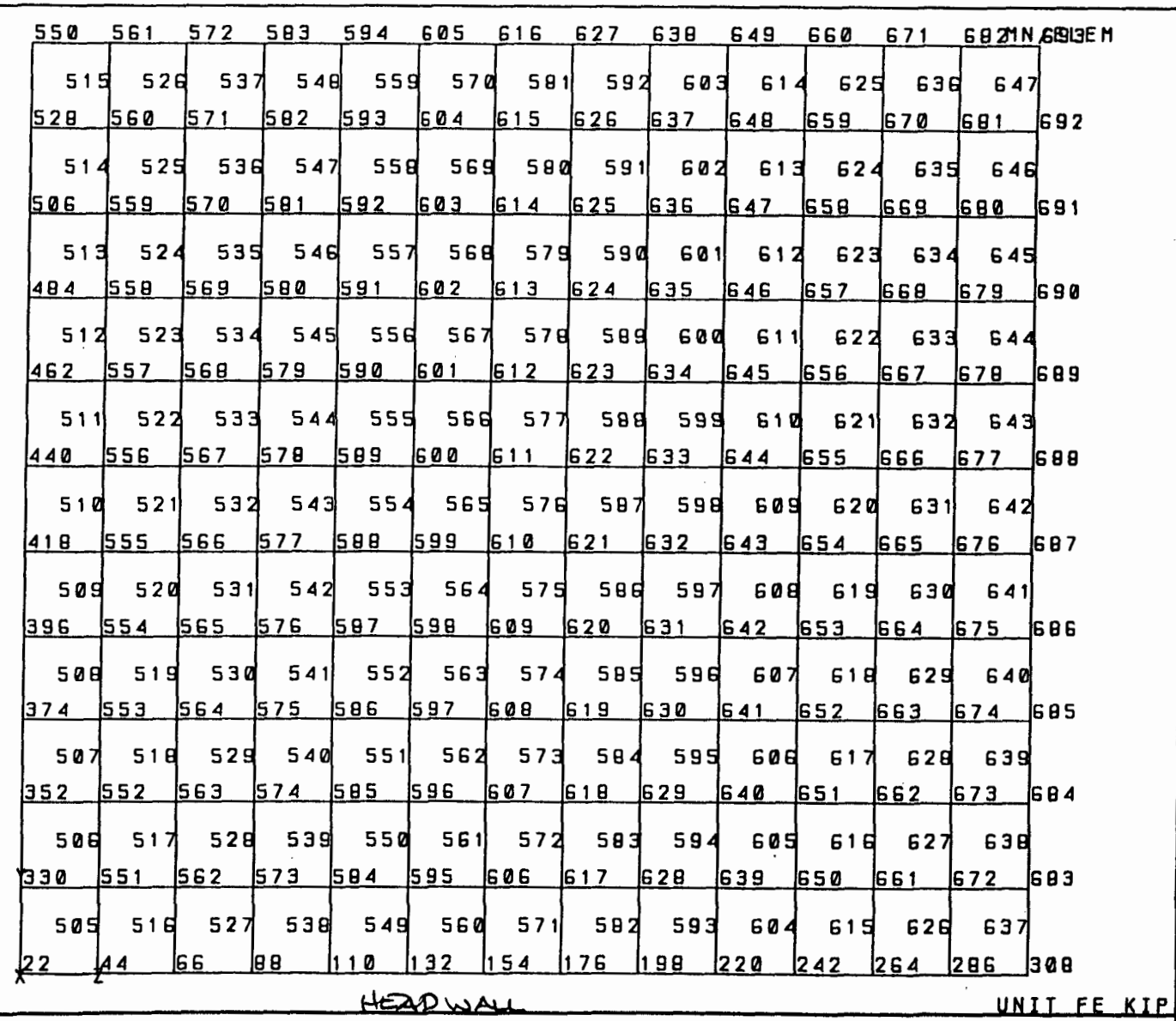
42

User ID:

STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0

XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0



UNIT FE KIP

S T A A D P R E - P L O T (VERSION 22.0) DATE: DEC 22, 1997

TITLE: OUTLET DROP STRUCTURE

HORIZONTAL MOMENTS

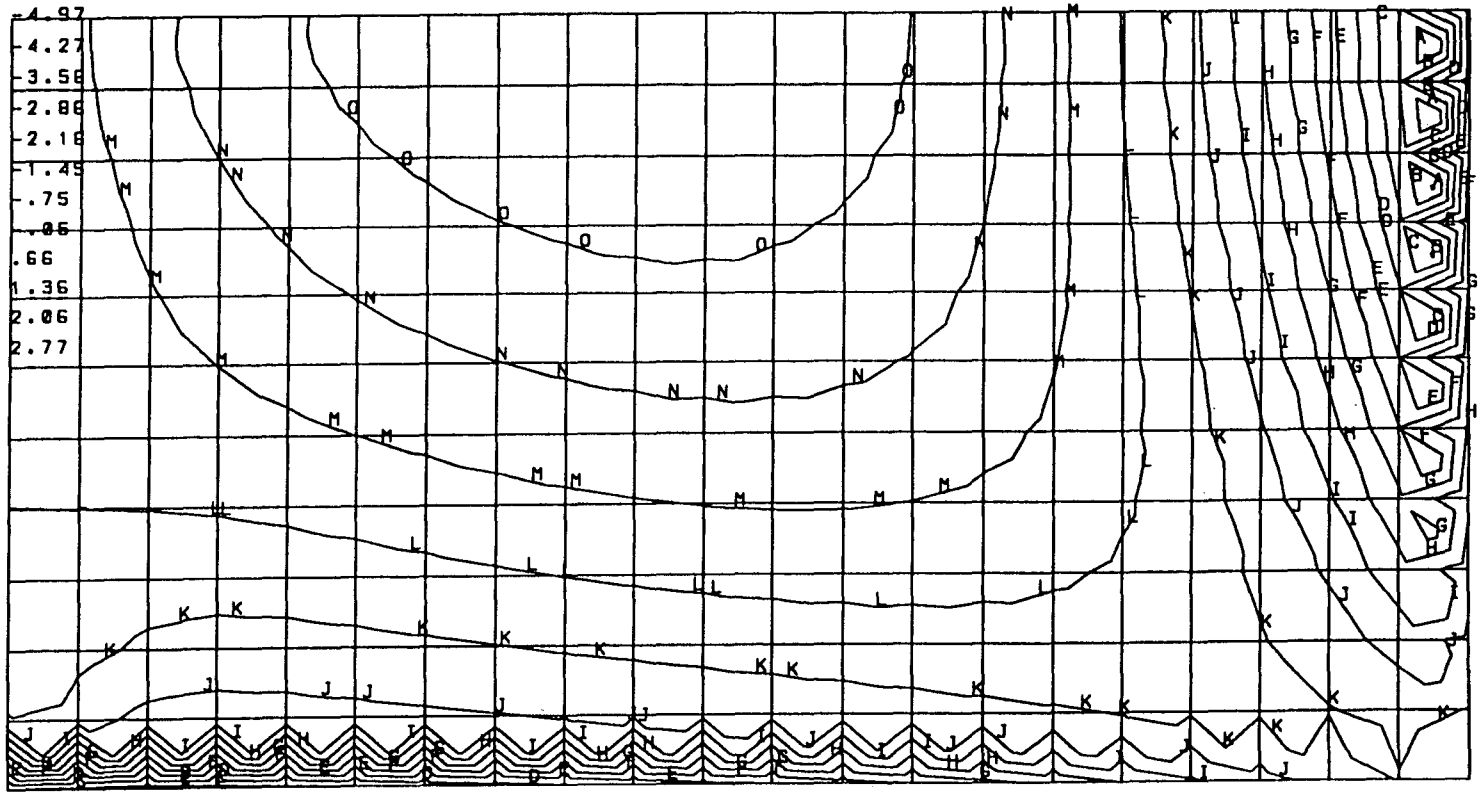
+ = TENSION I.F.

MX CONTOUR

MN/ELEM

STDR LOAD= 7

A -7.79
B -7.08
C -6.38
D -5.68
E -4.97
F -4.27
G -3.56
H -2.86
I -2.16
J -1.45
K -.75
L -.05
M .66
N 1.36
O 2.06
2.77



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

SIDEWALL

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

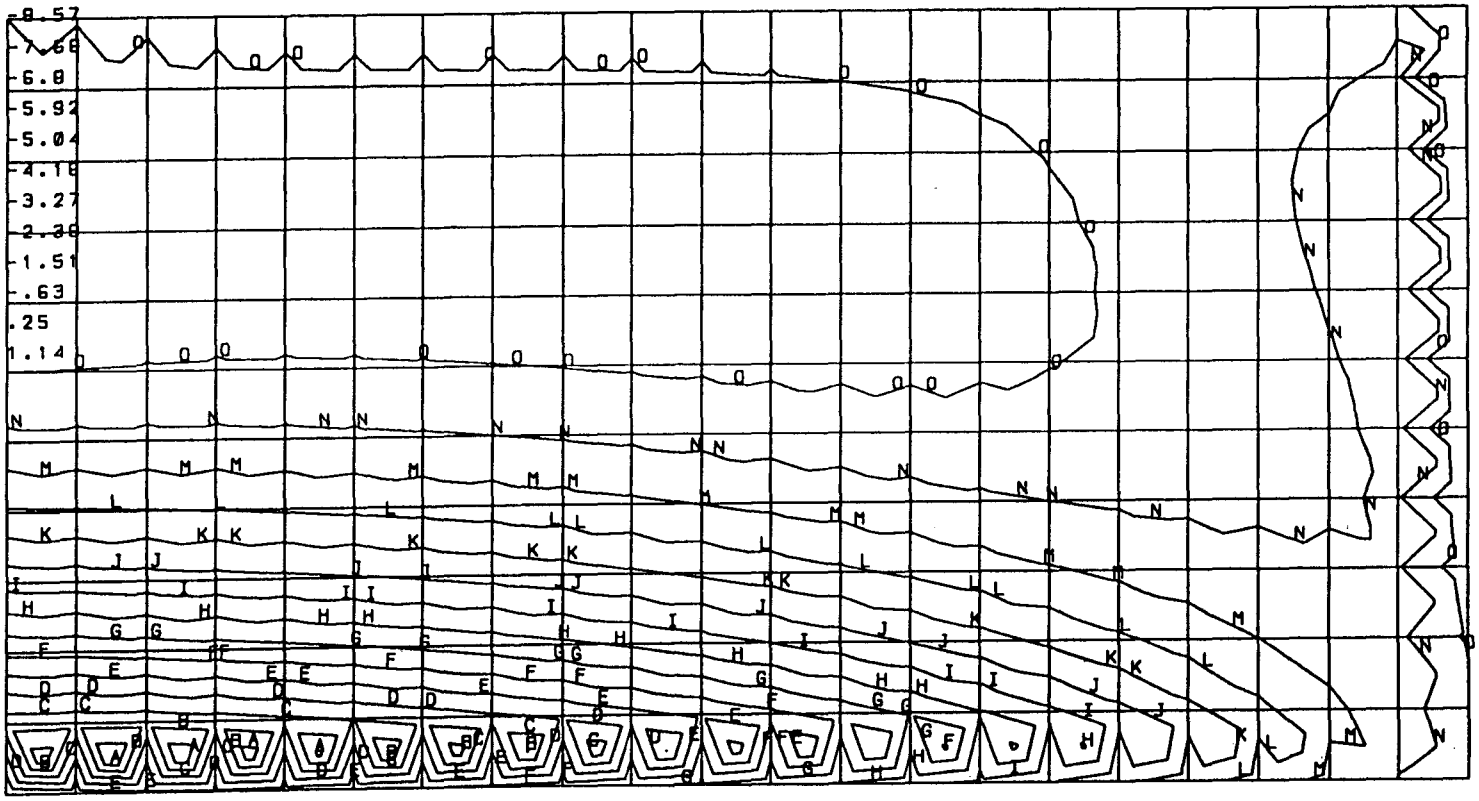
User ID: R2H ENGINEERING

VERTICAL MOMENTS

MY CONTOUR + = TENSION I.F. MN/ELEM

STDR LOAD= 7

A -12.09
B -11.21
C -10.33
D -9.45
E -8.57
F -7.68
G -6.8
H -5.92
I -5.04
J -4.16
K -3.27
L -2.39
M -1.51
N -.63
O .25
1.14



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

SIDEWALL

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

45

HORIZONTAL MOMENTS

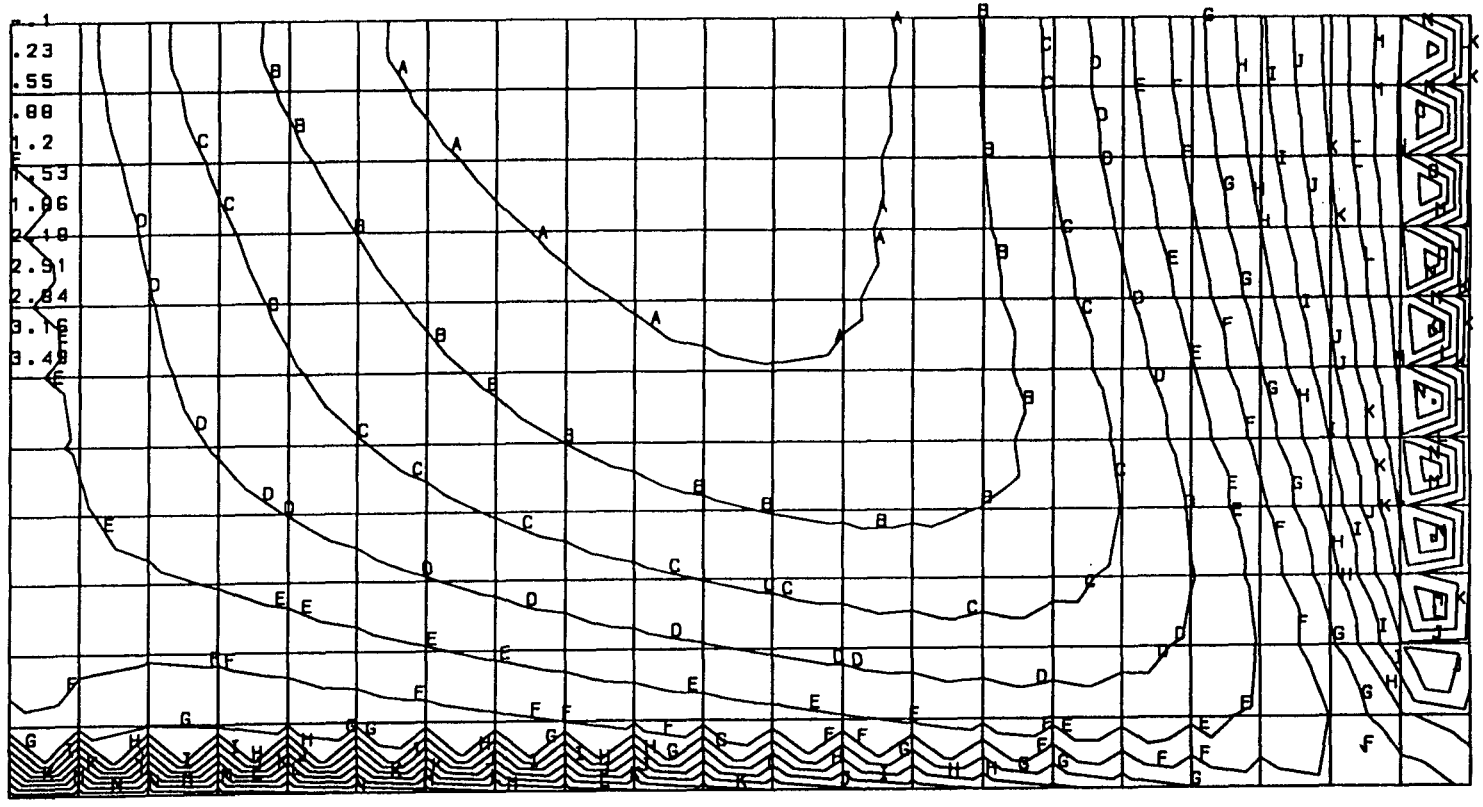
+ = TENSION I.F.

MX CONTOUR

MN/ELEM

STOR LOAD= 8

A -1.41
B -1.08
C -.75
D -.43
E -.1
F .23
G .55
H .88
I 1.2
J 1.53
K 1.86
L 2.18
M 2.51
N 2.84
O 3.16
3.49



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

SIDEWALL

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

VERTICAL MOMENTS

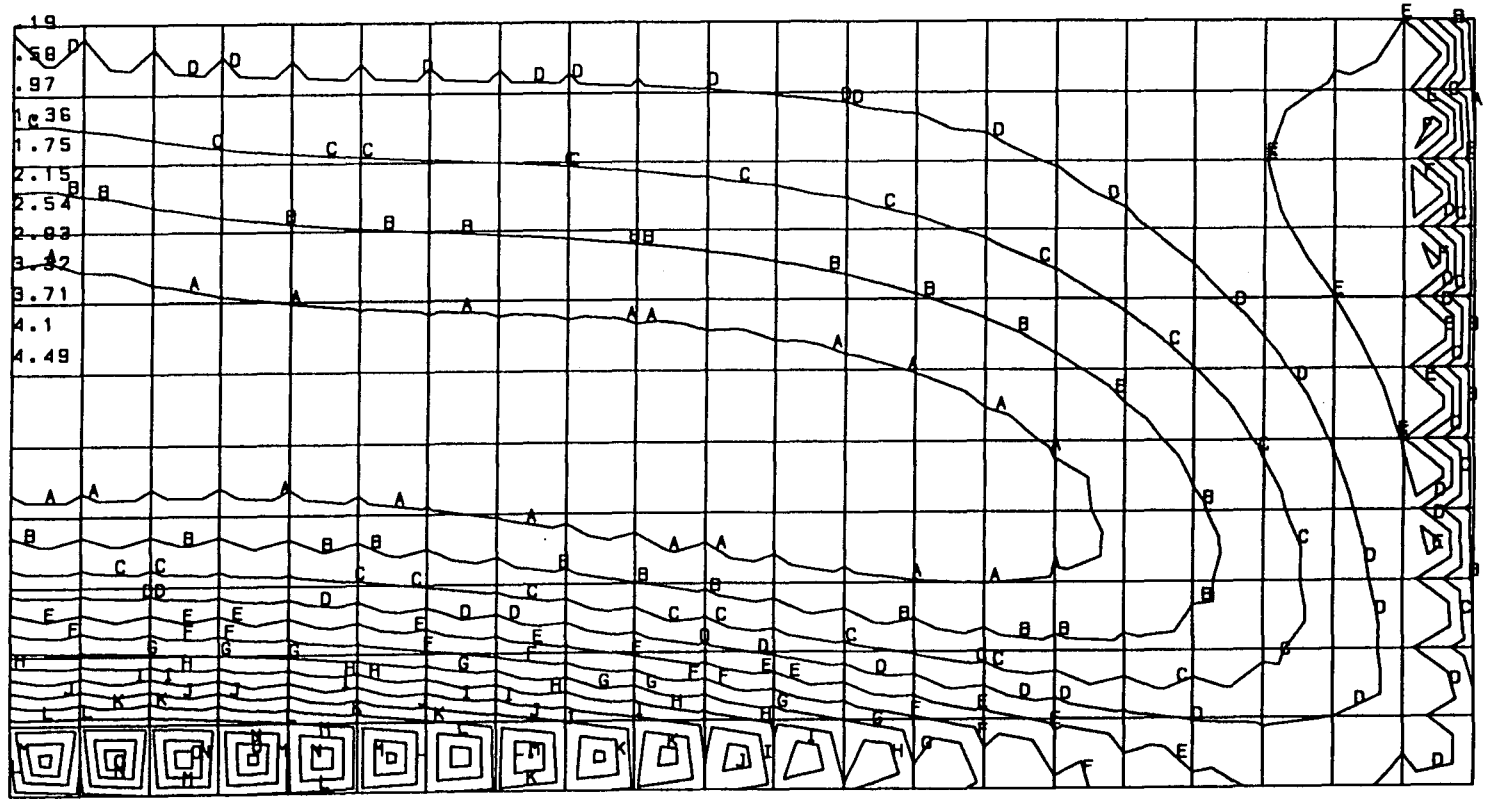
+ = TENSION I.F.

MY CONTOUR

MN/ELEM

STDR LOAD= 8

A -1.37
B -.98
C -.59
D -.2
E .19
F .58
G .97
H 1.36
I 1.75
J 2.15
K 2.54
L 2.93
M 3.32
N 3.71
O 4.1
4.49



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

SIDEWALL

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

TRANS. MOMENTS

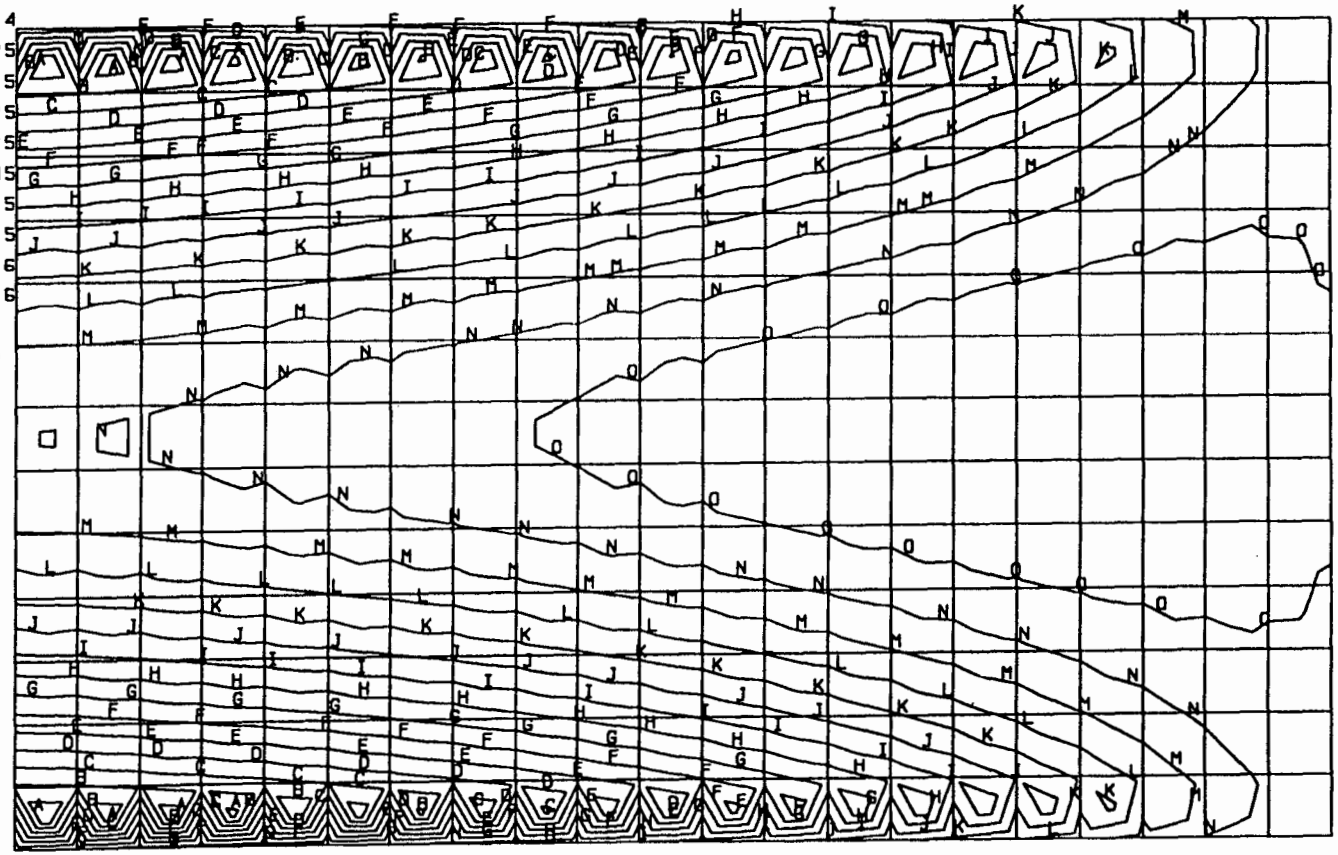
+= TENSION TOP

MX CONTOUR

MN/ELEM

STOR LOAD= 7

A -12.64
B -11.74
C -10.84
D -9.94
E -9.05
F -8.15
G -7.25
H -6.35
I -5.45
J -4.55
K -3.65
L -2.76
M -1.86
N -.96
O -.06
.84



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

BOTTOM SLAB

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

LONGIT. MOMENTS

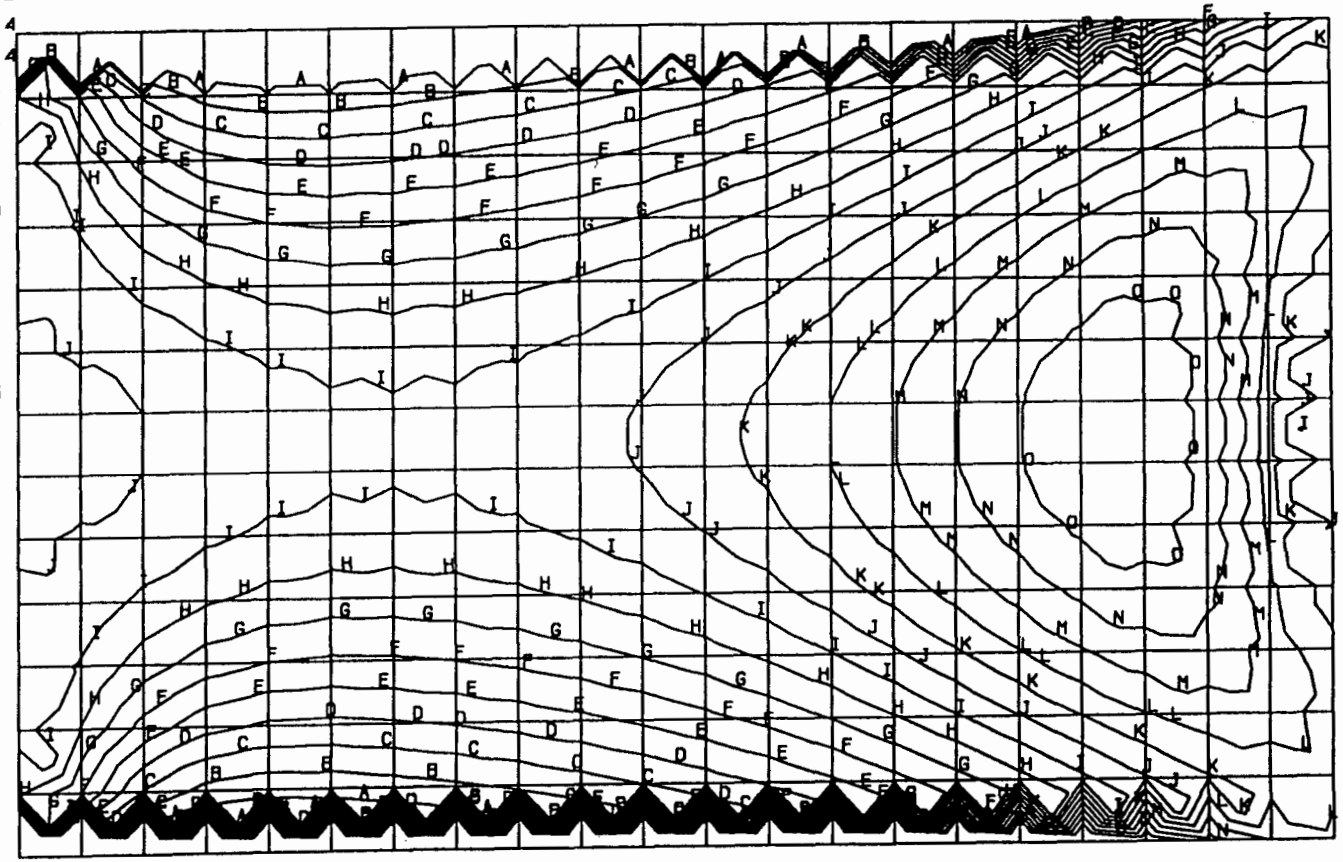
+ = TENSION TOP

MY CONTOUR

MN/ELEM

STOR LOAD= 7

A -1.97
B -1.76
C -1.55
D -1.34
E -1.14
F -.93
G -.72
H -.51
I -.3
J -.09
K .11
L .32
M .53
N .74
O .95
1.15



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

BOTTOM SLAB

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

TRANS. MOMENTS

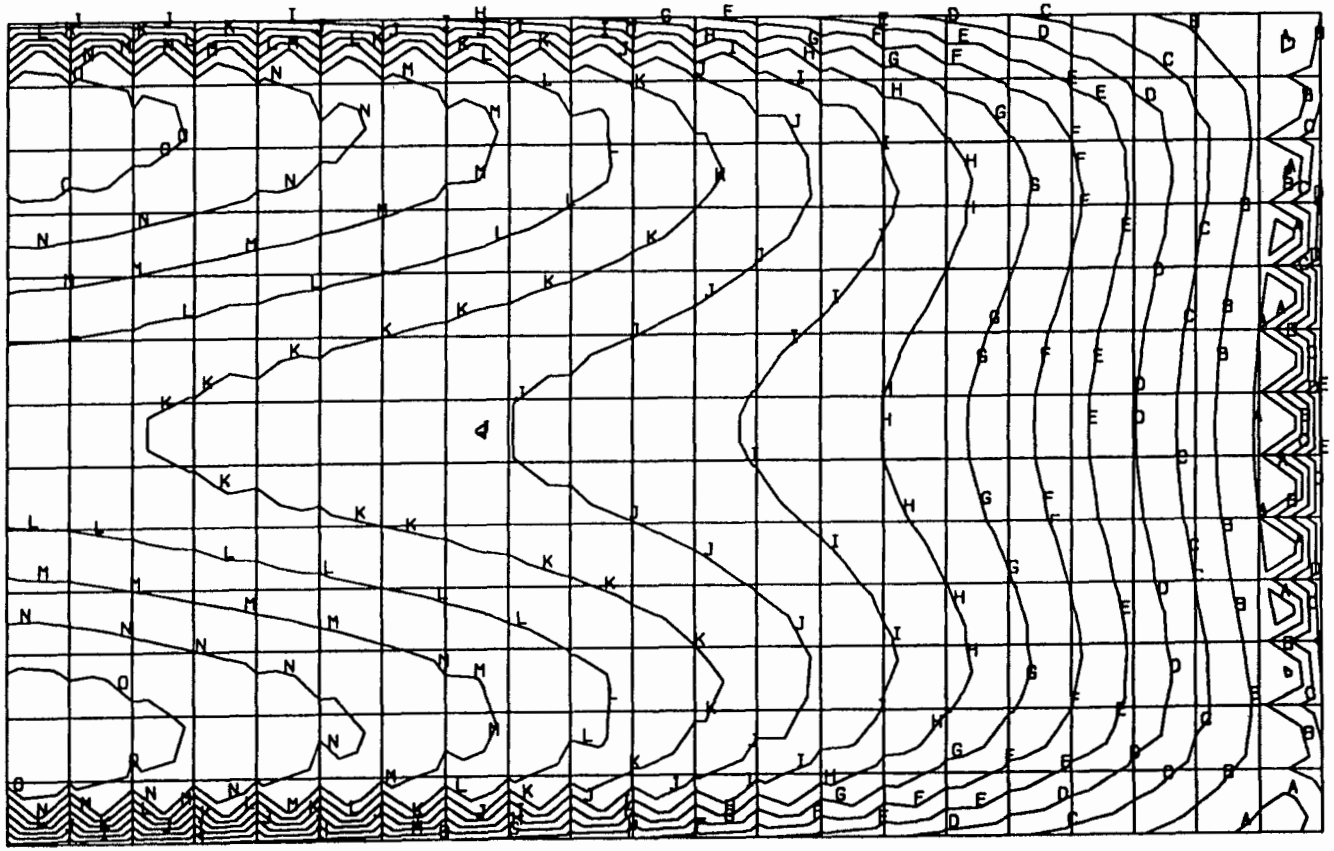
+ = TENSION TOP

MX CONTOUR

MN/ELEM

STDR LOAD= 8

A .06
B .54
C 1.03
D 1.51
E 2
F 2.48
G 2.96
H 3.45
I 3.93
J 4.42
K 4.9
L 5.39
M 5.87
N 6.36
O 6.84
7.32



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

BOTTOM SLAB

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

TRANS. MOMENTS

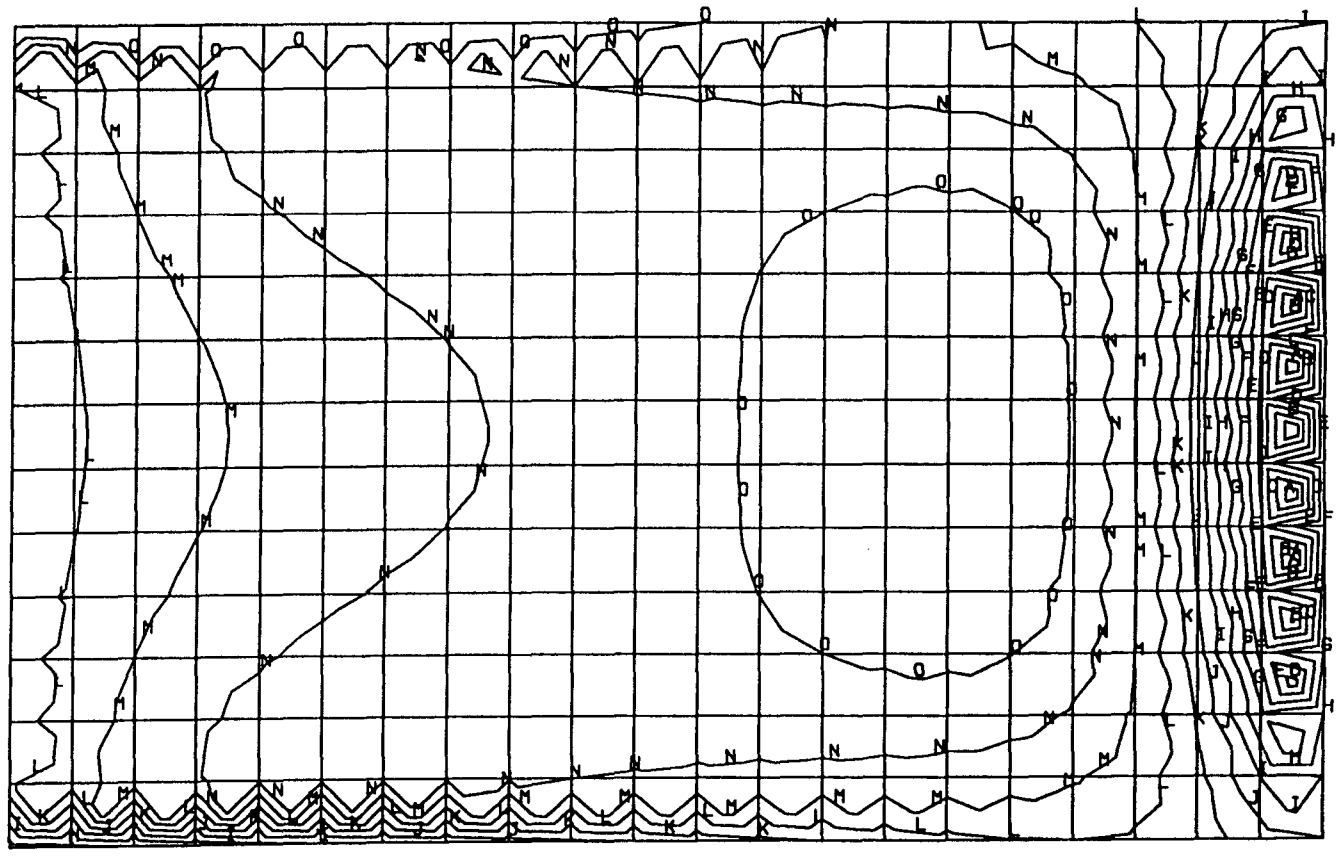
+ = TENSION TOP

MY CONTOUR

MN/ELEM

STOR LOAD= 8

A -4.2
B -3.8
C -3.4
D -3
E -2.6
F -2.2
G -1.8
H -1.4
I -1
J -.6
K -.2
L .2
M .6
N 1
O 1.4
1.79



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

BOTTOM SLAB

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 21, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

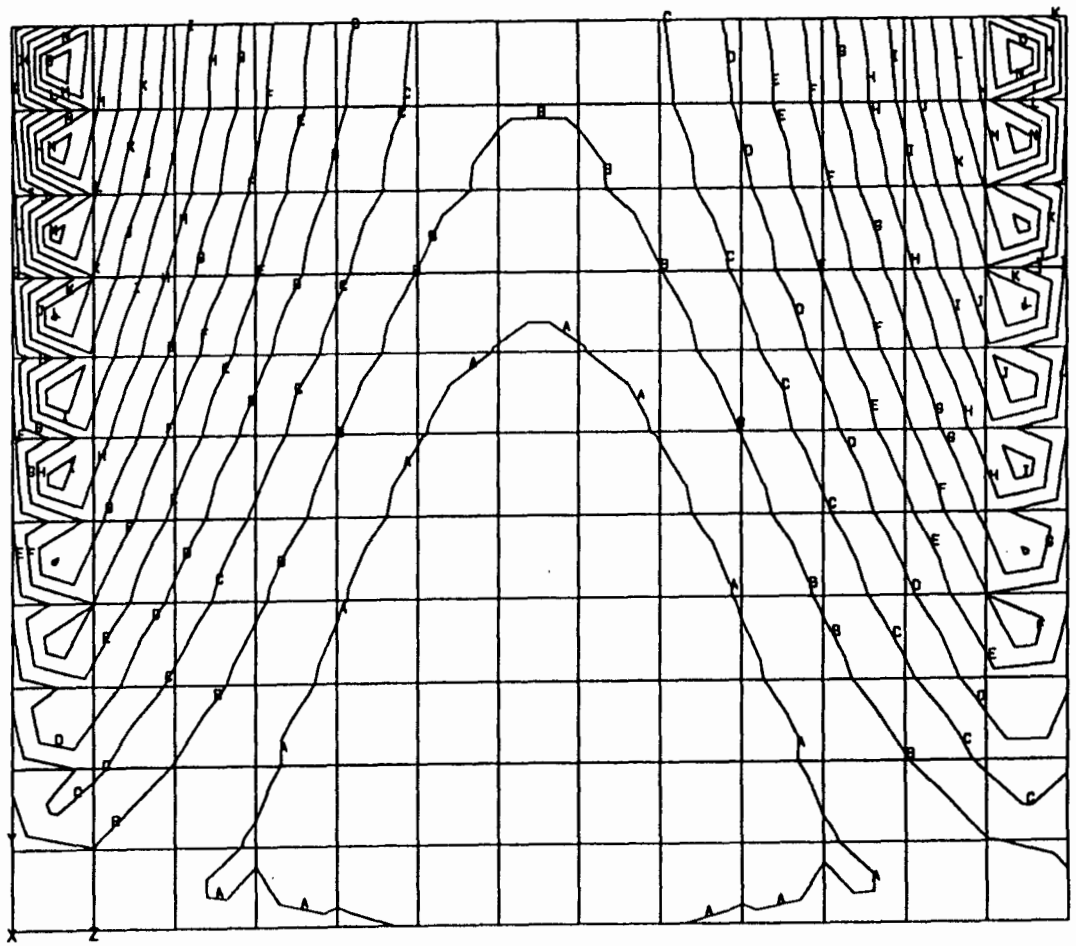
HORIZONTAL MOMENT
+, TENSION F.F.

MY CONTOUR

MN/ELEM

STOR LOAD= 6

A .02
B .69
C 1.36
D 2.02
E 2.69
F 3.36
G 4.02
H 4.69
I 5.36
J 6.02
K 6.69
L 7.36
M 8.02
N 8.69
O 9.36
10.02



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 7
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

HEADWALL

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: DEC 22, 1997

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

VERTICAL MOMENT

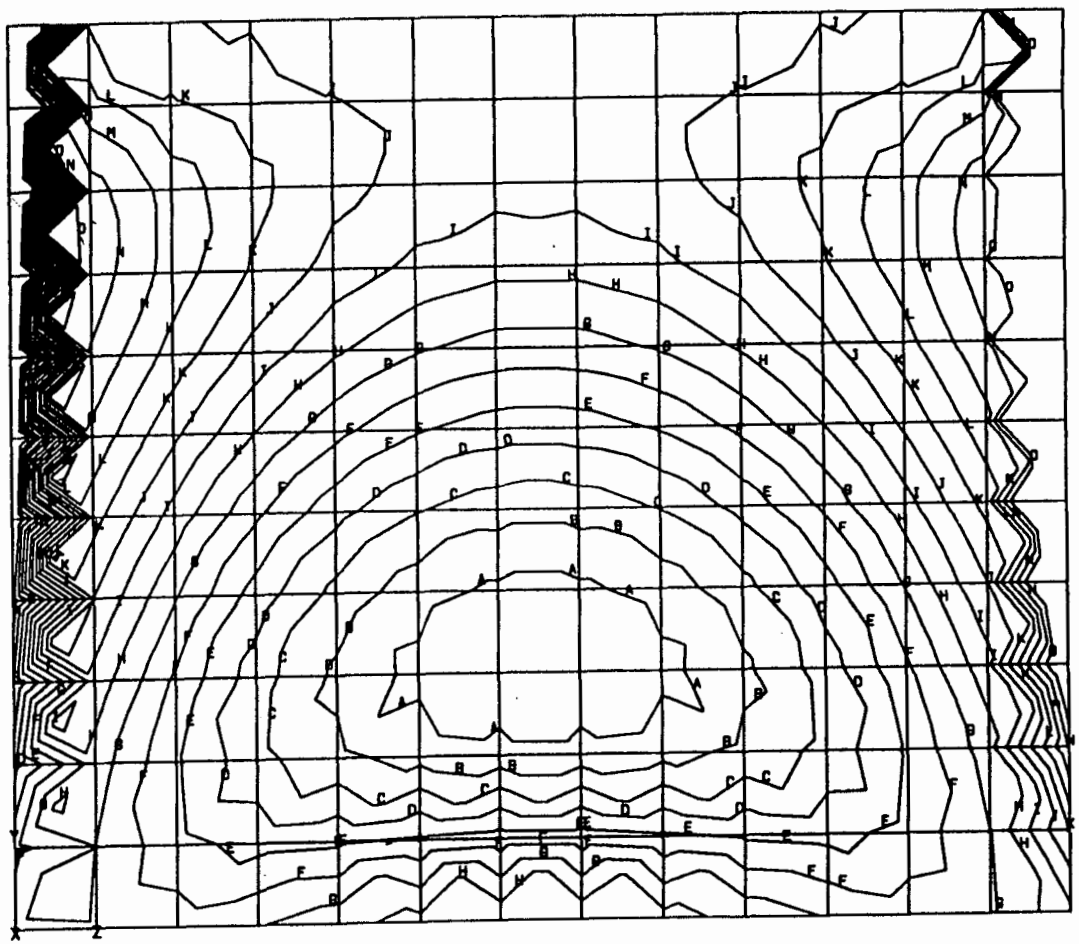
+ = TENSION ON F.F.

MX CONTOUR

MN/ELEM

STOR LOAD= 6

A -1.48
B -1.29
C -1.11
D -.93
E -.75
F -.56
G -.38
H -.2
I -.02
J .17
K .35
L .53
M .71
N .9
O 1.08
1.26



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 7
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

HEADWALL

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: DEC 22; 1997

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

HORIZONTAL MOMENT

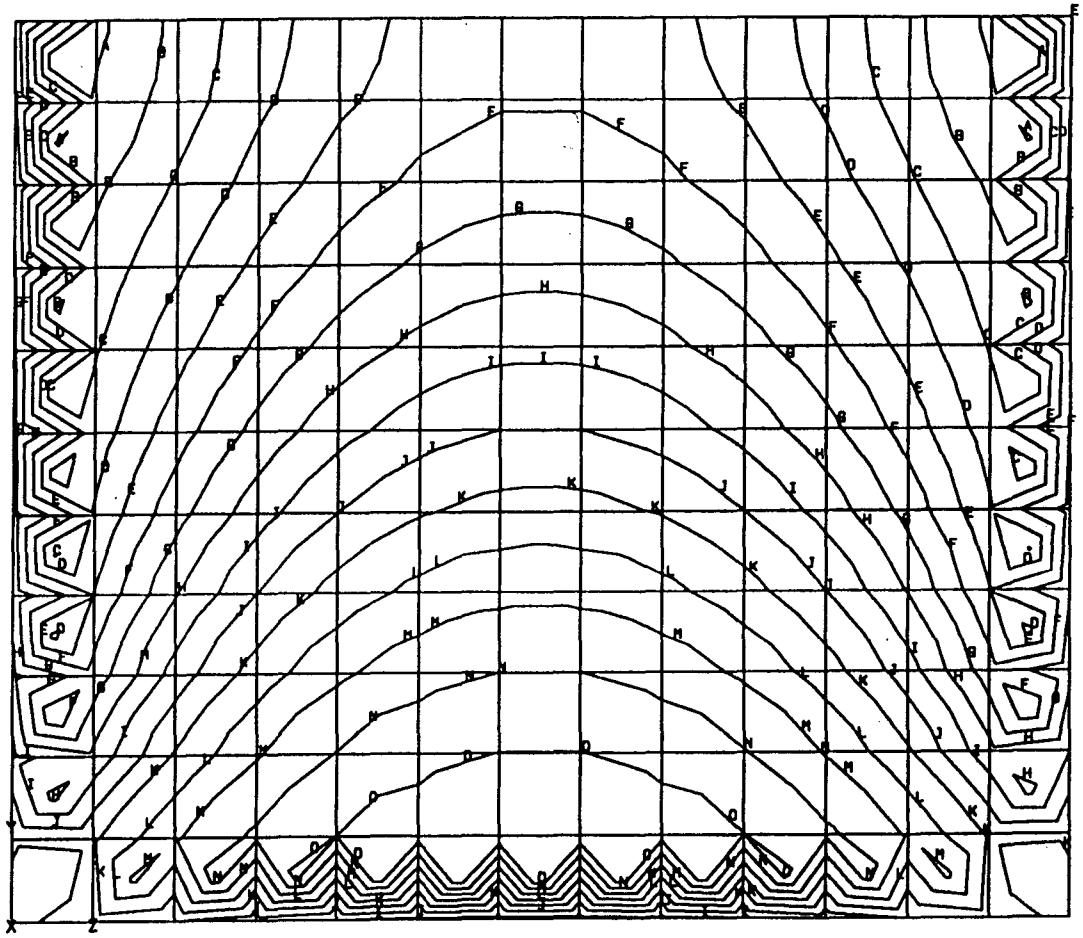
+ = TENSION F.F.

MY CONTOUR

MN/ELEM

STDR LOAD= 7

A	-4.98
B	-4.55
C	-4.13
D	-3.71
E	-3.29
F	-2.86
G	-2.44
H	-2.02
I	-1.6
J	-1.18
K	-.75
L	-.33
M	.09
N	.51
O	.94
	1.36



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 7
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

HEADWALL

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: DEC 22, 1997

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

54

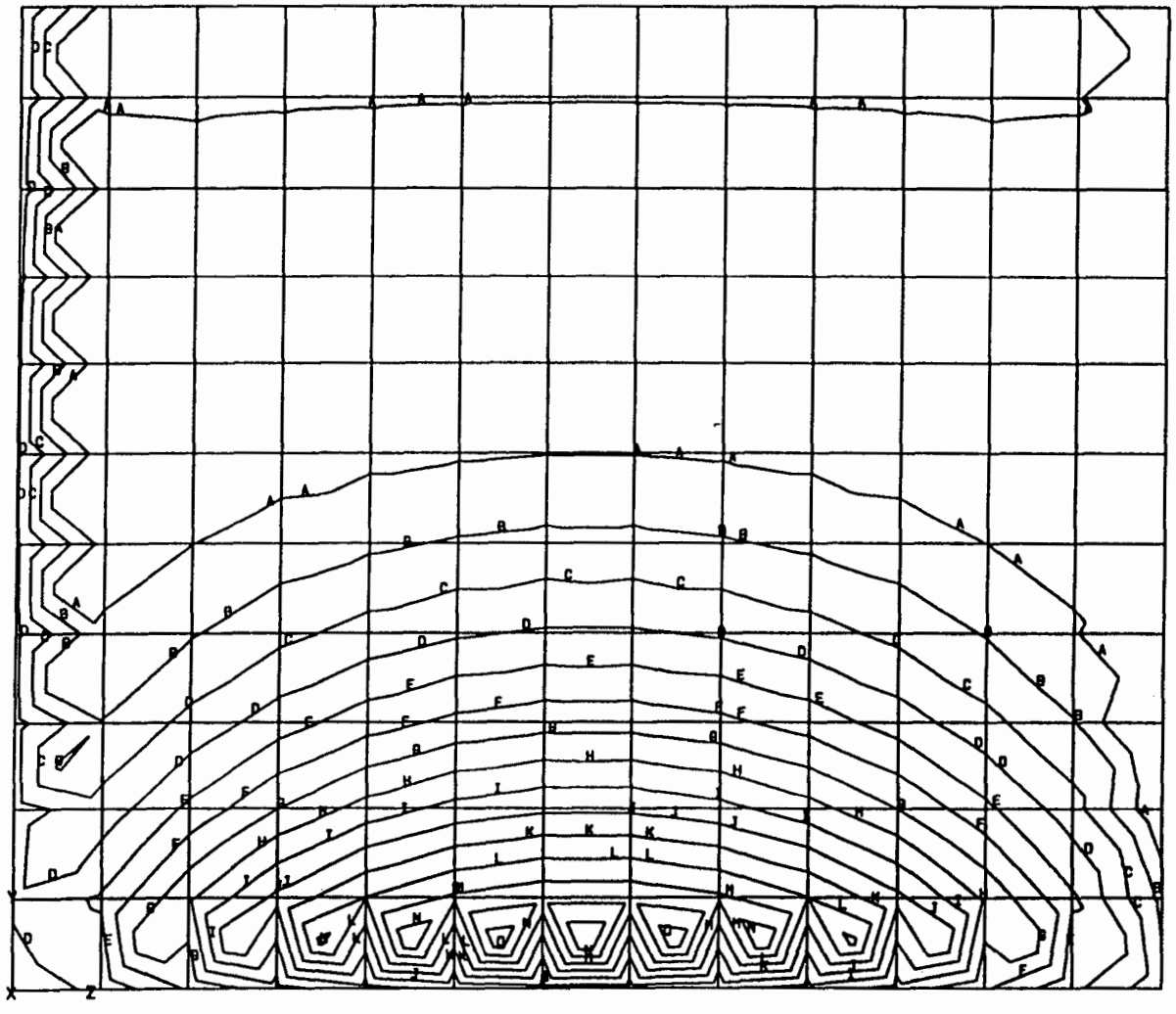
VERTICAL MOMENT

+ = TENSION F.F.

MX CONTOUR MN/ELEM

STDR LOAD= 7

A -.4
B .1
C .61
D 1.12
E 1.62
F 2.13
G 2.63
H 3.14
I 3.64
J 4.15
K 4.66
L 5.16
M 5.67
N 6.17
O 6.68
7.18



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 7
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

HEADWALL

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: DEC 22; 1997

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

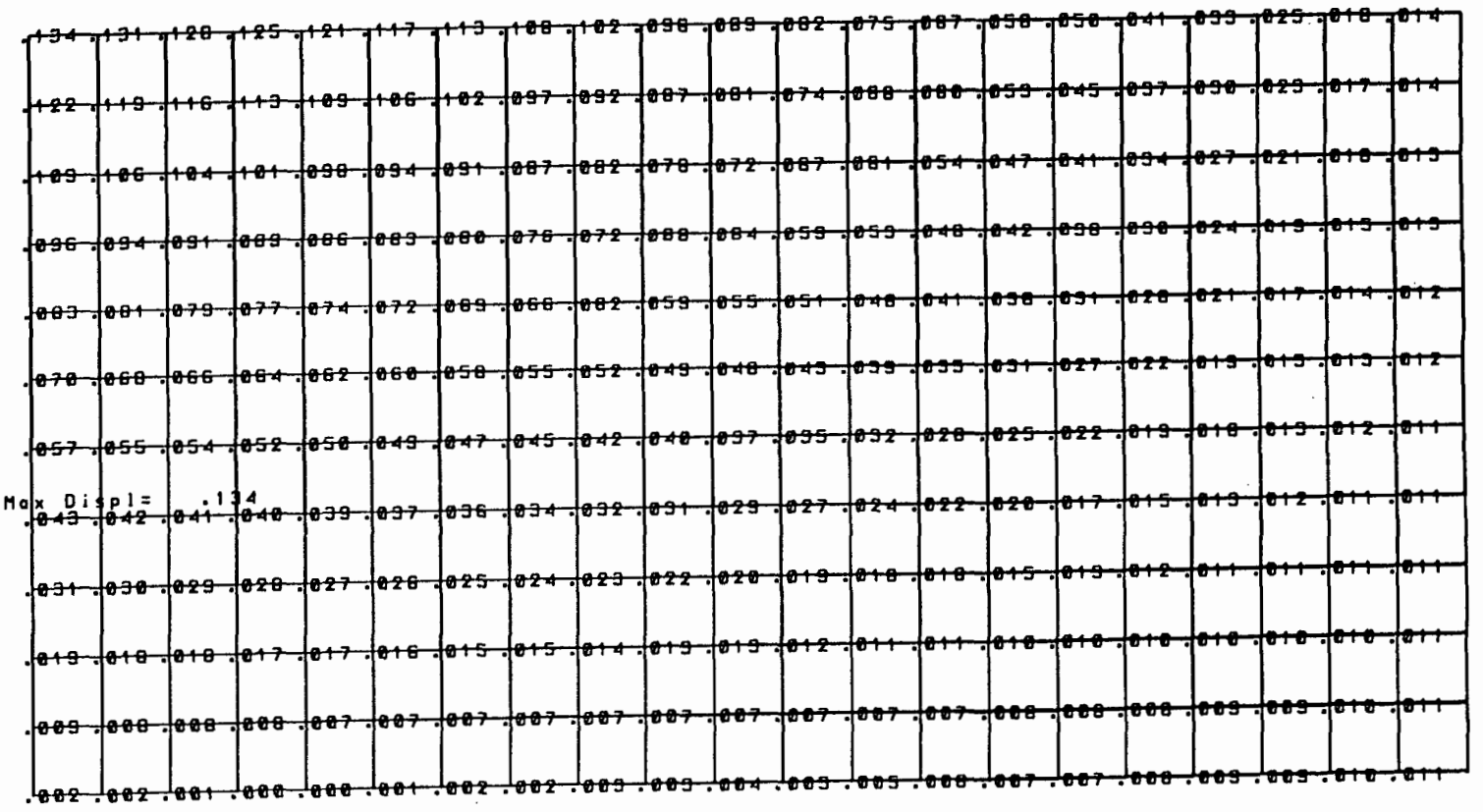
DEFLECTIONS (BASED ON I-GROSS)

MN/ELEM

DFOR LOAD= 5

STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 252.0
YMAX= 132.0
ZMAX= 156.0



J=924,E=878

SIDEWALL

UNIT INC KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 21; 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

DEFLECTIONS (BASED ON I-GROSS)

User ID: R2H ENGINEERING

STRUCTURE DATA

TYPE = SPACE
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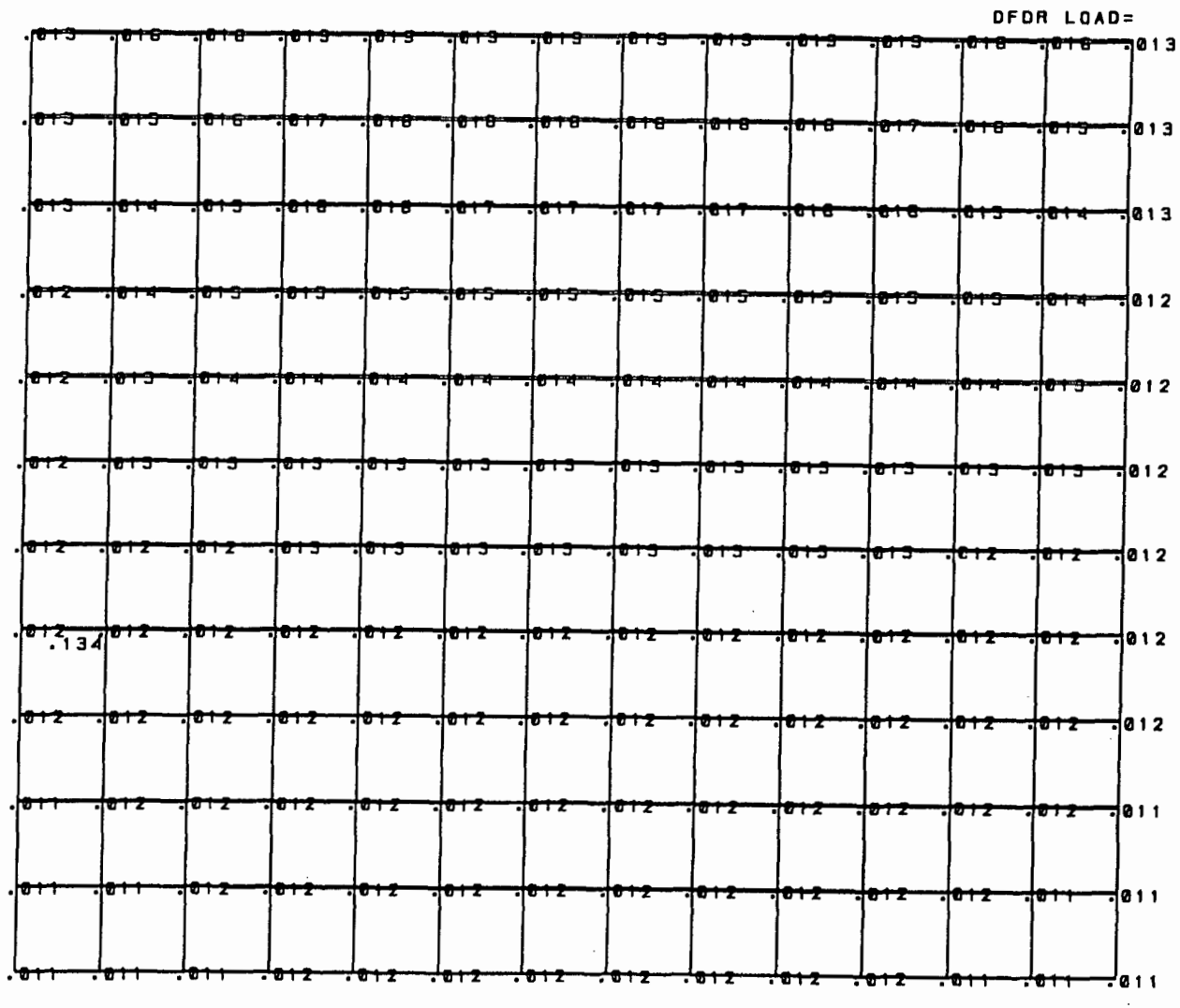
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 252.0
YMAX= 132.0
ZMAX= 156.0



S T A A D P O S T - P L O T (REV: 22.0W)
DATE: JAN 21; 1998
TITLE: OUTLET DROP STRUCTURE

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STAAD SPACE OUTLET DROP STRUCTURE
INPUT WIDTH 72
INPUT NODESIGN
UNIT FEET KIP
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877 902 903 924 923; 878 903 692 693 924
ELEMENT PROPERTY

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1 TO 878 THICKNESS 1.
CONSTANT
E CONCRETE ALL
DENSITY CONCRETE ALL
POISSON CONCRETE ALL
 'PPORT
   TO 43 46 TO 65 68 TO 87 90 TO 109 112 TO 131 134 TO 153 156 TO 175 -
.78 TO 197 200 TO 219 222 TO 241 244 TO 263 266 TO 284 -
285 FIXED BUT MX MZ KFY 690.
2 TO 21 23 44 45 66 67 88 89 110 111 132 133 154 155 176 177 198 199 -
220 221 242 243 264 265 286 288 TO 307 FIXED BUT MX MZ KFY 345.
1 22 287 308 FIXED BUT MX MZ KFY 173.
LOAD 1 SELF WT.
SELFWEIGHT Y -1.
LOAD 2 LATERAL EARTH
ELEMENT LOAD
274 TO 504 PR GZ .075
648 TO 878 PR GZ -.075
505 TO 647 PR GX -.075
274 TO 294 TRAP Y .37 .336
295 TO 315 TRAP Y .336 .303
316 TO 336 TRAP Y .303 .269
337 TO 357 TRAP Y .269 .235
358 TO 378 TRAP Y .235 .202
379 TO 399 TRAP Y .202 .168
400 TO 420 TRAP Y .168 .135
421 TO 441 TRAP Y .135 .101
442 TO 462 TRAP Y .101 .067
463 TO 483 TRAP Y .067 .034
484 TO 504 TRAP Y .034 0.
648 TO 668 TRAP Y -.37 -.336
669 TO 689 TRAP Y -.336 -.303
690 TO 710 TRAP Y -.303 -.269
711 TO 731 TRAP Y -.269 -.235
732 TO 752 TRAP Y -.235 -.202
753 TO 773 TRAP Y -.202 -.168
774 TO 794 TRAP Y -.168 -.135
795 TO 815 TRAP Y -.135 -.101
816 TO 836 TRAP Y -.101 -.067
837 TO 857 TRAP Y -.067 -.034
858 TO 878 TRAP Y -.034 0.
 05 516 527 538 549 560 571 582 593 604 615 626 637 TRAP X -.37 -.336
 06 517 528 539 550 561 572 583 594 605 616 627 638 TRAP X -.336 -.303
507 518 529 540 551 562 573 584 595 606 617 628 639 TRAP X -.303 -.269
508 519 530 541 552 563 574 585 596 607 618 629 640 TRAP X -.269 -.235
509 520 531 542 553 564 575 586 597 608 619 630 641 TRAP X -.235 -.202
510 521 532 543 554 565 576 587 598 609 620 631 642 TRAP X -.202 -.168
511 522 533 544 555 566 577 588 599 610 621 632 643 TRAP X -.168 -.135
512 523 534 545 556 567 578 589 600 611 622 633 644 TRAP X -.135 -.101
513 524 535 546 557 568 579 590 601 612 623 634 645 TRAP X -.101 -.067
514 525 536 547 558 569 580 591 602 613 624 635 646 TRAP X -.067 -.034
515 526 537 548 559 570 581 592 603 614 625 636 647 TRAP X -.034 0.
LOAD 3 STRUCTURE FULL
ELEMENT LOAD
1 TO 273 PR GY -.5
505 516 527 538 549 560 571 582 593 604 615 626 637 TRAP X -.37 -.336
506 517 528 539 550 561 572 583 594 605 616 627 638 TRAP X -.336 -.303
507 518 529 540 551 562 573 584 595 606 617 628 639 TRAP X -.303 -.269
508 519 530 541 552 563 574 585 596 607 618 629 640 TRAP X -.269 -.235
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511 522 533 544 555 566 577 588 599 610 621 632 643 TRAP X -.168 -.135
512 523 534 545 556 567 578 589 600 611 622 633 644 TRAP X -.135 -.101
513 524 535 546 557 568 579 590 601 612 623 634 645 TRAP X -.101 -.067
514 525 536 547 558 569 580 591 602 613 624 635 646 TRAP X -.067 -.034
515 526 537 548 559 570 581 592 603 614 625 636 647 TRAP X -.034 0.
274 TO 294 TRAP Y -.5 -.438
295 TO 315 TRAP Y -.438 -.375
316 TO 336 TRAP Y -.375 -.313
337 TO 357 TRAP Y -.313 -.25
358 TO 378 TRAP Y -.25 -.188
379 TO 399 TRAP Y -.188 -.125
400 TO 420 TRAP Y -.125 -.063
421 TO 441 TRAP Y -.063 0.
648 TO 668 TRAP Y .5 .438
669 TO 689 TRAP Y .438 .375
 90 TO 710 TRAP Y .375 .313
711 TO 731 TRAP Y .313 .25
732 TO 752 TRAP Y .25 .188
753 TO 773 TRAP Y .188 .125
774 TO 794 TRAP Y .125 .063
795 TO 815 TRAP Y .063 0.
505 516 527 538 549 560 571 582 593 604 615 626 637 TRAP X .5 .438
506 517 528 539 550 561 572 583 594 605 616 627 638 TRAP X .438 .375
507 518 529 540 551 562 573 584 595 606 617 628 639 TRAP X .375 .313
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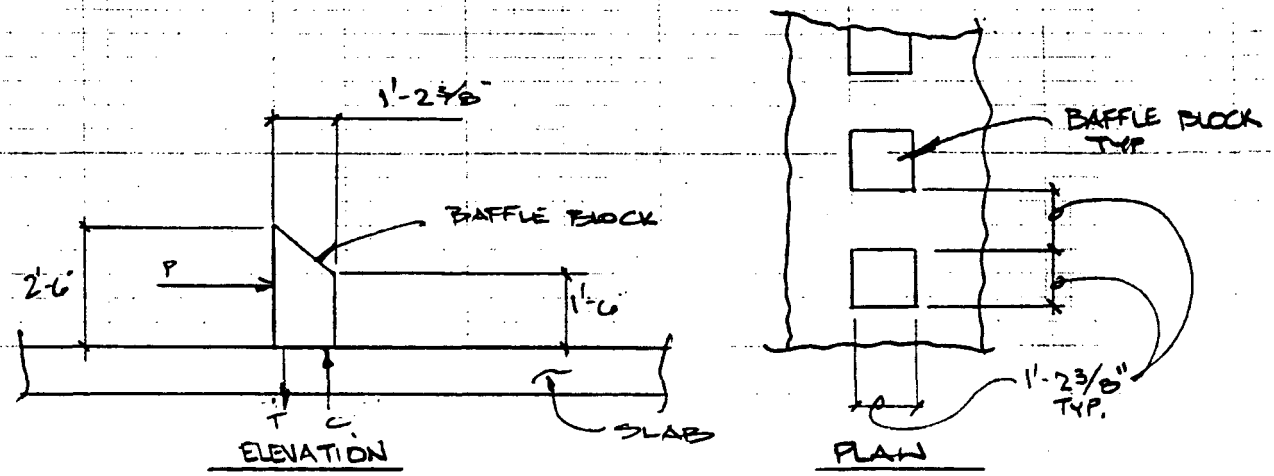
508 519 530 541 552 563 574 585 596 607 618 629 640 TRAP X .313 .25
509 520 531 542 553 564 575 586 597 608 619 630 641 TRAP X .25 .188
510 521 532 543 554 565 576 587 598 609 620 631 642 TRAP X .188 .125
511 522 533 544 555 566 577 588 599 610 621 632 643 TRAP X .125 .063
512 523 534 545 556 567 578 589 600 611 622 633 644 TRAP X .063 0.
AD 4 STREAM FLOW
NT LOAD
70 92 114 136 158 180 202 224 246 FY -4.
49 71 93 115 137 159 181 203 225 247 FY 4.
23 45 243 265 FY -2.9
1 67 221 287 FY -1.5
24 46 244 266 FY 2.9
2 68 222 288 FY 1.5
LOAD COMB 5 SELF WT. + LAT. EARTH (UNFACT)
1 1. 2 1.
LOAD COMB 6 SELF WT.+FULL STRUCT. (UNFACT)
1 1. 3 1.
LOAD COMB 7 SELF WT.+LAT. EARTH (FACT)
1 1.4 2 1.7
LOAD COMB 8 SELF WT.+FULL STRUCT. (FACT)
1 1.4 3 1.7
LOAD COMB 9 DL+EARTH+STREAM FLOW (FACT)
1 1.4 2 1.7 4 1.4
LOAD COMB 10 DL+FLUID+STREAM FLOW (FACT)
1 1.4 3 1.7 4 1.4
PERFORM ANALYSIS
PLOT DISPLACEMENT FILE
PLOT STRESS FILE
PRINT SUPPORT REACTIONS
FINISH
```

ENERGY DISSIPATER BAFFLE BLOCKS



STREAM CURRENT FORCE (AASHTO 3.18)

$P = KV^2$ $\quad V = 43.7$ FT/SEC, $K = 1\ 3/8$

$P = (1\ 3/8)(43.7)^2 \approx 2626$ PSF

$P = 2626 \times 2.5' \times 1.2' = 7.9^K$/BLOCK.

$P_u = 7.9 \times 1.7 = 13.4^K$

$T = \frac{7.9 \times 1.25}{0.7} = 14.1^K = C$ $\quad \therefore T_u = C_u = 14.1 \times 1.7 = 24.^K$

$A_{st\,REQD} = \frac{24.}{0.9 \times 60} = 0.44\ in^2$

USE 2 #5 BARS - $A_S = 0.62\ in^2$

MOMENTS IN SLAB (SEE COMPUTER OUTPUT)

TENSION IN TOP - $M_u = 4.4^K$/1' IN LONGIT. DIR.

TENSION IN BOT - $M_u = 1.4^K$/1' IN LONGIT DIR.

BY INSPECTION, TRANSV. MOMENTS TO SLAB FROM BAFFLE BLOCKS ARE 1

∴ TYPICAL #5 @ 12" E.F. E.W. SLAB REINF. IS ADEQUATE

TRANS. MOMENT

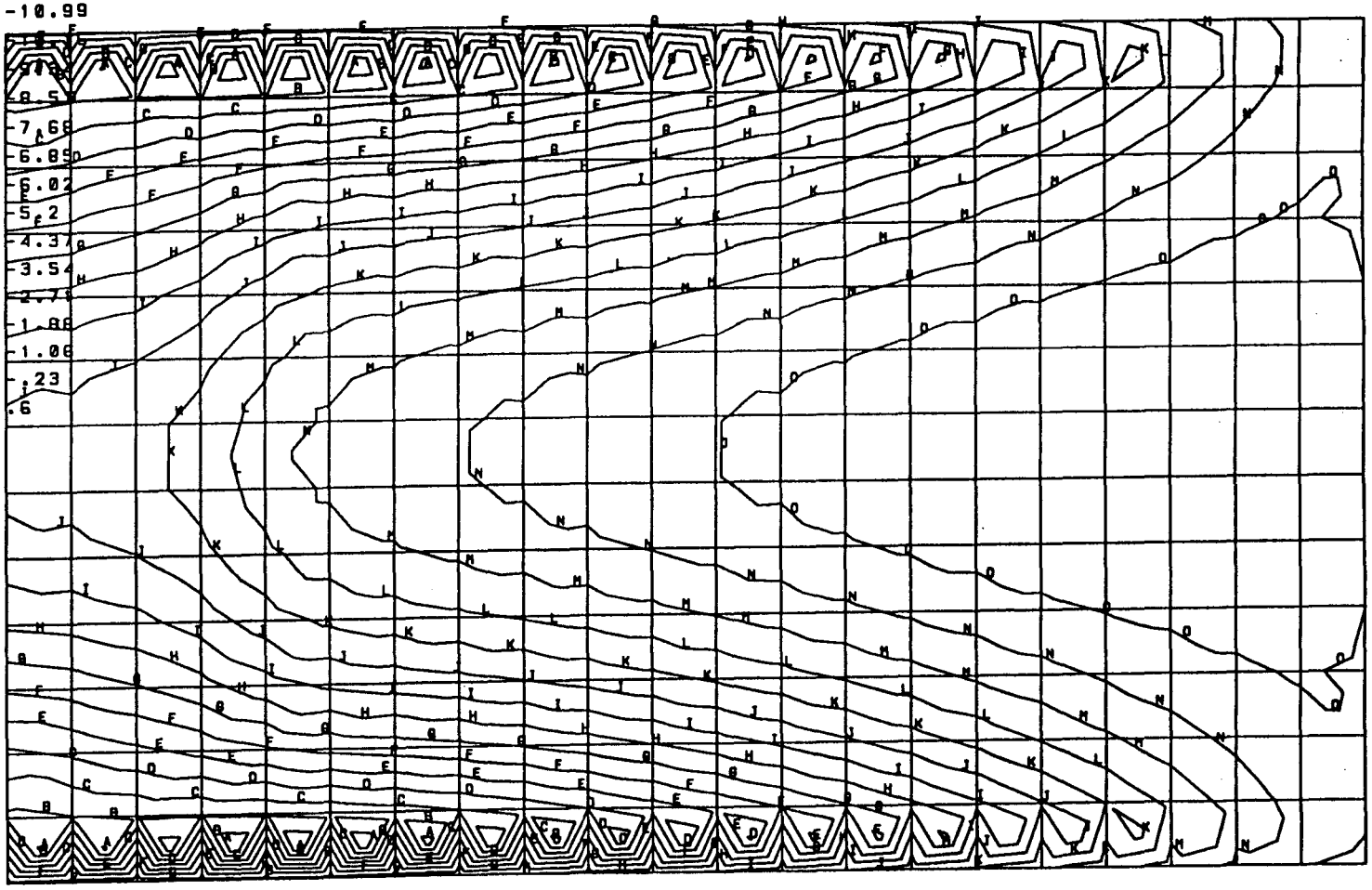
+ = TENSION TOP

MX CONTOUR

MN/ELEM

STOR LOAD= 9

A -11.82
B -10.99
C
D
E -8.5
F -7.68
G -6.85
H -6.02
I -5.2
J -4.37
K -3.54
L -2.71
M -1.88
N -1.06
O -.23
.6



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 5, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

LONGIT. MOMENT

+ = TENSION TOP

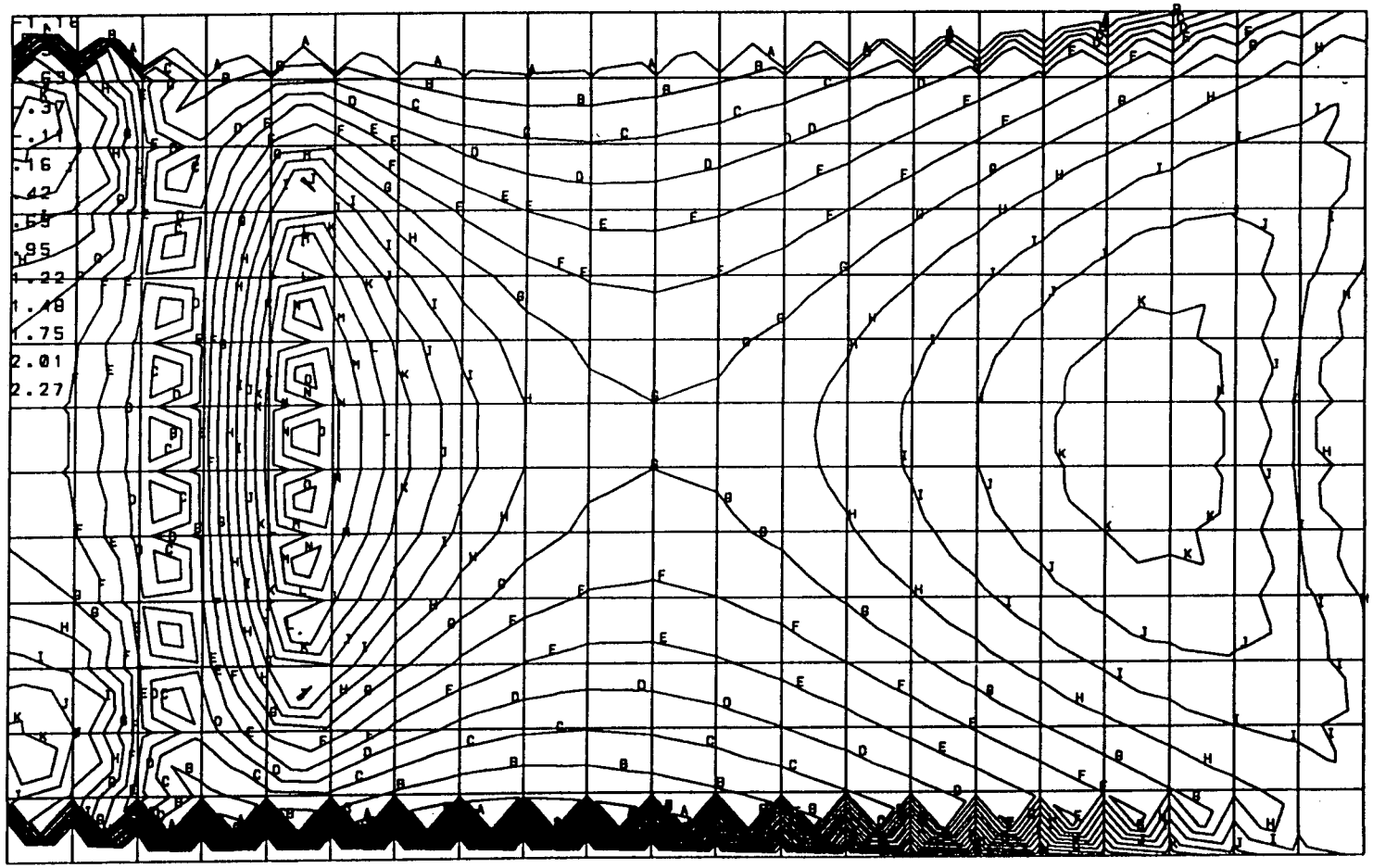
MY CONTOUR

MN/ELEM

STDR LOAD= 9

A -1.69
B -1.43
C
D
E
F
G
H
I
J
K
L
M
N
O

-.37
-.11
.16
.42
.69
.95
1.22
1.48
1.75
2.01
2.27



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 5, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

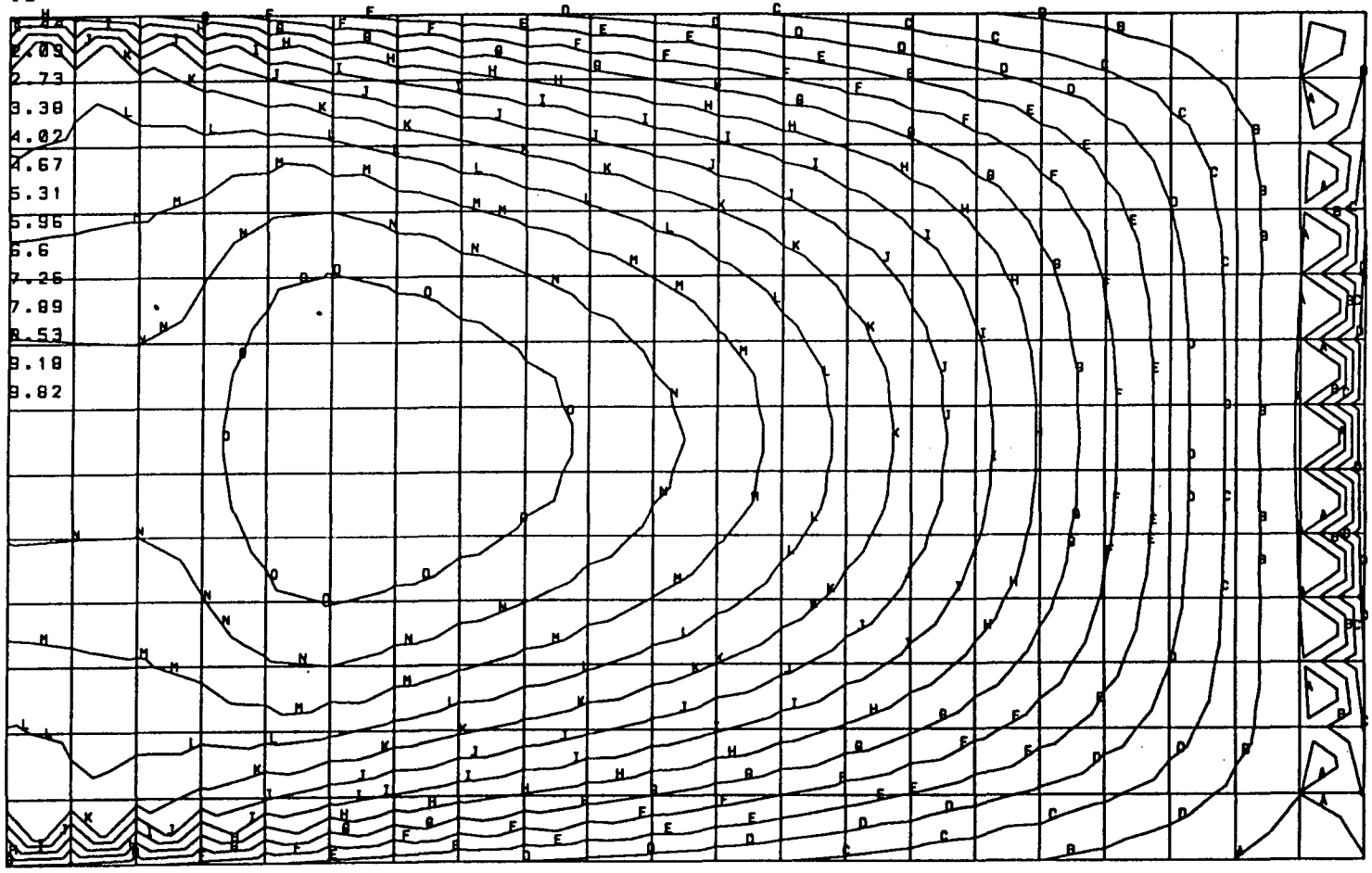
TRANS. MOMENT
+ = TENSION TOP

MX CONTOUR

MN/ELEM

STDR LOAD= 10

A .15
B .8
C 1.44
D 2.09
E 2.73
F 3.38
G 4.02
H 4.67
I 5.31
J 5.96
K 6.6
L 7.26
M 7.89
N 8.53
O 9.18
9.82



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

J=924,E=878

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 5, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

LONGIT. MOMENT

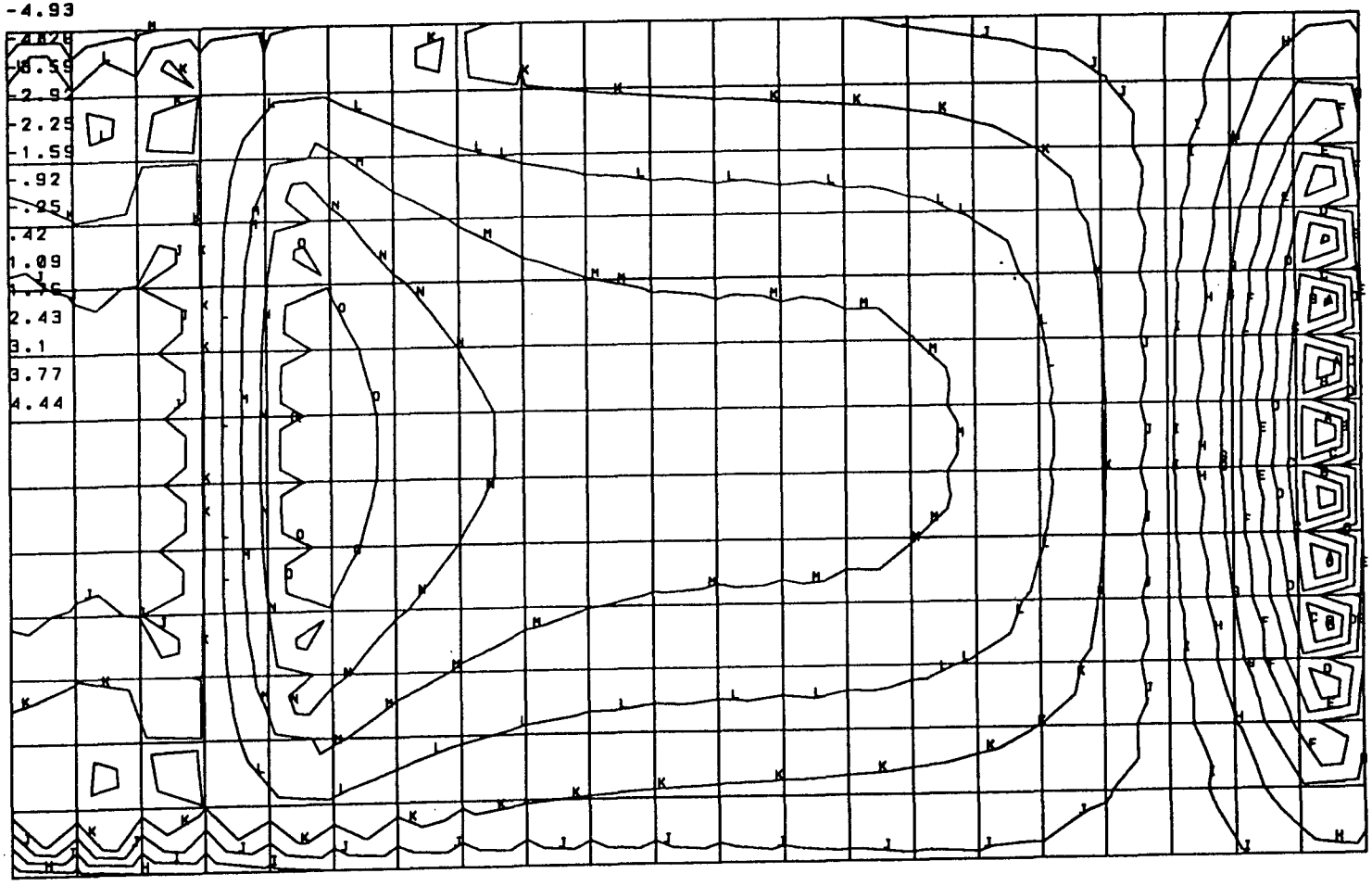
+ = TENSION TOP

MY CONTOUR

KN/ELEM

STDR LOAD= 10

A -5.6
B -4.93
C -4.26
D -3.59
E -2.92
F -2.25
G -1.59
H -.92
I -.25
J .42
K 1.09
L 1.76
M 2.43
N 3.1
O 3.77
4.44



STRUCTURE DATA

TYPE = SPACE
NJ = 924
NM = 0
NE = 878
NS = 0
NRJ= 308
NL = 10
XMAX= 21.0
YMAX= 11.0
ZMAX= 13.0

BOTTOM SLAB

UNIT FEE KIP

J=924,E=878

STAAD POST-PLOT (REV: 22.0W)

DATE: JAN 5, 1998

TITLE: OUTLET DROP STRUCTURE

User ID: R2H ENGINEERING

R2H Engineering, Inc.

JOB NO. 97183

PROJECT EAST C-1 DETENTION BASIN DATE

AH SUBJECT OUTLET DROP STRUCTURE SHEET OF

TOTAL HORIZ FORCE TO BAFFLE SYSTEM (P)

$P = 5\text{ea}(7.9^k) + 2\text{ea}(3.3\frac{1}{2}\times 3') = 59.3^k$

WEIGHT OF STRUCTURE:

SIDE WALLS $= 0.15[2\text{ea}\times 22'\times 10'\times 1.0 - 2\text{ea}(4'\times 5')1/2] = 30^k$

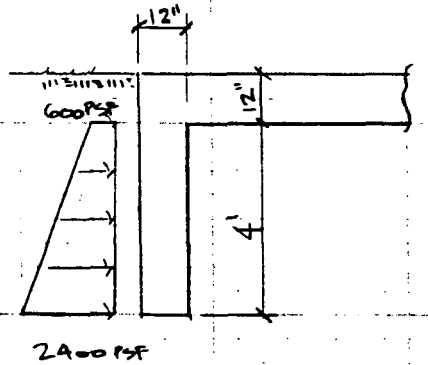
END WALL $= 0.15[12'\times 10'\times 1.0'] = 18.^k$

SLAB $= 0.15[22'\times 14'\times 1.0] = 46.2$

127.2^k

FRICTION RESISTANCE $: 127.2\times 0.35 = 44.5^k < 59.3^k$ ∴ N.G.

FRICTION RESISTANCE OF SLAB TURNDOWN:



$M = 600\times 4'\times 2' + 1/2(2400-600)4^2(2/3)$

$= 4800 + 9600 = 14,400'^{\#}/'$

$M_u = 14.4\times 1.7 = 24.5'^k/'$

$d = 12 - 2 - 5/8" = 9.4"$

$A_{s\,req'd} = \frac{24.5\times 12}{0.9\times 60(9.4-0.9/2)} = 0.61\,in^2$

∴ USE #5 @ 6" VERT. O.F.

SLIDING CHECK

TOT. FRICTION RESISTANCE BY TURNDOWN

$= 1/2(600+2400)4'\times 12' = 72,000^{\#}$

$F.S. = \frac{(72,000+44,500)}{59,300} = 1.96$ O.K.

R2H ENGINEERING, INC.
840 GRIER DRIVE
SUITE320
LAS VEGAS, NV 89119

Title : East C-1 Detention Basin
Dsgnr: AH
Description : Outlet Structures
Scope :

Job # 97138
Date: 8:35AM, 19 MAR 98

Rev: 504001

Cantilevered Retaining Wall

Description Outlet Drop Structure

General

Retained Height	=	6.50 ft
Wall height above retained soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Soil Density	=	125.00 pcf

Footing Data

Toe Width	=	0.00 ft
Heel Width	=	5.00 ft
Total Footing Width	=	5.00 ft
Footing Thickness	=	12.00 in

Footing Key Data

Distance from Toe	=	0.00 ft
Width	=	12.00 in
Depth	=	24.00 in

Added Lateral Load on Stem

Lateral Load	=	75.0 #/ft
...Height to Top	=	6.50 ft
...Height to Bottom	=	0.00 ft

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Active Soil Pressure - Heel Side	=	35.0 psf
Active Soil Pressure - Toe Side	=	0.0 pcf
Passive Pressure	=	600.0 pcf
Water table height over heel	=	0.0 ft

Sliding Data

Friction Factor @ Footing & Soil	=	0.400
...neglect ht. for passive	=	0.00 in
Lateral Sliding Force	=	1,471.9
less Passive Pressure Force	= -	2,700.0 lbs
less Friction Force	= -	2,110.0 lbs
Added Restraint Force Required	=	0.0 lbs

Adjacent Footing Data

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft

Footing Design Results

f'c	=	3,000 psi
Fy	=	60,000 psi
Minimum As %	=	0.0018
Rebar Cover @ Top	=	2.00 in
Rebar Cover @ Bottom	=	3.00 in

		Toe	Heel
ACI Factored Soil Pressure	=	3,360	0 psf
Mu' : From Upward Loads	=	0	0 ft-#
Mu' : From Downward Loads	=	0	0 ft-#
Mu: Used For Design	=	0	5,417 ft-#
Actual One-Way Shear	=	0.00	47.28 psi
Allowable One-Way Shear	=	0.00	93.11 psi

Minimum Footing Rebar Options.....

Toe Side.....	Heel Side....
Not req'd	# 4 @ 11.75 in
Mu < S * Fr	# 5 @ 18.25 in
	# 6 @ 25.75 in
	# 7 @ 35.25 in
	# 8 @ 46.25 in
	# 9 @ 48.25 in
	# 10 @ 48.25 in

Key Reinforcement: Not Req'd = Mu<S*Fr

R2H ENGINEERING, INC.
840 GRIER DRIVE
SUITE320
LAS VEGAS, NV 89119

Title : East C-1 Detention Basin
Dsgnr: AH
Description : Outlet Structures
Scope :

Job # 97138
Date: 8:35AM, 19 MAR 98

Cantilevered Retaining Wall

Description Outlet Drop Structure

Design Summary

Total Bearing Load		=	5,275 lbs	
...resultant ecc.		=	12.42 in	
Soil Pressure @ Toe	= 2,400	<=	5,000 psf	
Soil Pressure @ Heel	= 0	<=	5,000 psf	
ACI Factored Press @ Toe		=	3,360 psf	
ACI Factored Press @ Heel		=	0 psf	
Footing Shear @ Toe	= 0.0	<=	93.1 psi	
Footing Shear @ Heel	= 47.3	<=	93.1 psi	
WALL STABILITY RATIOS				
Overturning Stability Ratio		=	2.71	
Sliding Ratio Ratio		=	3.27	

Summary of Stem Section Designs....
Top: 12 in Conc, #4@12.00 in@Edge, From 6.5 ft to 0.0 ft

Stem Design & Construction

	Top Stem
Design location for stem is at	Stem OK
this height above footing	0.00 ft
Wall Material Above "Ht"	Concrete
Thickness	12.00 in
Rebar Size	# 4
Rebar Spacing	12.00 in
Rebar Placed at	Edge
Design Data	
fb/FB + fa/Fa	**0.599**
Total Force @ Section	2,085.7 lbs
Moment....Actual	5,416.8 ft-#
Moment.....Allowable	9,048.0 ft-#
Shear.....Actual	16.96 psi
Shear.....Allowable	93.11 psi
Bar Embed ABOVE Ht.	12.00 in
Bar Embed BELOW Ht.	6.00 in
Wall Weight	150.0 psf
Rebar Depth 'd'	10.25 in
Masonry Data	
f'm	
Fs =	
Solid Grouting	
Special Inspection =	
Modular Ratio 'n'	
Short Term Factor	
Equiv. Solid Thick.	
Concrete Data	
f'c	3,000 psi
Fy	60,000 psi

R2H ENGINEERING, INC.
840 GRIER DRIVE
SUITE320
LAS VEGAS, NV 89119

Title : East C-1 Detention Basin
Dsgnr: AH
Description : Outlet Structures
Scope :

Job # 97138
Date: 8:35AM, 19 MAR 98

Rev: 604001

Cantilevered Retaining Wall

Description Outlet Drop Structure

Summary of Overturning & Resisting Forces & Moments

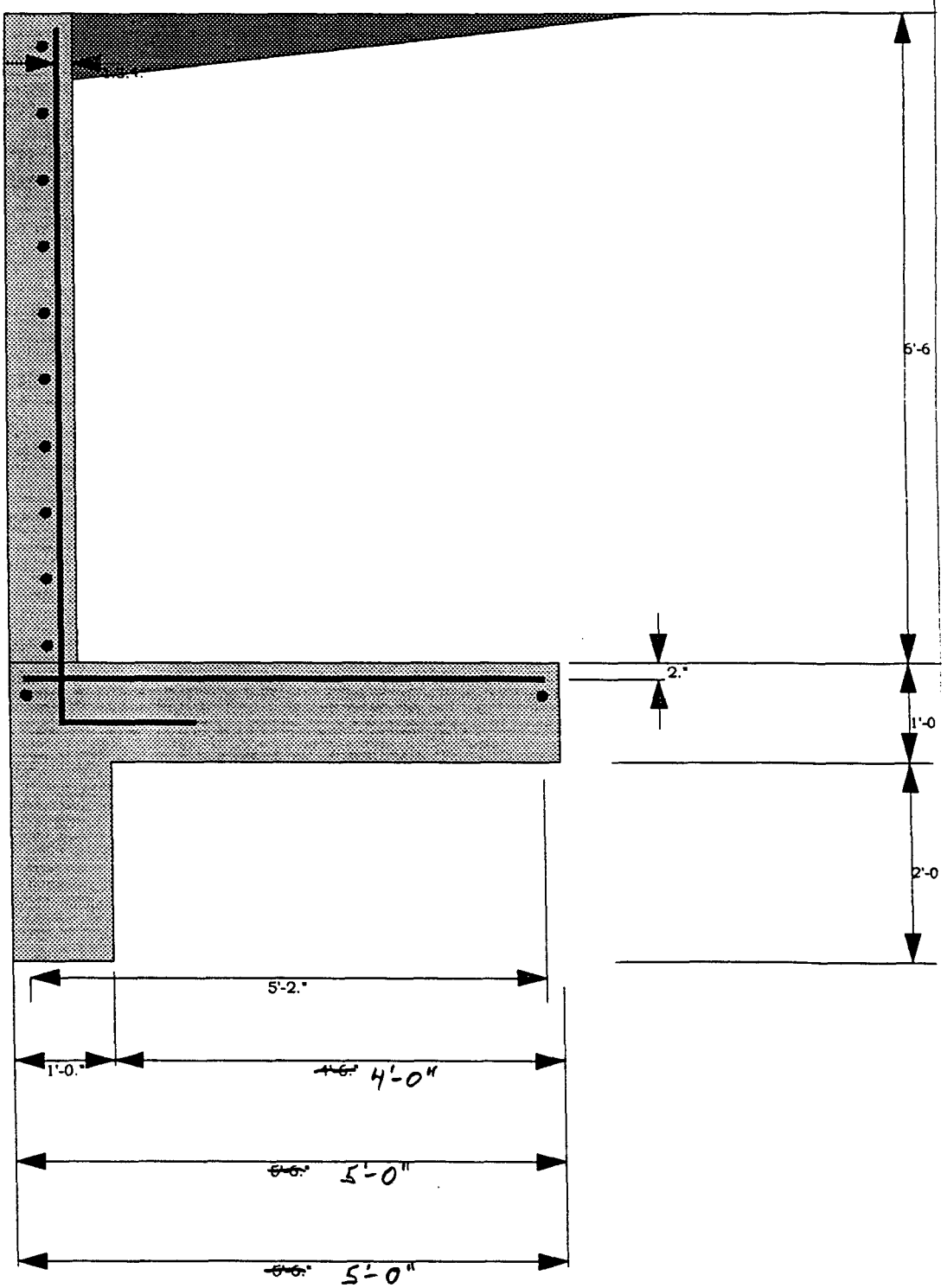
Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	984.4	2.50	2,460.9			
Soil Over Heel					3,250.0	3.00	9,750.0
Sloped Soil Over Heel	=						
Surcharge Over Heel	=						
Adjacent Footing Load	=						
Axial Dead Load on Stem	=					0.00	
Toe Active Pressure	=		0.33				
Soil Over Toe							
Surcharge Over Toe	=						
Stem Weight(s)	=				975.0	0.50	487.5
Earth @ Stem Transitions	=						
Footing Weight	=				750.0	2.50	1,875.0
Key Weight	=				300.0	0.50	150.0
Vert. Component	=						
Added Lateral Load	=	487.5	4.25	2,071.9			
Load @ Stem Above Soil	=						
TOTALS	=	1,471.9 lbs	O.T.M. =	4,532.8	5,275.0	R.M. =	12,262.5
					Resisting/Overturning Ratio		**2.71**

Total used for Soil Pressure = 5,275.0 *(+ Axial Live Load, - Vertical Soil Component)*

Vertical component of active pressure used for soil pressure
Toe Surcharge Not Used To Resist Overturning
Heel Surcharge Not Used To Resist Overturning

8." Conc w/ #5 @ 14.00in o/c

8."



LOADS

ALLOWABLE BEARING = 5000 psf

ACTIVE EARTH PRESSURE = 35 PCF

HYDROSTATIC PRESSURE = 0 (WALL is DRAINED)

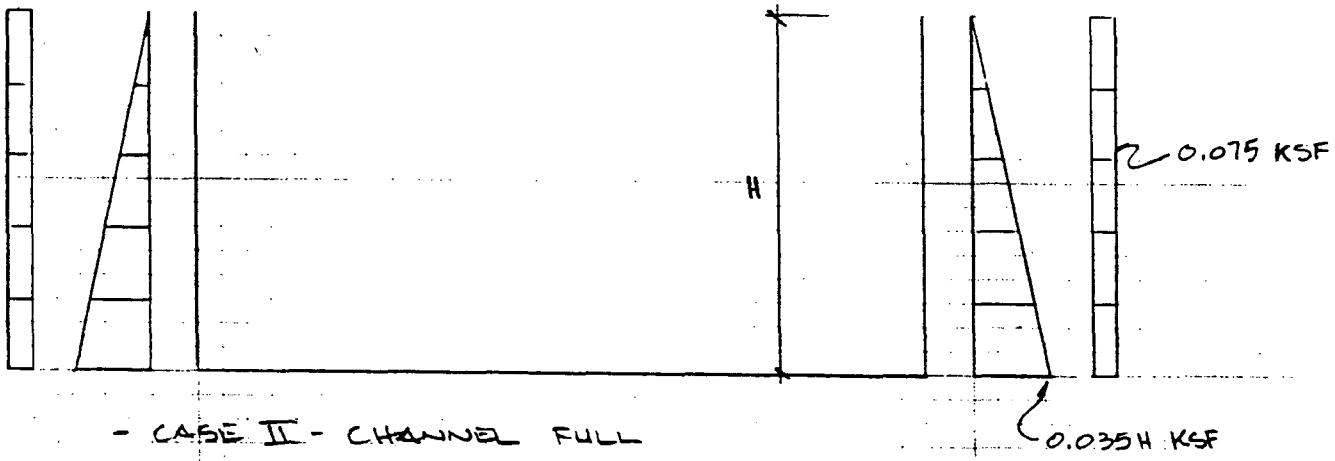
LIVE LOAD SURCHARGE (AASHTO 5.5.2)

= 2 x .125 x .3 = 0.075 KSF

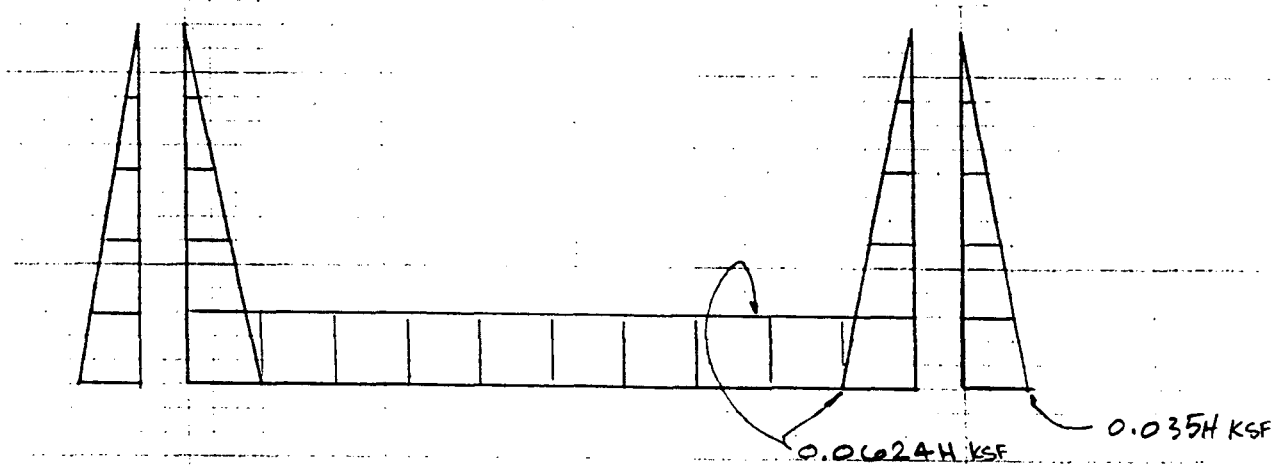
LOAD FACTORS - ACI 1.4DL+1.7H

TYPICAL CHANNEL:

-CASE I - CHANNEL EMPTY



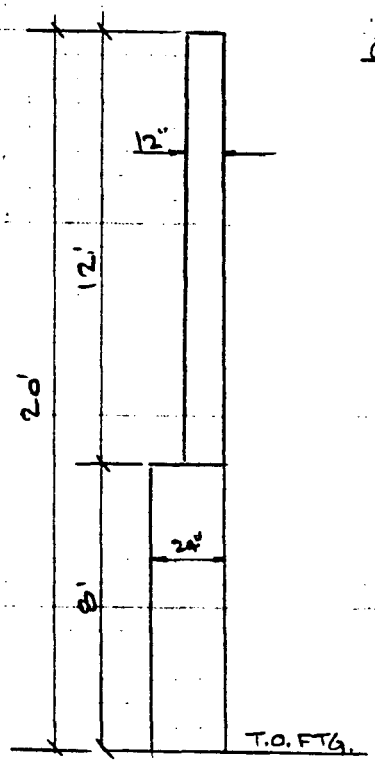
- CASE II - CHANNEL FULL



CHANNEL RETAINING WALL AT:

H = 20'

ULTIMATE FORCES & MOMENTS LOAD CASES: 11 & 12 FROM STAAD ANALYSIS.



CASE I:

AT BOTTOM OF 24" THK SECTION (T.O.FTG.)

M_u = 104.8^{k} (L.C. 11)

V_u = 14.5^{k} (L.C. 11)

FOR d = 24 - 2 - 0.5 = 21.5", A_s = 1.13 in^2

USE # 7 @ 6" O.F. VERT.

$\phi V_c = 0.85 \times 2 \times \sqrt{4,000} (12)(21.5) = 27.7^{k} > V_u$ ∴ O.K.

AT BOTTOM OF 12" THK SECTION

M_u = 26.3^{k} (L.C. 11)

V_u = 5.8^{k} (L.C. 11)

FOR d = 12 - 2 - 0.5 = 9.5", A_s = 0.71 in^2

USE # 6 @ 6" O.F. VERT

$\phi V_c = 0.85 \times 2 \times \sqrt{4,000} (12)(9.5) = 12.3^{k} > V_u$ ∴ O.K

CASE II:

AT BOTTOM OF 24" THK SECTION (T.O. FTG.)

M_u = 62.3^{k} (L.C. 12)

$A_{s\,REQ'D}$ = 0.71 in^2

$A_{s\,MIN} = 0.0033 \times 12 \times 21.5 = 0.85$ in^2

∴ USE # 6 @ 6" I.F. VERT.

AT BOTTOM OF 12" THK. SECTION

M_u = 13.5^{k} (L.C. 12.)

$A_{s\,REQ'D}$ = 0.33 in^2

$A_{s\,MIN} = 0.0033 \times 12 \times 9.5 = 0.38$ in^2

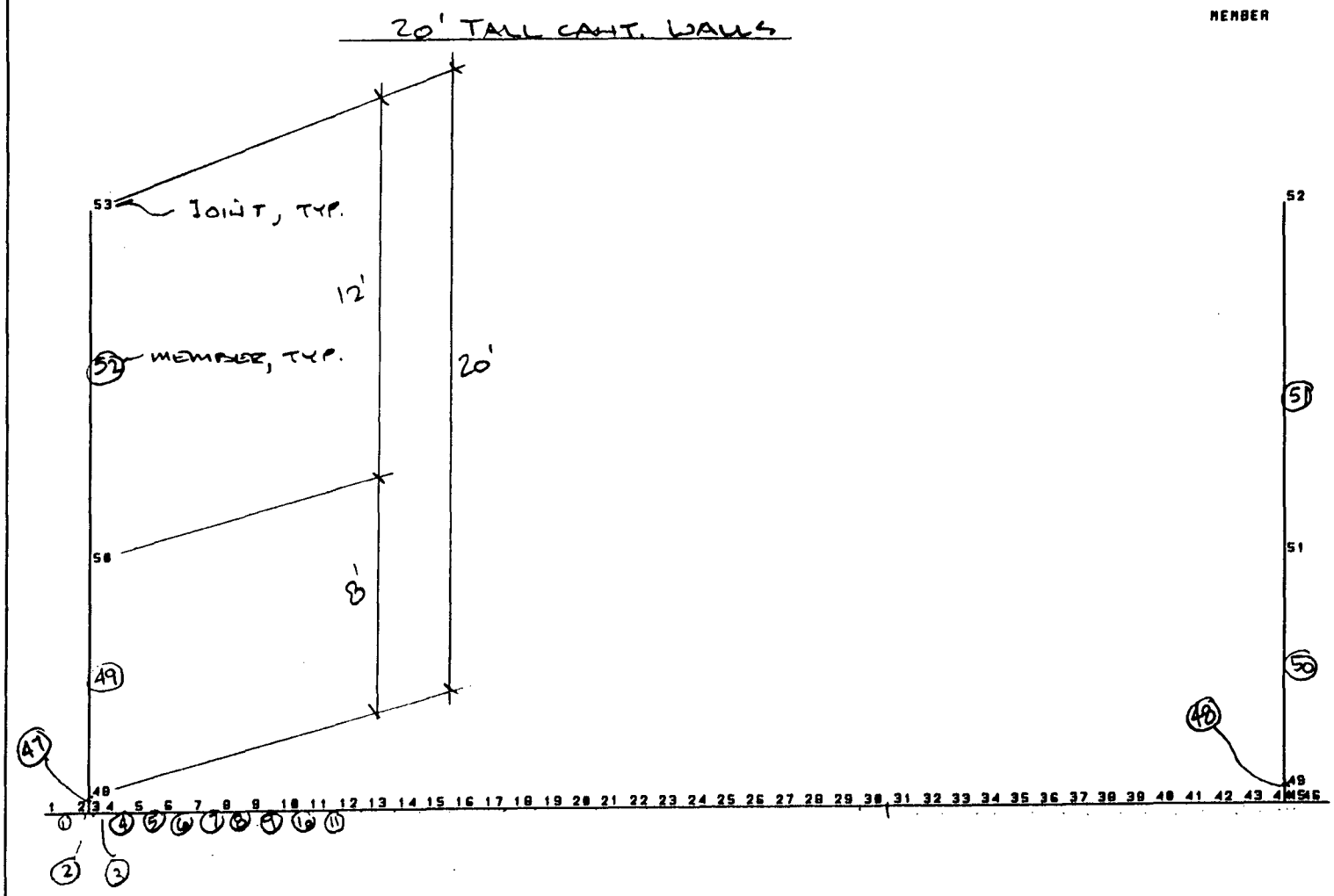
∴ USE # 6 @ 12" I.F. VERT.

OUTLET STRUCTURE

20' TALL CANT. WALLS

STRUCTURE DATA

TYPE = PLANE
NJ = 53
NM = 52
NE = 0
NS = 0
NRJ= 47
NL = 8
XMAX= 44.0
YMAX= 20.5
ZMAX= .0



J=53,M=52

UNIT FT KIP

S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 7, 1998

TITLE: OUTLET STRUCTURE

User ID: RZH ENGINEERING

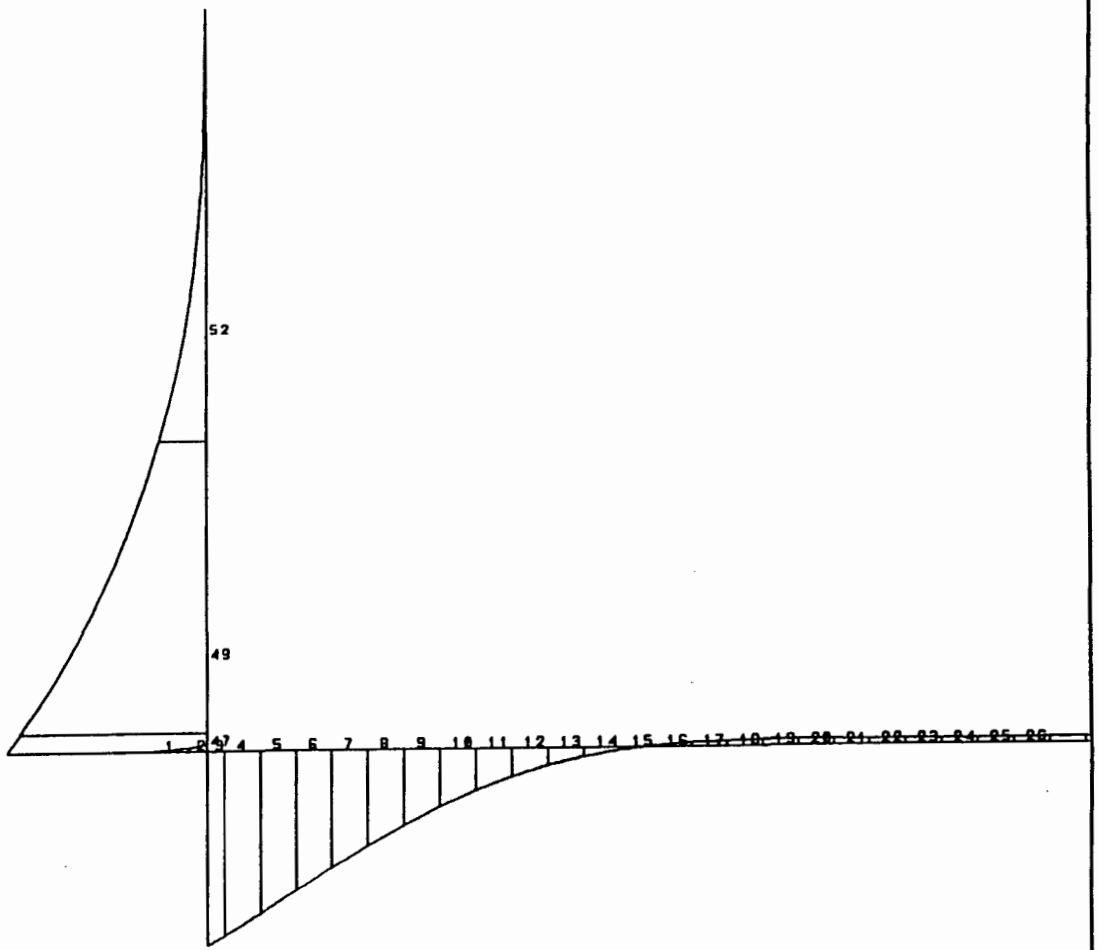
User ID: RZH ENGINEERING

STRUCTURE DATA

TYPE = PLANE
NJ = 53
NM = 52
NE = 0
NS = 0
NRJ= 47
NL = 8
XMAX= 44.0
YMAX= 20.5
ZMAX= .0

MEMBER
MOMENT MZ LN= 11

Maximum= 112.05



UNIT FT KIP

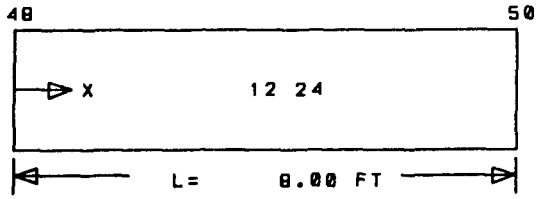
J=53,M=52

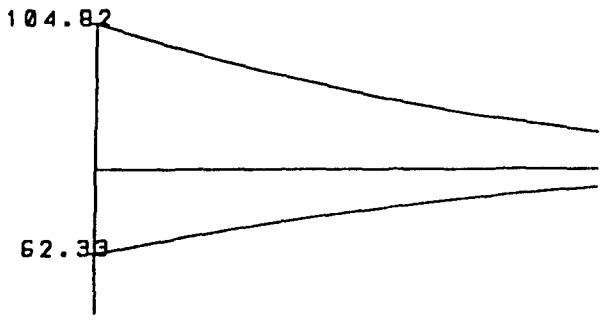
S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 7, 1998

TITLE: OUTLET STRUCTURE

ENVELOPE FOR MEMBER= 49





MZ Envelope Units (FT ,KIP)

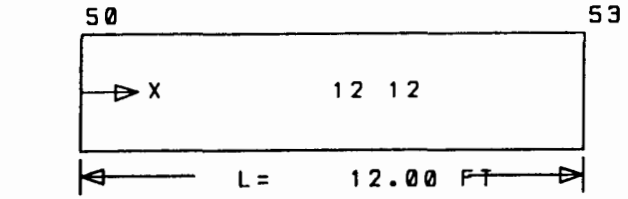
	High MZ Load		Low MZ Load	
.000L=	104.82	11	-62.33	12
.083L=	95.46	11	-56.28	12
.167L=	86.68	11	-50.66	12
.250L=	78.48	11	-45.44	12
.333L=	70.77	11	-40.56	12
.417L=	63.59	11	-36.05	12
.500L=	56.93	11	-31.91	12
.583L=	50.72	11	-28.08	12
.667L=	44.98	11	-24.57	12
.750L=	39.70	11	-21.38	12
.833L=	34.83	11	-18.46	12
.917L=	30.37	11	-15.83	12
1.00L=	26.31	11	-13.46	12

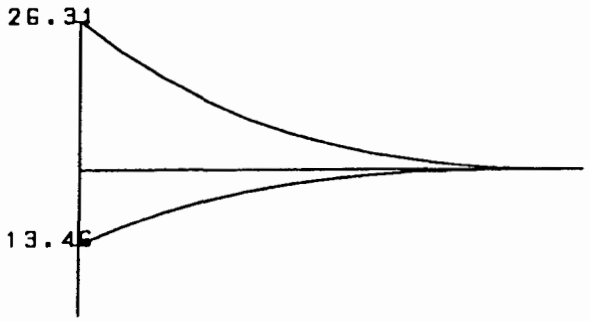
Maximum Force/Moment Summary, Units (FT ,KIP)

	Axial	Shear Y	Shear Z	Moment Y	Moment Z
Value=	5.88	14.45	.00	.00	104.82
Location=	.00	.00	.00	.00	.00
Loading=	11	11	11	11	11

User ID: R2H ENGINEERING

ENVELOPE FOR MEMBER= 52





MZ Envelope Units (FT ,KIP)

	High MZ Load		Low MZ Load	
.000L=	26.31	11	-13.46	12
.083L=	20.83	11	-10.30	12
.167L=	16.21	11	-7.73	12
.250L=	12.39	11	-5.68	12
.333L=	9.09	11	-3.94	12
.417L=	6.46	11	-2.62	12
.500L=	4.43	11	-1.68	12
.583L=	2.80	11	-.95	12
.667L=	1.62	11	-.47	12
.750L=	.84	11	-.21	12
.833L=	.32	11	-.05	12
.917L=	.06	11	.00	12
1.00L=	.00	11	.00	12

Maximum Force/Moment Summary, Units (FT ,KIP)

	Axial	Shear Y	Shear Z	Moment Y	Moment Z
Value=	2.52	5.81	.00	.00	26.31
Location=	.00	.00	.00	.00	.00
Loading=	11	11	11	11	11

User ID: R2H ENGINEERING

BOTTOM SLAB.

CASE I

AT 24" THK SLAB:

M_u @ WALL = 105.5^{k} (L.C.11)

$V_{u\,MAX}$ = 12.9^{k} (L.C.11)

FOR d = 24-3-0.5 = 20.5", A_s = 1.2 in^2

USE # 7 @ 6" BOTT

ϕV_c = 0.85x2x$\sqrt{3000}$x12x20.5 = 22.9^{k} > V_u ∴ O.K

M_u @ 2FT FROM WALL = 78^{k} (L.C.11)

#6@6" → ϕM_n = 2x0.44x60(20.5-1.73/2)/12 = 806.4^{k} > M_u O.K

$A_{s\,min}$ = 0.0033x12x20.5 = 0.81 in^2

∴ USE # 6 @ 6" BOTT

AT 15" THK SLAB:

M_u = 15.6^{k} (L.C.11)

V_u = 6.2^{k} (L.C.11)

FOR d = 15-3-0.5 = 11.5", A_s = 0.31 in^2

$A_{s\,min}$ = 0.0033x12x11.5 = 0.46 in^2

OR

$A_{s\,min}$ = 0.31x1.33 = 0.41 in^2 ← USE

∴ USE # 6 @ 12" BOTT

ϕV_c = 0.85x2x$\sqrt{3,000}$x12x11.5 = 12.8^{k} > V_u ∴ O.K

BOTTOM SLAB

CASE II

AT 24" THK. SLAB:

M_u @ WALL = 60.1^{k} (L.C. 12)

FOR d = 21.5" , A_s = 0.63 in^2

$A_{s\,min}$ = 0.0033 x 12 x 21.5 = 0.85 in^2

∴ USE # 6 @ 6" TOP

AT 15" THK SLAB

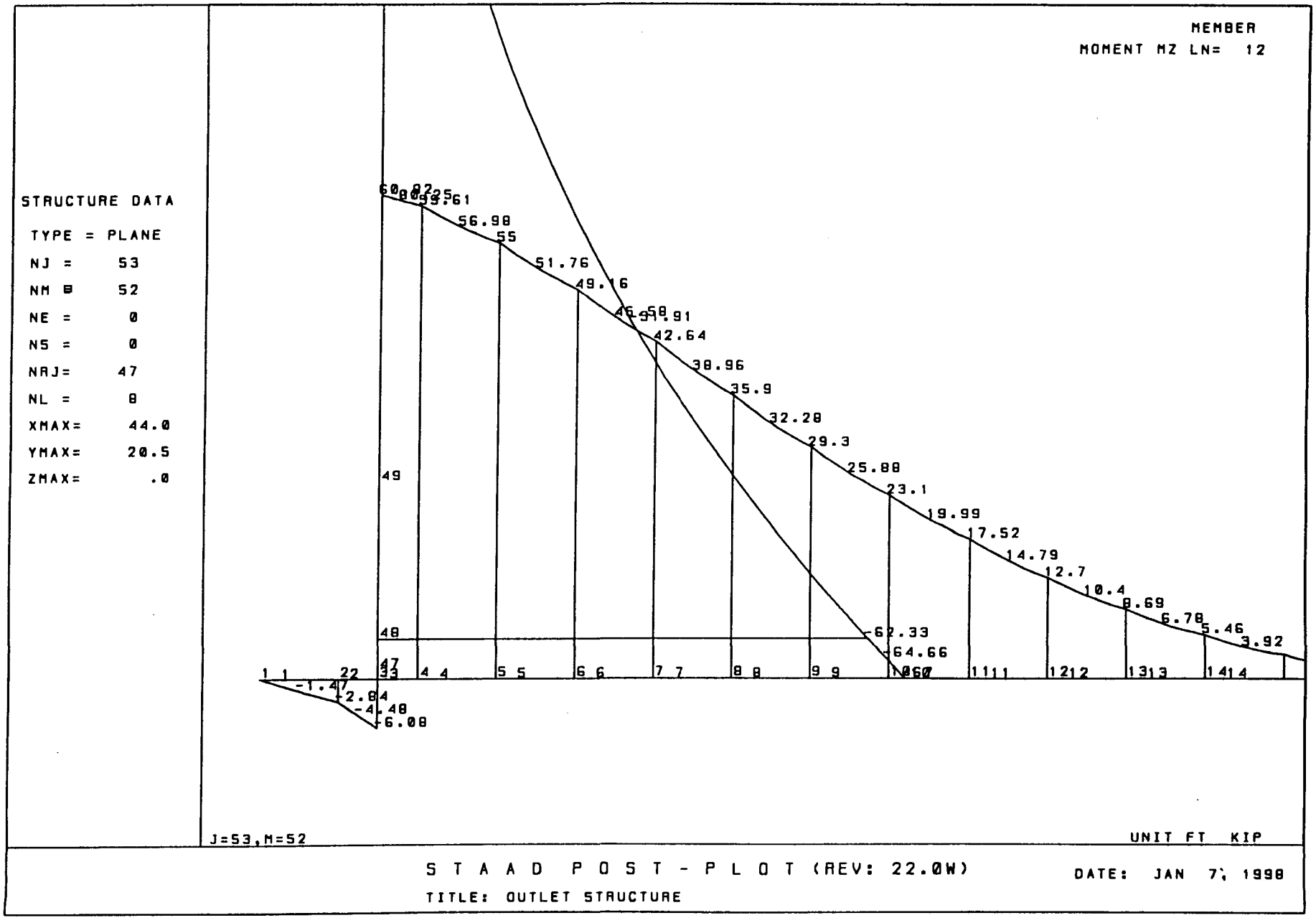
M_u = 12.7^{k} (L.C. 12)

FOR d = 11.5" , A_s = 0.25 x 1.33 = 0.34 in^2

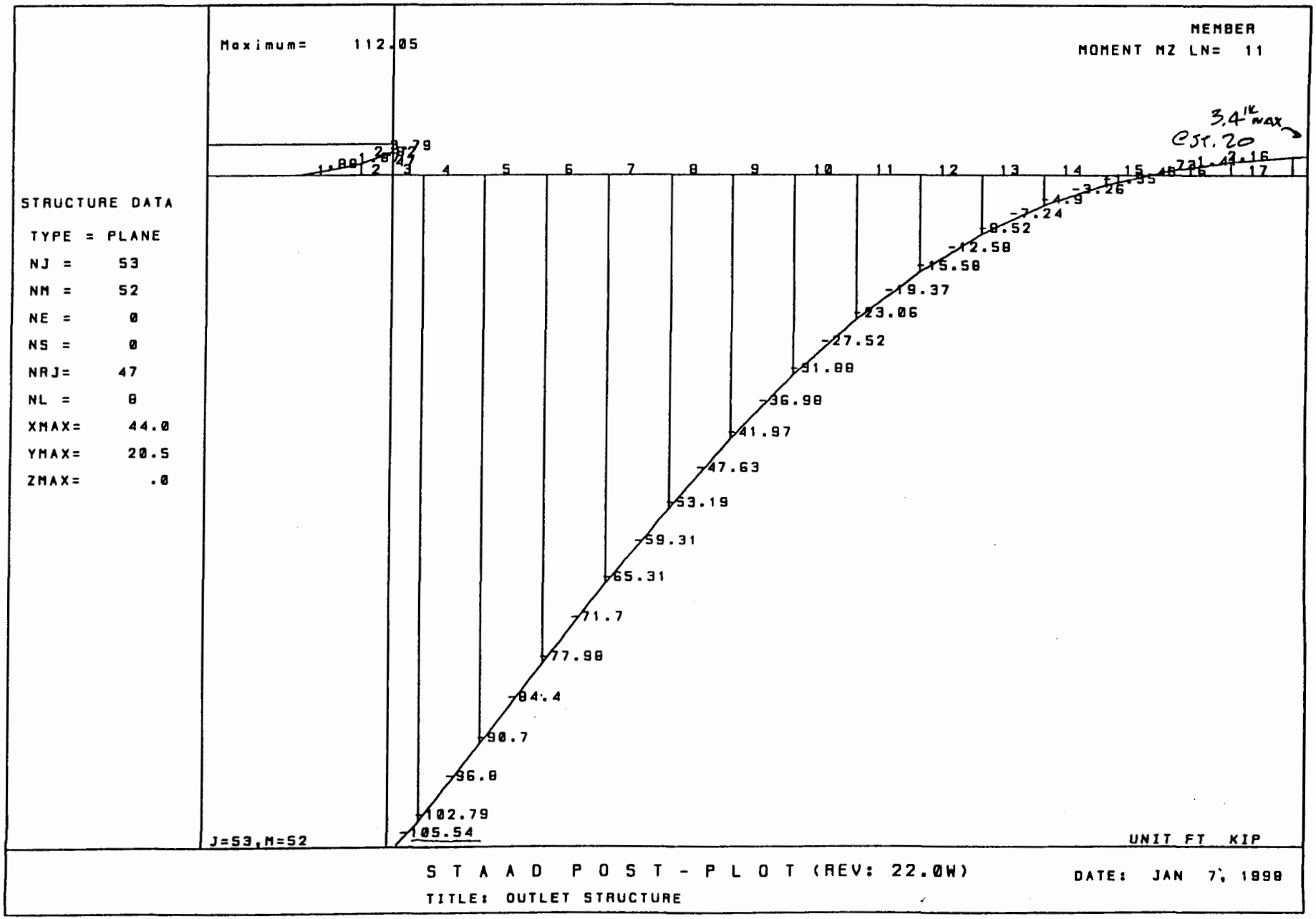
$A_{s\,min}$ = 0.0033 x 12 x 11.5 = 0.46 in^2

∴ USE # 6 @ 12" TOP

User ID: R2H ENGINEERING



User ID: R2H ENGINEERING



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*****************************************************
*                                                   *
*          S T A A D - III                          *
*          Revision 22.0W                           *
*          Proprietary Program of                   *
*          Research Engineers, Inc.                 *
*          Date=     JAN  7, 1998                   *
*          Time=      9:31:23                       *
*                                                   *
*      USER ID: R2H ENGINEERING                     *
*****************************************************
```

```
 1. STAAD PLANE OUTLET STRUCTURE
 2. INPUT WIDTH 72
 3. INPUT NODESIGN
 4. UNIT FEET KIP
 5. JOINT COORDINATES
 6.      1        7.000          .000          .000
 7.      2        8.000          .000          .000
 8.      3        8.500          .000          .000
 9.      4        9.000          .000          .000
10.      5       10.000          .000          .000
11.      6       11.000          .000          .000
12.      7       12.000          .000          .000
13.      8       13.000          .000          .000
14.      9       14.000          .000          .000
15.     10       15.000          .000          .000
16.     11       16.000          .000          .000
17.     12       17.000          .000          .000
18.     13       18.000          .000          .000
19.     14       19.000          .000          .000
20.     15       20.000          .000          .000
21.     16       21.000          .000          .000
22.     17       22.000          .000          .000
23.     18       23.000          .000          .000
24.     19       24.000          .000          .000
25.     20       25.000          .000          .000
26.     21       26.000          .000          .000
27.     22       27.000          .000          .000
28.     23       28.000          .000          .000
29.     24       29.000          .000          .000
30.     25       30.000          .000          .000
31.     26       31.000          .000          .000
32.     27       32.000          .000          .000
33.     28       33.000          .000          .000
34.     29       34.000          .000          .000
35.     30       35.000          .000          .000
36.     31       36.000          .000          .000
37.     32       37.000          .000          .000
38.     33       38.000          .000          .000
39.     34       39.000          .000          .000
40.     35       40.000          .000          .000
41.     36       41.000          .000          .000
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42.	37	42.000	.000	.000
43.	38	43.000	.000	.000
44.	39	44.000	.000	.000
45.	40	45.000	.000	.000
46.	41	46.000	.000	.000
47.	42	47.000	.000	.000
48.	43	48.000	.000	.000
49.	44	49.000	.000	.000
50.	45	49.500	.000	.000
51.	46	50.000	.000	.000
52.	47	51.000	.000	.000
53.	48	8.500	.500	.000
54.	49	49.500	.500	.000
55.	50	8.500	8.500	.000
56.	51	49.500	8.500	.000
57.	52	49.500	20.500	.000
58.	53	8.500	20.500	.000

59. MEMBER INCIDENCES

60.	1	1	2
61.	2	2	3
62.	3	3	4
63.	4	4	5
64.	5	5	6
65.	6	6	7
66.	7	7	8
67.	8	8	9
68.	9	9	10
69.	10	10	11
70.	11	11	12
71.	12	12	13
72.	13	13	14
73.	14	14	15
74.	15	15	16
75.	16	16	17
76.	17	17	18
77.	18	18	19
78.	19	19	20
79.	20	20	21
80.	21	21	22
81.	22	22	23
82.	23	23	24
83.	24	24	25
84.	25	25	26
85.	26	26	27
86.	27	27	28
87.	28	28	29
88.	29	29	30
89.	30	30	31
90.	31	31	32
91.	32	32	33
92.	33	33	34
93.	34	34	35
94.	35	35	36
95.	36	36	37
96.	37	37	38
97.	38	38	39

```
 98.          39          39          40
 99.          40          40          41
100.          41          41          42
101.          42          42          43
102.          43          43          44
103.          44          44          45
104.          45          45          46
105.          46          46          47
106.          47           3          48
107.          48          45          49
108.          49          48          50
109.          50          49          51
110.          51          51          52
111.          52          50          53
112. MEMBER PROPERTY AMERICAN
113. 12 TO 35 PRI YD 1.25 ZD 1.
114. 51 52 PRI YD 1. ZD 1.
115. 47 TO 50 PRI YD 2. ZD 1.
116. 1 TO 11 PRI YD 2. ZD 1.
117. 36 TO 46 PRI YD 2. ZD 1.
118. CONSTANT
119. E CONCRETE ALL
120. DENSITY CONCRETE ALL
121. SUPPORT
122. 5 TO 43 FIXED BUT MZ KFY 690.
123. 2 4 44 46 FIXED BUT MZ KFY 518.
124. 1 3 45 47 FIXED BUT MZ KFY 345.
125. LOAD 1 WEIGHT OF STRUCTURE
126. SELFWEIGHT Y -1.
127. LOAD 2 LL SURCHARGE
128. MEMBER LOAD
129. 49 52 UNI GX .075
130. 50 51 UNI GX -.075
131. LOAD 3 ACTIVE EARTH PRESSURE
132. MEMBER LOAD
133. 49 TRAP GX .7 .42
134. 52 TRAP GX .42 0.
135. 50 TRAP GX -.7 -.42
136. 51 TRAP GX -.42 0.
137. LOAD 4 WATER PRESSURE
138. MEMBER LOAD
139. 4 TO 43 UNI GY -1.25
140. 49 TRAP GX -1.25 -.75
141. 52 TRAP GX -.75 0.
142. 50 TRAP GX 1.25 .75
143. 51 TRAP GX .75 0.
144. LOAD COMB 11 CASE 1 CH. EMPTY
145. 1 1.4 2 1.7 3 1.7
146. LOAD COMB 12 CASE 2 CH. FULL
147. 1 1.4 3 1.7 4 1.7
148. LOAD COMB 13 CASE 1 CH. EMPTY
149. 1 1. 2 1. 3 1.
150. LOAD COMB 14 CASE 2 CH. FULL
151. 1 1. 3 1. 4 1.
152. PERFORM ANALYSIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 53/ 52/ 47
ORIGINAL/FINAL BAND-WIDTH = 45/ 2
TOTAL PRIMARY LOAD CASES = 4, TOTAL DEGREES OF FREEDOM = 112
SIZE OF STIFFNESS MATRIX = 896 DOUBLE PREC. WORDS
REQRD/AVAIL. DISK SPACE = 12.09/ 359.6 MB, EXMEM = 1983.6 MB

```
++ Processing Element Stiffness Matrix.              9:31:23
++ Processing Global Stiffness Matrix.               9:31:23
++ Processing Triangular Factorization.              9:31:23
++ Calculating Joint Displacements.                  9:31:23
++ Calculating Member  Forces.                       9:31:24
```

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153. PLOT BENDING FILE
154. PLOT DISPLACEMENT FILE
155. LOAD LIST 11 12
156. PRINT FORCE ENVELOPE NSECTION 10 LIST 49 52
```

MEMBER FORCE ENVELOPE

ALL UNITS ARE KIP FEET

MEMB	DISTANCE		FY	LD	MZ	LD	FZ	LD	MY	LD
49	.00	MAX.	14.45	11	104.82	11	.00	12	.00	12
		MIN.	-9.35	12	-62.33	12	.00	12	.00	12
	.80	MAX.	13.33	11	93.67	11	.00	12	.00	12
		MIN.	-8.55	12	-55.14	12	.00	12	.00	12
	1.60	MAX.	12.27	11	83.32	11	.00	12	.00	12
		MIN.	-7.80	12	-48.51	12	.00	12	.00	12
	2.40	MAX.	11.60	11	73.77	11	.00	12	.00	12
		MIN.	-7.35	12	-42.45	12	.00	12	.00	12
	3.20	MAX.	10.60	11	65.00	11	.00	12	.00	12
		MIN.	-6.64	12	-36.93	12	.00	12	.00	12
	4.00	MAX.	9.66	11	56.93	11	.00	12	.00	12
		MIN.	-5.98	12	-31.91	12	.00	12	.00	12
	4.80	MAX.	8.77	11	49.54	11	.00	12	.00	12
		MIN.	-5.37	12	-27.36	12	.00	12	.00	12
	5.60	MAX.	7.95	11	42.81	11	.00	12	.00	12
		MIN.	-4.81	12	-23.25	12	.00	12	.00	12
	6.40	MAX.	7.28	11	36.72	11	.00	12	.00	12
		MIN.	-4.36	12	-19.59	12	.00	12	.00	12
	7.20	MAX.	6.52	11	31.23	11	.00	12	.00	12
		MIN.	-3.84	12	-16.33	12	.00	12	.00	12
	8.00	MAX.	5.81	11	26.31	11	.00	12	.00	12
		MIN.	-3.37	12	-13.46	12	.00	12	.00	12

MAX/MIN FORCES FOR MEMBER 49, AMONGST ALL SECT LOCATIONS

	FY/FZ	DIST	LD	MZ/MY	DIST	LD	FX	DIST	LD
MAX.	14.45	.00	11	104.82	.00	11			
	.00	.00	11	.00	.00	11	5.88 C	.00	12
MIN.	-9.35	.00	12	-62.33	.00	12			
	.00	8.00	12	.00	8.00	12	2.52 C	8.00	11

MEMB	DISTANCE		FY	LD	MZ	LD	FZ	LD	MY	LD
52	.00	MAX.	5.81	11	26.31	11	.00	12	.00	12
		MIN.	-3.37	12	-13.46	12	.00	12	.00	12
	1.20	MAX.	4.66	11	19.89	11	.00	12	.00	12
		MIN.	-2.58	12	-9.79	12	.00	12	.00	12
	2.40	MAX.	3.63	11	14.54	11	.00	12	.00	12
		MIN.	-1.89	12	-6.81	12	.00	12	.00	12
	3.60	MAX.	3.48	11	10.28	11	.00	12	.00	12
		MIN.	-1.89	12	-4.54	12	.00	12	.00	12

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4.80	MAX.	2.59	11	6.98	11	.00	12	.00	12
	MIN.	-1.31	12	-2.89	12	.00	12	.00	12
6.00	MAX.	1.84	11	4.43	11	.00	12	.00	12
	MIN.	-.84	12	-1.68	12	.00	12	.00	12
7.20	MAX.	1.21	11	2.55	11	.00	12	.00	12
	MIN.	-.47	12	-.85	12	.00	12	.00	12
8.40	MAX.	.73	11	1.25	11	.00	12	.00	12
	MIN.	-.21	12	-.34	12	.00	12	.00	12
9.60	MAX.	.57	11	.47	11	.00	12	.00	12
	MIN.	-.21	12	-.08	12	.00	12	.00	12
10.80	MAX.	.22	11	.11	11	.00	12	.00	12
	MIN.	-.05	12	-.01	12	.00	12	.00	12
12.00	MAX.	.00	12	.00	11	.00	12	.00	12
	MIN.	.00	11	.00	12	.00	12	.00	12

MAX/MIN FORCES FOR MEMBER 52,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	5.81	.00	11	26.31	.00	11			
	.00	.00	11	.00	.00	11	2.52 C	.00	11
MIN.	-3.37	.00	12	-13.46	.00	12			
	.00	12.00	12	.00	12.00	12	.00 T	12.00	12

********** END OF FORCE ENVELOPE FROM INTERNAL STORAGE **********

157. PRINT MAXFORCE ENVELOPE NSECTION 2 LIST 1 4 TO 23

MEMBER FORCE ENVELOPE

ALL UNITS ARE KIP FEET

MAX AND MIN FORCE VALUES AMONGST ALL SECTION LOCATIONS

MEMB		FY/ FZ	DIST DIST	LD LD	MZ/ MY	DIST DIST	LD LD	FX	DIST	LD
1	MAX	3.05	.00	12	1.87	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-2.08	1.00	11	-2.84	1.00	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
4	MAX	5.88	.00	12	59.61	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-12.30	1.00	11	-102.79	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
5	MAX	7.12	.00	12	55.00	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-12.93	1.00	11	-90.70	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
6	MAX	7.79	.00	12	49.16	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-12.88	1.00	11	-77.98	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
7	MAX	8.01	.00	12	42.64	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-12.33	1.00	11	-65.31	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
8	MAX	7.88	.00	12	35.90	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-11.43	1.00	11	-53.19	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
9	MAX	7.47	.00	12	29.30	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-10.30	1.00	11	-41.97	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
10	MAX	6.86	.00	12	23.10	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-9.03	1.00	11	-31.88	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
11	MAX	6.09	.00	12	17.52	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11

	MIN	-7.69	1.00	11	-23.06	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
12	MAX	5.20	.00	12	12.70	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-6.19	1.00	11	-15.58	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
13	MAX	4.43	.00	12	8.69	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-4.75	1.00	11	-9.52	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
14	MAX	3.68	.00	12	5.46	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-3.48	1.00	11	-4.90	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
15	MAX	3.02	.00	12	2.97	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-2.41	1.00	11	-1.55	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
16	MAX	2.46	.00	12	2.16	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.56	1.00	11	-.12	1.00	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
17	MAX	2.02	.00	12	2.95	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-.92	1.00	11	-.94	1.00	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
18	MAX	1.69	.00	12	3.29	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-.70	1.00	12	-1.49	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
19	MAX	1.46	.00	12	3.36	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-.93	1.00	12	-1.87	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
20	MAX	1.31	.00	12	3.36	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.08	1.00	12	-2.05	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
21	MAX	1.23	.00	12	3.28	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.16	1.00	12	-2.13	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
22	MAX	1.19	.00	12	3.15	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11

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	MIN	-1.19	1.00	12	-2.15	.50	12		
		.00	1.00	12	.00	1.00	12	.00	1.00	12
23	MAX	1.19	.00	12	3.04	.00	11		
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.20	1.00	12	-2.14	.50	12		
		.00	1.00	12	.00	1.00	12	.00	1.00	12

********** END OF FORCE ENVELOPE FROM INTERNAL STORAGE **********

158. LOAD LIST 13 14
159. PRINT JOINT DISPLACEMENTS LIST 1 24 47 50 TO 53

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	13	.00000	.02965	.00000	.00000	.00000	-.00093
	14	.00000	-.06676	.00000	.00000	.00000	.00074
24	13	.00000	-.00236	.00000	.00000	.00000	.00000
	14	.00000	-.02497	.00000	.00000	.00000	.00000
47	13	.00000	.02965	.00000	.00000	.00000	.00093
	14	.00000	-.06676	.00000	.00000	.00000	-.00074
50	13	.16154	.01258	.00000	.00000	.00000	-.00197
	14	-.11434	-.05390	.00000	.00000	.00000	.00133
51	13	-.16154	.01258	.00000	.00000	.00000	.00197
	14	.11434	-.05390	.00000	.00000	.00000	-.00133
52	13	-.59937	.01229	.00000	.00000	.00000	.00334
	14	.37882	-.05418	.00000	.00000	.00000	-.00196
53	13	.59937	.01229	.00000	.00000	.00000	-.00334
	14	-.37882	-.05418	.00000	.00000	.00000	.00196

********** END OF LATEST ANALYSIS RESULT **********

160. PRINT SUPPORT REACTIONS

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
5	13	.00	.05	.00	.00	.00	.00
	14	.00	2.40	.00	.00	.00	.00
6	13	.00	.43	.00	.00	.00	.00
	14	.00	2.05	.00	.00	.00	.00
7	13	.00	.70	.00	.00	.00	.00
	14	.00	1.76	.00	.00	.00	.00
8	13	.00	.89	.00	.00	.00	.00
	14	.00	1.53	.00	.00	.00	.00
9	13	.00	1.01	.00	.00	.00	.00
	14	.00	1.35	.00	.00	.00	.00
10	13	.00	1.07	.00	.00	.00	.00
	14	.00	1.21	.00	.00	.00	.00
11	13	.00	1.09	.00	.00	.00	.00
	14	.00	1.10	.00	.00	.00	.00
12	13	.00	1.09	.00	.00	.00	.00
	14	.00	1.02	.00	.00	.00	.00
13	13	.00	1.03	.00	.00	.00	.00
	14	.00	.98	.00	.00	.00	.00
14	13	.00	.93	.00	.00	.00	.00
	14	.00	.99	.00	.00	.00	.00
15	13	.00	.81	.00	.00	.00	.00
	14	.00	1.04	.00	.00	.00	.00
16	13	.00	.68	.00	.00	.00	.00
	14	.00	1.10	.00	.00	.00	.00
17	13	.00	.55	.00	.00	.00	.00
	14	.00	1.17	.00	.00	.00	.00
18	13	.00	.44	.00	.00	.00	.00
	14	.00	1.23	.00	.00	.00	.00
19	13	.00	.34	.00	.00	.00	.00
	14	.00	1.29	.00	.00	.00	.00
20	13	.00	.27	.00	.00	.00	.00
	14	.00	1.34	.00	.00	.00	.00
21	13	.00	.21	.00	.00	.00	.00
	14	.00	1.38	.00	.00	.00	.00
22	13	.00	.17	.00	.00	.00	.00
	14	.00	1.41	.00	.00	.00	.00
23	13	.00	.14	.00	.00	.00	.00
	14	.00	1.43	.00	.00	.00	.00
24	13	.00	.14	.00	.00	.00	.00
	14	.00	1.44	.00	.00	.00	.00
25	13	.00	.14	.00	.00	.00	.00
	14	.00	1.43	.00	.00	.00	.00
26	13	.00	.17	.00	.00	.00	.00
	14	.00	1.41	.00	.00	.00	.00
27	13	.00	.21	.00	.00	.00	.00
	14	.00	1.38	.00	.00	.00	.00
28	13	.00	.27	.00	.00	.00	.00
	14	.00	1.34	.00	.00	.00	.00

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
29	13	.00	.34	.00	.00	.00	.00
	14	.00	1.29	.00	.00	.00	.00
30	13	.00	.44	.00	.00	.00	.00
	14	.00	1.23	.00	.00	.00	.00
31	13	.00	.55	.00	.00	.00	.00
	14	.00	1.17	.00	.00	.00	.00
32	13	.00	.68	.00	.00	.00	.00
	14	.00	1.10	.00	.00	.00	.00
33	13	.00	.81	.00	.00	.00	.00
	14	.00	1.04	.00	.00	.00	.00
34	13	.00	.93	.00	.00	.00	.00
	14	.00	.99	.00	.00	.00	.00
35	13	.00	1.03	.00	.00	.00	.00
	14	.00	.98	.00	.00	.00	.00
36	13	.00	1.09	.00	.00	.00	.00
	14	.00	1.02	.00	.00	.00	.00
37	13	.00	1.09	.00	.00	.00	.00
	14	.00	1.10	.00	.00	.00	.00
38	13	.00	1.07	.00	.00	.00	.00
	14	.00	1.21	.00	.00	.00	.00
39	13	.00	1.01	.00	.00	.00	.00
	14	.00	1.35	.00	.00	.00	.00
40	13	.00	.89	.00	.00	.00	.00
	14	.00	1.53	.00	.00	.00	.00
41	13	.00	.70	.00	.00	.00	.00
	14	.00	1.76	.00	.00	.00	.00
42	13	.00	.43	.00	.00	.00	.00
	14	.00	2.05	.00	.00	.00	.00
43	13	.00	.05	.00	.00	.00	.00
	14	.00	2.40	.00	.00	.00	.00
2	13	.00	-.80	.00	.00	.00	.00
	14	.00	2.50	.00	.00	.00	.00
4	13	.00	-.33	.00	.00	.00	.00
	14	.00	2.13	.00	.00	.00	.00
44	13	.00	-.33	.00	.00	.00	.00
	14	.00	2.13	.00	.00	.00	.00
46	13	.00	-.80	.00	.00	.00	.00
	14	.00	2.50	.00	.00	.00	.00
1	13	.00	-.85	.00	.00	.00	.00
	14	.00	1.92	.00	.00	.00	.00
3	13	-8.50	-.37	.00	.00	.00	.00
	14	5.50	1.54	.00	.00	.00	.00
45	13	8.50	-.37	.00	.00	.00	.00
	14	-5.50	1.54	.00	.00	.00	.00
47	13	.00	-.85	.00	.00	.00	.00
	14	.00	1.92	.00	.00	.00	.00

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********** END OF LATEST ANALYSIS RESULT **********

161. FINISH

********** END OF STAAD-III **********

**** DATE= JAN 7,1998 TIME= 9:31:25 ****

****
* For questions on STAAD-III, contact: *
* Research Engineers, Inc at *
* West Coast: Ph- (714) 974-2500 Fax- (714) 921-2543 *
* East Coast: Ph- (508) 688-3626 Fax- (508) 685-7230 *
****

```
STAAD PLANE OUTLET STRUCTURE
INPUT WIDTH 72
INPUT NODESIGN
UNIT FEET KIP
JOINT COORDINATES
    1        7.000          .000          .000
    2        8.000          .000          .000
    3        8.500          .000          .000
    4        9.000          .000          .000
    5       10.000          .000          .000
    6       11.000          .000          .000
    7       12.000          .000          .000
    8       13.000          .000          .000
    9       14.000          .000          .000
   10       15.000          .000          .000
   11       16.000          .000          .000
   12       17.000          .000          .000
   13       18.000          .000          .000
   14       19.000          .000          .000
   15       20.000          .000          .000
   16       21.000          .000          .000
   17       22.000          .000          .000
   18       23.000          .000          .000
   19       24.000          .000          .000
   20       25.000          .000          .000
   21       26.000          .000          .000
   22       27.000          .000          .000
   23       28.000          .000          .000
   24       29.000          .000          .000
   25       30.000          .000          .000
   26       31.000          .000          .000
   27       32.000          .000          .000
   28       33.000          .000          .000
   29       34.000          .000          .000
   30       35.000          .000          .000
   31       36.000          .000          .000
   32       37.000          .000          .000
   33       38.000          .000          .000
   34       39.000          .000          .000
   35       40.000          .000          .000
   36       41.000          .000          .000
   37       42.000          .000          .000
   38       43.000          .000          .000
   39       44.000          .000          .000
   40       45.000          .000          .000
   41       46.000          .000          .000
   42       47.000          .000          .000
   43       48.000          .000          .000
   44       49.000          .000          .000
   45       49.500          .000          .000
   46       50.000          .000          .000
   47       51.000          .000          .000
   48        8.500          .500          .000
   49       49.500          .500          .000
   50        8.500         8.500          .000
   51       49.500         8.500          .000
   52       49.500        20.500          .000
   53        8.500        20.500          .000
MEMBER INCIDENCES
        1        1        2
        2        2        3
        3        3        4
        4        4        5
        5        5        6
        6        6        7
        7        7        8
        8        8        9
        9        9       10
       10       10       11
       11       11       12
       12       12       13
       13       13       14
       14       14       15
       15       15       16
       16       16       17
       17       17       18
       18       18       19
       19       19       20
       20       20       21
       21       21       22
       22       22       23
       23       23       24
       24       24       25
       25       25       26
       26       26       27
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        27        27        28
        28        28        29
        29        29        30
        30        30        31
        31        31        32
        32        32        33
        33        33        34
        34        34        35
        35        35        36
        36        36        37
        37        37        38
        38        38        39
        39        39        40
        40        40        41
        41        41        42
        42        42        43
        43        43        44
        44        44        45
        45        45        46
        46        46        47
        47         3        48
        48        45        49
        49        48        50
        50        49        51
        51        51        52
        52        50        53
MEMBER PROPERTY AMERICAN
12 TO 35 PRI YD 1.25 ZD 1.
51 52 PRI YD 1. ZD 1.
47 TO 50 PRI YD 2. ZD 1.
1 TO 11 PRI YD 2. ZD 1.
36 TO 46 PRI YD 2. ZD 1.
CONSTANT
E CONCRETE ALL
DENSITY CONCRETE ALL
SUPPORT
5 TO 43 FIXED BUT MZ KFY 690.
2 4 44 46 FIXED BUT MZ KFY 518.
1 3 45 47 FIXED BUT MZ KFY 345.
LOAD 1 WEIGHT OF STRUCTURE
SELFWEIGHT Y -1.
LOAD 2 LL SURCHARGE
MEMBER LOAD
49 52 UNI GX .075
50 51 UNI GX -.075
LOAD 3 ACTIVE EARTH PRESSURE
MEMBER LOAD
49 TRAP GX .7 .42
52 TRAP GX .42 0.
50 TRAP GX -.7 -.42
51 TRAP GX -.42 0.
LOAD 4 WATER PRESSURE
MEMBER LOAD
4 TO 43 UNI GY -1.25
49 TRAP GX -1.25 -.75
52 TRAP GX -.75 0.
50 TRAP GX 1.25 .75
51 TRAP GX .75 0.
LOAD COMB 11 CASE 1 CH. EMPTY
1 1.4 2 1.7 3 1.7
LOAD COMB 12 CASE 2 CH. FULL
1 1.4 3 1.7 4 1.7
LOAD COMB 13 CASE 1 CH. EMPTY
1 1. 2 1. 3 1.
LOAD COMB 14 CASE 2 CH. FULL
1 1. 3 1. 4 1.
PERFORM ANALYSIS
PLOT BENDING FILE
PLOT DISPLACEMENT FILE
LOAD LIST 11 12
PRINT FORCE ENVELOPE NSECTION 10 LIST 49 52
PRINT MAXFORCE ENVELOPE NSECTION 2 LIST 1 4 TO 23
LOAD LIST 13 14
PRINT JOINT DISPLACEMENTS LIST 1 24 47 50 TO 53
PRINT SUPPORT REACTIONS
FINISH
```

OUTLET STRUCTURE

16' TALL CANT. WALLS

User ID:

STRUCTURE DATA

TYPE = PLANE

NJ = 53

NM = 52

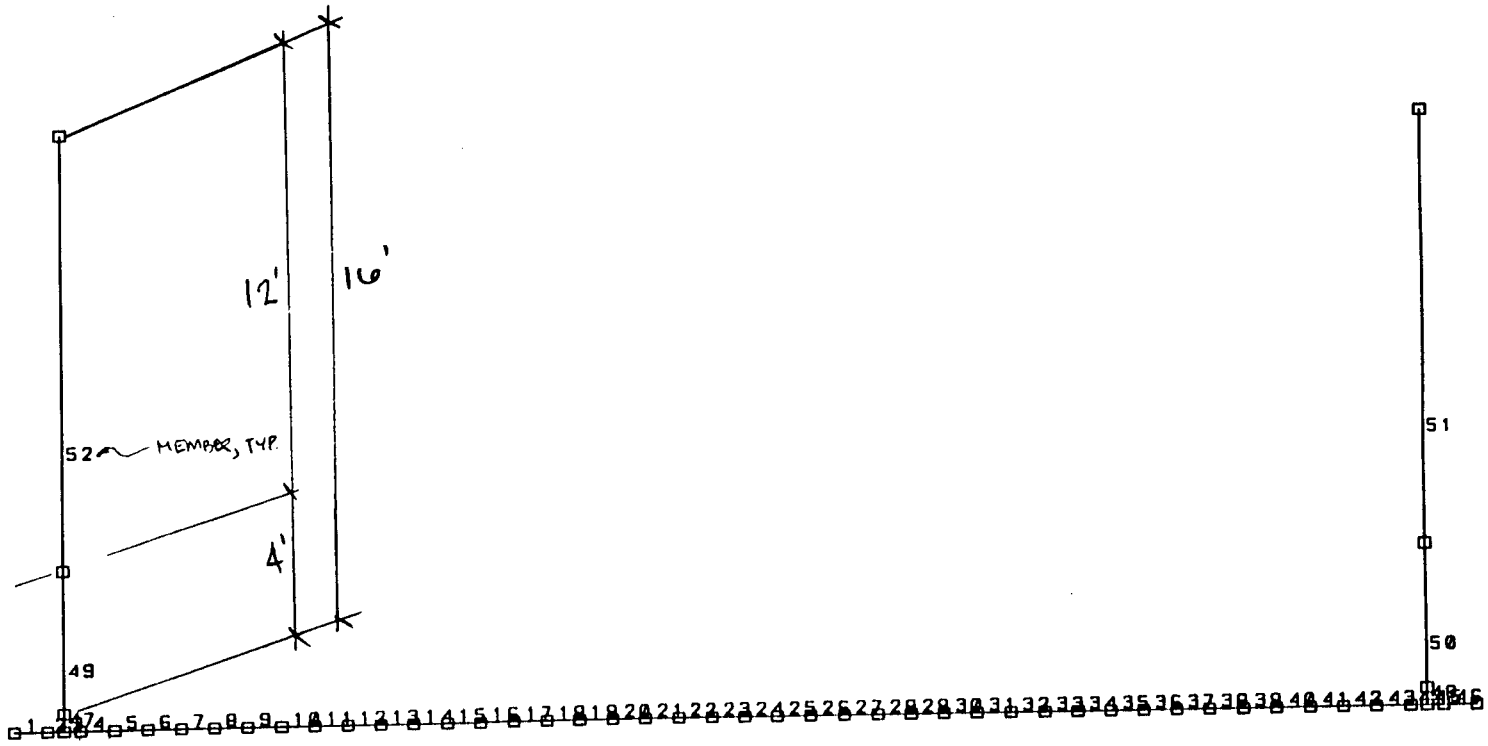
NE = 0

NS = 0

XMAX= 51.0

YMAX= 16.5

ZMAX= .0



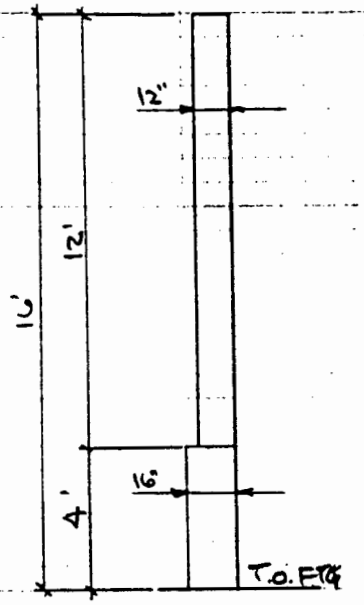
S T A A D P R E - P L O T (VERSION 22.0) DATE: JAN 8, 1998

TITLE: OUTLET STRUCTURE

CHANNEL RETAINING WALL AT ;

H = 16'

ULTIMATE FORCES & MOMENTS LOAD CASES 11 & 12 FROM STAAD ANALYSIS



CASE I :

AT BOTTOM OF 16' THK. SECTION (T.O.FTG.)

M_u = 56.9^{k} (L.C. 11)

V_u = 9.7^{k} (L.C. 11)

FOR d = 16 - 2 - 0.5 = 13.5" , A_s = 1.1 in^2

USE # 7 @ 6" O.F. VERT.

$\phi V_c = 0.85 \times 2 \times \sqrt{4,000}\,(12)(13.5) =$ 17.4^{k} > V_u : o.k

AT BOTTOM OF 12" THK SECTION

M_u = 26.3^{k} (L.C. 11)

V_u = 5.8^{k} (L.C. 11)

FOR d = 9.5 , A_s = 0.7 in^2

USE # 6 @ 6" O.F. VERT.

$\phi V_c = 0.85 \times 2 \sqrt{4,000}\,(12)(9.5) =$ 12.3^{k} > V_u : o.k

CASE II

AT BOTTOM OF 16" THK SECTION (T.O.FTG.)

M_u = 42.7^{k} (L.C. 12)

$A_{s\,REQ'D}$ = 0.73

$A_{s\,min} = 0.0033 \times 12 \times 13.5 = 0.53$ in^2

USE # 6 @ 6" I.F. VERT.

AT BOTTOM OF 12" THK SECTION

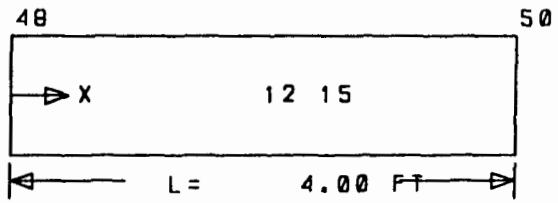
M_u = 13.5 (L.C. 12)

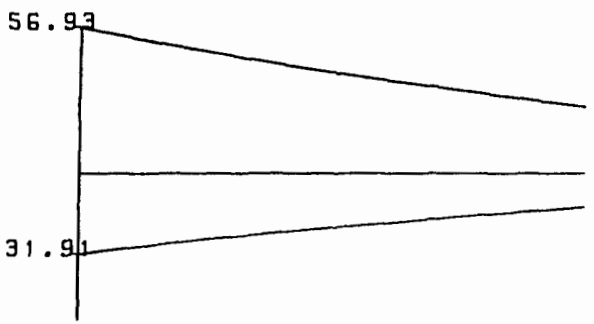
$A_{s\,REQ'D}$ = 0.33 in^2

$A_{s\,min} = 0.0033 \times 12 \times 9.5 = 0.38$ in^2

USE # 6 @ 12" I.F. VERT.

ENVELOPE FOR MEMBER= 49





MZ Envelope Units (FT ,KIP)

	High MZ Load		Low MZ Load	
.000L=	56.93	11	-31.91	12
.083L=	53.77	11	-29.95	12
.167L=	50.73	11	-28.08	12
.250L=	47.81	11	-26.29	12
.333L=	44.99	11	-24.58	12
.417L=	42.29	11	-22.94	12
.500L=	39.70	11	-21.38	12
.583L=	37.21	11	-19.88	12
.667L=	34.83	11	-18.46	12
.750L=	32.55	11	-17.11	12
.833L=	30.37	11	-15.83	12
.917L=	28.29	11	-14.61	12
1.00L=	26.31	11	-13.46	12

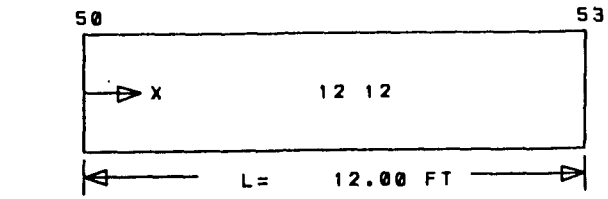
Maximum Force/Moment Summary, Units (FT ,KIP)

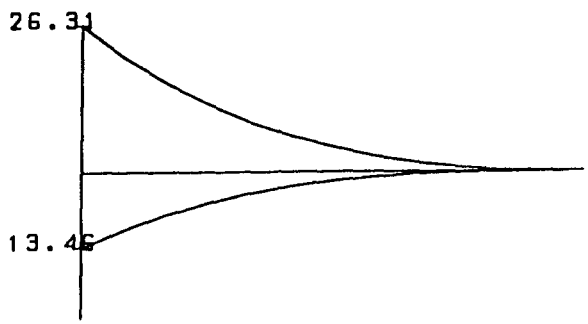
	Axial	Shear Y	Shear Z	Moment Y	Moment Z
Value=	3.64	9.66	.00	.00	56.93
Location=	.00	.00	.00	.00	.00
Loading=	11	11	11	11	11

User ID: KZH ENGINEERING

User ID: KZH ENGINEERING

ENVELOPE FOR MEMBER= 52





MZ Envelope Units (FT ,KIP)

	High MZ Load		Low MZ Load	
.000L=	26.31	11	-13.46	12
.083L=	20.83	11	-10.30	12
.167L=	16.21	11	-7.73	12
.250L=	12.39	11	-5.68	12
.333L=	9.09	11	-3.94	12
.417L=	6.46	11	-2.62	12
.500L=	4.43	11	-1.68	12
.583L=	2.80	11	-.95	12
.667L=	1.62	11	-.47	12
.750L=	.84	11	-.21	12
.833L=	.32	11	-.05	12
.917L=	.06	11	.00	12
1.00L=	.00	12	.00	11

Maximum Force/Moment Summary, Units (FT ,KIP)

	Axial	Shear Y	Shear Z	Moment Y	Moment Z
Value=	2.52	5.81	.00	.00	26.31
Location=	.00	.00	.00	.00	.00
Loading=	11	11	11	11	11

User ID: R2H ENGINEERING

MN/ELEM

MOMENT MZ LN= 11

STRUCTURE DATA

TYPE = PLANE

NJ = 53

NM = 52

NE = 0

NS = 0

NRJ= 47

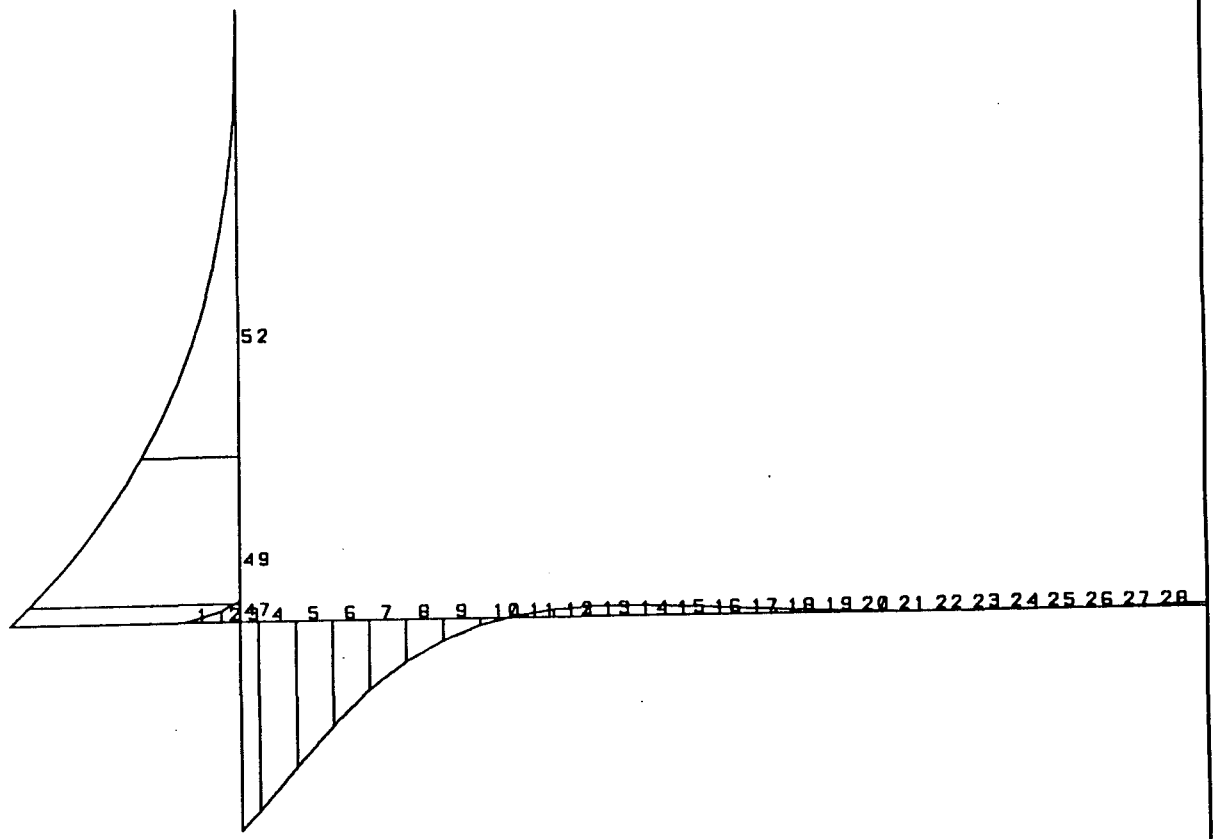
NL = 8

XMAX= 44.0

YMAX= 16.5

ZMAX= .0

Maximum= 61.76



UNIT FEE KIP

J=53,M=52

S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 8, 1998

TITLE: OUTLET STRUCTURE

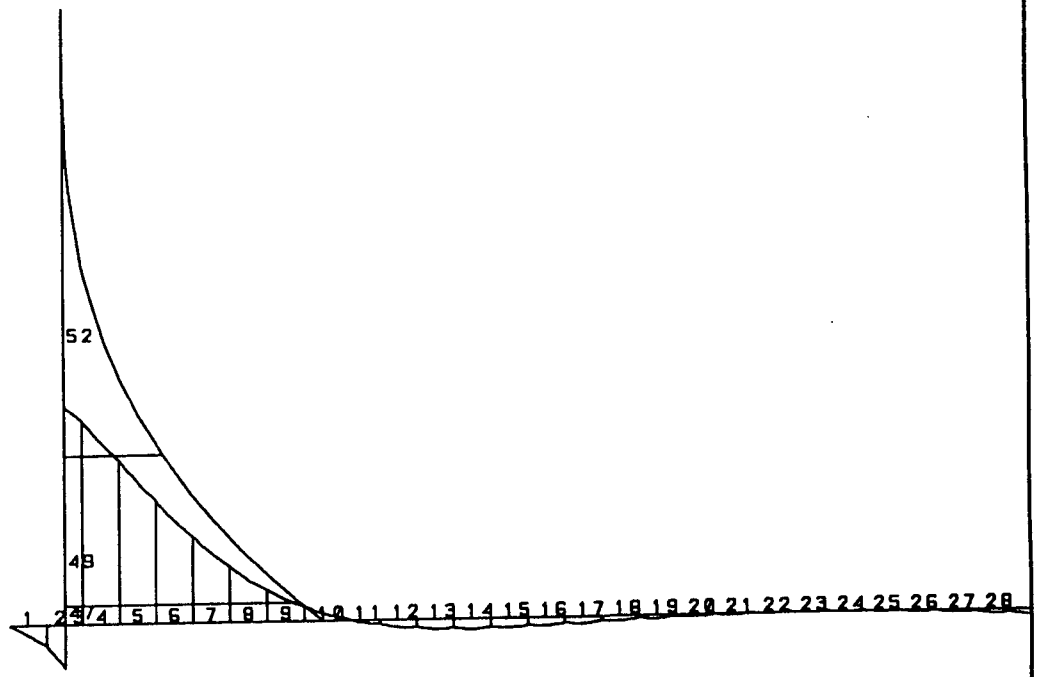
User ID: R2H ENGINEERING

MN/ELEM
MOMENT MZ LN= 12

STRUCTURE DATA

TYPE = PLANE
NJ = 53
NM = 52
NE = 0
NS = 0
NRJ= 47
NL = 8
XMAX= 44.0
YMAX= 16.5
ZMAX= .0

Maximum= 34.90



UNIT FEE KIP

J=53,M=52

S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 8, 1998

TITLE: OUTLET STRUCTURE

BOTTOM SLAB - 15" THK.

CASE I

M_u @ WALL = 53.2'K (L.C. 11)

$V_{u\,max}$ = 9.7'K (L.C. 11)

FOR d = 15 - 3 - 0.5 = 11.5" , A_s = 1.1

USE # 7 @ 6" BOTT.

$\phi V_c = 0.85 \times 2 \times \sqrt{3,000}\, 12 \times 11.5 =$ 12.8'K > $V_{u\,max}$: O.K

M_u @ 3.5' FROM FACE OF WALL = 21.5'K

FOR # 6 @ 12"

$\phi M_n = 0.9 \times 0.44 \times 60 (11.5 - 0.863/2)/12 =$ 21.9'K

∴ USE # 6 @ 12" BOTT

CASE II

M_u = 28.5'K (L.C. 12)

FOR d = 15 - 2 - 0.5 = 12.5"

A_s = 0.53 in^2

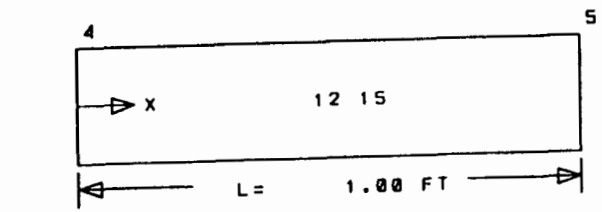
USE # 7 @ 12" TOP

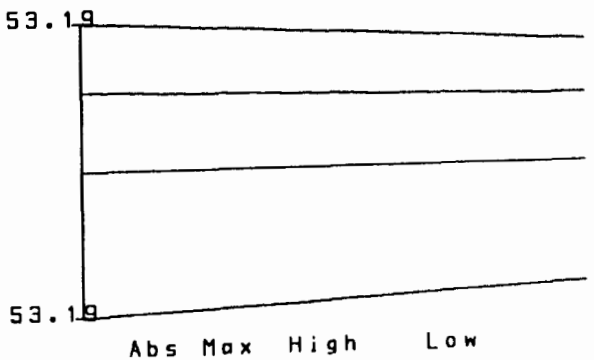
M_u @ 2' FROM FACE OF WALL = 20.1'K

∴ USE # 6 @ 12" TOP

User ID: R2H ENGINEERING

ENVELOPE FOR MEMBER= 4





MZ Envelope Units (FT ,KIP)

	High MZ Load		Low MZ Load	
.000L=	28.52	12	-53.19	11
.083L=	28.09	12	-52.40	11
.167L=	27.68	12	-51.60	11
.250L=	27.28	12	-50.81	11
.333L=	26.90	12	-50.02	11
.417L=	26.53	12	-49.22	11
.500L=	26.17	12	-48.42	11
.583L=	25.83	12	-47.62	11
.667L=	25.50	12	-46.82	11
.750L=	25.18	12	-46.01	11
.833L=	24.88	12	-45.20	11
.917L=	24.59	12	-44.40	11
1.00L=	24.32	12	-43.59	11

Maximum Force/Moment Summary, Units (FT ,KIP)

	Axial	Shear Y	Shear Z	Moment Y	Moment Z
Value=	.00	-9.47	.00	.00	-53.19
Location=	.00	.00	.00	.00	.00
Looding=	11	11	11	11	11

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```
*****************************************************
*                                                   *
*           S T A A D - III                         *
*           Revision 22.0W                          *
*           Proprietary Program of                  *
*           Research Engineers, Inc.                *
*           Date=    JAN  8, 1998                   *
*           Time=    14: 7:19                       *
*                                                   *
*      USER ID: R2H ENGINEERING                     *
*****************************************************
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```
 1. STAAD PLANE OUTLET STRUCTURE
 2. INPUT WIDTH 72
 3. INPUT NODESIGN
 4. UNIT FEET KIP
 5. JOINT COORDINATES
 6.      1        7.000         .000         .000
 7.      2        8.000         .000         .000
 8.      3        8.500         .000         .000
 9.      4        9.000         .000         .000
10.      5       10.000         .000         .000
11.      6       11.000         .000         .000
12.      7       12.000         .000         .000
13.      8       13.000         .000         .000
14.      9       14.000         .000         .000
15.     10       15.000         .000         .000
16.     11       16.000         .000         .000
17.     12       17.000         .000         .000
18.     13       18.000         .000         .000
19.     14       19.000         .000         .000
20.     15       20.000         .000         .000
21.     16       21.000         .000         .000
22.     17       22.000         .000         .000
23.     18       23.000         .000         .000
24.     19       24.000         .000         .000
25.     20       25.000         .000         .000
26.     21       26.000         .000         .000
27.     22       27.000         .000         .000
28.     23       28.000         .000         .000
29.     24       29.000         .000         .000
30.     25       30.000         .000         .000
31.     26       31.000         .000         .000
32.     27       32.000         .000         .000
33.     28       33.000         .000         .000
34.     29       34.000         .000         .000
35.     30       35.000         .000         .000
36.     31       36.000         .000         .000
37.     32       37.000         .000         .000
38.     33       38.000         .000         .000
39.     34       39.000         .000         .000
40.     35       40.000         .000         .000
41.     36       41.000         .000         .000
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42.	37	42.000	.000	.000
43.	38	43.000	.000	.000
44.	39	44.000	.000	.000
45.	40	45.000	.000	.000
46.	41	46.000	.000	.000
47.	42	47.000	.000	.000
48.	43	48.000	.000	.000
49.	44	49.000	.000	.000
50.	45	49.500	.000	.000
51.	46	50.000	.000	.000
52.	47	51.000	.000	.000
53.	48	8.500	.500	.000
54.	49	49.500	.500	.000
55.	50	8.500	4.500	.000
56.	51	49.500	4.500	.000
57.	52	49.500	16.500	.000
58.	53	8.500	16.500	.000

59. MEMBER INCIDENCES

60.	1	1	2
61.	2	2	3
62.	3	3	4
63.	4	4	5
64.	5	5	6
65.	6	6	7
66.	7	7	8
67.	8	8	9
68.	9	9	10
69.	10	10	11
70.	11	11	12
71.	12	12	13
72.	13	13	14
73.	14	14	15
74.	15	15	16
75.	16	16	17
76.	17	17	18
77.	18	18	19
78.	19	19	20
79.	20	20	21
80.	21	21	22
81.	22	22	23
82.	23	23	24
83.	24	24	25
84.	25	25	26
85.	26	26	27
86.	27	27	28
87.	28	28	29
88.	29	29	30
89.	30	30	31
90.	31	31	32
91.	32	32	33
92.	33	33	34
93.	34	34	35
94.	35	35	36
95.	36	36	37
96.	37	37	38
97.	38	38	39

111

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 98.          39          39          40
 99.          40          40          41
100.          41          41          42
101.          42          42          43
102.          43          43          44
103.          44          44          45
104.          45          45          46
105.          46          46          47
106.          47           3          48
107.          48          45          49
108.          49          48          50
109.          50          49          51
110.          51          51          52
111.          52          50          53
112. MEMBER PROPERTY AMERICAN
113. 1 TO 46 PRI YD 1.25 ZD 1.
114. 51 52 PRI YD 1. ZD 1.
115. 47 49 PRI YD 1.33 ZD 1.
116. 48 50 PRI YD 1.33 ZD 1.
117. CONSTANT
118. E CONCRETE ALL
119. DENSITY CONCRETE ALL
120. SUPPORT
121. 5 TO 43 FIXED BUT MZ KFY 690.
122. 2 4 44 46 FIXED BUT MZ KFY 518.
123. 1 3 45 47 FIXED BUT MZ KFY 345.
124. LOAD 1 WEIGHT OF STRUCTURE
125. SELFWEIGHT Y -1.
126. LOAD 2 LL SURCHARGE
127. MEMBER LOAD
128. 49 52 UNI GX .075
129. 50 51 UNI GX -.075
130. LOAD 3 ACTIVE EARTH PRESSURE
131. MEMBER LOAD
132. 49 TRAP GX .56 .42
133. 52 TRAP GX .42 0.
134. 50 TRAP GX -.56 -.42
135. 51 TRAP GX -.42 0.
136. LOAD 4 WATER PRESSURE
137. MEMBER LOAD
138. 4 TO 43 UNI GY -1.
139. 49 TRAP GX -1. -.75
140. 52 TRAP GX -.75 0.
141. 50 TRAP GX 1. .75
142. 51 TRAP GX .75 0.
143. LOAD COMB 11 CASE 1 CH. EMPTY
144. 1 1.4 2 1.7 3 1.7
145. LOAD COMB 12 CASE 2 CH. FULL
146. 1 1.4 3 1.7 4 1.7
147. LOAD COMB 13 CASE 1 CH. EMPTY
148. 1 1. 2 1. 3 1.
149. LOAD COMB 14 CASE 2 CH. FULL
150. 1 1. 3 1. 4 1.
151. PERFORM ANALYSIS
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P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 53/ 52/ 47
ORIGINAL/FINAL BAND-WIDTH = 45/ 2
TOTAL PRIMARY LOAD CASES = 4, TOTAL DEGREES OF FREEDOM = 112
SIZE OF STIFFNESS MATRIX = 896 DOUBLE PREC. WORDS
REQRD/AVAIL. DISK SPACE = 12.09/ 312.5 MB, EXMEM = 1985.8 MB

++ Processing Element Stiffness Matrix. 14: 7:20
++ Processing Global Stiffness Matrix. 14: 7:20
++ Processing Triangular Factorization. 14: 7:20
++ Calculating Joint Displacements. 14: 7:20
++ Calculating Member Forces. 14: 7:20

152. PLOT BENDING FILE
153. PLOT DISPLACEMENT FILE
154. LOAD LIST 11 12
155. PRINT FORCE ENVELOPE NSECTION 10 LIST 49 52

MEMBER FORCE ENVELOPE

ALL UNITS ARE KIP FEET

MEMB	DISTANCE		FY	LD	MZ	LD	FZ	LD	MY	LD
49	.00	MAX.	9.66	11	56.93	11	.00	12	.00	12
		MIN.	-5.98	12	-31.91	12	.00	12	.00	12
	.40	MAX.	9.21	11	53.15	11	.00	12	.00	12
		MIN.	-5.67	12	-29.57	12	.00	12	.00	12
	.80	MAX.	8.77	11	49.54	11	.00	12	.00	12
		MIN.	-5.37	12	-27.36	12	.00	12	.00	12
	1.20	MAX.	8.44	11	46.10	11	.00	12	.00	12
		MIN.	-5.15	12	-25.25	12	.00	12	.00	12
	1.60	MAX.	8.02	11	42.82	11	.00	12	.00	12
		MIN.	-4.86	12	-23.26	12	.00	12	.00	12
	2.00	MAX.	7.62	11	39.70	11	.00	12	.00	12
		MIN.	-4.58	12	-21.38	12	.00	12	.00	12
	2.40	MAX.	7.23	11	36.73	11	.00	12	.00	12
		MIN.	-4.32	12	-19.59	12	.00	12	.00	12
	2.80	MAX.	6.85	11	33.91	11	.00	12	.00	12
		MIN.	-4.06	12	-17.91	12	.00	12	.00	12
	3.20	MAX.	6.52	11	31.23	11	.00	12	.00	12
		MIN.	-3.84	12	-16.33	12	.00	12	.00	12
	3.60	MAX.	6.16	11	28.70	11	.00	12	.00	12
		MIN.	-3.60	12	-14.85	12	.00	12	.00	12
	4.00	MAX.	5.81	11	26.31	11	.00	12	.00	12
		MIN.	-3.37	12	-13.46	12	.00	12	.00	12

MAX/MIN FORCES FOR MEMBER 49,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	9.66	.00	11	56.93	.00	11			
	.00	.00	11	.00	.00	11	3.64 C	.00	11
MIN.	-5.98	.00	12	-31.91	.00	12			
	.00	4.00	12	.00	4.00	12	2.52 C	4.00	12

MEMB	DISTANCE		FY	LD	MZ	LD	FZ	LD	MY	LD
52	.00	MAX.	5.81	11	26.31	11	.00	12	.00	12
		MIN.	-3.37	12	-13.46	12	.00	12	.00	12
	1.20	MAX.	4.66	11	19.89	11	.00	12	.00	12
		MIN.	-2.58	12	-9.79	12	.00	12	.00	12
	2.40	MAX.	3.63	11	14.54	11	.00	12	.00	12
		MIN.	-1.89	12	-6.81	12	.00	12	.00	12
	3.60	MAX.	3.48	11	10.28	11	.00	12	.00	12
		MIN.	-1.89	12	-4.54	12	.00	12	.00	12

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4.80	MAX.	2.59	11	6.98	11	.00	12	.00	12
	MIN.	-1.31	12	-2.89	12	.00	12	.00	12
6.00	MAX.	1.84	11	4.43	11	.00	12	.00	12
	MIN.	-.84	12	-1.68	12	.00	12	.00	12
7.20	MAX.	1.21	11	2.55	11	.00	12	.00	12
	MIN.	-.47	12	-.85	12	.00	12	.00	12
8.40	MAX.	.73	11	1.25	11	.00	12	.00	12
	MIN.	-.21	12	-.34	12	.00	12	.00	12
9.60	MAX.	.57	11	.47	11	.00	12	.00	12
	MIN.	-.21	12	-.08	12	.00	12	.00	12
10.80	MAX.	.22	11	.11	11	.00	12	.00	12
	MIN.	-.05	12	-.01	12	.00	12	.00	12
12.00	MAX.	.00	11	.00	11	.00	12	.00	12
	MIN.	.00	12	.00	12	.00	12	.00	12

MAX/MIN FORCES FOR MEMBER 52, AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	5.81	.00	11	26.31	.00	11			
	.00	.00	11	.00	.00	11	2.52 C	.00	11
MIN.	-3.37	.00	12	-13.46	.00	12			
	.00	12.00	12	.00	12.00	12	.00 C	12.00	12

********** END OF FORCE ENVELOPE FROM INTERNAL STORAGE **********

156. PRINT MAXFORCE ENVELOPE NSECTION 2 LIST 1 4 TO 23

MEMBER FORCE ENVELOPE

ALL UNITS ARE KIP FEET

MAX AND MIN FORCE VALUES AMONGST ALL SECTION LOCATIONS

MEMB		FY/ FZ	DIST DIST	LD LD	MZ/ MY	DIST DIST	LD LD	FX	DIST	LD
1	MAX	2.47	.00	12	2.13	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-2.26	1.00	11	-2.34	1.00	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
4	MAX	5.19	.00	12	28.52	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-9.73	1.00	11	-53.19	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
5	MAX	5.55	.00	12	24.32	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-9.68	1.00	11	-43.59	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
6	MAX	5.43	.00	12	19.74	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-8.90	1.00	11	-34.04	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
7	MAX	5.01	.00	12	15.29	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-7.72	1.00	11	-25.27	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
8	MAX	4.43	.00	12	11.26	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-6.38	1.00	11	-17.68	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
9	MAX	3.79	.00	12	7.81	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-5.03	1.00	11	-11.43	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
10	MAX	3.15	.00	12	5.01	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-3.78	1.00	11	-6.54	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
11	MAX	2.58	.00	12	2.83	.00	12			
		.00	.00	11	.00	.00	11	.00	.00	11

	MIN	-2.69	1.00	11	-2.89	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
12	MAX	2.09	.00	12	1.33	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.79	1.00	11	-.33	.00	11			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
13	MAX	1.68	.00	12	2.29	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.09	1.00	11	-.57	1.00	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
14	MAX	1.37	.00	12	2.71	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-.59	1.00	12	-1.01	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
15	MAX	1.14	.00	12	2.77	1.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-.82	1.00	12	-1.29	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
16	MAX	.98	.00	12	2.77	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-.98	1.00	12	-1.36	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
17	MAX	.88	.00	12	2.58	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.08	1.00	12	-1.31	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
18	MAX	.83	.00	12	2.26	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.13	1.00	12	-1.19	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
19	MAX	.82	.00	12	1.88	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.15	1.00	12	-1.03	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
20	MAX	.83	.00	12	1.50	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.13	1.00	12	-.87	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
21	MAX	.86	.00	12	1.17	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.10	1.00	12	-.73	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
22	MAX	.90	.00	12	.92	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11

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	MIN	-1.06	1.00	12	-.63	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12
23	MAX	.95	.00	12	.76	.00	11			
		.00	.00	11	.00	.00	11	.00	.00	11
	MIN	-1.01	1.00	12	-.58	.50	12			
		.00	1.00	12	.00	1.00	12	.00	1.00	12

********** END OF FORCE ENVELOPE FROM INTERNAL STORAGE **********

157. LOAD LIST 13 14
158. PRINT JOINT DISPLACEMENTS LIST 1 24 47 50 TO 53

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JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	13	.00000	.03780	.00000	.00000	.00000	-.00135
	14	.00000	-.05349	.00000	.00000	.00000	.00084
24	13	.00000	-.00215	.00000	.00000	.00000	.00000
	14	.00000	-.02118	.00000	.00000	.00000	.00000
47	13	.00000	.03780	.00000	.00000	.00000	.00135
	14	.00000	-.05349	.00000	.00000	.00000	-.00084
50	13	.11379	.01325	.00000	.00000	.00000	-.00264
	14	-.06891	-.03848	.00000	.00000	.00000	.00156
51	13	-.11379	.01325	.00000	.00000	.00000	.00264
	14	.06891	-.03848	.00000	.00000	.00000	-.00156
52	13	-.64728	.01296	.00000	.00000	.00000	.00400
	14	.36546	-.03876	.00000	.00000	.00000	-.00218
53	13	.64728	.01296	.00000	.00000	.00000	-.00400
	14	-.36546	-.03876	.00000	.00000	.00000	.00218

********** END OF LATEST ANALYSIS RESULT **********

159. PRINT SUPPORT REACTIONS

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
5	13	.00	.30	.00	.00	.00	.00
	14	.00	1.48	.00	.00	.00	.00
6	13	.00	.70	.00	.00	.00	.00
	14	.00	1.18	.00	.00	.00	.00
7	13	.00	.92	.00	.00	.00	.00
	14	.00	.98	.00	.00	.00	.00
8	13	.00	1.01	.00	.00	.00	.00
	14	.00	.87	.00	.00	.00	.00
9	13	.00	1.00	.00	.00	.00	.00
	14	.00	.82	.00	.00	.00	.00
10	13	.00	.93	.00	.00	.00	.00
	14	.00	.82	.00	.00	.00	.00
11	13	.00	.83	.00	.00	.00	.00
	14	.00	.85	.00	.00	.00	.00
12	13	.00	.71	.00	.00	.00	.00
	14	.00	.89	.00	.00	.00	.00
13	13	.00	.60	.00	.00	.00	.00
	14	.00	.95	.00	.00	.00	.00
14	13	.00	.49	.00	.00	.00	.00
	14	.00	1.00	.00	.00	.00	.00
15	13	.00	.40	.00	.00	.00	.00
	14	.00	1.05	.00	.00	.00	.00
16	13	.00	.32	.00	.00	.00	.00
	14	.00	1.09	.00	.00	.00	.00
17	13	.00	.26	.00	.00	.00	.00
	14	.00	1.12	.00	.00	.00	.00
18	13	.00	.22	.00	.00	.00	.00
	14	.00	1.15	.00	.00	.00	.00
19	13	.00	.18	.00	.00	.00	.00
	14	.00	1.18	.00	.00	.00	.00
20	13	.00	.16	.00	.00	.00	.00
	14	.00	1.19	.00	.00	.00	.00
21	13	.00	.14	.00	.00	.00	.00
	14	.00	1.20	.00	.00	.00	.00
22	13	.00	.13	.00	.00	.00	.00
	14	.00	1.21	.00	.00	.00	.00
23	13	.00	.13	.00	.00	.00	.00
	14	.00	1.22	.00	.00	.00	.00
24	13	.00	.12	.00	.00	.00	.00
	14	.00	1.22	.00	.00	.00	.00
25	13	.00	.13	.00	.00	.00	.00
	14	.00	1.22	.00	.00	.00	.00
26	13	.00	.13	.00	.00	.00	.00
	14	.00	1.21	.00	.00	.00	.00
27	13	.00	.14	.00	.00	.00	.00
	14	.00	1.20	.00	.00	.00	.00
28	13	.00	.16	.00	.00	.00	.00
	14	.00	1.19	.00	.00	.00	.00

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
29	13	.00	.18	.00	.00	.00	.00
	14	.00	1.18	.00	.00	.00	.00
30	13	.00	.22	.00	.00	.00	.00
	14	.00	1.15	.00	.00	.00	.00
31	13	.00	.26	.00	.00	.00	.00
	14	.00	1.12	.00	.00	.00	.00
32	13	.00	.32	.00	.00	.00	.00
	14	.00	1.09	.00	.00	.00	.00
33	13	.00	.40	.00	.00	.00	.00
	14	.00	1.05	.00	.00	.00	.00
34	13	.00	.49	.00	.00	.00	.00
	14	.00	1.00	.00	.00	.00	.00
35	13	.00	.60	.00	.00	.00	.00
	14	.00	.95	.00	.00	.00	.00
36	13	.00	.71	.00	.00	.00	.00
	14	.00	.89	.00	.00	.00	.00
37	13	.00	.83	.00	.00	.00	.00
	14	.00	.85	.00	.00	.00	.00
38	13	.00	.93	.00	.00	.00	.00
	14	.00	.82	.00	.00	.00	.00
39	13	.00	1.00	.00	.00	.00	.00
	14	.00	.82	.00	.00	.00	.00
40	13	.00	1.01	.00	.00	.00	.00
	14	.00	.87	.00	.00	.00	.00
41	13	.00	.92	.00	.00	.00	.00
	14	.00	.98	.00	.00	.00	.00
42	13	.00	.70	.00	.00	.00	.00
	14	.00	1.18	.00	.00	.00	.00
43	13	.00	.30	.00	.00	.00	.00
	14	.00	1.48	.00	.00	.00	.00
2	13	.00	-.93	.00	.00	.00	.00
	14	.00	1.87	.00	.00	.00	.00
4	13	.00	-.26	.00	.00	.00	.00
	14	.00	1.44	.00	.00	.00	.00
44	13	.00	-.26	.00	.00	.00	.00
	14	.00	1.44	.00	.00	.00	.00
46	13	.00	-.93	.00	.00	.00	.00
	14	.00	1.87	.00	.00	.00	.00
1	13	.00	-1.09	.00	.00	.00	.00
	14	.00	1.54	.00	.00	.00	.00
3	13	-5.68	-.39	.00	.00	.00	.00
	14	3.52	1.10	.00	.00	.00	.00
45	13	5.68	-.39	.00	.00	.00	.00
	14	-3.52	1.10	.00	.00	.00	.00
47	13	.00	-1.09	.00	.00	.00	.00
	14	.00	1.54	.00	.00	.00	.00

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********** END OF LATEST ANALYSIS RESULT **********

160. FINISH

********** END OF STAAD-III **********

**** DATE= JAN 8,1998 TIME= 14: 7:21 ****

For questions on STAAD-III, contact:
Research Engineers, Inc at
West Coast: Ph- (714) 974-2500 Fax- (714) 921-2543
East Coast: Ph- (508) 688-3626 Fax- (508) 685-7230

BACK WALL -

SUMMARY OF ULTIMATE MOMENTS FROM STAAD FINITE ELEMENT ANALYSIS.

24" THK SECTION :		MOMENT (K-FT)	TENS. @	LOAD COMB.
HORIZ AT CORNER	=	62	O.F	11
HORIZ. AT BOTTOM (MIDSPAN)	:	14	O.F	11
HORIZ. AT MIDSPAN (MAX) (TOP OF 24" SECTION)	=	16.7	I.F	11
VERT. AT CORNER	=	4.1	I.F	11
" " "	:	6.3	O.F	11
VERT. AT BOTTOM	=	73.2	O.F.	11
VERT AT TOP OF 24" SECT.	:	21.7	O.F.	11

12" THK SECTION :				
HORIZ. AT CORNER	=	25.3	O.F	11
HORIZ. AT BOTTOM (MIDSPAN)	=	6.3	I.F.	11
HORIZ AT MIDSPAN (MAX)	:	16.8	I.F.	11
VERT. AT CORNER	=	4.1	I.F	11
VERT AT BOTTOM	:	4.1	I.F	11

24" THK SECTION - HORIZ. REINF. AT CORNER

#6@6" ⇒ d = 20.9, a = 1.29"

$\phi M_n = 0.9 \times 2 \times 0.44 \times 60 (20.9 - 1.29/2)/12 = 80.3^{IK}$

∴ USE #6 @ 6" O.F. HORIZ. @ CORNERS (6' 6')

12" THK SECTION - HORIZ. REINF. AT CORNER

#6@6" ⇒ d = 8.9", a = 1.29"

$\phi M_n = 0.9 \times 2 \times 0.44 \times 60 (8.9 - 1.29/2)/12 = 32.7^{IK}$

∴ USE #6 @ 6" O.F. HORIZ. @ CORNERS (6' 6')

```
STAAD SPACE OUTLET STRUCTURE
INPUT WIDTH 72
INPUT NODESIGN
UNIT FEET KIP
JOINT COORDINATES
   1      .000     .500     .000
   2     1.000     .500     .000
   3     1.000    1.000     .000
   4      .000    1.000     .000
   5     2.000     .500     .000
   6     2.000    1.000     .000
   7     3.000     .500     .000
   8     3.000    1.000     .000
   9     4.000     .500     .000
  10     4.000    1.000     .000

.
.
5092    42.000     .500    6.000
5093    42.000     .500    5.000
5094    42.000     .500    4.000
5095    42.000     .500    3.000
5096    42.000     .500    2.000
5097    42.000     .500    1.000
5098    42.000     .500     .000
5099    42.000     .500   -1.000
5100    42.000     .500   -2.000
5101    43.000     .500   -1.000
5102    43.000     .500   -2.000
5103    43.000     .500   52.000
5104    42.000     .500   52.000
5105    42.000     .500   51.000
5106    43.000     .500   51.000
ELEMENT INCIDENCES
   1     1    2    3    4
   2     2    5    6    3
   3     5    7    8    6
   4     7    9   10    8

.
.
5000  5098  5097  4998  4997
5001    83  1864  5097  5098
5002  4907    83  5098  5099
5003  4908  4907  5099  5100
5004  5099  5098  4997  5101
5005  5100  5099  5101  5102
5006  4996  4950  5104  5105
5007  1962  4996  5105  5049
5008  5105  5104  5103  5106
5009  5049  5105  5106  5047
5010     1  1009  2719     2
START GROUP DEFINITION
_SIDEW24 1 TO 369 944 TO 966 994 TO 1016 1044 TO 1066 1094 TO 1116 -
1144 TO 1166 1194 TO 1216 1244 TO 1266 1294 TO 1316 1344 TO 1366 -
1763 TO 1785 1813 TO 1835 1863 TO 1885 1913 TO 1935 1963 TO 1985 -
```

2013 TO 2035 2063 TO 2085 2113 TO 2135 2163 TO 2185
_SIDEW16 967 TO 993 1017 TO 1043 1067 TO 1093 1117 TO 1143 -
1167 TO 1193 1786 TO 1812 1836 TO 1862 1886 TO 1912 1936 TO 1962 -
1986 TO 2012
_SDEW1224 370 TO 943 1394 TO 1416 1445 TO 1661 1747 TO 1755 -
2213 TO 2235 2263 TO 2479 2564 TO 2572
_SDEW1216 1217 TO 1243 1267 TO 1293 1317 TO 1343 1367 TO 1393 -
1417 TO 1443 1662 TO 1745 1756 TO 1762 2036 TO 2062 2086 TO 2112 -
2136 TO 2162 2186 TO 2212 2236 TO 2262 2480 TO 2563 2573 TO 2579
_SLAB24 2581 TO 3079 3105 TO 3120 3146 TO 3161 3187 TO 3202 -
3228 TO 3243 3269 TO 3284 3310 TO 3325 3351 TO 3366 3392 TO 3407 -
3433 TO 3448 3474 TO 3489 3515 TO 3530 3556 TO 3571 3597 TO 3612 -
3638 TO 3645 4630 TO 5010
_SLAB15 3080 TO 3104 3121 TO 3145 3162 TO 3186 3203 TO 3227 -
3244 TO 3268 3285 TO 3309 3326 TO 3350 3367 TO 3391 3408 TO 3432 -
3449 TO 3473 3490 TO 3514 3531 TO 3555 3572 TO 3596 3613 TO 3637 -
3646 TO 4629
END
ELEMENT PROPERTY
_SIDEW24 THICKNESS 2.
_SIDEW16 THICKNESS 1.33
_SDEW1224 THICKNESS 1.
_SDEW1216 THICKNESS 1.
_SLAB24 THICKNESS 2.
_SLAB15 THICKNESS 1.25
CONSTANT
E 2.592E5 ALL
DENSITY CONCRETE ALL
POISSON CONCRETE ALL
SUPPORT
1 2 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 -
51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 1009 1011 1013 -
1015 1017 1019 1021 1023 1025 1027 1029 1031 1033 1035 1037 1039 1041 -
1043 1045 1047 1049 1051 1053 1055 1057 1059 1061 1063 1065 1067 1069 -
1071 1073 1075 1077 1079 1081 1083 1085 1087 1089 1091 1093 1095 1097 -
1099 1101 1103 1105 1107 1864 1866 1868 1870 1872 1874 1876 1878 1880 -
1882 1884 1886 1888 1890 1892 1894 1896 1898 1900 1902 1904 1906 1908 -
1910 1912 1914 1916 1918 1920 1922 1924 1926 1928 1930 1932 1934 1936 -
1938 1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 -
2719 TO 4720 4723 4725 4727 4729 4731 4733 4735 4737 4739 4741 4743 -
4745 4747 4749 4751 4753 4755 4757 4759 4761 4763 4765 4767 4769 4771 -
4773 4775 4777 4779 4781 4783 4785 4787 4789 4791 4793 4795 4797 4799 -
4801 4803 4805 4807 4809 4811 4813 4815 4817 4819 4821 4825 4827 4829 -
4831 4833 4835 4837 4839 4841 4843 4845 4847 4849 4851 4853 4855 4857 -
4859 4861 4863 4865 4867 4869 4871 4873 4875 4877 4879 4881 4883 4885 -
4887 4889 4891 4893 4895 4897 4899 4901 4903 4905 4907 4953 -
4955 TO 4996 5048 TO 5099 5105 FIXED BUT MX MZ KFY 690.
4721 4722 4724 4726 4728 4730 4732 4734 4736 4738 4740 4742 4744 4746 -
4748 4750 4752 4754 4756 4758 4760 4762 4764 4766 4768 4770 4772 4774 -
4776 4778 4780 4782 4784 4786 4788 4790 4792 4794 4796 4798 4800 4802 -
4804 4806 4808 4810 4812 4814 4816 4818 4820 4822 4823 4826 4828 4830 -
4832 4834 4836 4838 4840 4842 4844 4846 4848 4850 4852 4854 4856 4858 -
4860 4862 4864 4866 4868 4870 4872 4874 4876 4878 4880 4882 4884 4886 -
4888 4890 4892 4894 4896 4898 4900 4902 4904 4906 4908 TO 4951 4954 -

4997 TO 5047 5100 5101 5104 5106 FIXED BUT MX MZ KFY 345.
4824 4952 5102 5103 FIXED BUT MX MZ KFY 173.
LOAD 1 WEIGHT OF STRUCTURE
SELFWEIGHT Y -1.
LOAD 2 SURCHARGE
ELEMENT LOAD
42 TO 943 PR GZ .075
994 TO 1443 1445 TO 1745 1747 TO 1762 PR GX .075
1813 TO 2579 PR GX -.075
LOAD 3 LATERAL EARTH
ELEMENT LOAD
42 TO 82 TRAP Y .77 .735
83 TO 123 TRAP Y .735 .7
124 TO 164 TRAP Y .7 .665
165 TO 205 TRAP Y .665 .63
206 TO 246 TRAP Y .63 .595
247 TO 287 TRAP Y .595 .56
288 TO 328 TRAP Y .56 .525
329 TO 369 TRAP Y .525 .49
370 TO 410 TRAP Y .49 .455
411 TO 451 TRAP Y .455 .42
452 TO 492 TRAP Y .42 .385
493 TO 533 TRAP Y .385 .35
534 TO 574 TRAP Y .35 .315
575 TO 615 TRAP Y .315 .28
616 TO 656 TRAP Y .28 .245
657 TO 697 TRAP Y .245 .21
698 TO 738 TRAP Y .21 .175
739 TO 779 TRAP Y .175 .14
780 TO 820 TRAP Y .14 .105
821 TO 861 TRAP Y .105 .07
862 TO 902 TRAP Y .07 .035
903 TO 943 TRAP Y .035 0.
994 TO 997 TRAP Y -.735 -.7
1044 TO 1047 TRAP Y -.7 -.665
1094 TO 1097 TRAP Y -.665 -.63
1144 TO 1147 TRAP Y -.63 -.595
1194 TO 1197 TRAP Y -.595 -.56
1244 TO 1247 TRAP Y -.56 -.525
1294 TO 1297 TRAP Y -.525 -.49
1344 TO 1347 TRAP Y -.49 -.455
1394 TO 1397 TRAP Y -.455 -.42
1445 1457 1468 1469 TRAP Y -.42 -.385
1446 1458 1470 1471 TRAP Y -.385 -.35
1447 1459 1472 1473 TRAP Y -.35 -.315
1448 1460 1474 1475 TRAP Y -.315 -.28
1449 1461 1476 1477 TRAP Y -.28 -.245
1450 1462 1478 1479 TRAP Y -.245 -.21
1451 1463 1480 1481 TRAP Y -.21 -.175
1452 1464 1482 1483 TRAP Y -.175 -.14
1453 1465 1484 1485 TRAP Y -.14 -.105
1454 1466 1486 1487 TRAP Y -.105 -.07
1455 1467 1488 1489 TRAP Y -.07 -.035
1456 1490 1491 1525 TRAP Y -.035 0.

998 TO 1001 TRAP Y -.7 -.665
1048 TO 1051 TRAP Y -.665 -.63
1098 TO 1101 TRAP Y -.63 -.595
1148 TO 1151 TRAP Y -.595 -.56
1198 TO 1201 TRAP Y -.56 -.525
1248 TO 1251 TRAP Y -.525 -.49
1298 TO 1301 TRAP Y -.49 -.455
1348 TO 1351 TRAP Y -.455 -.42
1398 TO 1401 TRAP Y -.42 -.385
1492 1493 1514 1526 TRAP Y -.385 -.35
1494 1495 1515 1528 TRAP Y -.35 -.315
1496 1497 1516 1530 TRAP Y -.315 -.28
1498 1499 1517 1532 TRAP Y -.28 -.245
1500 1501 1518 1534 TRAP Y -.245 -.21
1502 1503 1519 1536 TRAP Y -.21 -.175
1504 1505 1520 1538 TRAP Y -.175 -.14
1506 1507 1521 1540 TRAP Y -.14 -.105
1508 1509 1522 1542 TRAP Y -.105 -.07
1510 1511 1523 1544 TRAP Y -.07 -.035
1512 1513 1524 1747 TRAP Y -.035 0.
1002 TO 1005 TRAP Y -.665 -.63
1052 TO 1055 TRAP Y -.63 -.595
1102 TO 1105 TRAP Y -.595 -.56
1152 TO 1155 TRAP Y -.56 -.525
1202 TO 1205 TRAP Y -.525 -.49
1252 TO 1255 TRAP Y -.49 -.455
1302 TO 1305 TRAP Y -.455 -.42
1352 TO 1355 TRAP Y -.42 -.385
1402 TO 1405 TRAP Y -.385 -.35
1527 1546 1556 1566 TRAP Y -.35 -.315
1529 1547 1557 1569 TRAP Y -.315 -.28
1531 1548 1558 1572 TRAP Y -.28 -.245
1533 1549 1559 1575 TRAP Y -.245 -.21
1535 1550 1560 1578 TRAP Y -.21 -.175
1537 1551 1561 1581 TRAP Y -.175 -.14
1539 1552 1562 1584 TRAP Y -.14 -.105
1541 1553 1563 1587 TRAP Y -.105 -.07
1543 1554 1564 1590 TRAP Y -.07 -.035
1545 1555 1565 1748 TRAP Y -.035 0.
1006 TO 1009 TRAP Y -.63 -.595
1056 TO 1059 TRAP Y -.595 -.56
1106 TO 1109 TRAP Y -.56 -.525
1156 TO 1159 TRAP Y -.525 -.49
1206 TO 1209 TRAP Y -.49 -.455
1256 TO 1259 TRAP Y -.455 -.42
1306 TO 1309 TRAP Y -.42 -.385
1356 TO 1359 TRAP Y -.385 -.35
1406 TO 1409 TRAP Y -.35 -.315
1567 1568 1593 1602 TRAP Y -.315 -.28
1570 1571 1594 1606 TRAP Y -.28 -.245
1573 1574 1595 1610 TRAP Y -.245 -.21
1576 1577 1596 1614 TRAP Y -.21 -.175
1579 1580 1597 1618 TRAP Y -.175 -.14
1582 1583 1598 1622 TRAP Y -.14 -.105

1585 1586 1599 1626 TRAP Y -.105 -.07
1588 1589 1600 1630 TRAP Y -.07 -.035
1591 1592 1601 1749 TRAP Y -.035 0.
1010 TO 1012 TRAP Y -.595 -.56
1060 TO 1062 TRAP Y -.56 -.525
1110 TO 1112 TRAP Y -.525 -.49
1160 TO 1162 TRAP Y -.49 -.455
1210 TO 1212 TRAP Y -.455 -.42
1260 TO 1262 TRAP Y -.42 -.385
1310 TO 1312 TRAP Y -.385 -.35
1360 TO 1362 TRAP Y -.35 -.315
1410 TO 1412 TRAP Y -.315 -.28
1603 TO 1605 TRAP Y -.28 -.245
1607 TO 1609 TRAP Y -.245 -.21
1611 TO 1613 TRAP Y -.21 -.175
1615 TO 1617 TRAP Y -.175 -.14
1619 TO 1621 TRAP Y -.14 -.105
1623 TO 1625 TRAP Y -.105 -.07
1627 TO 1629 TRAP Y -.07 -.035
1631 TO 1633 TRAP Y -.035 0.
1013 TO 1016 TRAP Y -.56 -.525
1063 TO 1066 TRAP Y -.525 -.49
1113 TO 1116 TRAP Y -.49 -.455
1163 TO 1166 TRAP Y -.455 -.42
1213 TO 1216 TRAP Y -.42 -.385
1263 TO 1266 TRAP Y -.385 -.35
1313 TO 1316 TRAP Y -.35 -.315
1363 TO 1366 TRAP Y -.315 -.28
1413 TO 1416 TRAP Y -.28 -.245
1634 TO 1637 TRAP Y -.245 -.21
1638 TO 1641 TRAP Y -.21 -.175
1642 TO 1645 TRAP Y -.175 -.14
1646 TO 1649 TRAP Y -.14 -.105
1650 TO 1653 TRAP Y -.105 -.07
1654 TO 1657 TRAP Y -.07 -.035
1658 TO 1661 TRAP Y -.035 0.
1017 TO 1020 TRAP Y -.525 -.49
1067 TO 1070 TRAP Y -.49 -.455
1117 TO 1120 TRAP Y -.455 -.42
1167 TO 1170 TRAP Y -.42 -.385
1217 TO 1220 TRAP Y -.385 -.35
1267 TO 1270 TRAP Y -.35 -.315
1317 TO 1320 TRAP Y -.315 -.28
1367 TO 1370 TRAP Y -.28 -.245
1417 TO 1420 TRAP Y -.245 -.21
1662 TO 1665 TRAP Y -.21 -.175
1666 TO 1669 TRAP Y -.175 -.14
1670 TO 1673 TRAP Y -.14 -.105
1674 TO 1677 TRAP Y -.105 -.07
1678 TO 1681 TRAP Y -.07 -.035
1682 TO 1685 TRAP Y -.035 0.
1021 TO 1024 TRAP Y -.49 -.455
1071 TO 1074 TRAP Y -.455 -.42
1121 TO 1124 TRAP Y -.42 -.385

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1171 TO 1174 TRAP Y -.385 -.35
1221 TO 1224 TRAP Y -.35 -.315
1271 TO 1274 TRAP Y -.315 -.28
1321 TO 1324 TRAP Y -.28 -.245
1371 TO 1374 TRAP Y -.245 -.21
1421 TO 1424 TRAP Y -.21 -.175
1686 TO 1689 TRAP Y -.175 -.14
1690 TO 1693 TRAP Y -.14 -.105
1694 TO 1697 TRAP Y -.105 -.07
1698 TO 1701 TRAP Y -.07 -.035
1702 TO 1705 TRAP Y -.035 0.
1025 TO 1028 TRAP Y -.455 -.42
1075 TO 1078 TRAP Y -.42 -.385
1125 TO 1128 TRAP Y -.385 -.35
1175 TO 1178 TRAP Y -.35 -.315
1225 TO 1228 TRAP Y -.315 -.28
1275 TO 1278 TRAP Y -.28 -.245
1325 TO 1328 TRAP Y -.245 -.21
1375 TO 1378 TRAP Y -.21 -.175
1425 TO 1428 TRAP Y -.175 -.14
1706 TO 1709 TRAP Y -.14 -.105
1710 TO 1713 TRAP Y -.105 -.07
1714 TO 1717 TRAP Y -.07 -.035
1718 TO 1721 TRAP Y -.035 0.
1029 TO 1032 TRAP Y -.42 -.385
1079 TO 1082 TRAP Y -.385 -.35
1129 TO 1132 TRAP Y -.35 -.315
1179 TO 1182 TRAP Y -.315 -.28
1229 TO 1232 TRAP Y -.28 -.245
1279 TO 1282 TRAP Y -.245 -.21
1329 TO 1332 TRAP Y -.21 -.175
1379 TO 1382 TRAP Y -.175 -.14
1429 TO 1432 TRAP Y -.14 -.105
1722 TO 1725 TRAP Y -.105 -.07
1726 TO 1729 TRAP Y -.07 -.035
1730 TO 1733 TRAP Y -.035 0.
1033 TO 1036 TRAP Y -.385 -.35
1083 TO 1086 TRAP Y -.35 -.315
1133 TO 1136 TRAP Y -.315 -.28
1183 TO 1186 TRAP Y -.28 -.245
1233 TO 1236 TRAP Y -.245 -.21
1283 TO 1286 TRAP Y -.21 -.175
1333 TO 1336 TRAP Y -.175 -.14
1383 TO 1386 TRAP Y -.14 -.105
1433 TO 1436 TRAP Y -.105 -.07
1734 TO 1737 TRAP Y -.07 -.035
1738 TO 1741 TRAP Y -.035 0.
1037 TO 1040 TRAP Y -.35 -.315
1087 TO 1090 TRAP Y -.315 -.28
1137 TO 1140 TRAP Y -.28 -.245
1187 TO 1190 TRAP Y -.245 -.21
1237 TO 1240 TRAP Y -.21 -.175
1287 TO 1290 TRAP Y -.175 -.14
1337 TO 1340 TRAP Y -.14 -.105
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1387 TO 1390 TRAP Y -.105 -.07
1437 TO 1440 TRAP Y -.07 -.035
1742 TO 1745 TRAP Y -.035 0.
1041 TO 1043 TRAP Y -.315 -.28
1091 TO 1093 TRAP Y -.28 -.245
1141 TO 1143 TRAP Y -.245 -.21
1191 TO 1193 TRAP Y -.21 -.175
1241 TO 1243 TRAP Y -.175 -.14
1291 TO 1293 TRAP Y -.14 -.105
1341 TO 1343 TRAP Y -.105 -.07
1391 TO 1393 TRAP Y -.07 -.035
1441 TO 1443 TRAP Y -.035 0.
1813 TO 1816 TRAP Y .735 .7
1863 TO 1866 TRAP Y .7 .665
1913 TO 1916 TRAP Y .665 .63
1963 TO 1966 TRAP Y .63 .595
2013 TO 2016 TRAP Y .595 .56
2063 TO 2066 TRAP Y .56 .525
2113 TO 2116 TRAP Y .525 .49
2163 TO 2166 TRAP Y .49 .455
2213 TO 2216 TRAP Y .455 .42
2263 2275 2286 2287 TRAP Y .42 .385
2264 2276 2288 2289 TRAP Y .385 .35
2265 2277 2290 2291 TRAP Y .35 .315
2266 2278 2292 2293 TRAP Y .315 .28
2267 2279 2294 2295 TRAP Y .28 .245
2268 2280 2296 2297 TRAP Y .245 .21
2269 2281 2298 2299 TRAP Y .21 .175
2270 2282 2300 2301 TRAP Y .175 .14
2271 2283 2302 2303 TRAP Y .14 .105
2272 2284 2304 2305 TRAP Y .105 .07
2273 2285 2306 2307 TRAP Y .07 .035
2274 2308 2309 2343 TRAP Y .035 0.
1817 TO 1820 TRAP Y .7 .665
1867 TO 1870 TRAP Y .665 .63
1917 TO 1920 TRAP Y .63 .595
1967 TO 1970 TRAP Y .595 .56
2017 TO 2020 TRAP Y .56 .525
2067 TO 2070 TRAP Y .525 .49
2117 TO 2120 TRAP Y .49 .455
2167 TO 2170 TRAP Y .455 .42
2217 TO 2220 TRAP Y .42 .385
2310 2311 2332 2344 TRAP Y .385 .35
2312 2313 2333 2346 TRAP Y .35 .315
2314 2315 2334 2348 TRAP Y .315 .28
2316 2317 2335 2350 TRAP Y .28 .245
2318 2319 2336 2352 TRAP Y .245 .21
2320 2321 2337 2354 TRAP Y .21 .175
2322 2323 2338 2356 TRAP Y .175 .14
2324 2325 2339 2358 TRAP Y .14 .105
2326 2327 2340 2360 TRAP Y .105 .07
2328 2329 2341 2362 TRAP Y .07 .035
2330 2331 2342 2564 TRAP Y .035 0.
1821 TO 1824 TRAP Y .665 .63
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1871 TO 1874 TRAP Y .63 .595
1921 TO 1924 TRAP Y .595 .56
1971 TO 1974 TRAP Y .56 .525
2021 TO 2024 TRAP Y .525 .49
2071 TO 2074 TRAP Y .49 .455
2121 TO 2124 TRAP Y .455 .42
2171 TO 2174 TRAP Y .42 .385
2221 TO 2224 TRAP Y .385 .35
2345 2364 2374 2384 TRAP Y .35 .315
2347 2365 2375 2387 TRAP Y .315 .28
2349 2366 2376 2390 TRAP Y .28 .245
2351 2367 2377 2393 TRAP Y .245 .21
2353 2368 2378 2396 TRAP Y .21 .175
2355 2369 2379 2399 TRAP Y .175 .14
2357 2370 2380 2402 TRAP Y .14 .105
2359 2371 2381 2405 TRAP Y .105 .07
2361 2372 2382 2408 TRAP Y .07 .035
2363 2373 2383 2565 TRAP Y .035 0.
1825 TO 1828 TRAP Y .63 .595
1875 TO 1878 TRAP Y .595 .56
1925 TO 1928 TRAP Y .56 .525
1975 TO 1978 TRAP Y .525 .49
2025 TO 2028 TRAP Y .49 .455
2075 TO 2078 TRAP Y .455 .42
2125 TO 2128 TRAP Y .42 .385
2175 TO 2178 TRAP Y .385 .35
2225 TO 2228 TRAP Y .35 .315
2385 2386 2411 2420 TRAP Y .315 .28
2388 2389 2412 2424 TRAP Y .28 .245
2391 2392 2413 2428 TRAP Y .245 .21
2394 2395 2414 2432 TRAP Y .21 .175
2397 2398 2415 2436 TRAP Y .175 .14
2400 2401 2416 2440 TRAP Y .14 .105
2403 2404 2417 2444 TRAP Y .105 .07
2406 2407 2418 2448 TRAP Y .07 .035
2409 2410 2419 2566 TRAP Y .035 0.
1829 TO 1831 TRAP Y .595 .56
1879 TO 1881 TRAP Y .56 .525
1929 TO 1931 TRAP Y .525 .49
1979 TO 1981 TRAP Y .49 .455
2029 TO 2031 TRAP Y .455 .42
2079 TO 2081 TRAP Y .42 .385
2129 TO 2131 TRAP Y .385 .35
2179 TO 2181 TRAP Y .35 .315
2229 TO 2231 TRAP Y .315 .28
2421 TO 2423 TRAP Y .28 .245
2425 TO 2427 TRAP Y .245 .21
2429 TO 2431 TRAP Y .21 .175
2433 TO 2435 TRAP Y .175 .14
2437 TO 2439 TRAP Y .14 .105
2441 TO 2443 TRAP Y .105 .07
2445 TO 2447 TRAP Y .07 .035
2449 TO 2451 TRAP Y .035 0.
1832 TO 1835 TRAP Y .56 .525

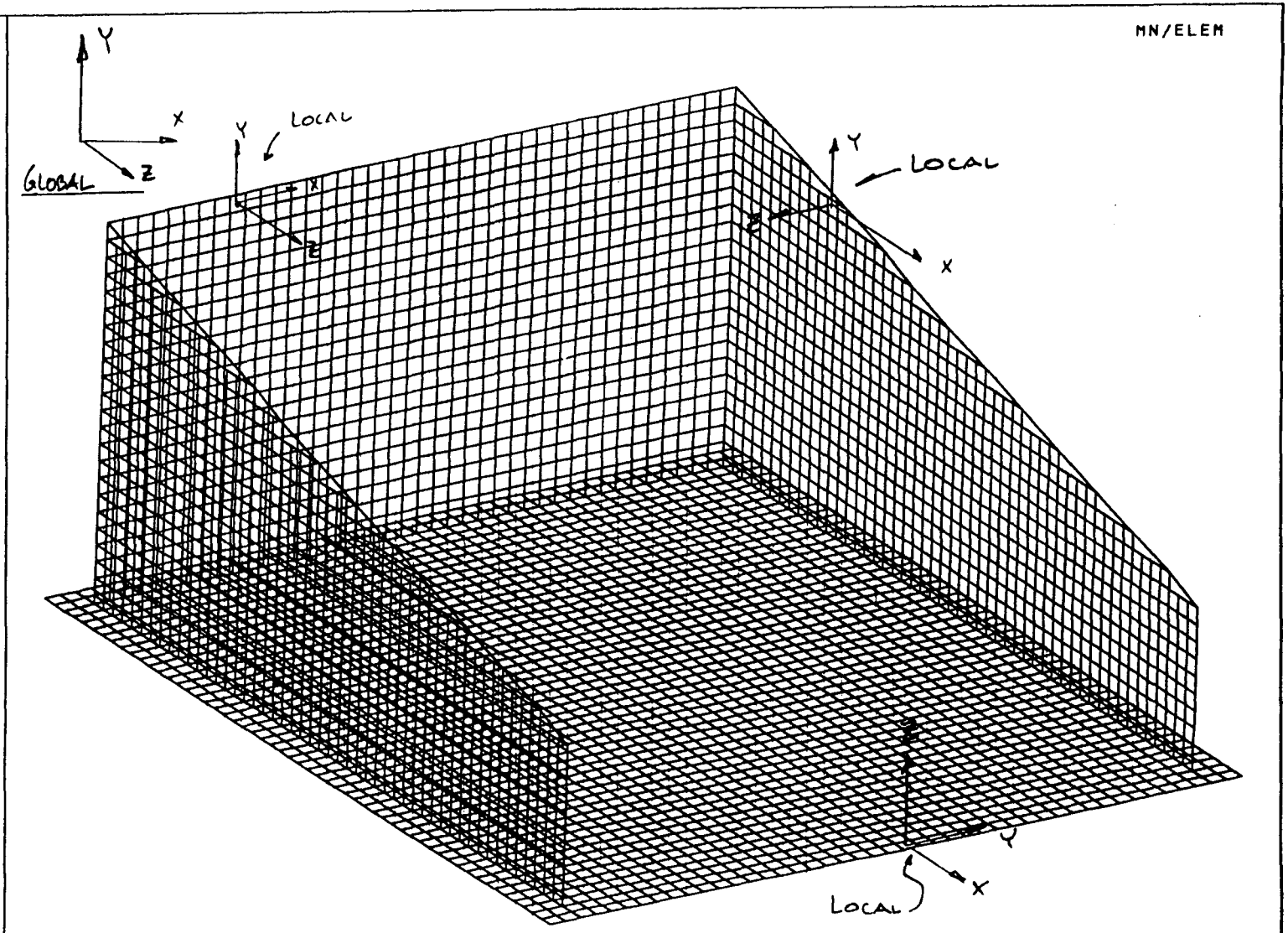
1882 TO 1885 TRAP Y .525 .49
1932 TO 1935 TRAP Y .49 .455
1982 TO 1985 TRAP Y .455 .42
2032 TO 2035 TRAP Y .42 .385
2082 TO 2085 TRAP Y .385 .35
2132 TO 2135 TRAP Y .35 .315
2182 TO 2185 TRAP Y .315 .28
2232 TO 2235 TRAP Y .28 .245
2452 TO 2455 TRAP Y .245 .21
2456 TO 2459 TRAP Y .21 .175
2460 TO 2463 TRAP Y .175 .14
2464 TO 2467 TRAP Y .14 .105
2468 TO 2471 TRAP Y .105 .07
2472 TO 2475 TRAP Y .07 .035
2476 TO 2479 TRAP Y .035 0.
1836 TO 1839 TRAP Y .525 .49
1886 TO 1889 TRAP Y .49 .455
1936 TO 1939 TRAP Y .455 .42
1986 TO 1989 TRAP Y .42 .385
2036 TO 2039 TRAP Y .385 .35
2086 TO 2089 TRAP Y .35 .315
2136 TO 2139 TRAP Y .315 .28
2186 TO 2189 TRAP Y .28 .245
2236 TO 2239 TRAP Y .245 .21
2480 TO 2483 TRAP Y .21 .175
2484 TO 2487 TRAP Y .175 .14
2488 TO 2491 TRAP Y .14 .105
2492 TO 2495 TRAP Y .105 .07
2496 TO 2499 TRAP Y .07 .035
2500 TO 2503 TRAP Y .035 0.
1840 TO 1843 TRAP Y .49 .455
1890 TO 1893 TRAP Y .455 .42
1940 TO 1943 TRAP Y .42 .385
1990 TO 1993 TRAP Y .385 .35
2040 TO 2043 TRAP Y .35 .315
2090 TO 2093 TRAP Y .315 .28
2140 TO 2143 TRAP Y .28 .245
2190 TO 2193 TRAP Y .245 .21
2240 TO 2243 TRAP Y .21 .175
2504 TO 2507 TRAP Y .175 .14
2508 TO 2511 TRAP Y .14 .105
2512 TO 2515 TRAP Y .105 .07
2516 TO 2519 TRAP Y .07 .035
2520 TO 2523 TRAP Y .035 0.
1844 TO 1847 TRAP Y .455 .42
1894 TO 1897 TRAP Y .42 .385
1944 TO 1947 TRAP Y .385 .35
1994 TO 1997 TRAP Y .35 .315
2044 TO 2047 TRAP Y .315 .28
2094 TO 2097 TRAP Y .28 .245
2144 TO 2147 TRAP Y .245 .21
2194 TO 2197 TRAP Y .21 .175
2244 TO 2247 TRAP Y .175 .14
2524 TO 2527 TRAP Y .14 .105

2528 TO 2531 TRAP Y .105 .07
2532 TO 2535 TRAP Y .07 .035
2536 TO 2539 TRAP Y .035 0.
1848 TO 1851 TRAP Y .42 .385
1898 TO 1901 TRAP Y .385 .35
1948 TO 1951 TRAP Y .35 .315
1998 TO 2001 TRAP Y .315 .28
2048 TO 2051 TRAP Y .28 .245
2098 TO 2101 TRAP Y .245 .21
2148 TO 2151 TRAP Y .21 .175
2198 TO 2201 TRAP Y .175 .14
2248 TO 2251 TRAP Y .14 .105
2540 TO 2543 TRAP Y .105 .07
2544 TO 2547 TRAP Y .07 .035
2548 TO 2551 TRAP Y .035 0.
1852 TO 1855 TRAP Y .385 .35
1902 TO 1905 TRAP Y .35 .315
1952 TO 1955 TRAP Y .315 .28
2002 TO 2005 TRAP Y .28 .245
2052 TO 2055 TRAP Y .245 .21
2102 TO 2105 TRAP Y .21 .175
2152 TO 2155 TRAP Y .175 .14
2202 TO 2205 TRAP Y .14 .105
2252 TO 2255 TRAP Y .105 .07
2552 TO 2555 TRAP Y .07 .035
2556 TO 2559 TRAP Y .035 0.
1856 TO 1859 TRAP Y .35 .315
1906 TO 1909 TRAP Y .315 .28
1956 TO 1959 TRAP Y .28 .245
2006 TO 2009 TRAP Y .245 .21
2056 TO 2059 TRAP Y .21 .175
2106 TO 2109 TRAP Y .175 .14
2156 TO 2159 TRAP Y .14 .105
2206 TO 2209 TRAP Y .105 .07
2256 TO 2259 TRAP Y .07 .035
2560 TO 2563 TRAP Y .035 0.
1860 TO 1862 TRAP Y .315 .28
1910 TO 1912 TRAP Y .28 .245
1960 TO 1962 TRAP Y .245 .21
2010 TO 2012 TRAP Y .21 .175
2060 TO 2062 TRAP Y .175 .14
2110 TO 2112 TRAP Y .14 .105
2160 TO 2162 TRAP Y .105 .07
2210 TO 2212 TRAP Y .07 .035
2260 TO 2262 TRAP Y .035 0.
LOAD 4 STRUCTURE FULL
ELEMENT LOAD
42 TO 82 TRAP Y -.77 -.706
83 TO 123 TRAP Y -.706 -.642
124 TO 164 TRAP Y -.642 -.577
165 TO 205 TRAP Y -.577 -.513
206 TO 246 TRAP Y -.513 -.449
247 TO 287 TRAP Y -.449 -.385
288 TO 328 TRAP Y -.385 -.321

```
329 TO 369 TRAP Y -.321 -.257
370 TO 410 TRAP Y -.257 -.192
411 TO 451 TRAP Y -.192 -.128
452 TO 492 TRAP Y -.128 -.064
493 TO 533 TRAP Y -.064 0.
994 TO 1043 TRAP Y .624 .555
1044 TO 1093 TRAP Y .555 .485
1094 TO 1143 TRAP Y .485 .416
1144 TO 1193 TRAP Y .416 .347
1194 TO 1243 TRAP Y .347 .277
1244 TO 1293 TRAP Y .277 .208
1294 TO 1343 TRAP Y .208 .139
1344 TO 1393 TRAP Y .139 .069
1394 TO 1443 TRAP Y .069 0.
1813 TO 1862 TRAP Y -.624 -.555
1863 TO 1912 TRAP Y -.555 -.485
1913 TO 1962 TRAP Y -.485 -.416
1963 TO 2012 TRAP Y -.416 -.347
2013 TO 2062 TRAP Y -.347 -.277
2063 TO 2112 TRAP Y -.277 -.208
2113 TO 2162 TRAP Y -.208 -.139
2163 TO 2212 TRAP Y -.139 -.069
2213 TO 2262 TRAP Y -.069 0.
2581 TO 4629 PR GY -.624
LOAD COMB 11 DL+SURCH+LAT. EARTH (FACT)
1 1.4 2 1.7 3 1.7
LOAD COMB 12 DL+LAT.EARTH+WATER (FACT.)
1 1.4 3 1.7 4 1.7
LOAD COMB 13 DL+SURCH+LAT. EARTH (UNFACT)
1 1. 1 3.
LOAD COMB 14 DL+LAT. EARTH+WATER (UNFACT)
1 1. 3 1. 4 1.
PERFORM ANALYSIS
PLOT DISPLACEMENT FILE
PLOT STRESS FILE
LOAD LIST 13 14
PRINT SUPPORT REACTIONS
PRINT JOINT DISPLACEMENTS LIST 967 969 TO 1008 2413 2494 2602 2630 -
2654 2674 2690 2702 2710 2714 TO 2717
PRINT JOINT DISPLACEMENTS LIST 968 1558 1639 1747 1775 1799 1819 1835 -
1847 1855 1859 1861 TO 1863
FINISH
```

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0



S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

HORIZONTAL MOMENT

MX CONTOUR + : TENSION I.F. MN/ELEM

STDR LOAD= 11

A -62.11
B -56.85
C -51.59
D -46.33
E -41.07
F -35.8
G -30.
I -20.
J -14.
K -9.5
L -4.2
M .99
N 6.25

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
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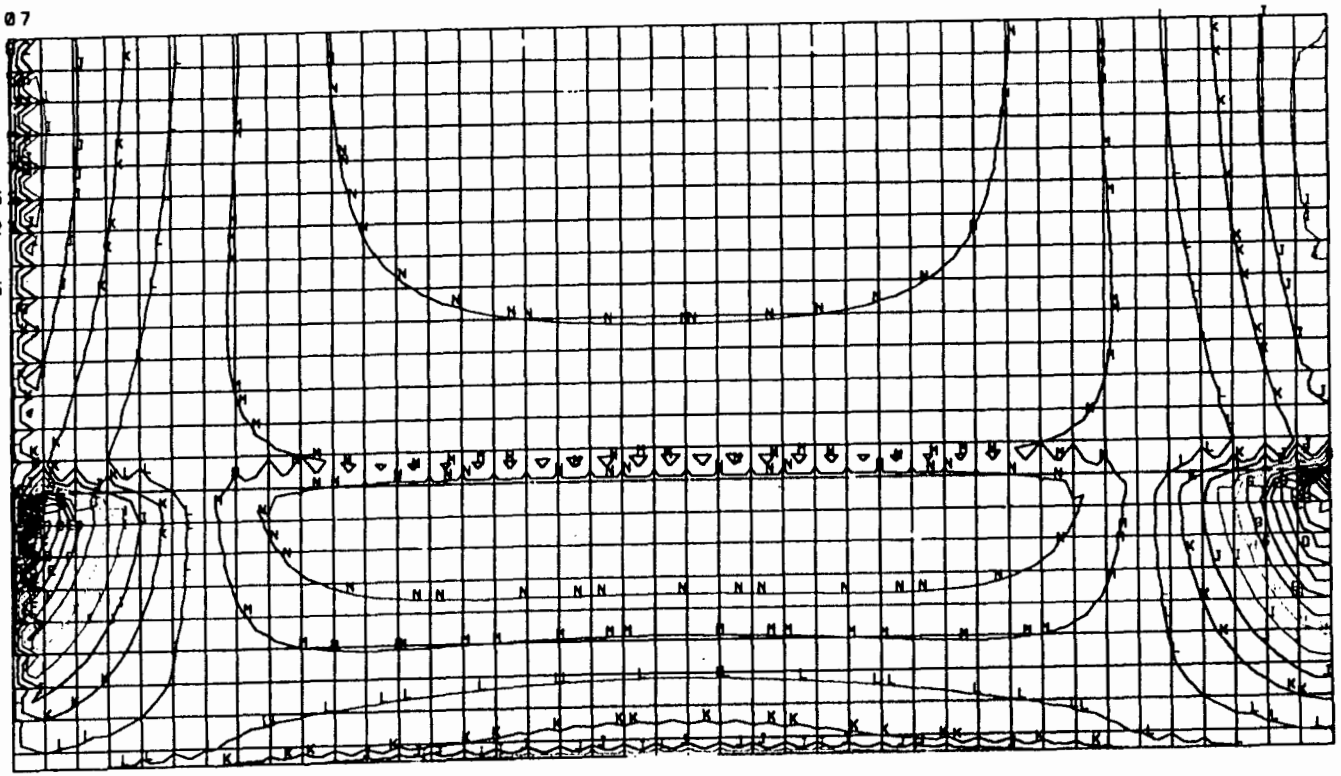
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0



BACK WALL

UNIT FEE KIP

J=5104,E=5007

S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

NERTICAL MOMENT

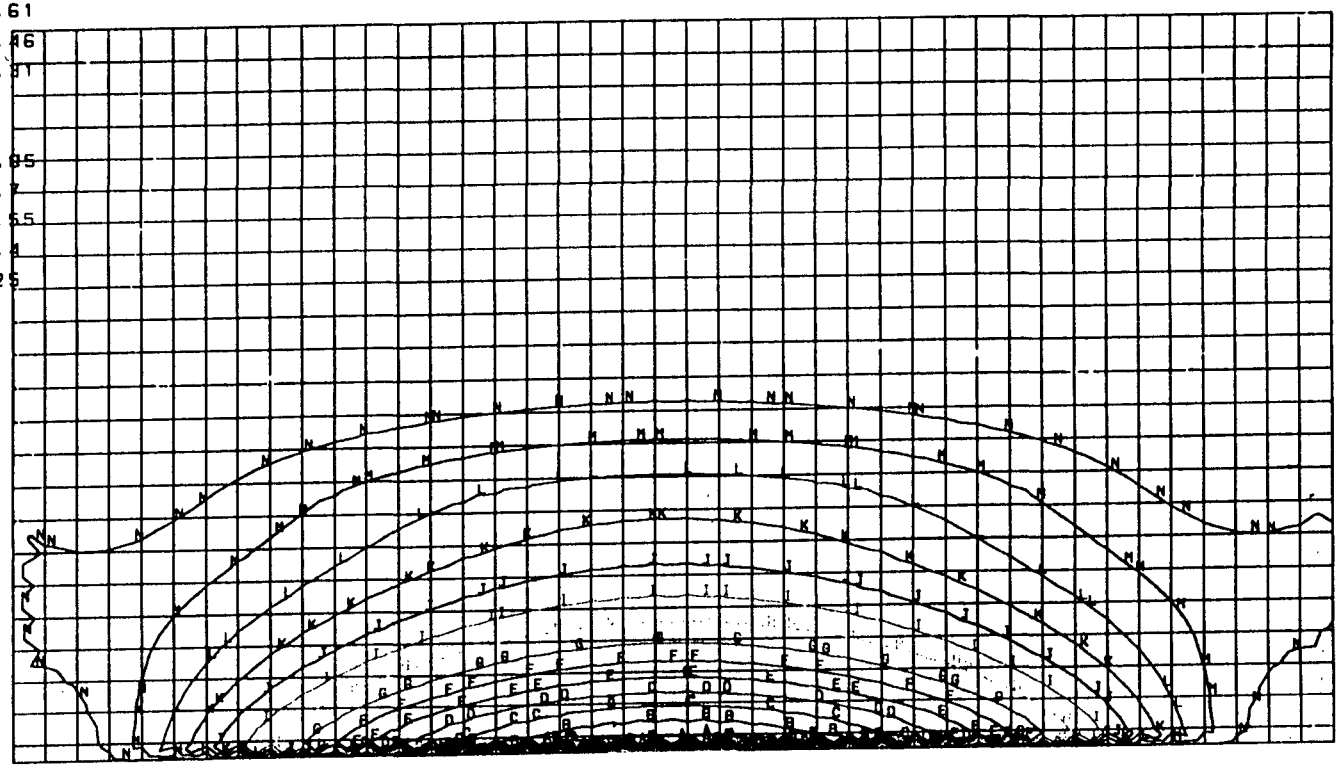
+ : TENSION I.F

MY CONTOUR

MN/ELEM

STDR LOAD= 11

A -73.21
B -68.06
C -62.91
D -57.76
E -52.61
F -47.46
G -42.31
H -37.16
J -26.85
K -21.7
L -16.55
M -11.4
N -6.25



BACK WALL

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 0
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0

J=5104,E=5007

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

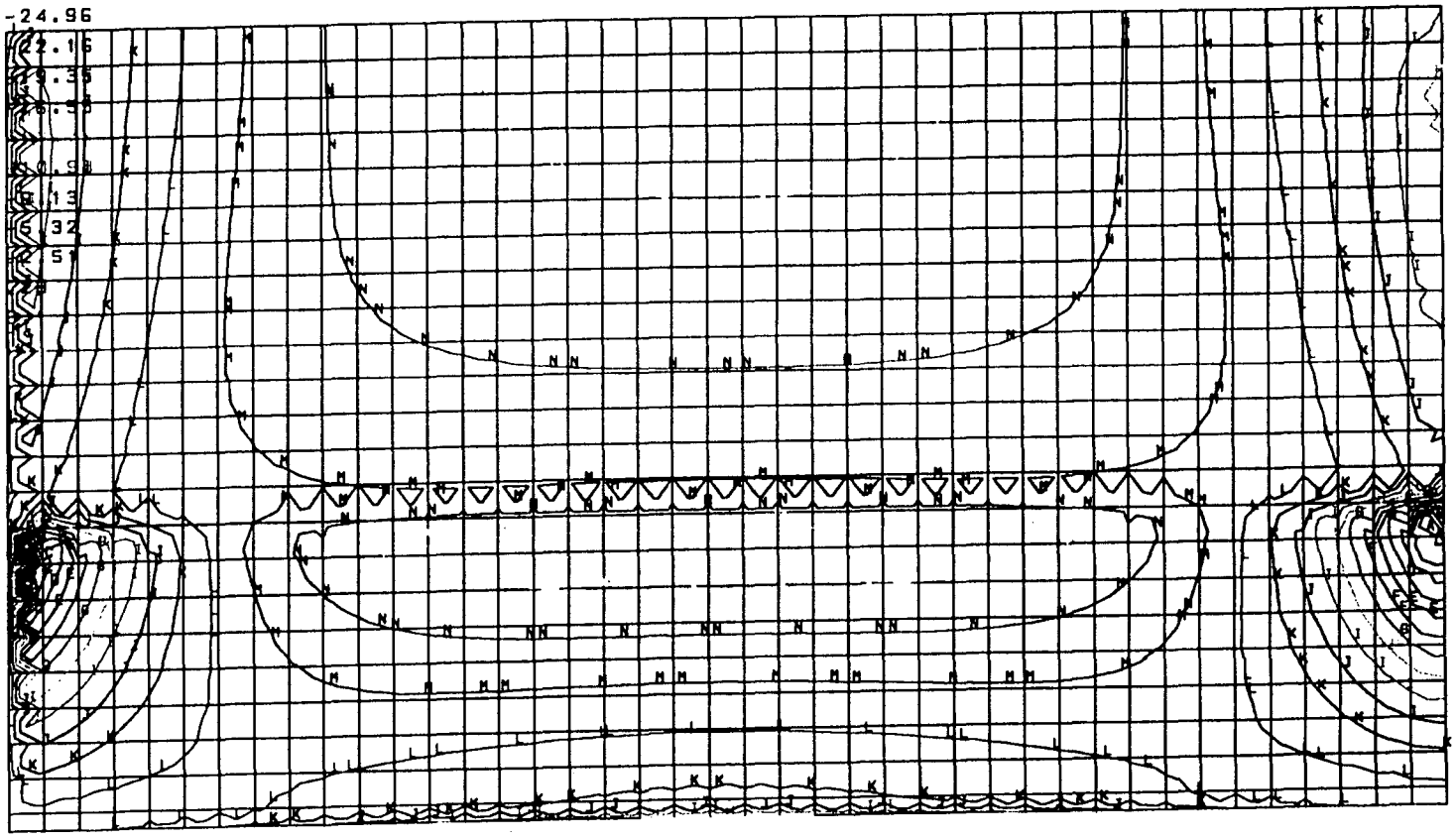
HORIZONTAL MOMENT

MX CONTOUR + : TENSION I.F.

MN/ELEM

STOR LOAD= 12

A -33.38
B -30.58
C -27.77
D -24.96
E -22.16
F -19.35
G -16.55
J -11.13
K -8.32
L -5.51
M
N



BACK WALL

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 0
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0

UNIT FEE KIP

J=5104,E=5007

S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

VERTICAL MOMENT

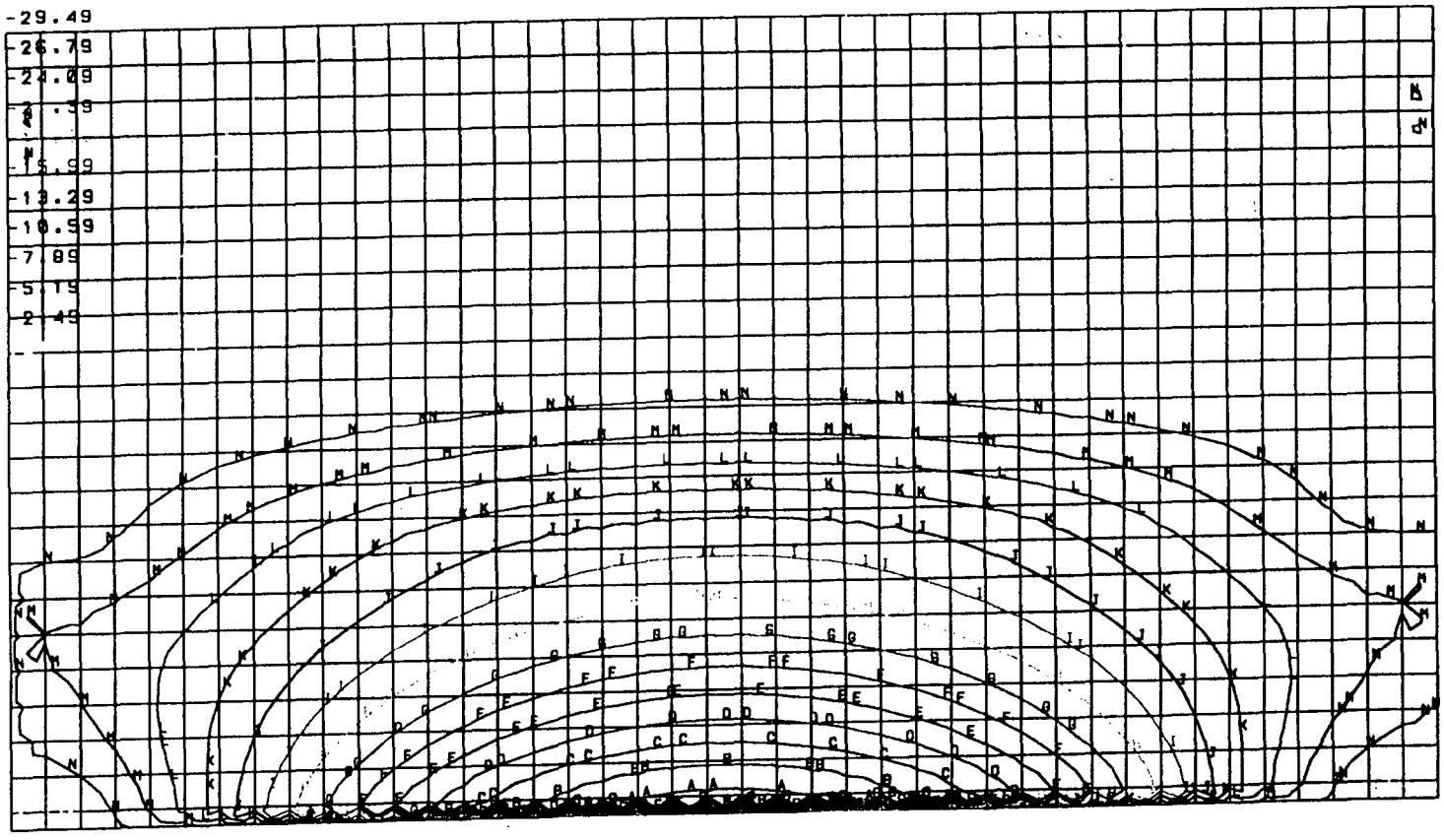
+= TENSION I.F.

MY CONTOUR

MN/ELEM

STDR LOAD= 12

A -37.6
B -34.9
C -32.19
D -29.49
E -26.79
F -24.09
G -21.39
I -15.99
J -13.29
K -10.59
L -7.89
M -5.19
N -2.49



STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0

BACK WALL

UNIT FEE KIP

J=5104,E=5007

STAAD POST-PLOT (REV: 22.0W)

DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

LONGITUDINAL MOMENT

+ = TENSION TOP

MN/ELEM

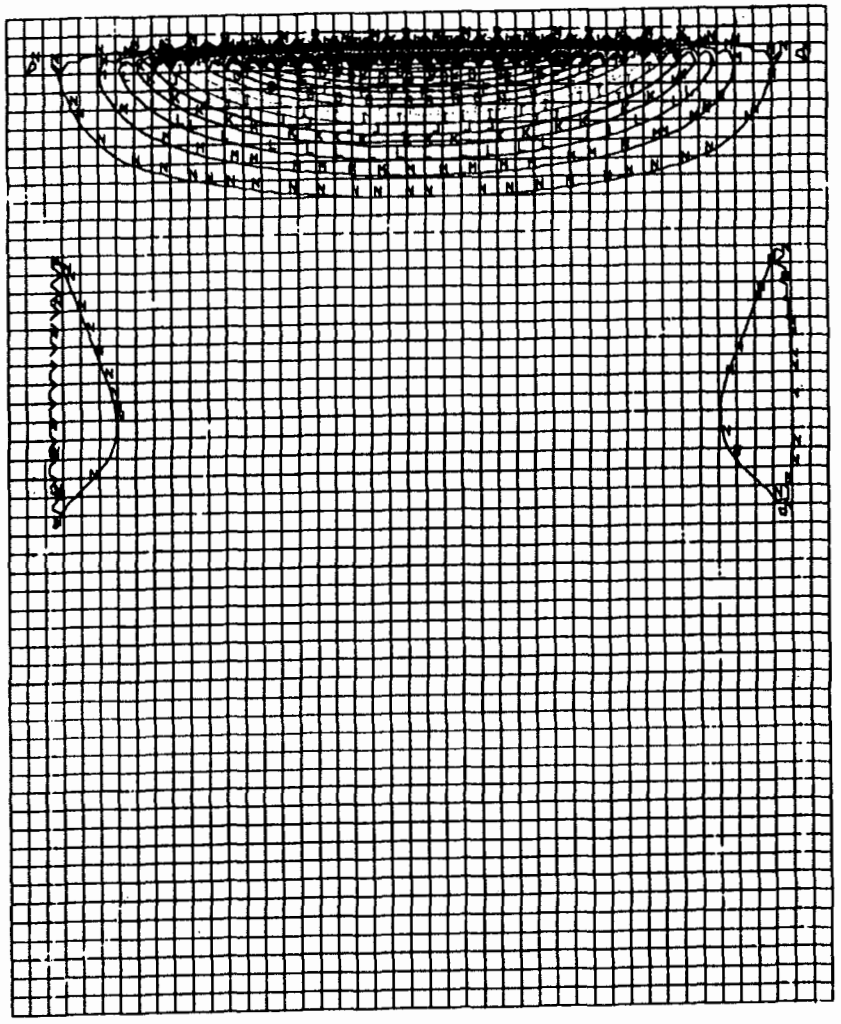
STDR LOAD= 11

MX CONTOUR

A -64.46
B -59.89
C -55.33
D -50.77
E -46.21
F -41.65
G -37.08
[illegible]
J -23.4
K -18.83
L -14.27
M -9.71
N -5.15

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0



BOTTOM SLAB

J=5104,E=5007

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

TRANSVERSE MOMENT

+ = TENSION TOP

MY CONTOUR

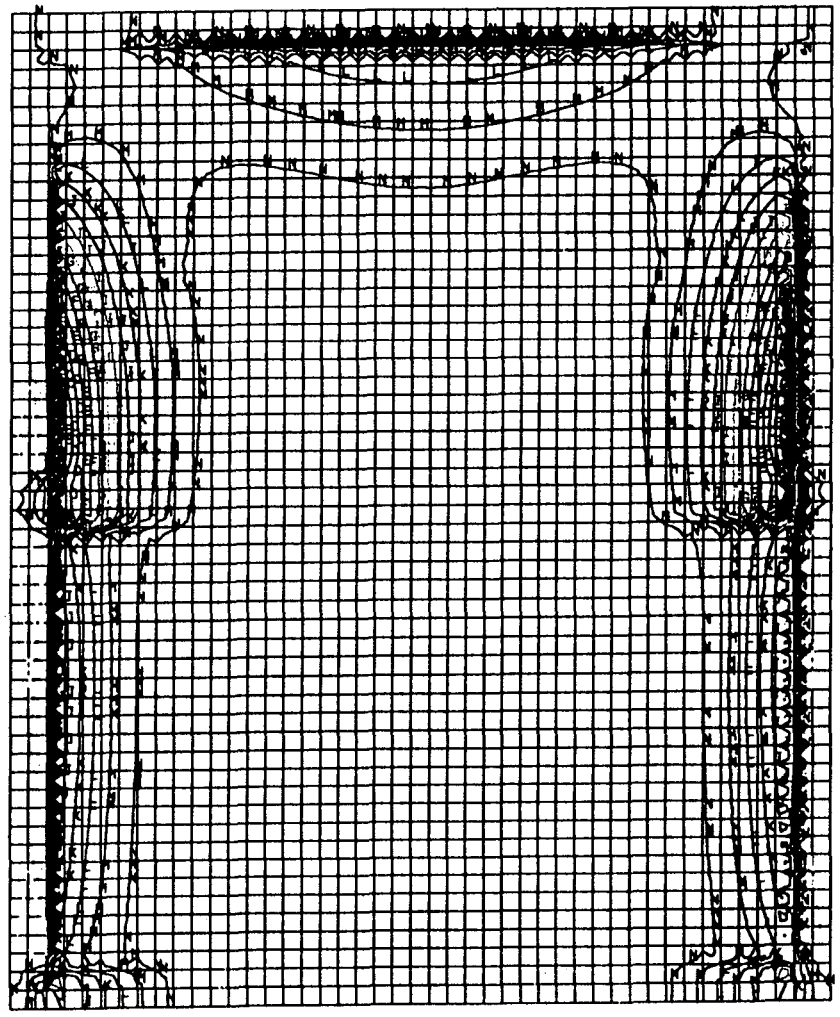
MN/ELEM

STOR LOAD= 11

A -50.37
B -46.66
C -42.94
D -39.23
E -35.52
F -31.81
G -28.1
I -20.68
J -16.97
K -13.26
L -9.55
M -5.84
N -2.13

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0



J=5104,E=5007

BOTTOM SLAB

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

LONGITUDINAL MOMENT

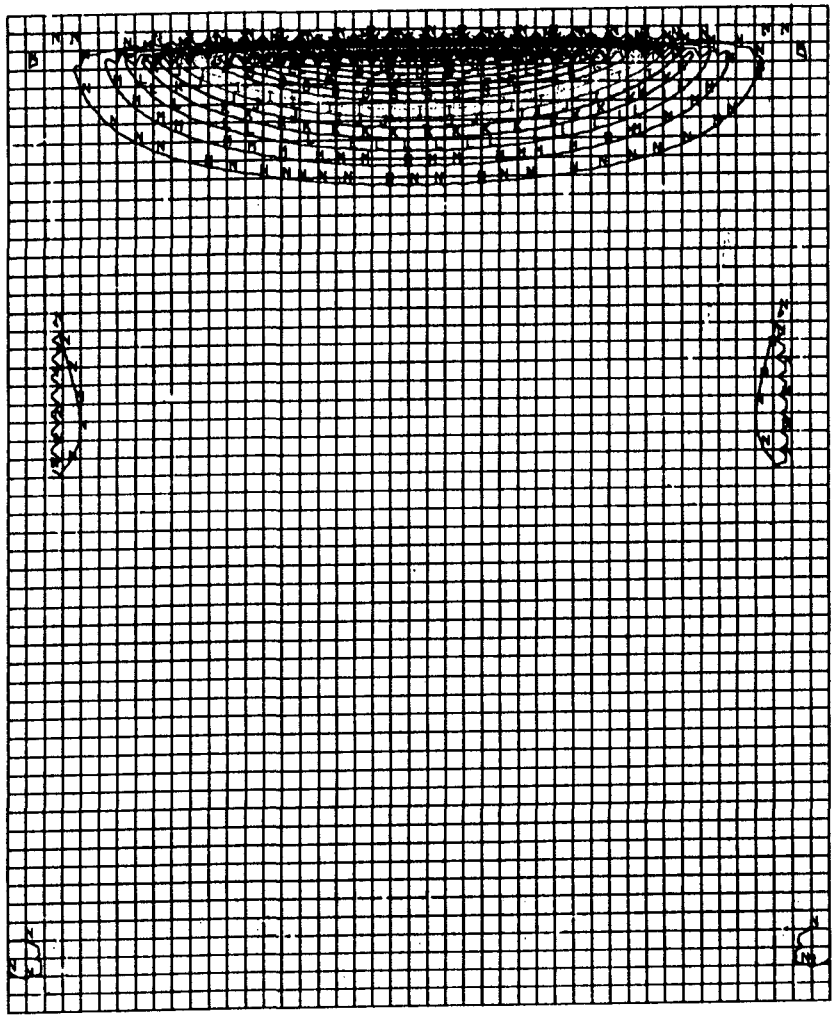
+ = TENSION TOP

MX CONTOUR

MN/ELEM

STDR LOAD= 12

A -34.52
B -32.14
C -29.75
D -27.37
E -24.98
F -22.6
G -20.22
I 15.45
J -13.07
K -10.68
L -8.3
M -5.91
N -3.53



STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 0
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0

J=5104,E=5007

BOTTOM SLAB

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

1H

TRANSVERSE MOMENT

+ = TENSION TOP

MY CONTOUR

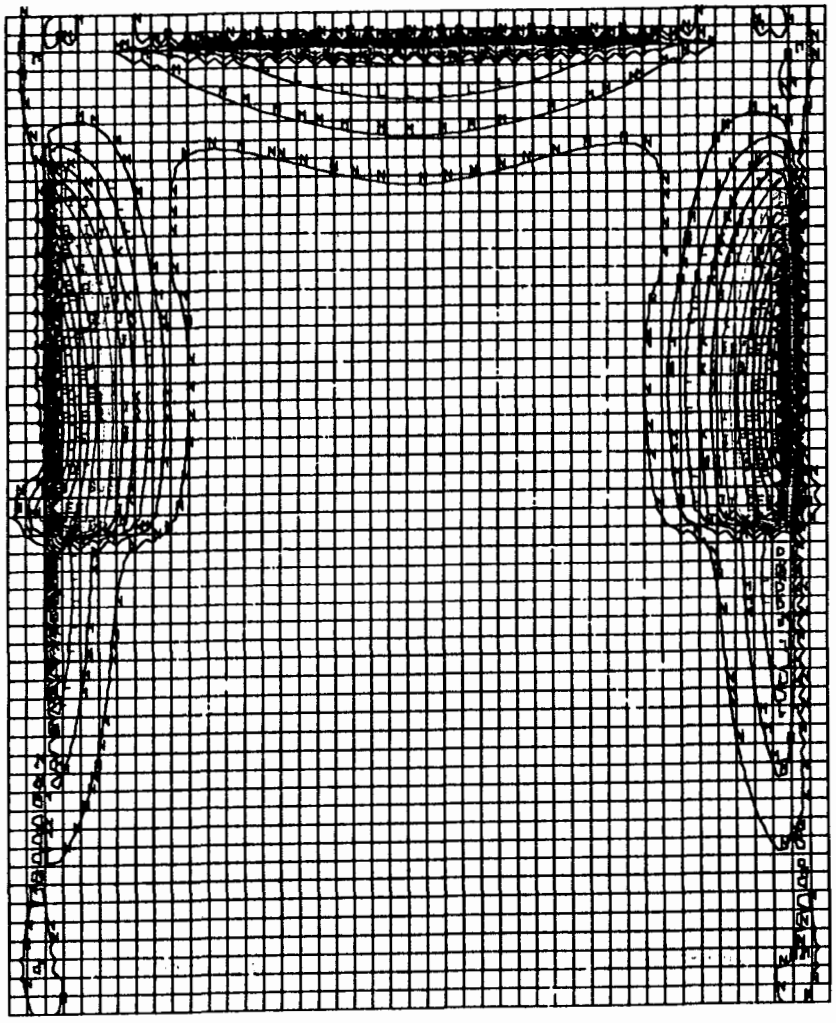
MN/ELEM

STOR LOAD= 12

A -22.1
B -20.49
C -18.88
D -17.26
E -15.65
F -14.04
G -12.42
H -9.2
J -7.58
K -5.97
L -4.36
M -2.74
N -1.13

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0



J=5104,E=5007

BOTTOM SLAB

UNIT FEE KIP

S T A A D P O S T - P L O T (REV: 22.0W)

DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

LONGITUDINAL MOMENT

+ , TENSION O.F.

MX CONTOUR

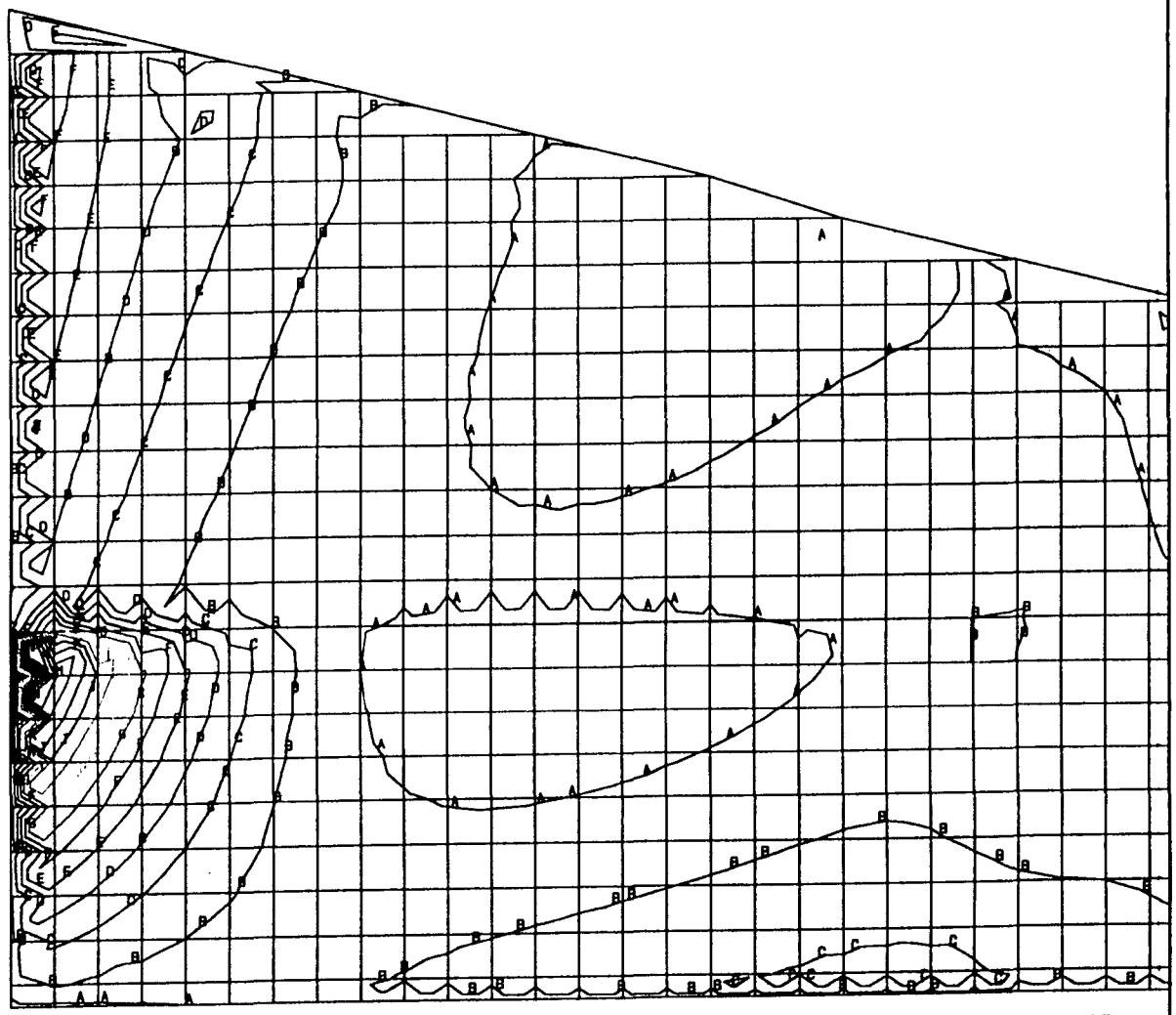
MN/ELEM

STDR LOAD= 11

A -1.64
B 3.15
C 7.95
D 12.75
E 17.54
F 22.34
G 27.13
H 32.72
J 41.52
K 46.31
L 51.11
M 55.9
N 60.7

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0



J=5104,E=5007

CORNER @ BACKWALL / SIDEWALL

UNIT FEE KIP

STAAD POST-PLOT (REV: 22.0W)

DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

LONGITUDINAL MOMENT

+ = TENSION O.F.

MX CONTOUR

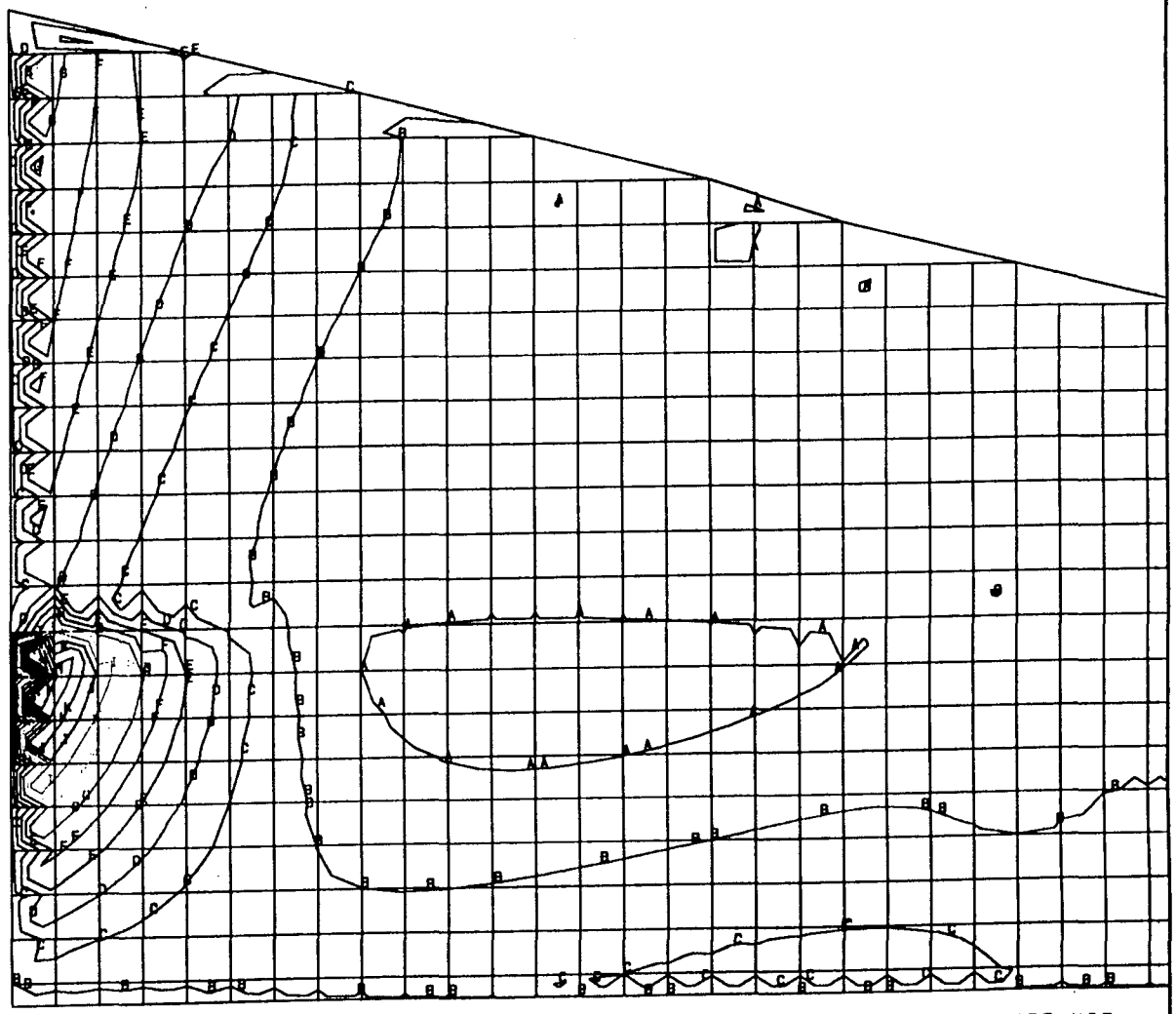
MN/ELEM

STDR LOAD= 12

A -2.35
B .29
C 2.92
D 5.55
E 8.18
F 10.81
G 13.44
I 18.71
J 21.34
K 23.97
L 26.6
M 29.24
N 31.87

STRUCTURE DATA

TYPE = SPACE
NJ = 5104
NM = 0
NE = 5007
NS = 0
NRJ= 2530
NL = 8
XMAX= 45.0
YMAX= 22.5
ZMAX= 54.0



UNIT FEE KIP

J=5104,E=5007

S T A A D P O S T - P L O T (REV: 22.0W) DATE: JAN 14, 1998

TITLE: OUTLET STRUCTURE

R2H ENGINEERING, INC.
840 GRIER DRIVE
SUITE320
LAS VEGAS, NV 89119

Title : East C-1 Detention Basin Job # 97183
Dsgnr: AH Date: 8:34AM, 19 MAR 98
Description : Outlet Drop Structure
Scope :

145

Cantilevered Retaining Wall

Description 9 FT Tall Wall at Outlet Structure

General

Retained Height	=	9.00 ft
Wall height above retained soil	=	0.00 ft
Slope Behind Wall	=	3.00 : 1
Height of Soil over Toe	=	0.00 in
Soil Density	=	125.00 pcf

Footing Data

Toe Width	=	0.00 ft
Heel Width	=	6.00 ft
Total Footing Width	=	6.00 ft
Footing Thickness	=	15.00 in

Footing Key Data

Distance from Toe	=	0.00 ft
Width	=	12.00 in
Depth	=	24.00 in

Added Lateral Load on Stem

Lateral Load	=	75.0 #/ft
...Height to Top	=	9.00 ft
...Height to Bottom	=	0.00 ft

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Active Soil Pressure - Heel Side	=	35.0 psf
Active Soil Pressure - Toe Side	=	0.0 pcf
Passive Pressure	=	600.0 pcf
Water table height over heel	=	0.0 ft

Sliding Data

Friction Factor @ Footing & Soil	=	0.400
...neglect ht. for passive	=	0.00 in
Lateral Sliding Force	=	3,160.1
less Passive Pressure Force	= -	3,168.8 lbs
less Friction Force	= -	3,899.7 lbs
Added Restraint Force Required	=	0.0 lbs

Adjacent Footing Data

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type	=	Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft

Footing Design Results

f'c	=	3,000 psi
Fy	=	60,000 psi
Minimum As %	=	0.0018
Rebar Cover @ Top	=	2.00 in
Rebar Cover @ Bottom	=	3.00 in

		Toe	Heel	
ACI Factored Soil Pressure	=	5,203	0	psf
Mu' : From Upward Loads	=	0	0	ft-#
Mu' : From Downward Loads	=	0	0	ft-#
Mu: Used For Design	=	0	12,393	ft-#
Actual One-Way Shear	=	0.00	75.50	psi
Allowable One-Way Shear	=	0.00	93.11	psi

Minimum Footing Rebar Options.....

Toe Side.....	Heel Side....
Not req'd	# 4 @ 8.25 in
Mu < S * Fr	# 5 @ 12.50 in
	# 6 @ 17.75 in
	# 7 @ 24.25 in
	# 8 @ 32.00 in
	# 9 @ 40.25 in
	# 10 @ 48.25 in

Key Reinforcement: Not Req'd = Mu<S*Fr

R2H ENGINEERING, INC.
840 GRIER DRIVE
SUITE320
LAS VEGAS, NV 89119

Title : East C-1 Detention Basin Job # 97183
Dsgnr: AH Date: 8:34AM, 19 MAR 98
Description : Outlet Drop Structure
Scope :

146

Cantilevered Retaining Wall

Description 9 FT Tall Wall at Outlet Structure

Design Summary

Total Bearing Load		=	9,749 lbs	
...resultant ecc.		=	14.63 in	
Soil Pressure @ Toe	= 3,650	<=	5,000 psf	
Soil Pressure @ Heel	= 0	<=	5,000 psf	
ACI Factored Press @ Toe		=	5,203 psf	
ACI Factored Press @ Heel		=	0 psf	
Footing Shear @ Toe	= 0.0	<=	93.1 psi	
Footing Shear @ Heel	= 75.5	<=	93.1 psi	
WALL STABILITY RATIOS				
Overturning Stability Ratio		=	2.26	
Sliding Ratio Ratio		=	2.24	

Summary of Stem Section Designs....
Top: 12 in Conc, #6@12.00 in@Edge, From 9.0 ft to 0.0 ft

Stem Design & Construction

	Top Stem
Design location for stem is at	Stem OK
this height above footing	0.00 ft
Wall Material Above "Ht"	Concrete
Thickness	12.00 in
Rebar Size	# 6
Rebar Spacing	12.00 in
Rebar Placed at	Edge
Design Data	
fb/FB + fa/Fa	**0.681**
Total Force @ Section	3,557.3 lbs
Moment....Actual	12,393.0 ft-#
Moment.....Allowable	18,200.8 ft-#
Shear.....Actual	30.80 psi
Shear.....Allowable	93.11 psi
Bar Embed ABOVE Ht.	13.22 in
Bar Embed BELOW Ht.	7.71 in
Wall Weight	150.0 psf
Rebar Depth 'd'	9.63 in
Masonry Data	
f'm	
Fs	=
Solid Grouting	
Special Inspection	=
Modular Ratio 'n'	
Short Term Factor	
Equiv. Solid Thick.	
Concrete Data	
f'c	3,000 psi
Fy	60,000 psi

R2H ENGINEERING, INC.
840 GRIER DRIVE
SUITE320
LAS VEGAS, NV 89119

Title : East C-1 Detention Basin Job # 97183
Dsgnr: AH Date: 8:34AM, 19 MAR 98
Description : Outlet Drop Structure
Scope :

147

Cantilevered Retaining Wall

Description 9 FT Tall Wall at Outlet Structure

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	2,485.1	3.97	9,871.5			
Soil Over Heel					5,625.0	3.50	19,687.5
Sloped Soil Over Heel	=				520.8	4.33	2,256.9
Surcharge Over Heel	=						
Adjacent Footing Load	=						
Axial Dead Load on Stem	=					0.00	
Toe Active Pressure	=		0.42				
Soil Over Toe							
Surcharge Over Toe	=						
Stem Weight(s)	=				1,350.0	0.50	675.0
Earth @ Stem Transitions	=						
Footing Weight	=				1,125.0	3.00	3,375.0
Key Weight	=				300.0	0.50	150.0
Vert. Component	=				828.4	6.00	4,970.2
Added Lateral Load	=	675.0	5.75	3,881.3			
Load @ Stem Above Soil	=						
TOTALS	=	3,160.1 lbs	O.T.M. =	13,752.7	9,749.2	R.M. =	31,114.7

Resisting/Overturning Ratio **2.26**

Total used for Soil Pressure = 9,749.2 *(+ Axial Live Load, - Vertical Soil Component)*

Vertical component of active pressure used for soil pressure
Toe Surcharge Not Used To Resist Overturning
Heel Surcharge Not Used To Resist Overturning

SECTION 8

MPU LEVEE DESIGN
(1000-YR AND 100 YR DESIGN EVENT)

HEC-2 MODEL OUTPUT

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*********************************************
*  HEC-2 WATER SURFACE PROFILES             *
*                                           *
*  Version   4.6.0;  February 1991          *
*                                           *
*  RUN DATE    14APR98     TIME    13:33:37 *
*********************************************
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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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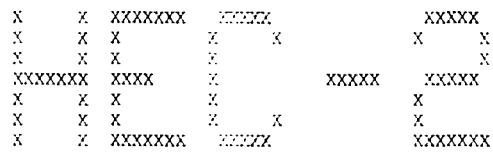

THIS RUN EXECUTED 14APR98 13:33:37

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

T1 EAST C-1 DETENTION BASIN MPU LEVEE STUDY
T2 SEDIMENT EROSION STUDY (MULTIPLE FREQUENCY ANALYSIS, 100-YR & 1000-YR)
T3 VTN MODEL (SUPERCRITICAL)

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	2	WSEL	FQ
		2		1	.0200				2346	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IEW	CHNIM	ITRACE
	1		-1				-1			

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

150 200

NC	.024	.024	.030	.1	.3					
QT	4	229	599	462	1211					
X1	1120	8	173	223	330	330	330			
X3	10			128	2349					
GR	2349	100	2349	128	2349	138	2344	173	2343.5	198
GR	2344	223	2343.5	238	2348	330				
X1	1450	9	225	275	406	406	406			
X3	10			180	2340.5					
GR	2336	100	2339	160	2340.5	180	2340.5	190	2335.5	225
GR	2335	250	2335.5	275	2340	293	2340	313		
X1	1856	12	225	275	594	594	594			
X3	10			180	2330					
GR	2328	100	2325	130	2325	160	2330	180	2330	190
GR	2325	225	2324.5	250	2325	275	2326	279	2326	299
GR	2325	314	2336	340						
X1	2450	10	223	248	511	511	511			
X3	10			178	2308					
GR	2306	100	2305	140	2306	170	2308	178	2308	188
GR	2303	223	2302.5	248	2303	273	2304	285	2315	320

X1	2961	11	223	273	639	639	639			
X3	10			178	2289					
BR	2288	100	2287	130	2287	170	2289	178	2289	188
BR	2284	223	2283.5	248	2284	273	2285.5	279	2286	325
BR	2288	400								
X1	3600	10	205	255	750	750	750			
X3	10			160	2269.5					
BR	2266	100	2267	150	2269.5	160	2269.5	171	2264.5	205
BR	2264	230	2264.5	255	2267	265	2267	290	2280	310
X1	4350	9	217	267	200	200	200			
X3	10			172	2247					
BR	2243	100	2244	160	2247	172	2247	182	2242	217
BR	2241.5	242	2242	267	2244	275	2256	385		

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 1120.000

3470 ENCROACHMENT STATIONS= 128.0 330.0 TYPE= 1 TARGET= -128.000
ELENCL= 2349.00 ELENCR= 100000.00

1120.000	.85	2344.35	2344.61	2346.00	2345.22	.86	.00	.00	2344.00
229.0	1.2	226.1	1.7	.4	99.1	.6	.0	.0	2344.00
.00	2.74	7.50	2.75	.024	.020	.024	.000	2343.50	170.53
.020054	0.	0.	0.	0	14	6	.00	55.99	226.53

*SECNO 1450.000

3470 ENCROACHMENT STATIONS= 180.0 313.0 TYPE= 1 TARGET= -180.000
ELENCL= 2340.50 ELENCR= 100000.00

1450.000	.78	2335.78	2336.11	.00	2336.94	1.16	8.25	.03	2335.50
229.0	.8	227.8	.4	.3	96.3	.2	.2	.4	2335.50
.01	2.94	8.66	2.90	.024	.020	.024	.000	2335.00	223.67
.032034	330.	330.	330.	6	11	0	.00	53.03	276.19

*SECNO 1856.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 180.0 340.0 TYPE= 1 TARGET= -180.000
ELENCL= 2330.00 ELENCR= 100000.00

1856.000	.84	2325.34	2325.61	.00	2326.24	.90	10.62	.08	2325.00
229.0	1.1	224.6	3.3	.4	99.3	1.2	.5	.9	2325.00
.03	2.76	7.67	2.75	.024	.020	.024	.000	2324.50	222.65
.021751	406.	406.	406.	6	14	0	.00	59.52	314.79

*SECNO 2450.000

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 = 1.79

3470 ENCROACHMENT STATIONS= 178.0 320.0 TYPE= 1 TARGET= -178.000
ELENCL= 2308.00 ELENCR= 100000.00

2450.000	.75	2303.20	2303.62	.00	2304.89	1.27	21.27	.08	2303.00
229.0	.4	124.3	104.3	.1	11.0	11.2	.9	1.7	2302.50
.04	3.37	11.33	9.32	.024	.020	.024	.000	2302.50	221.68
.069664	594.	594.	594.	6	11	1	.00	53.59	275.27

*SECNO 2961.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

3470 ENCROACHMENT STATIONS= 178.0 400.0 TYPE= 1 TARGET= -178.000
ELENCL= 2289.00 ELENCR= 100000.00

2961.000	.82	2284.32	2284.61	.00	2285.29	.97	19.38	.02	2284.00
229.0	1.1	227.4	.6	.4	28.7	.2	1.2	2.3	2284.00
.06	2.82	7.92	2.78	.024	.020	.024	.000	2283.50	220.73
.023811	511.	511.	511.	7	14	1	.00	53.57	274.30

*SECNO 3600.000

3470 ENCROACHMENT STATIONS= 160.0 310.0 TYPE= 1 TARGET= -160.000
ELENCL= 2269.50 ELENCR= 100000.00

3600.000	.75	2264.75	2265.12	.00	2266.05	1.31	19.20	.03	2264.50
229.0	.6	228.0	.4	.2	24.8	.1	1.6	3.1	2264.50
.08	3.00	9.20	2.96	.024	.020	.024	.000	2264.00	203.28
.039113	639.	639.	639.	6	11	1	.00	52.70	255.98

*SECNO 4350.000

3470 ENCROACHMENT STATIONS= 172.0 385.0 TYPE= 1 TARGET= -172.000
ELENCL= 2247.00 ELENCR= 100000.00

4350.000	.83	2242.33	2242.61	.00	2243.31	.97	22.65	.10	2242.00
229.0	1.1	227.4	.6	.4	28.6	.3	2.0	4.0	2242.00
.11	2.82	7.94	2.79	.024	.020	.024	.000	2241.50	214.74
.024017	750.	750.	750.	7	14	1	.00	53.55	268.29

T1 EAST C-1 DETENTION BASIN MPU LEVEE STUDY
T2 SEDIMENT EROSION STUDY (MULTIPLE FREQUENCY ANALYSIS, 100-YR & 1000-YR)
T3 VTN MODEL (SUPERCRITICAL)

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3		1	.0248				2346	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2		-1				-1			

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 1120.000

3470 ENCROACHMENT STATIONS= 128.0 331.0 TYPE= 1 TARGET= -128.000
ELENCL= 2349.00 ELENCR= 100000.00

1120.000	1.24	2344.74	2345.34	2346.00	2346.78	2.04	.00	.00	2344.00
599.0	9.6	575.8	13.7	1.9	49.4	2.7	.0	.0	2344.00
.00	5.00	11.65	5.02	.024	.020	.024	.000	2343.50	167.83
.024947	0.	0.	0.	0	15	6	.00	62.56	230.39

*SECNO 1450.000

3470 ENCROACHMENT STATIONS= 180.0 313.0 TYPE= 1 TARGET= -180.000
ELENCL= 2340.50 ELENCR= 100000.00

1450.000	1.23	2336.23	2336.86	.00	2338.37	2.14	8.40	.01	2335.50
599.0	9.6	583.9	5.4	1.9	49.3	1.1	.4	.5	2335.50
.01	5.09	11.85	5.02	.024	.020	.024	.000	2335.00	219.85
.025960	330.	330.	330.	7	14	0	.00	58.09	277.94

*SECNO 1856.000

3165 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 180.0 341.0 TYPE= 1 TARGET= -180.000
ELENCL= 2330.00 ELENCR= 100000.00

1856.000	1.22	2325.72	2326.33	.00	2327.75	2.03	10.59	.03	2325.00
599.0	8.9	563.2	26.9	1.8	48.1	5.4	.9	1.1	2325.00
.02	5.00	11.72	4.98	.024	.020	.024	.000	2324.50	220.02
.026213	406.	406.	406.	6	14	0	.00	70.18	315.68

*SECNO 2450.000

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 = 1.40

3470 ENCROACHMENT STATIONS= 178.0 320.0 TYPE= 1 TARGET= -178.000
ELENCL= 2308.00 ELENCR= 100000.00

2450.000	1.09	2303.59	2304.32	.00	2306.46	2.87	21.20	.08	2303.01
599.9	7.6	315.5	275.9	1.2	21.0	23.1	1.6	2.0	2302.51
.03	6.19	15.01	11.94	.024	.020	.024	.000	2302.50	218.86
.051436	594.	594.	594.	7	14	0	.00	61.23	280.09

*SECNO 2961.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 178.0 400.0 TYPE= 1 TARGET= -178.000
ELENCL= 2289.00 ELENCR= 100000.00

2961.000	1.21	2284.71	2285.36	.00	2286.99	2.28	19.29	.18	2284.01
599.0	9.1	584.8	5.1	1.7	47.8	1.0	2.2	2.6	2284.00
.04	5.22	12.25	5.15	.024	.020	.024	.000	2283.50	218.06
.028891	511.	511.	511.	7	14	0	.00	57.76	275.82

*SECNO 3600.000

3470 ENCROACHMENT STATIONS= 160.0 310.0 TYPE= 1 TARGET= -160.000
ELENCL= 2269.50 ELENCR= 100000.00

3600.000	1.18	2265.18	2265.86	.00	2267.60	2.43	19.37	.01	2264.81
599.0	8.6	585.6	4.8	1.6	46.4	.9	2.9	3.5	2264.81
.06	5.34	12.62	5.27	.024	.020	.024	.000	2264.00	200.28
.031854	639.	639.	639.	7	14	0	.00	57.46	257.71

*SECNO 4350.000

3470 ENCROACHMENT STATIONS= 172.0 385.0 TYPE= 1 TARGET= -172.000
ELENCL= 2247.00 ELENCR= 100000.00

4350.000	1.21	2242.71	2243.36	.00	2244.98	2.26	22.58	.05	2242.01
599.0	9.1	584.7	5.2	1.8	47.9	1.0	3.7	4.5	2242.01
.07	5.20	12.19	5.13	.024	.020	.024	.000	2241.50	212.04
.028490	750.	750.	750.	7	14	0	.00	57.80	269.84

T1 EAST C-1 DETENTION BASIN MPU LEVEE STUDY
T2 SEDIMENT EROSION STUDY (MULTIPLE FREQUENCY ANALYSIS, 100-YR & 1000-YR)
T3 VTN MODEL (SUPERCRITICAL)

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
J1		4		1	.0248				2347	

	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
J2	3		-1				-1			

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 1120.000

3470 ENCROACHMENT STATIONS= 128.0 330.0 TYPE= 1 TARGET= -128.000
ELENCL= 2349.00 ELENCR= 100000.00

1120.000	1.11	2344.61	2345.10	2347.00	2346.27	1.67	.00	.00	2344.00
462.0	5.6	448.4	8.0	1.3	42.8	1.8	.0	.0	2344.00
.00	4.34	10.49	4.36	.024	.020	.024	.000	2343.50	168.76
.024549	0.	0.	0.	0	14	5	.00	60.29	229.05

*SECNO 1450.000

3470 ENCROACHMENT STATIONS= 130.0 313.0 TYPE= 1 TARGET= -130.000
ELENCL= 2340.50 ELENCR= 100000.00

1450.000	1.09	2336.09	2336.61	.00	2337.87	1.77	8.40	.01	2335.50
462.0	5.5	453.5	3.1	1.2	42.1	.7	.3	.4	2335.50
.01	4.44	10.76	4.38	.024	.020	.024	.000	2335.00	220.85
.026384	330.	330.	330.	7	14	0	.00	56.52	277.37

*SECNO 1856.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 130.0 340.0 TYPE= 1 TARGET= -130.000
ELENCL= 2330.00 ELENCR= 100000.00

1856.000	1.09	2325.59	2326.12	.00	2327.26	1.67	10.57	.03	2325.00
462.0	5.2	441.0	15.8	1.2	41.7	3.7	.8	1.0	2325.00
.02	4.35	10.56	4.33	.024	.020	.024	.000	2324.50	220.91
.025713	406.	406.	406.	6	14	0	.00	66.59	315.38

*SECNO 2450.000

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3332 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.44

3470 ENCROACHMENT STATIONS= 178.0 320.0 TYPE= 1 TARGET= -178.000
ELENCL= 2308.00 ELENCR= 100000.00

2450.000	.97	2303.47	2304.10	.00	2305.91	2.43	21.28	.08	2313.00
462.0	4.1	245.9	212.0	.8	17.9	19.2	1.3	1.9	2312.50
.03	5.38	13.73	11.03	.024	.020	.024	.000	2302.50	219.74
.053316	594.	594.	594.	6	14	0	.00	56.86	178.60

*SECNO 2961.000

3331 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 178.0 400.0 TYPE= 1 TARGET= -178.000
ELENCL= 2289.00 ELENCR= 100000.00

2961.000	1.07	2284.57	2285.11	.00	2286.42	1.85	19.31	.18	2294.00
462.0	5.2	453.8	3.0	1.2	41.3	.7	1.8	2.5	2294.00
.05	4.50	10.98	4.44	.024	.020	.024	.000	2283.50	218.97
.028181	511.	511.	511.	7	14	0	.00	56.34	178.31

*SECNO 3600.000

3470 ENCROACHMENT STATIONS= 160.0 310.0 TYPE= 1 TARGET= -160.000
ELENCL= 2269.50 ELENCR= 100000.00

3600.000	1.05	2265.05	2265.61	.00	2267.06	2.02	19.34	.02	2284.50
462.0	4.8	454.5	2.7	1.0	39.6	.6	2.4	3.4	2284.50
.06	4.65	11.46	4.59	.024	.020	.024	.000	2264.00	211.21
.032577	639.	639.	639.	7	14	0	.00	55.96	167.17

*SECNO 4350.000

3470 ENCROACHMENT STATIONS= 172.0 385.0 TYPE= 1 TARGET= -172.000
ELENCL= 2247.00 ELENCR= 100000.00

4350.000	1.09	2242.59	2243.11	.00	2244.42	1.83	22.59	.05	2242.00
462.0	5.3	453.8	3.0	1.2	41.4	.7	3.2	4.3	2242.00
.08	4.50	10.95	4.44	.024	.020	.024	.000	2241.50	212.95
.027927	750.	750.	750.	6	14	0	.00	56.36	169.31

T1 EAST C-1 DETENTION BASIN MPU LEVEE STUDY
T2 SEDIMENT EROSION STUDY (MULTIPLE FREQUENCY ANALYSIS, 100-YR & 1000-YR)
T3 VTN MODEL (SUPERCRITICAL)

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
J1		5		1	.0248				.2347	

	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
J2	4		-1				-1			

SECNO	DEPTH	TWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WCL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	ICRAR	TOPWID	ENDST

*PROF 4

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 1120.000

3470 ENCROACHMENT STATIONS= 128.0 330.0 TYPE= 1 TARGET= -128.000
ELENCL= 2349.00 ELENCR= 100000.00

1120.000	1.73	2345.23	2346.24	2347.00	2348.57	3.33	.00	.00	2344.00
1211.0	37.1	1220.7	53.2	5.3	74.2	7.6	.0	.0	2344.00
.00	6.96	15.10	6.99	.024	.020	.024	.000	2343.50	164.36
.024409	0.	0.	0.	8	15	4	.00	70.98	235.34

*SECNO 1450.000

3470 ENCROACHMENT STATIONS= 180.0 313.0 TYPE= 1 TARGET= -180.000
ELENCL= 2340.50 ELENCR= 100000.00

1450.000	1.74	2336.74	2337.76	.00	2340.31	3.57	8.23	.02	2335.50
1211.0	38.3	1181.1	21.6	5.4	74.4	3.1	.6	.5	2335.50
.01	7.14	15.47	7.04	.024	.020	.024	.000	2335.00	216.33
.025501	330.	330.	330.	7	14	9	.00	63.62	279.95

*SECNO 1856.000

3470 ENCROACHMENT STATIONS= 180.0 340.0 TYPE= 1 TARGET= -180.000
ELENCL= 2330.00 ELENCR= 100000.00

1856.000	1.64	2326.14	2327.01	.00	2329.46	3.33	10.77	.07	2325.00
1211.0	31.9	1068.7	110.4	4.5	69.5	16.5	1.5	1.3	2325.00
.01	7.03	15.38	6.70	.024	.020	.024	.000	2324.50	217.02
.027639	406.	406.	406.	7	14	5	.00	99.67	316.69

*SECNO 2450.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 178.0 320.0 TYPE= 1 TARGET= -178.000
ELENCL= 2308.00 ELENCR= 100000.00

2450.000	1.54	2304.04	2305.15	.00	2308.45	4.40	10.91	.11	2303.00
1211.0	32.5	911.6	566.9	3.8	32.3	38.9	2.6	2.4	2302.50
.02	8.56	15.96	14.63	.024	.020	.024	.000	2302.50	215.72
.046344	594.	594.	594.	7	14	1	.00	69.41	285.13

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

*SECNO 2961.000

3470 ENCROACHMENT STATIONS= 176.0 400.0 TYPE= 1 TARGET= -176.000
ELENCL= 2289.00 ELENCR= 100000.00

2961.000	1.66	2285.16	2286.38	.00	2289.19	4.03	19.15	.11	2284.00
1211.0	35.3	1155.8	19.9	4.7	70.4	2.7	3.5	3.2	2284.00
.03	7.51	16.41	7.41	.024	.020	.024	.001	2283.50	214.89
.030914	511.	511.	511.	7	14	0	.01	62.74	277.63

*SECNO 3600.000

3470 ENCROACHMENT STATIONS= 160.0 310.0 TYPE= 1 TARGET= -160.000
ELENCL= 2269.50 ELENCR= 100000.00

3600.000	1.67	2265.67	2266.75	.00	2269.65	3.97	19.53	.02	2264.50
1211.0	35.6	1155.3	20.1	4.8	70.9	2.7	4.6	4.1	2264.50
.04	7.47	16.30	7.37	.024	.020	.024	.001	2264.00	196.83
.030216	639.	639.	639.	7	14	0	.01	62.84	259.67

*SECNO 4350.000

3470 ENCROACHMENT STATIONS= 172.0 385.0 TYPE= 1 TARGET= -172.000
ELENCL= 2247.00 ELENCR= 100000.00

4350.000	1.68	2243.18	2244.27	.00	2247.12	3.94	22.51	.01	2242.00
1211.0	35.8	1154.9	20.2	4.8	71.2	2.8	6.1	5.2	2242.00
.06	7.44	16.23	7.34	.024	.020	.024	.001	2241.50	208.79
.029822	750.	750.	750.	7	14	0	.01	62.90	271.69

THIS RUN EXECUTED 14APR98 13:33:39

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

MODEL (SUPERCRITICAL)

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	1120.000	.00	.00	.00	2343.50	229.00	2344.35	2344.61	2345.22	200.54	7.50	31.18	16.17
	1120.000	.00	.00	.00	2343.50	599.00	2344.74	2345.34	2346.78	249.47	11.65	54.08	37.92
	1120.000	.00	.00	.00	2343.50	462.00	2344.61	2345.10	2346.27	245.49	10.49	45.87	29.49
	1120.000	.00	.00	.00	2343.50	1211.00	2345.23	2346.24	2348.57	244.09	15.10	87.15	77.51
	1450.000	330.00	.00	.00	2335.00	229.00	2335.78	2336.11	2336.94	320.34	8.66	26.71	12.79
	1450.000	330.00	.00	.00	2335.00	599.00	2336.23	2336.86	2338.37	259.60	11.85	52.24	37.18
	1450.000	330.00	.00	.00	2335.00	462.00	2336.09	2336.61	2337.87	263.84	10.76	44.06	28.44
	1450.000	330.00	.00	.00	2335.00	1211.00	2336.74	2337.76	2340.31	255.01	15.47	82.86	75.83
	1856.000	406.00	.00	.00	2324.50	229.00	2325.34	2325.61	2326.24	317.51	7.67	30.88	15.53
	1856.000	406.00	.00	.00	2324.50	599.00	2325.72	2326.33	2327.75	262.13	11.72	55.25	37.00
	1856.000	406.00	.00	.00	2324.50	462.00	2325.59	2326.12	2327.26	257.13	10.56	46.60	28.81
	1856.000	406.00	.00	.00	2324.50	1211.00	2326.14	2327.01	2329.46	276.39	15.38	90.51	72.84
*	2450.000	594.00	.00	.00	2302.50	229.00	2303.20	2303.62	2304.89	696.64	11.33	22.29	8.66
*	2450.000	594.00	.00	.00	2302.50	599.00	2303.59	2304.32	2306.46	514.36	15.01	45.36	26.41
*	2450.000	594.00	.00	.00	2302.50	462.00	2303.47	2304.10	2305.91	533.16	13.73	37.88	20.01
	2450.000	594.00	.00	.00	2302.50	1211.00	2304.04	2305.15	2308.45	463.44	18.96	74.80	56.25
*	2961.000	511.00	.00	.00	2283.50	229.00	2284.32	2284.61	2285.29	238.11	7.92	29.29	14.84
	2961.000	511.00	.00	.00	2283.50	599.00	2284.71	2285.36	2286.99	288.91	12.25	50.49	35.24
	2961.000	511.00	.00	.00	2283.50	462.00	2284.57	2285.11	2286.42	281.81	10.98	43.15	27.52
	2961.000	511.00	.00	.00	2283.50	1211.00	2285.16	2286.38	2289.19	309.14	16.41	77.80	68.86
	3600.000	639.00	.00	.00	2264.00	229.00	2264.75	2265.12	2266.09	391.13	9.20	25.11	11.58
	3600.000	639.00	.00	.00	2264.00	599.00	2265.18	2265.86	2267.60	318.54	12.62	48.94	33.56
	3600.000	639.00	.00	.00	2264.00	462.00	2265.05	2265.61	2267.08	325.77	11.48	41.22	25.60
	3600.000	639.00	.00	.00	2264.00	1211.00	2265.67	2266.75	2269.65	302.16	16.30	78.39	69.67
	4350.000	750.00	.00	.00	2241.50	229.00	2242.33	2242.61	2243.31	240.17	7.94	29.21	14.78
	4350.000	750.00	.00	.00	2241.50	599.00	2242.71	2243.36	2244.98	284.90	12.19	50.71	35.49
	4350.000	750.00	.00	.00	2241.50	462.00	2242.59	2243.11	2244.42	279.27	10.95	43.27	27.65
	4350.000	750.00	.00	.00	2241.50	1211.00	2243.18	2244.27	2247.12	298.22	16.23	78.72	70.13

MODEL (SUPERCRITICAL)

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	1120.000	229.00	2344.35	.00	.00	-1.65	55.99	.00
	1120.000	599.00	2344.74	.39	.00	-1.26	62.56	.00
	1120.000	462.00	2344.61	-.13	.00	-2.39	60.29	.00
	1120.000	1211.00	2345.23	.63	.00	-1.77	70.98	.00
	1450.000	229.00	2335.78	.00	-8.57	.00	53.03	330.00
	1450.000	599.00	2336.23	.46	-8.50	.00	58.09	330.00
	1450.000	462.00	2336.09	-.14	-8.51	.00	56.52	330.00
	1450.000	1211.00	2336.74	.65	-8.49	.00	63.62	330.00
	1856.000	229.00	2325.34	.00	-10.43	.00	59.52	406.00
	1856.000	599.00	2325.72	.38	-10.51	.00	70.18	406.00
	1856.000	462.00	2325.59	-.13	-10.50	.00	66.59	406.00
	1856.000	1211.00	2326.14	.55	-10.60	.00	99.67	406.00
*	2450.000	229.00	2303.20	.00	-22.15	.00	53.59	594.00
*	2450.000	599.00	2303.59	.39	-22.13	.00	61.23	594.00
*	2450.000	462.00	2303.47	-.12	-22.12	.00	58.86	594.00
	2450.000	1211.00	2304.04	.57	-22.10	.00	69.41	594.00
*	2961.000	229.00	2284.32	.00	-18.87	.00	53.57	511.00
	2961.000	599.00	2284.71	.38	-18.88	.00	57.76	511.00
	2961.000	462.00	2284.57	-.13	-18.90	.00	56.34	511.00
	2961.000	1211.00	2285.16	.59	-18.88	.00	62.74	511.00
	3600.000	229.00	2264.75	.00	-19.58	.00	52.70	639.00
	3600.000	599.00	2265.18	.43	-19.53	.00	57.46	639.00
	3600.000	462.00	2265.05	-.13	-19.53	.00	55.96	639.00
	3600.000	1211.00	2265.67	.63	-19.49	.00	62.84	639.00
	4350.000	229.00	2242.33	.00	-22.41	.00	53.55	750.00
	4350.000	599.00	2242.71	.38	-22.46	.00	57.80	750.00
	4350.000	462.00	2242.59	-.13	-22.46	.00	56.36	750.00
	4350.000	1211.00	2243.18	.59	-22.49	.00	62.90	750.00

FLOODWAY DATA, MODEL (SUPERCRITICAL)
PROFILE NO. 1

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1120.000	63.	54.	11.1	2344.8	2344.4	.4
1450.000	58.	52.	11.5	2336.3	2335.8	.5
1856.000	96.	55.	10.8	2325.7	2325.3	.4
2450.000	61.	45.	13.2	2303.6	2303.2	.4
2961.000	58.	50.	11.9	2284.7	2284.3	.4
3600.000	57.	49.	12.2	2265.1	2264.7	.4
4350.000	58.	51.	11.8	2242.7	2242.3	.4

FLOODWAY DATA, MODEL (SUPERCRITICAL)
PROFILE NO. 3

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1120.000	60.	46.	10.1	2344.6	2344.4	.2
1450.000	57.	44.	10.5	2336.1	2335.8	.3
1856.000	94.	47.	9.9	2325.6	2325.3	.3
2450.000	59.	38.	12.2	2303.5	2303.2	.3
2961.000	56.	43.	10.7	2284.6	2284.3	.3
3600.000	56.	41.	11.2	2265.0	2264.7	.3
4350.000	56.	43.	10.7	2242.6	2242.3	.3

FLOODWAY DATA, MODEL (SUPERCRITICAL)
PROFILE NO. 4

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1120.000	71.	87.	13.9	2345.2	2344.4	.8
1450.000	64.	83.	14.6	2336.7	2335.8	.9
1856.000	100.	91.	13.4	2326.1	2325.3	.8
2450.000	69.	75.	16.2	2304.0	2303.2	.8
2961.000	63.	78.	15.6	2285.2	2284.3	.9
3600.000	63.	78.	15.4	2265.7	2264.7	1.0
4350.000	63.	79.	15.4	2243.2	2242.3	.9

CHANNEL CAPACITY ANALYSIS

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==========================================================================
              OPEN CHANNEL FLOW ANALYSIS:COMPOSITE CHANNEL
      Developed by Dr James Guo, Civil Eng Dept, U of Colorado at Denver
           Metro Denver Cities/Counties and UF&FCD Pool Fund Study
==========================================================================
User=: VTN-nevada.....................................................
                        ON DATE 04-14-1998  AT TIME 14:05:01  Version =12-12-1997
** PROJECT TITLE: EAST C-1 DETENTION BASIN MPU LEVEE CAPACITY ANALYSIS

** DESCRIPTIONS OF CHANNEL CROSS SECTION:

    DIMENSIONS OF THE CENTRAL CHANNEL AND BANK AREAS:

      DIMENSIONS OF CENTRAL CHANNEL ARE:
         CHANNEL BOTTOM WIDTH       (FEET)=      50.0
         CHANNEL LEFT SIDE SLOPE    (FT/FT)=     50.00
         CHANNEL RIGHT SIDE SLOPE   (FT/FT)=     50.00
         CHANNEL ROUGHNESS                =      0.020
         CHANNEL FLOWING FULL DEPTH (FEET)=       0.5

      DIMENSIONS OF LEFT BANK FLOW ARE:
         LEFT BANK WIDTH            (FEET) =     35.0
         LEFT BANK SIDE SLOPE       (FT/FT)=     7.00
         LEFT BANK ROUGHNESS              =      0.024

      DIMENSIONS OF RIGHT BANK FLOW ARE:
         RIGHT BANK WIDTH           (FEET) =     20.0
         RIGHT BANK SIDE SLOPE      (FT/FT)=     4.00
         RIGHT BANK ROUGHNESS             =      0.024

      CHANNEL SLOPE                 (FT/FT)=    0.0248
```

** COMPUTED RATING CURVE FOR THIS CROSS SECTION:

DEPTH FEET	AREA SQ-FEET	W-P'METER FEET	TOP WIDTH FEET	FROUDE NO	MANNING-N	FLOWRATE CFS	VELOCITY FPS
0.5	37.5	100.0	100.0	1.756	0.020	228.8	6.1
0.6	53.1	156.1	156.1	1.999	0.017	350.9	6.6
0.7	68.7	157.2	157.2	1.953	0.018	503.5	7.3
0.8	84.5	158.4	158.3	1.948	0.019	682.3	8.1
0.9	100.4	159.5	159.4	1.959	0.020	885.4	8.8
1.0	116.4	160.6	160.5	1.976	0.020	1111.3	9.5
1.1	132.5	161.7	161.6	1.996	0.020	1358.9	10.3
1.2	148.7	162.8	162.7	2.017	0.020	1627.4	10.9
1.3	165.0	164.0	163.8	2.039	0.020	1916.0	11.6
1.4	181.5	165.1	164.9	2.059	0.020	2224.3	12.3
1.5	198.0	166.2	166.0	2.079	0.020	2551.7	12.9
1.6	214.7	167.3	167.1	2.099	0.021	2897.7	13.5
1.7	231.4	168.4	168.2	2.118	0.021	3262.1	14.1
1.8	248.3	169.6	169.3	2.136	0.021	3644.4	14.7
1.9	265.3	170.7	170.4	2.153	0.021	4044.4	15.2
2.0	282.4	171.8	171.5	2.170	0.021	4461.7	15.8
2.1	299.6	172.9	172.6	2.186	0.021	4896.3	16.3
2.2	316.9	174.0	173.7	2.202	0.021	5347.8	16.9
2.3	334.3	175.2	174.8	2.217	0.021	5816.0	17.4
2.4	351.9	176.3	175.9	2.231	0.021	6300.9	17.9
2.5	369.5	177.4	177.0	2.245	0.021	6802.1	18.4
2.6	387.3	178.5	178.1	2.259	0.021	7319.6	18.9
2.7	405.1	179.6	179.2	2.272	0.021	7853.3	19.4
2.8	423.1	180.8	180.3	2.285	0.021	8402.9	19.9
2.9	441.2	181.9	181.4	2.297	0.021	8968.5	20.3
3.0	459.4	183.0	182.5	2.309	0.021	9549.8	20.8
3.1	477.7	184.1	183.6	2.321	0.021	10146.9	21.2
3.2	496.1	185.2	184.7	2.332	0.021	10759.5	21.7
3.3	514.6	186.4	185.8	2.343	0.021	11387.7	22.1
3.4	533.3	187.5	186.9	2.354	0.021	12031.3	22.6
3.5	552.0	188.6	188.0	2.364	0.021	12690.3	23.0
3.6	570.9	189.7	189.1	2.375	0.021	13364.6	23.4
3.7	589.8	190.8	190.2	2.385	0.021	14054.1	23.8
3.8	608.9	192.0	191.3	2.394	0.021	14758.8	24.2
3.9	628.1	193.1	192.4	2.404	0.021	15478.7	24.6
4.0	647.4	194.2	193.5	2.413	0.021	16213.7	25.0
4.1	666.8	195.3	194.6	2.422	0.021	16963.7	25.4
4.2	686.3	196.4	195.7	2.431	0.021	17728.7	25.8
4.3	705.9	197.5	196.8	2.440	0.021	18508.7	26.2
4.4	725.7	198.7	197.9	2.448	0.021	19303.7	26.6
4.5	745.5	199.8	199.0	2.456	0.021	20113.5	27.0
4.6	765.5	200.9	200.1	2.465	0.021	20938.2	27.4
4.7	785.5	202.0	201.2	2.473	0.021	21777.8	27.7
4.8	805.7	203.1	202.3	2.481	0.021	22632.2	28.1
4.9	826.0	204.3	203.4	2.488	0.021	23501.4	28.5
5.0	846.4	205.4	204.5	2.496	0.021	24385.3	28.8
5.1	866.9	206.5	205.6	2.503	0.021	25284.1	29.2
5.2	887.5	207.6	206.7	2.510	0.021	26197.6	29.5
5.3	908.2	208.7	207.8	2.518	0.021	27125.8	29.9
5.4	929.1	209.9	208.9	2.525	0.021	28068.7	30.2
5.5	950.0	211.0	210.0	2.532	0.021	29026.4	30.6

NOTE:FLOW VARIABLES IN THE ABOVE TABLE ARE CROSS SECTIONAL VALUES.

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==========================================================================
              OPEN CHANNEL FLOW ANALYSIS:COMPOSITE CHANNEL
     Developed by Dr James Guo, Civil Eng Dept, U of Colorado at Denver
          Metro Denver Cities/Counties and UF&FCD Pool Fund Study
==========================================================================
User=: VTN-nevada.....................................................
                        ON DATE 04-14-1998  AT TIME 14:05:40  Version =12-12-1997
** PROJECT TITLE: EAST C-1 DETENTION BASIN MPU LEVEE CAPACITY ANALYSIS

** DESCRIPTIONS OF CHANNEL CROSS SECTION:

    DIMENSIONS OF THE CENTRAL CHANNEL AND BANK AREAS:

      DIMENSIONS OF CENTRAL CHANNEL ARE:
         CHANNEL BOTTOM WIDTH       (FEET)=      50.0
         CHANNEL LEFT SIDE SLOPE    (FT/FT)=     50.00
         CHANNEL RIGHT SIDE SLOPE   (FT/FT)=     50.00
         CHANNEL ROUGHNESS                =      0.020
         CHANNEL FLOWING FULL DEPTH (FEET)=       0.5

      DIMENSIONS OF LEFT BANK FLOW ARE:
         LEFT BANK WIDTH            (FEET) =     35.0
         LEFT BANK SIDE SLOPE       (FT/FT)=      7.00
         LEFT BANK ROUGHNESS              =      0.024

      DIMENSIONS OF RIGHT BANK FLOW ARE:
         RIGHT BANK WIDTH           (FEET) =     20.0
         RIGHT BANK SIDE SLOPE      (FT/FT)=      4.00
         RIGHT BANK ROUGHNESS             =      0.024

      CHANNEL SLOPE                (FT/FT)=    0.0375
```

** COMPUTED RATING CURVE FOR THIS CROSS SECTION:

DEPTH FEET	AREA SQ-FEET	W-P'METER FEET	TOP WIDTH FEET	FROUDE NO	MANNING-N	FLOWRATE CFS	VELOCITY FPS
0.5	37.5	100.0	100.0	2.159	0.020	281.3	7.5
0.6	53.1	156.1	156.1	2.458	0.017	431.4	8.1
0.7	68.7	157.2	157.2	2.401	0.018	619.1	9.0
0.8	84.5	158.4	158.3	2.395	0.019	839.1	9.9
0.9	100.4	159.5	159.4	2.409	0.020	1088.8	10.8
1.0	116.4	160.6	160.5	2.430	0.020	1366.5	11.7
1.1	132.5	161.7	161.6	2.455	0.020	1671.0	12.6
1.2	148.7	162.8	162.7	2.481	0.020	2001.1	13.5
1.3	165.0	164.0	163.8	2.507	0.020	2356.1	14.3
1.4	181.5	165.1	164.9	2.532	0.020	2735.2	15.1
1.5	198.0	166.2	166.0	2.557	0.020	3137.7	15.8
1.6	214.7	167.3	167.1	2.581	0.021	3563.3	16.6
1.7	231.4	168.4	168.2	2.604	0.021	4011.3	17.3
1.8	248.3	169.6	169.3	2.626	0.021	4481.4	18.0
1.9	265.3	170.7	170.4	2.648	0.021	4973.2	18.7
2.0	282.4	171.8	171.5	2.668	0.021	5486.5	19.4
2.1	299.6	172.9	172.6	2.688	0.021	6020.8	20.1
2.2	316.9	174.0	173.7	2.707	0.021	6576.0	20.8
2.3	334.3	175.2	174.8	2.726	0.021	7151.8	21.4
2.4	351.9	176.3	175.9	2.744	0.021	7748.0	22.0
2.5	369.5	177.4	177.0	2.761	0.021	8364.4	22.6
2.6	387.3	178.5	178.1	2.778	0.021	9000.7	23.2
2.7	405.1	179.6	179.2	2.794	0.021	9657.0	23.8
2.8	423.1	180.8	180.3	2.810	0.021	10332.9	24.4
2.9	441.2	181.9	181.4	2.825	0.021	11028.3	25.0
3.0	459.4	183.0	182.5	2.839	0.021	11743.2	25.6
3.1	477.7	184.1	183.6	2.854	0.021	12477.3	26.1
3.2	496.1	185.2	184.7	2.868	0.021	13230.7	26.7
3.3	514.6	186.4	185.8	2.881	0.021	14003.1	27.2
3.4	533.3	187.5	186.9	2.895	0.021	14794.6	27.7
3.5	552.0	188.6	188.0	2.907	0.021	15604.9	28.3
3.6	570.9	189.7	189.1	2.920	0.021	16434.1	28.8
3.7	589.8	190.8	190.2	2.932	0.021	17282.0	29.3
3.8	608.9	192.0	191.3	2.944	0.021	18148.6	29.8
3.9	628.1	193.1	192.4	2.956	0.021	19033.8	30.3
4.0	647.4	194.2	193.5	2.967	0.021	19937.5	30.8
4.1	666.8	195.3	194.6	2.978	0.021	20859.8	31.3
4.2	686.3	196.4	195.7	2.989	0.021	21800.5	31.8
4.3	705.9	197.5	196.8	3.000	0.021	22759.7	32.2
4.4	725.7	198.7	197.9	3.010	0.021	23737.2	32.7
4.5	745.5	199.8	199.0	3.021	0.021	24733.0	33.2
4.6	765.5	200.9	200.1	3.031	0.021	25747.2	33.6
4.7	785.5	202.0	201.2	3.041	0.021	26779.6	34.1
4.8	805.7	203.1	202.3	3.050	0.021	27830.2	34.5
4.9	826.0	204.3	203.4	3.060	0.021	28899.0	35.0
5.0	846.4	205.4	204.5	3.069	0.021	29986.0	35.4
5.1	866.9	206.5	205.6	3.078	0.021	31091.2	35.9
5.2	887.5	207.6	206.7	3.087	0.021	32214.5	36.3
5.3	908.2	208.7	207.8	3.096	0.021	33355.9	36.7
5.4	929.1	209.9	208.9	3.104	0.021	34515.4	37.2
5.5	950.0	211.0	210.0	3.113	0.021	35693.0	37.6

NOTE:FLOW VARIABLES IN THE ABOVE TABLE ARE CROSS SECTIONAL VALUES.

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==========================================================================
              OPEN CHANNEL FLOW ANALYSIS:COMPOSITE CHANNEL
      Developed by Dr James Guo, Civil Eng Dept, U of Colorado at Denver
            Metro Denver Cities/Counties and UF&FCD Pool Fund Study
==========================================================================
User=: VTN-nevada.....................................................
                        ON DATE 04-14-1998  AT TIME 14:06:08  Version =12-12-1997
** PROJECT TITLE: EAST C-1 DETENTION BASIN MPU LEVEE CAPACITY ANALYSIS

** DESCRIPTIONS OF CHANNEL CROSS SECTION:

    DIMENSIONS OF THE CENTRAL CHANNEL AND BANK AREAS:

      DIMENSIONS OF CENTRAL CHANNEL ARE:
         CHANNEL BOTTOM WIDTH       (FEET)=      50.0
         CHANNEL LEFT SIDE SLOPE    (FT/FT)=     50.00
         CHANNEL RIGHT SIDE SLOPE   (FT/FT)=     50.00
         CHANNEL ROUGHNESS                =      0.020
         CHANNEL FLOWING FULL DEPTH (FEET)=       0.5

      DIMENSIONS OF LEFT BANK FLOW ARE:
         LEFT BANK WIDTH            (FEET) =     35.0
         LEFT BANK SIDE SLOPE       (FT/FT)=     7.00
         LEFT BANK ROUGHNESS              =      0.024

      DIMENSIONS OF RIGHT BANK FLOW ARE:
         RIGHT BANK WIDTH           (FEET) =     20.0
         RIGHT BANK SIDE SLOPE      (FT/FT)=     4.00
         RIGHT BANK ROUGHNESS             =      0.024

      CHANNEL SLOPE                 (FT/FT)=    0.0305
```

** COMPUTED RATING CURVE FOR THIS CROSS SECTION:

DEPTH FEET	AREA SQ-FEET	W-P'METER FEET	TOP WIDTH FEET	FROUDE NO	MANNING-N	FLOWRATE CFS	VELOCITY FPS
0.5	37.5	100.0	100.0	1.947	0.020	253.7	6.8
0.6	53.1	156.1	156.1	2.217	0.017	389.1	7.3
0.7	68.7	157.2	157.2	2.166	0.018	558.3	8.1
0.8	84.5	158.4	158.3	2.160	0.019	756.7	9.0
0.9	100.4	159.5	159.4	2.172	0.020	981.9	9.8
1.0	116.4	160.6	160.5	2.192	0.020	1232.4	10.6
1.1	132.5	161.7	161.6	2.214	0.020	1507.0	11.4
1.2	148.7	162.8	162.7	2.237	0.020	1804.7	12.1
1.3	165.0	164.0	163.8	2.261	0.020	2124.9	12.9
1.4	181.5	165.1	164.9	2.284	0.020	2466.7	13.6
1.5	198.0	166.2	166.0	2.306	0.020	2829.8	14.3
1.6	214.7	167.3	167.1	2.328	0.021	3213.5	15.0
1.7	231.4	168.4	168.2	2.349	0.021	3617.6	15.6
1.8	248.3	169.6	169.3	2.369	0.021	4041.6	16.3
1.9	265.3	170.7	170.4	2.388	0.021	4485.1	16.9
2.0	282.4	171.8	171.5	2.407	0.021	4948.0	17.5
2.1	299.6	172.9	172.6	2.424	0.021	5429.9	18.1
2.2	316.9	174.0	173.7	2.442	0.021	5930.6	18.7
2.3	334.3	175.2	174.8	2.458	0.021	6449.9	19.3
2.4	351.9	176.3	175.9	2.474	0.021	6987.5	19.9
2.5	369.5	177.4	177.0	2.490	0.021	7543.4	20.4
2.6	387.3	178.5	178.1	2.505	0.021	8117.3	21.0
2.7	405.1	179.6	179.2	2.520	0.021	8709.1	21.5
2.8	423.1	180.8	180.3	2.534	0.021	9318.7	22.0
2.9	441.2	181.9	181.4	2.547	0.021	9945.9	22.5
3.0	459.4	183.0	182.5	2.561	0.021	10590.6	23.1
3.1	477.7	184.1	183.6	2.574	0.021	11252.7	23.6
3.2	496.1	185.2	184.7	2.586	0.021	11932.1	24.1
3.3	514.6	186.4	185.8	2.599	0.021	12628.7	24.5
3.4	533.3	187.5	186.9	2.610	0.021	13342.5	25.0
3.5	552.0	188.6	188.0	2.622	0.021	14073.3	25.5
3.6	570.9	189.7	189.1	2.633	0.021	14821.0	26.0
3.7	589.8	190.8	190.2	2.644	0.021	15585.7	26.4
3.8	608.9	192.0	191.3	2.655	0.021	16367.3	26.9
3.9	628.1	193.1	192.4	2.666	0.021	17165.6	27.3
4.0	647.4	194.2	193.5	2.676	0.021	17980.7	27.8
4.1	666.8	195.3	194.6	2.686	0.021	18812.4	28.2
4.2	686.3	196.4	195.7	2.696	0.021	19660.8	28.6
4.3	705.9	197.5	196.8	2.706	0.021	20525.8	29.1
4.4	725.7	198.7	197.9	2.715	0.021	21407.4	29.5
4.5	745.5	199.8	199.0	2.724	0.021	22305.5	29.9
4.6	765.5	200.9	200.1	2.733	0.021	23220.1	30.3
4.7	785.5	202.0	201.2	2.742	0.021	24151.2	30.7
4.8	805.7	203.1	202.3	2.751	0.021	25098.7	31.2
4.9	826.0	204.3	203.4	2.759	0.021	26062.6	31.6
5.0	846.4	205.4	204.5	2.768	0.021	27042.9	32.0
5.1	866.9	206.5	205.6	2.776	0.021	28039.6	32.3
5.2	887.5	207.6	206.7	2.784	0.021	29052.6	32.7
5.3	908.2	208.7	207.8	2.792	0.021	30082.0	33.1
5.4	929.1	209.9	208.9	2.800	0.021	31127.7	33.5
5.5	950.0	211.0	210.0	2.807	0.021	32189.7	33.9

NOTE: FLOW VARIABLES IN THE ABOVE TABLE ARE CROSS SECTIONAL VALUES.

SECTION 9

INLET STRUCTURE DESIGN
SEDIMENT TRANSPORTATION

(PER PREDESIGN REPORT DATED NOVEMBER 1997)

Table 1. Total Sediment Yields summarize for Basin C4C

Return Period (years)	Total Sediment Yields (acre-feet)		
	C4CA	C4CB	C4CC
PMP	180.6	18.6	15.7
10,000	79.4	8.8	6.8
8,000	68.3	7.5	6.0
1,000	44.0	5.0	3.9
500	27.4	3.2	2.5
100	19.3	2.3	1.8
50	15.6	1.8	1.4
25	11.3	1.3	1.0
10	6.3	0.8	0.6
5	3.3	0.4	0.3

Table 2. Sediment Yields for Subbasin C4CA

Return Period (years)	Peak Discharge (cfs)	Flood Volume (acre-feet)	Upland Sediment Yield, Y_s (tons)	Stream Sediment Yield, Y_{bm} (tons)	Total Sediment Yield (tons)
PMP	17,030	2,453	283,400	70,700	354,100
10,000	7,450	1,193	119,100	36,500	155,600
8,000	6,404	1,109	105,100	28,900	134,000
1,000	4,378	687	64,900	21,300	86,200
500	2,809	438	39,400	14,400	53,800
100	2,048	318	27,600	10,200	37,800
50	1,596	248	20,900	9,670	30,570
25	1,150	180	14,500	7,590	22,090
10	646	104	7,730	4,560	12,290
5	316	54	3,590	3,030	6,620

Table 3. Sediment Yields for Subbasin C4CB

Return Period (years)	Peak Discharge (cfs)	Flood Volume (acre-feet)	Upland Sediment Yield, Y_s (tons)	Stream Sediment Yield, Y_{bm} (tons)	Total Sediment Yield (tons)
PMP	2,677	310	26,140	10,300	36,440
10,000	1,145	151	10,860	6,410	17,270
8,000	985	129	9,140	5,500	14,640
1,000	674	87	5,930	3,940	9,870
500	433	55	3,580	2,710	6,290
100	316	40	2,510	2,040	4,550
50	247	31	1,900	1,710	3,610
25	178	23	1,340	1,260	2,600
10	100	13	700	800	1,500
5	49	7	330	450	780

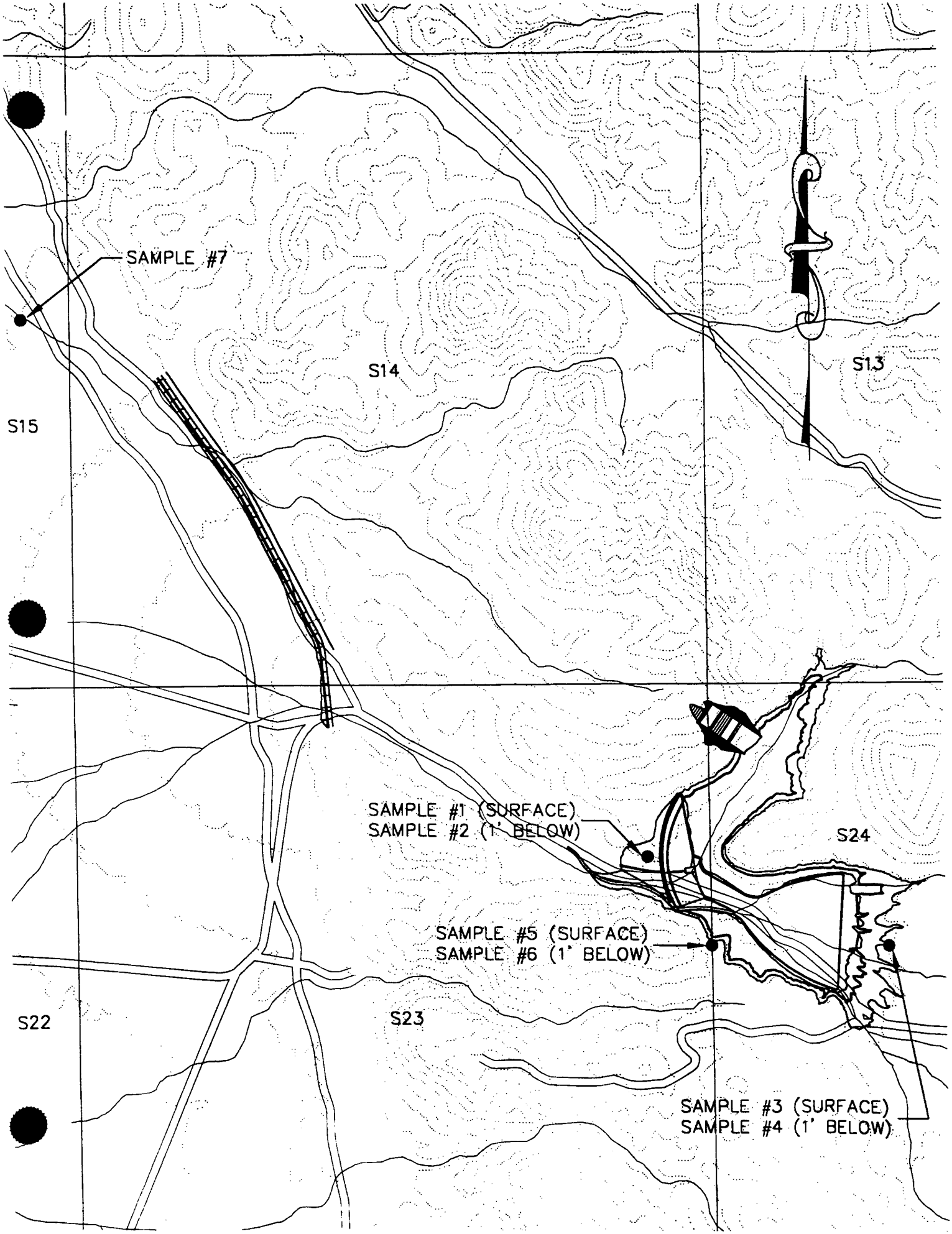
Table 4. Sediment Yields for Subbasin C4CC

Return Period (years)	Peak Discharge (cfs)	Flood Volume (acre-feet)	Upland Sediment Yield, Y_s (tons)	Stream Sediment Yield, Y_{bm} (tons)	Total Sediment Yield (tons)
PMP	2,474	234	21,720	9,030	30,750
10,000	1,035	114	8,910	4,500	13,410
8,000	891	97	7,490	4,210	11,700
1,000	611	66	4,890	2,730	7,620
500	393	42	2,960	1,930	4,890
100	286	30	2,050	1,410	3,460
50	223	24	1,580	1,160	2,740
25	162	17	1,090	840	1,930
10	91	10	580	550	1,130
5	44	5	260	290	550

BED MATERIAL SAMPLE LOCATION AND SIZE DISTRIBUTION

Bed-Material Size Distributions

Size	Size(mm)	Sample 1 %Passing	Sample 2 %Passing	Sample 3 %Passing	Sample 4 %Passing	Geo.Mean %Passing	d/s Fan Ar %Passing
3	76.2	100	100	100	100	100	100
2	50.8	100	100	100	89	97.12868	100
1.5	38.1	100	100	100	89	97.12868	100
1	25.4	87	98	100	84	91.99329	93
0.75	19.05	81	93	99	80	87.88673	85
12/30	12.7	71	84	94	75	80.52518	73
0.375	9.525	65	76	87	69	73.79447	65
No. 4	6	54	56	68	56	58.25319	57
No. 8	3	41	40	49	44	43.36338	48
No. 16	1.2	30	27	33	35	31.10046	41
No. 30	0.6	21	17	20	26	20.75716	36
No. 50	0.3	13	10	12	18	12.94492	29
No. 100	0.15	9	7	8	11	8.628907	22
No. 200	0.074	4.8	3.8	4.7	5.9	4.742351	12.6


SAMPLE #7
S14
S13
S15
SAMPLE #1 (SURFACE)
SAMPLE #2 (1' BELOW)
S24
SAMPLE #5 (SURFACE)
SAMPLE #6 (1' BELOW)
S22
S23
SAMPLE #3 (SURFACE)
SAMPLE #4 (1' BELOW)

Sample #1

Summary Report

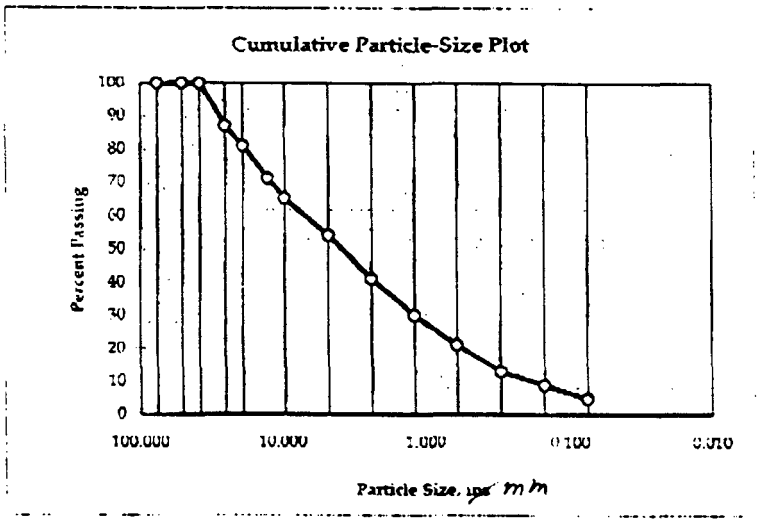
Percent Passing		Specification Spec Not Reported Min.	Specification Spec Not Reported Max.	Pass Fail
6"				
3"				
2"				
1½"	100			
1"	87			
¾"	81			
½"	71			
3/8"	65			
No. 4	54			
No. 8	41			
No. 16	30			
No. 30	21			
No.50	13			
No. 100	9			
No. 200	4.8			

Well Graded Sand with Gravel

Lab No. 13460

~~Second Trial~~

		Specification Spec Not Reported Min.	Specification Spec Not Reported Max.	Pass Fail
Sand Equivalent				
Cleanness Value				
Moisture Content				
Liquid Limit				
Plastic Limit				
Plasticity Index				
Solubility, % loss				
Swell, 60 psf				
Fractured Faces				
Fineness Modulus				
R-Value				
CBR Value				
Specific Gravity, Dry				
Specific Gravity, SSD				
Specific Gravity, App				
Absorption,%				
% of Wear				



Test results will be mailed on official letter-head, signed and dated.

Sample #2

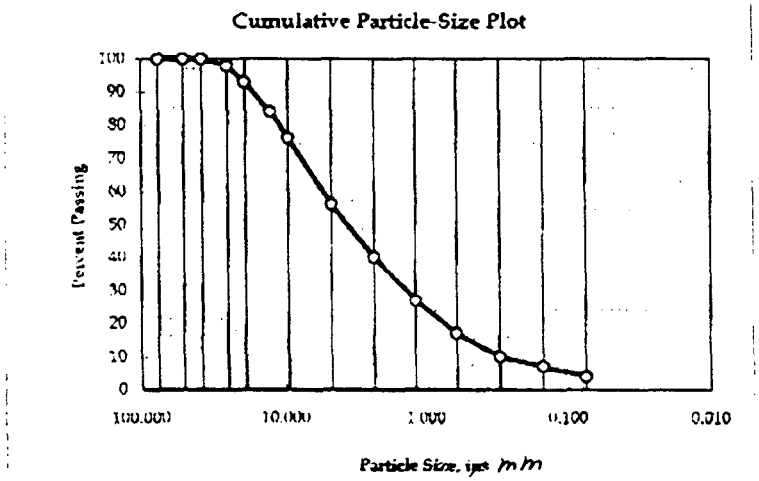
Summary Report

Percent Passing		Specification Spec Not Reported Min.	Max.	Pass Fail
6"				
3"				
2"				
1½"	100			
1"	98			
¾"	93			
½"	84			
3/8"	76			
No. 4	56			
No. 8	40			
No. 16	27			
No. 30	17			
No.50	10			
No 100	7			
No. 200	3.8			

Well Graded Sand with Gravel

Lab No. 13461

		Specification Spec Not Reported Min.	Max.	Pass Fail
Sand Equivalent				
Cleanness Value				
Moisture Content				
Liquid Limit				
Plastic Limit				
Plasticity Index				
Solubility, % loss				
Swell, 60 psf				
Fractured Faces				
Fineness Modulus				
R-Value				
CBR Value				
Specific Gravity, Dry				
Specific Gravity, SSD				
Specific Gravity, App				
Absorption,%				
% of Wear				



Test results will be mailed on official letter-head, signed and dated.

Sample #3

Summary Report

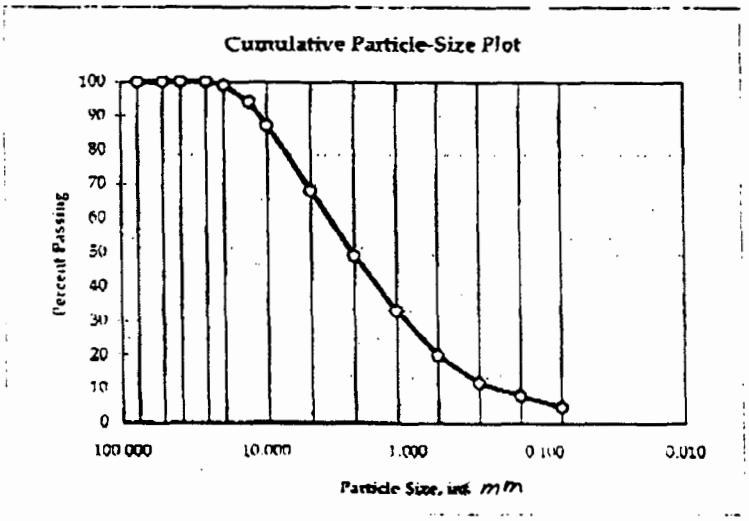
Percent Passing		Specification Spec Not Reported Min.	Max.	Pass Fail
6"				
3"				
2"				
1½"				
1"	100			
¾"	99			
½"	94			
3/8"	87			
No. 4	68			
No. 8	49			
No. 16	33			
No. 30	20			
No 50	12			
No 100	8			
No 200	4 7			

Well Graded Sand with Gravel

Lab No. 13462

7/10/97

		Specification Spec Not Reported Min.	Max.	Pass Fail
Sand Equivalent				
Cleanness Value				
Moisture Content				
Liquid Limit	Gran			
Plastic Limit				
Plasticity Index	N/P			
Solubility, % loss				
Swell. 60 psf				
Fractured Faces				
Fineness Modulus				
R-Value				
CBR Value				
Specific Gravity. Dry				
Specific Gravity. SSD				
Specific Gravity, App				
Absorption,%				
% of Wear				



Test results will be mailed on official letter-head, signed and dated.

Sample #4

Summary Report

Percent Passing		Specification Spec Not Reported Min.	Specification Spec Not Reported Max.	Pass Fail
6"				
3"	100			
2"	89			
1½"	89			
1"	84			
¾"	80			
½"	75			
3/8"	69			
No. 4	56			
No. 8	44			
No. 16	35			
No. 30	26			
No 50	18			
No. 100	11			
No. 200	5.9			

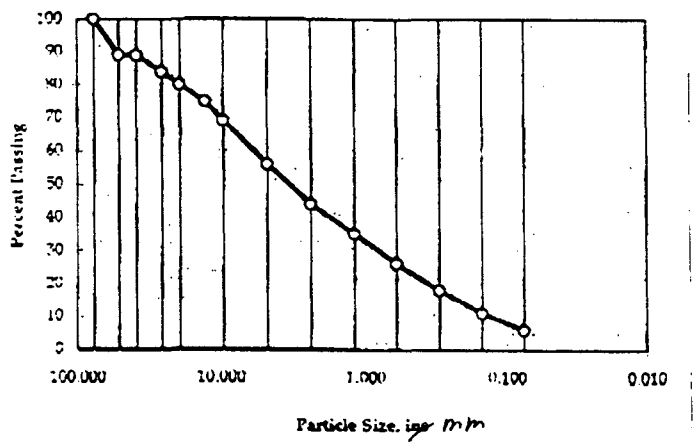
Poorly Graded Sand with Silt And Gravel

Lab No. 13463

7/11/97

		Specification Spec Not Reported Min.	Specification Spec Not Reported Max.	Pass Fail
Sand Equivalent				
Cleanness Value				
Moisture Content				
Liquid Limit	Gran			
Plastic Limit				
Plasticity Index	N/P			
Solubility, % loss				
Swell, 60 psf				
Fractured Faces				
Fineness Modulus				
R-Value				
CBR Value				
Specific Gravity, Dry				
Specific Gravity, SSD				
Specific Gravity, App				
Absorption,%				
% of Wear				

Cumulative Particle-Size Plot



Test results will be mailed on official letter-head, signed and dated.

Sample #5

Summary Report

Percent Passing		Specification Spec Not Reported Min.	Specification Spec Not Reported Max.	Pass Fail
6"				
3"				
2"				
1½"				
1"				
¾"				
½"	100			
3/8"	97			
No. 4	87			
No. 8	73			
No. 16	55			
No. 30	37			
No.50	21			
No 100	11			
No. 200	5.0			

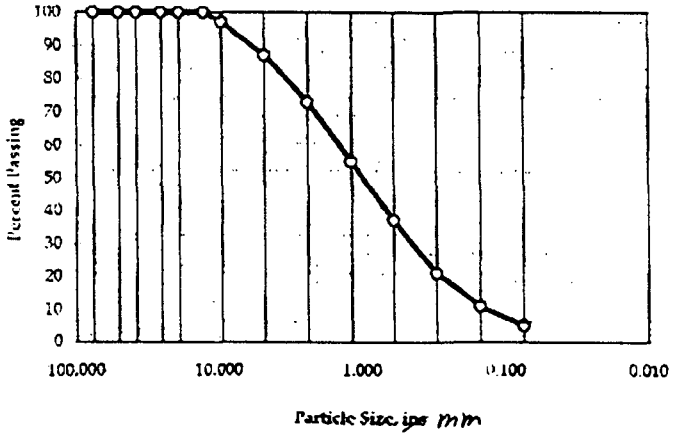
Well Graded Sand with Silt

Lab No. 13464

7/11/97

		Specification Spec Not Reported Min.	Specification Spec Not Reported Max.	Pass Fail
Sand Equivalent				
Cleanness Value				
Moisture Content				
Liquid Limit	Gran			
Plastic Limit				
Plasticity Index	N/P			
Solubility, % loss				
Swell, 60 psf				
Fractured Faces				
Fineness Modulus				
R-Value				
CBR Value				
Specific Gravity, Dry				
Specific Gravity, SSD				
Specific Gravity, App				
Absorption,%				
% of Wear				

Cumulative Particle-Size Plot



Test results will be mailed on official letter-head, signed and dated.

Sample #6

Summary Report

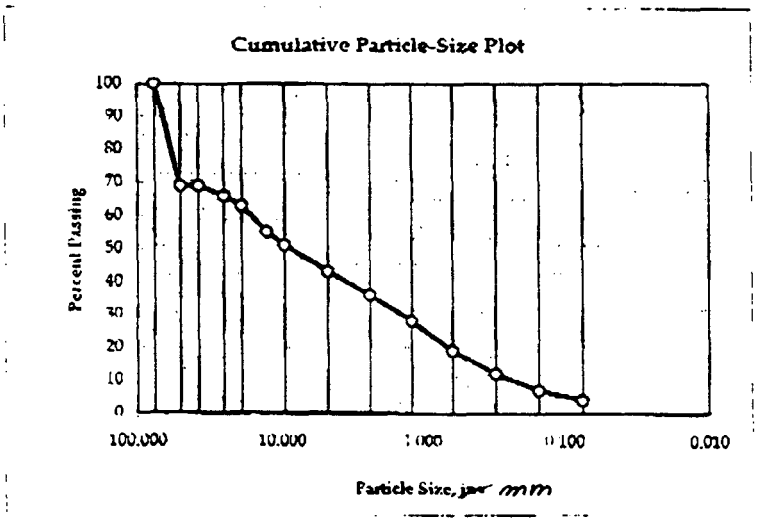
Percent Passing		Specification Spec Not Reported Min	Max.	Pass Fail
6"				
3"	100			
2"	69			
1½"	69			
1"	66			
¾"	63			
½"	55			
3/8"	51			
No. 4	43			
No. 8	36			
No. 16	28			
No. 30	19			
No.50	12			
No. 100	7			
No. 200	3.9			

Poorly Graded Gravel with Sand

Lab No. 13465

7/11/97

		Specification Spec Not Reported Min.	Max.	Pass Fail
Sand Equivalent				
Cleanness Value				
Moisture Content				
Liquid Limit	Gran			
Plastic Limit				
Plasticity Index	N/P			
Solubility, % loss				
Swell, 60 psf				
Fractured Faces				
Fineness Modulus				
R-Value				
CBR Value				
Specific Gravity, Dry				
Specific Gravity, SSD				
Specific Gravity, App				
Absorption,%				
% of Wear				



Test results will be mailed on official letter-head, signed and dated.

Sample #7

Summary Report

Percent Passing		Specification Spec Not Reported Min.	Max.	Pass Fail
6"				
3"				
2"				
1½"	100			
1"	93			
¾"	85			
½"	73			
3/8"	66			
No. 4	57			
No. 8	48			
No. 16	41			
No. 30	36			
No.50	29			
No. 100	22			
No. 200	12.6			

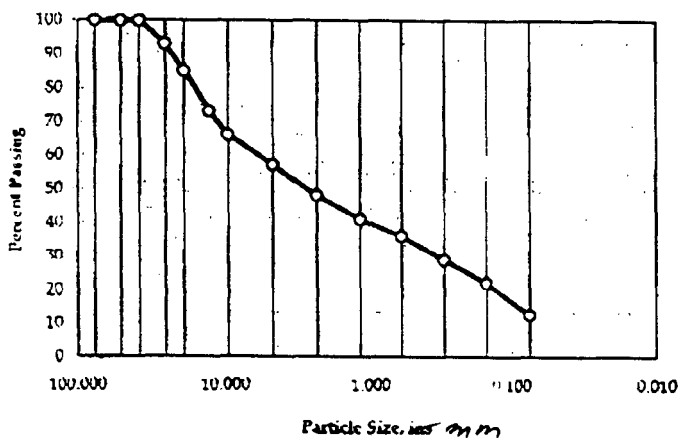
Lab No. 13466

7/11/97

		Specification Spec Not Reported Min.	Max.	Pass Fail
Sand Equivalent				
Cleanness Value				
Moisture Content				
Liquid Limit	Gran			
Plastic Limit				
Plasticity Index	N/P			
Solubility, % loss				
Swell, 60 psf				
Fractured Faces				
Fineness Modulus				
R-Value				
CBR Value				
Specific Gravity, Dry				
Specific Gravity, SSD				
Specific Gravity, App				
Absorption,%				
% of Wear				

Silty Sand With Gravel

Cumulative Particle-Size Plot



Test results will be mailed on official letter-head, signed and dated.

RATING TABLE FOR IRREGULAR CHANNEL

Table
Rating Table for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	C4C Rating Table
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Constant Data	
Channel Slope	0.030000 ft/ft

Input Data			
	Minimum	Maximum	Increment
Discharge	1.00	22,000.00	250.00 cfs

Rating Table

Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
1.00	0.030	2,320.03	0.76
251.00	0.030	2,320.71	6.49
501.00	0.030	2,321.07	8.32
751.00	0.030	2,321.35	9.58
1,001.00	0.030	2,321.59	10.56
1,251.00	0.030	2,321.81	11.37
1,501.00	0.030	2,322.00	12.07
1,751.00	0.030	2,322.19	12.69
2,001.00	0.030	2,322.36	13.24
2,251.00	0.030	2,322.52	13.75
2,501.00	0.030	2,322.67	14.21
2,751.00	0.030	2,322.81	14.64

Tab.

Rating Table for Irregular Channel C4C

Rating Table

Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
3,001.00	0.030	2,322.95	15.04
3,251.00	0.030	2,323.08	15.41
3,501.00	0.030	2,323.21	15.76
3,751.00	0.030	2,323.33	16.10
4,001.00	0.030	2,323.45	16.41
4,251.00	0.030	2,323.56	16.71
4,501.00	0.030	2,323.67	17.00
4,751.00	0.030	2,323.78	17.28
5,001.00	0.030	2,323.89	17.54
5,251.00	0.030	2,323.99	17.80
5,501.00	0.030	2,324.09	18.04
5,751.00	0.030	2,324.19	18.28
6,001.00	0.030	2,324.28	18.51
6,251.00	0.030	2,324.38	18.73
6,501.00	0.030	2,324.47	18.94
6,751.00	0.030	2,324.56	19.15
7,001.00	0.030	2,324.65	19.35
7,251.00	0.030	2,324.73	19.55
7,501.00	0.030	2,324.82	19.74
7,751.00	0.030	2,324.90	19.93
8,001.00	0.030	2,324.98	20.11
8,251.00	0.030	2,325.06	20.29
8,501.00	0.030	2,325.14	20.46
8,751.00	0.030	2,325.22	20.63
9,001.00	0.030	2,325.29	20.80
9,251.00	0.030	2,325.37	20.96
9,501.00	0.030	2,325.44	21.12
9,751.00	0.030	2,325.52	21.27
10,001.00	0.030	2,325.59	21.42
10,251.00	0.030	2,325.66	21.57

Table

Rating Table for Irregular Channel

Rating Table			
Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
10,501.00	0.030	2,325.73	21.72
10,751.00	0.030	2,325.80	21.86
11,001.00	0.030	2,325.87	22.01
11,251.00	0.030	2,325.93	22.14
11,501.00	0.030	2,326.00	22.28
11,751.00	0.030	2,326.07	22.42
12,001.00	0.030	2,326.13	22.55
12,251.00	0.030	2,326.20	22.68
12,501.00	0.030	2,326.26	22.80
12,751.00	0.030	2,326.32	22.93
13,001.00	0.030	2,326.39	23.05
13,251.00	0.030	2,326.45	23.18
13,501.00	0.030	2,326.51	23.30
13,751.00	0.030	2,326.57	23.41
14,001.00	0.030	2,326.63	23.53
14,251.00	0.030	2,326.69	23.65
14,501.00	0.030	2,326.75	23.76
14,751.00	0.030	2,326.80	23.87
15,001.00	0.030	2,326.86	23.98
15,251.00	0.030	2,326.92	24.09
15,501.00	0.030	2,326.97	24.20
15,751.00	0.030	2,327.03	24.31
16,001.00	0.030	2,327.09	24.41
16,251.00	0.030	2,327.14	24.51
16,501.00	0.030	2,327.19	24.62
16,751.00	0.030	2,327.25	24.72
17,001.00	0.030	2,327.30	24.82
17,251.00	0.030	2,327.35	24.92
17,501.00	0.030	2,327.41	25.02
17,751.00	0.030	2,327.46	25.11

Table

Rating Table for Irregular Channel

Rating Table			
Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
18,001.00	0.030	2,327.51	25.21
18,251.00	0.030	2,327.56	25.30
18,501.00	0.030	2,327.61	25.40
18,751.00	0.030	2,327.66	25.49
19,001.00	0.030	2,327.71	25.58
19,251.00	0.030	2,327.76	25.67
19,501.00	0.030	2,327.81	25.76
19,751.00	0.030	2,327.86	25.85
20,001.00	0.030	2,327.91	25.94
20,251.00	0.030	2,327.96	26.03
20,501.00	0.030	2,328.01	26.11
20,751.00	0.030	2,328.06	26.20
21,001.00	0.030	2,328.10	26.28
21,251.00	0.030	2,328.15	26.37
21,501.00	0.030	2,328.20	26.45
21,751.00	0.030	2,328.24	26.53
22,001.00	0.030	2,328.29	26.62

C5D1 Rating Table
Rating Table for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	C4C Rating Table
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Constant Data	
Channel Slope	0.100000 ft/ft

Input Data

	Minimum	Maximum	Increment
Discharge	1.00	1,000.00	50.00 cfs

Rating Table

Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
1.00	0.030	2,275.02	1.09
51.00	0.030	2,275.19	5.20
101.00	0.030	2,275.29	6.80
151.00	0.030	2,275.37	7.96
201.00	0.030	2,275.44	8.90
251.00	0.030	2,275.50	9.69
301.00	0.030	2,275.56	10.40
351.00	0.030	2,275.61	11.03
401.00	0.030	2,275.66	11.60
451.00	0.030	2,275.71	12.13
501.00	0.030	2,275.76	12.63
551.00	0.030	2,275.80	13.09

C5D1 Rating Table
Rating Table for Irregular Channel

Rating Table

Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
601.00	0.030	2,275.85	13.53
651.00	0.030	2,275.89	13.94
701.00	0.030	2,275.93	14.33
751.00	0.030	2,275.97	14.71
801.00	0.030	2,276.00	15.07
851.00	0.030	2,276.04	15.41
901.00	0.030	2,276.08	15.74
951.00	0.030	2,276.11	16.06
1,001.00	0.030	2,276.14	16.37

Table
Rating Table for Irregular Channel

Project Description	
Project File	c:\haestad\fmw\project1.fm2
Worksheet	C5D2 RATING TABLE
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Constant Data	
Channel Slope	0.090000 ft/ft

Input Data			
	Minimum	Maximum	Increment
Discharge	1.00	1,200.00	50.00 cfs

Rating Table

Discharge (cfs)	Wtd. Mannings Coefficient	Water Surface Elevation (ft)	Velocity (ft/s)
1.00	0.030	2,270.29	3.96
51.00	0.030	2,271.27	10.58
101.00	0.030	2,271.64	12.56
151.00	0.030	2,271.90	13.88
201.00	0.030	2,272.12	14.91
251.00	0.030	2,272.30	15.76
301.00	0.030	2,272.47	16.50
351.00	0.030	2,272.61	17.14
401.00	0.030	2,272.75	17.72
451.00	0.030	2,272.87	18.25
501.00	0.030	2,272.99	18.74
551.00	0.030	2,273.09	19.19
601.00	0.030	2,273.20	19.61
651.00	0.030	2,273.29	20.01
701.00	0.030	2,273.39	20.38
751.00	0.030	2,273.47	20.73
801.00	0.030	2,273.56	21.07
851.00	0.030	2,273.64	21.39
901.00	0.030	2,273.72	21.70
951.00	0.030	2,273.80	21.99
1,001.00	0.030	2,273.87	22.28
1,051.00	0.030	2,273.94	22.55
1,101.00	0.030	2,274.01	22.81
1,151.00	0.030	2,274.08	23.07
1,201.00	0.030	2,274.14	23.32

TECHNICAL DRAINAGE STUDY

LETTER OF MAP REVISION
FOR
EQUESTRIAN DETENTION BASIN

PDG PROJECT #1002005

BOOK 4
EAST C-1 DETENTION BASIN
FINAL DESIGN NOTEBOOK

PREPARED FOR:
THE CITY OF HENDERSON
DRAFT
DECEMBER 18, 1998
PREPARED BY:

POGGEMEYER DESIGN GROUP, INC.
ENGINEERS – PLANNERS – SURVEYORS – LANDSCAPE ARCHITECTS
2601 NORTH TENAYA WAY
LAS VEGAS, NEVADA 89128
(702) 255-8100 FAX (702) 255-8375
pdg-lv@pdg-lv.com

COMPUTATION OF SEDIMENT YIELDS

Computation of Sediment Yields, EC1DB

A	A	B	C	D	E	F	G	H
1	Sub-Basin	DA(mi)	C0(ft)	C100(ft)	Z(ft)	C25(ft)	C50(ft)	C75(ft)
2	C4CA	4.53	2440	3400	960	2680	2920	3160
3	C4CB	0.57	2440	3080	640	2600	2760	2920
4	C4CC	0.43	2440	2840	400	2540	2640	2740
5	C5D1	0.08	2260	2640	380	2355	2450	2545
6	C5D2	0.14	2240	2560	320	2320	2400	2480

A	I	J	K	L	M	N	O
1	LC25(ft)	LC50(ft)	LC75(ft)	S	LB25(ft)	LB50(ft)	LB75(ft)
2	9650	21500	26000	0.109	6000	13700	14400
3	3000	4700	1900	0.097	1500	1800	1500
4	5850	3100	2350	0.094	2100	2000	1500
5	2300	1950	500	0.193	1550	1600	450
6	1350	1900	3200	0.129	750	1000	1200

A	P	Q	R	S	T	U
1	EP25	EP50	EP75	Lam25(ft)	Lam50(ft)	Lam75(ft)
2	6.00	7.00	7.00	638	1270	1235
3	1.00	1.00	1.00	866	974	1222
4	1.00	1.00	1.00	1125	1309	974
5	1.00	1.00	1.00	1049	1400	516
6	1.00	1.00	1.00	451	588	647

A	V	W	X	Y	Z	AA	AB
1	Lamta(ft)	Sub-Basin	DA(mi)	LS	K	C	P
2	1048	C4CA	4.53	5.03	0.10	0.32	1.00
3	1021	C4CB	0.57	4.17	0.10	0.32	1.00
4	1136	C4CC	0.43	4.23	0.10	0.32	1.00
5	988	C5D1	0.08	12.37	0.10	0.32	1.00
6	562	C5D2	0.14	4.85	0.10	0.32	1.00

Cell Formulas

Computation of Sediment Yields, EC1DB

A:A1:	Sub-Basin
A:B1:	DA(mi)
A:C1:	C0(ft)
A:D1:	C100(ft)
A:E1:	Z(ft)
A:F1:	C25(ft)
A:G1:	C50(ft)
A:H1:	C75(ft)
A:A2:	C4CA
A:B2:	4.53
A:C2:	2440
A:D2:	3400
A:E2:	+D2-C2
A:F2:	+E2*0.25+C2
A:G2:	+E2*0.5+C2
A:H2:	+E2*0.75+C2
A:A3:	C4CB
A:B3:	0.57
A:C3:	2440
A:D3:	3080
A:E3:	+D3-C3
A:F3:	+E3*0.25+C3
A:G3:	+E3*0.5+C3
A:H3:	+E3*0.75+C3
A:A4:	C4CC
A:B4:	0.43
A:C4:	2440
A:D4:	2840
A:E4:	+D4-C4
A:F4:	+E4*0.25+C4
A:G4:	+E4*0.5+C4
A:H4:	+E4*0.75+C4
A:A5:	C5D1
A:B5:	0.084
A:C5:	2260
A:D5:	2640
A:E5:	+D5-C5
A:F5:	+E5*0.25+C5
A:G5:	+E5*0.5+C5
A:H5:	+E5*0.75+C5
A:A6:	C5D2
A:B6:	0.143
A:C6:	2240
A:D6:	2560
A:E6:	+D6-C6
A:F6:	+E6*0.25+C6
A:G6:	+E6*0.5+C6
A:H6:	+E6*0.75+C6

Computation of Sediment Yields, EC1DB

A:I1:	LC25(ft)
A:J1:	LC50(ft)
A:K1:	LC75(ft)
A:L1:	S
A:M1:	LB25(ft)
A:N1:	LB50(ft)
A:O1:	LB75(ft)
A:I2:	9650
A:J2:	21500
A:K2:	26000
A:L2:	+0.25*E2*(I2+J2+K2)/(B2*5280*5280)
A:M2:	6000
A:N2:	13700
A:O2:	14400
A:I3:	3000
A:J3:	4700
A:K3:	1900
A:L3:	+0.25*E3*(I3+J3+K3)/(B3*5280*5280)
A:M3:	1500
A:N3:	1800
A:O3:	1500
A:I4:	5850
A:J4:	3100
A:K4:	2350
A:L4:	+0.25*E4*(I4+J4+K4)/(B4*5280*5280)
A:M4:	2100
A:N4:	2000
A:O4:	1500
A:I5:	2300
A:J5:	1950
A:K5:	500
A:L5:	+0.25*E5*(I5+J5+K5)/(B5*5280*5280)
A:M5:	1550
A:N5:	1600
A:O5:	450
A:I6:	1350
A:J6:	1900
A:K6:	3200
A:L6:	+0.25*E6*(I6+J6+K6)/(B6*5280*5280)
A:M6:	750
A:N6:	1000
A:O6:	1200

A:P1:	EP25
A:Q1:	EP50
A:R1:	EP75
A:S1:	Lam25(ft)

Computation of Sediment Yields, EC1DB

A:T1:	Lam50(ft)
A:U1:	Lam75(ft)
A:P2:	6
A:Q2:	7
A:R2:	7
A:S2:	(I2*M2)/(2*P2*@SQRT(I2*I2-M2*M2))
A:T2:	(J2*N2)/(2*Q2*@SQRT(J2*J2-N2*N2))
A:U2:	(K2*O2)/(2*R2*@SQRT(K2*K2-O2*O2))
A:P3:	1
A:Q3:	1
A:R3:	1
A:S3:	(I3*M3)/(2*P3*@SQRT(I3*I3-M3*M3))
A:T3:	(J3*N3)/(2*Q3*@SQRT(J3*J3-N3*N3))
A:U3:	(K3*O3)/(2*R3*@SQRT(K3*K3-O3*O3))
A:P4:	1
A:Q4:	1
A:R4:	1
A:S4:	(I4*M4)/(2*P4*@SQRT(I4*I4-M4*M4))
A:T4:	(J4*N4)/(2*Q4*@SQRT(J4*J4-N4*N4))
A:U4:	(K4*O4)/(2*R4*@SQRT(K4*K4-O4*O4))
A:P5:	1
A:Q5:	1
A:R5:	1
A:S5:	(I5*M5)/(2*P5*@SQRT(I5*I5-M5*M5))
A:T5:	(J5*N5)/(2*Q5*@SQRT(J5*J5-N5*N5))
A:U5:	(K5*O5)/(2*R5*@SQRT(K5*K5-O5*O5))
A:P6:	1
A:Q6:	1
A:R6:	1
A:S6:	(I6*M6)/(2*P6*@SQRT(I6*I6-M6*M6))
A:T6:	(J6*N6)/(2*Q6*@SQRT(J6*J6-N6*N6))
A:U6:	(K6*O6)/(2*R6*@SQRT(K6*K6-O6*O6))

A:V1:	Lamta(ft)
A:W1:	Sub-Basin
A:X1:	DA(mi)
A:Y1:	LS
A:Z1:	K
A:AA1:	C
A:AB1:	P
A:V2:	(S2+T2+U2)/3
A:W2:	C4CA
A:X2:	4.53
A:Y2:	(V2/72.6)^0.5*(0.065+0.0454*L2*100+0.0065*(L2*100)^2)
A:Z2:	0.1
A:AA2:	0.32
A:AB2:	1

Computation of Sediment Yields, EC1DB

A:V3:	(S3+T3+U3)/3
A:W3:	C4CB
A:X3:	0.57
A:Y3:	(V3/72.6)^0.5*(0.065+0.0454*L3*100+0.0065*(L3*100)^2)
A:Z3:	0.1
A:AA3:	0.32
A:AB3:	1
A:V4:	(S4+T4+U4)/3
A:W4:	C4CC
A:X4:	0.43
A:Y4:	(V4/72.6)^0.5*(0.065+0.0454*L4*100+0.0065*(L4*100)^2)
A:Z4:	0.1
A:AA4:	0.32
A:AB4:	1
A:V5:	(S5+T5+U5)/3
A:W5:	C5D1
A:X5:	0.084
A:Y5:	(V5/72.6)^0.5*(0.065+0.0454*L5*100+0.0065*(L5*100)^2)
A:Z5:	0.1
A:AA5:	0.32
A:AB5:	1
A:V6:	(S6+T6+U6)/3
A:W6:	C5D2
A:X6:	0.143
A:Y6:	(V6/72.6)^0.5*(0.065+0.0454*L6*100+0.0065*(L6*100)^2)
A:Z6:	0.1
A:AA6:	0.32
A:AB6:	1

Computation of Sediment Yields, EC1DB

A	A	B	C	D	E	F	G
8	Return Pe	C4CA					
9		Qp (cfs)	V (ac-ft)	Ys (tons)	Yb (tons)	Ys+Yb(tor	Ys+Yb (ac
10	PMP	17030	2453	283407	70700	354107	180.6
11	10000	7450	1193	119131	36500	155631	79.4
12	8000	6404	1109	105069	28900	133969	68.3
13	1000	4378	687	64940	21300	86240	44.0
14	500	2809	438	39365	14400	53765	27.4
15	100	2048	318	27568	10200	37768	19.3
16	50	1596	248	20859	9670	30529	15.6
17	25	1150	180	14509	7590	22099	11.3
18	10	646	104	7726	4560	12286	6.3
19	5	316	54	3586	3030	6616	3.4

A	H	I	J	K	L	M	N
8	Return Pe	C4CB					
9	:-ft)	Qp (cfs)	V (ac-ft)	Ys (tons)	Yb (tons)	Ys+Yb(tor	Ys+Yb (ac
10	PMP	2677	310	26139	10300	36439	18.59
11	10000	1145	151	10859	6410	17269	8.81
12	8000	985	129	9139	5500	14639	7.47
13	1000	674	87	5927	3940	9867	5.03
14	500	433	55	3578	2710	6288	3.21
15	100	316	40	2510	2040	4550	2.32
16	50	247	31	1895	1710	3605	1.84
17	25	178	23	1335	1260	2595	1.32
18	10	100	13	702	800	1502	0.77
19	5	49	7	333	450	783	0.40

A	O	P	Q	R	S	T	U
8	Return Pe	C4CC					
9	:-ft)	Qp (cfs)	V (ac-ft)	Ys (tons)	Yb (tons)	Ys+Yb(tor	Ys+Yb (ac
10	PMP	2474	234	21715	9030	30745	15.68
11	10000	1035	114	8911	4500	13411	6.84
12	8000	891	97	7485	4210	11695	5.97
13	1000	611	66	4885	2730	7615	3.88
14	500	393	42	2962	1930	4892	2.50
15	100	286	30	2053	1410	3463	1.77
16	50	223	24	1576	1160	2736	1.40
17	25	162	17	1087	840	1927	0.98
18	10	91	10	584	550	1134	0.58
19	5	44	5	264	290	554	0.28

Computation of Sediment Yields, EC1DB

A:B9:	Qp (cfs)
A:C9:	V (ac-ft)
A:D9:	Ys (tons)
A:E9:	Yb (tons)
A:F9:	Ys+Yb(tons)
A:G9:	Ys+Yb (ac-ft)
A:A10:	PMP
A:B10:	17030
A:C10:	2453
A:D10:	+95*(C10*B10)^0.56*Y2*Z2*AA2*AB2
A:E10:	70700
A:F10:	+D10+E10
A:G10:	+F10*2000/90/43560
A:A11:	10000
A:B11:	7450
A:C11:	1193
A:D11:	+95*(C11*B11)^0.56*Y2*Z2*AA2*AB2
A:E11:	36500
A:F11:	+D11+E11
A:G11:	+F11*2000/90/43560
A:A12:	8000
A:B12:	6404
A:C12:	1109
A:D12:	+95*(C12*B12)^0.56*Y2*Z2*AA2*AB2
A:E12:	28900
A:F12:	+D12+E12
A:G12:	+F12*2000/90/43560
A:A13:	1000
A:B13:	4378
A:C13:	687
A:D13:	+95*(C13*B13)^0.56*Y2*Z2*AA2*AB2
A:E13:	21300
A:F13:	+D13+E13
A:G13:	+F13*2000/90/43560
A:A14:	500
A:B14:	2809
A:C14:	438
A:D14:	+95*(C14*B14)^0.56*Y2*Z2*AA2*AB2
A:E14:	14400
A:F14:	+D14+E14
A:G14:	+F14*2000/90/43560
A:A15:	100
A:B15:	2048
A:C15:	318
A:D15:	+95*(C15*B15)^0.56*Y2*Z2*AA2*AB2
A:E15:	10200
A:F15:	+D15+E15
A:G15:	+F15*2000/90/43560
A:A16:	50
A:B16:	1596

Computation of Sediment Yields, EC1DB

A:C16:	248
A:D16:	+95*(C16*B16)^0.56*Y2*Z2*AA2*AB2
A:E16:	9670
A:F16:	+D16+E16
A:G16:	+F16*2000/90/43560
A:A17:	25
A:B17:	1150
A:C17:	180
A:D17:	+95*(C17*B17)^0.56*Y2*Z2*AA2*AB2
A:E17:	7590
A:F17:	+D17+E17
A:G17:	+F17*2000/90/43560
A:A18:	10
A:B18:	646
A:C18:	104
A:D18:	+95*(C18*B18)^0.56*Y2*Z2*AA2*AB2
A:E18:	4560
A:F18:	+D18+E18
A:G18:	+F18*2000/90/43560
A:A19:	5
A:B19:	316
A:C19:	54
A:D19:	+95*(C19*B19)^0.56*Y2*Z2*AA2*AB2
A:E19:	3030
A:F19:	+D19+E19
A:G19:	+F19*2000/90/43560

A:I9:	Qp (cfs)
A:J9:	V (ac-ft)
A:K9:	Ys (tons)
A:L9:	Yb (tons)
A:M9:	Ys+Yb(tons)
A:N9:	Ys+Yb (ac-ft)
A:H10:	PMP
A:I10:	2677
A:J10:	310
A:K10:	+95*(J10*I10)^0.56*Y3*Z3*AA3*AB3
A:L10:	10300
A:M10:	+K10+L10
A:N10:	+M10*2000/90/43560
A:H11:	10000
A:I11:	1145
A:J11:	151
A:K11:	+95*(J11*I11)^0.56*Y3*Z3*AA3*AB3
A:L11:	6410
A:M11:	+K11+L11
A:N11:	+M11*2000/90/43560

Computation of Sediment Yields, EC1DB

A:H12:	8000
A:I12:	985
A:J12:	129
A:K12:	+95*(J12*I12)^0.56*Y3*Z3*AA3*AB3
A:L12:	5500
A:M12:	+K12+L12
A:N12:	+M12*2000/90/43560
A:H13:	1000
A:I13:	674
A:J13:	87
A:K13:	+95*(J13*I13)^0.56*Y3*Z3*AA3*AB3
A:L13:	3940
A:M13:	+K13+L13
A:N13:	+M13*2000/90/43560
A:H14:	500
A:I14:	433
A:J14:	55
A:K14:	+95*(J14*I14)^0.56*Y3*Z3*AA3*AB3
A:L14:	2710
A:M14:	+K14+L14
A:N14:	+M14*2000/90/43560
A:H15:	100
A:I15:	316
A:J15:	40
A:K15:	+95*(J15*I15)^0.56*Y3*Z3*AA3*AB3
A:L15:	2040
A:M15:	+K15+L15
A:N15:	+M15*2000/90/43560
A:H16:	50
A:I16:	247
A:J16:	31
A:K16:	+95*(J16*I16)^0.56*Y3*Z3*AA3*AB3
A:L16:	1710
A:M16:	+K16+L16
A:N16:	+M16*2000/90/43560
A:H17:	25
A:I17:	178
A:J17:	23
A:K17:	+95*(J17*I17)^0.56*Y3*Z3*AA3*AB3
A:L17:	1260
A:M17:	+K17+L17
A:N17:	+M17*2000/90/43560
A:H18:	10
A:I18:	100
A:J18:	13
A:K18:	+95*(J18*I18)^0.56*Y3*Z3*AA3*AB3
A:L18:	800
A:M18:	+K18+L18
A:N18:	+M18*2000/90/43560
A:H19:	5

Computation of Sediment Yields, EC1DB

A:I19:	49
A:J19:	7
A:K19:	+95*(J19*I19)^0.56*Y3*Z3*AA3*AB3
A:L19:	450
A:M19:	+K19+L19
A:N19:	+M19*2000/90/43560

A:P9:	Qp (cfs)
A:Q9:	V (ac-ft)
A:R9:	Ys (tons)
A:S9:	Yb (tons)
A:T9:	Ys+Yb(tons)
A:U9:	Ys+Yb (ac-ft)
A:O10:	PMP
A:P10:	2474
A:Q10:	234
A:R10:	+95*(Q10*P10)^0.56*Y4*Z4*AA4*AB4
A:S10:	9030
A:T10:	+R10+S10
A:U10:	+T10*2000/90/43560
A:O11:	10000
A:P11:	1035
A:Q11:	114
A:R11:	+95*(Q11*P11)^0.56*Y4*Z4*AA4*AB4
A:S11:	4500
A:T11:	+R11+S11
A:U11:	+T11*2000/90/43560
A:O12:	8000
A:P12:	891
A:Q12:	97
A:R12:	+95*(Q12*P12)^0.56*Y4*Z4*AA4*AB4
A:S12:	4210
A:T12:	+R12+S12
A:U12:	+T12*2000/90/43560
A:O13:	1000
A:P13:	611
A:Q13:	66
A:R13:	+95*(Q13*P13)^0.56*Y4*Z4*AA4*AB4
A:S13:	2730
A:T13:	+R13+S13
A:U13:	+T13*2000/90/43560
A:O14:	500
A:P14:	393
A:Q14:	42
A:R14:	+95*(Q14*P14)^0.56*Y4*Z4*AA4*AB4
A:S14:	1930
A:T14:	+R14+S14

Computation of Sediment Yields, EC1DB

```
A:U14:    +T14*2000/90/43560
A:O15:    100
A:P15:    286
A:Q15:    30
A:R15:    +95*(Q15*P15)^0.56*$Y$4*$Z$4*$AA$4*$AB$4
A:S15:    1410
A:T15:    +R15+S15
A:U15:    +T15*2000/90/43560
A:O16:    50
A:P16:    223
A:Q16:    24
A:R16:    +95*(Q16*P16)^0.56*$Y$4*$Z$4*$AA$4*$AB$4
A:S16:    1160
A:T16:    +R16+S16
A:U16:    +T16*2000/90/43560
A:O17:    25
A:P17:    162
A:Q17:    17
A:R17:    +95*(Q17*P17)^0.56*$Y$4*$Z$4*$AA$4*$AB$4
A:S17:    840
A:T17:    +R17+S17
A:U17:    +T17*2000/90/43560
A:O18:    10
A:P18:    91
A:Q18:    10
A:R18:    +95*(Q18*P18)^0.56*$Y$4*$Z$4*$AA$4*$AB$4
A:S18:    550
A:T18:    +R18+S18
A:U18:    +T18*2000/90/43560
A:O19:    5
A:P19:    44
A:Q19:    5
A:R19:    +95*(Q19*P19)^0.56*$Y$4*$Z$4*$AA$4*$AB$4
A:S19:    290
A:T19:    +R19+S19
A:U19:    +T19*2000/90/43560
```

Computation of Sediment Yields, EC1DB

A	V	W	X	Y	Z	AA	AB
8	Return Pe	C5D1					
9	-ft)	Qp (cfs)	V (ac-ft)	Ys (tons)	Yb (tons)	Ys+Yb(tor	Ys+Yb (ac
10	PMP	795	47	13674	5630	19304	9.85
11	10000	298	23	5290	3110	8400	4.29
12	8000	257	19	4375	2720	7095	3.62
13	1000	180	13	2898	1900	4798	2.45
14	500	119	9	1871	1270	3141	1.60
15	100	89	6	1267	980	2247	1.15
16	50	70	5	1000	790	1790	0.91
17	25	52	4	747	650	1397	0.71
18	10	31	2	379	500	879	0.45
19	5	16	1	178	250	428	0.22

A	AC	AD	AE	AF	AG	AH	AI
8	Return Pe	C5D2					
9	-ft)	Qp (cfs)	V (ac-ft)	Ys (tons)	Yb (tons)	Ys+Yb(tor	Ys+Yb (ac
10	PMP	1109	80	8692	7370	16062	8.19
11	10000	433	39	3433	4110	7543	3.85
12	8000	375	33	2885	3570	6455	3.29
13	1000	261	23	1924	2560	4484	2.29
14	500	171	15	1195	1670	2865	1.46
15	100	127	11	850	1240	2090	1.07
16	50	100	8	622	1040	1662	0.85
17	25	73	6	444	770	1214	0.62
18	10	43	4	263	490	753	0.38
19	5	22	2	123	280	403	0.21

Computation of Sediment Yields, EC1DB

A:W9:	Qp (cfs)
A:X9:	V (ac-ft)
A:Y9:	Ys (tons)
A:Z9:	Yb (tons)
A:AA9:	Ys+Yb(tons)
A:AB9:	Ys+Yb (ac-ft)
A:V10:	PMP
A:W10:	795
A:X10:	47
A:Y10:	+95*(X10*W10)^0.56*Y5*Z5*AA5*AB5
A:Z10:	5630
A:AA10:	+Y10+Z10
A:AB10:	+AA10*2000/90/43560
A:V11:	10000
A:W11:	298
A:X11:	23
A:Y11:	+95*(X11*W11)^0.56*Y5*Z5*AA5*AB5
A:Z11:	3110
A:AA11:	+Y11+Z11
A:AB11:	+AA11*2000/90/43560
A:V12:	8000
A:W12:	257
A:X12:	19
A:Y12:	+95*(X12*W12)^0.56*Y5*Z5*AA5*AB5
A:Z12:	2720
A:AA12:	+Y12+Z12
A:AB12:	+AA12*2000/90/43560
A:V13:	1000
A:W13:	180
A:X13:	13
A:Y13:	+95*(X13*W13)^0.56*Y5*Z5*AA5*AB5
A:Z13:	1900
A:AA13:	+Y13+Z13
A:AB13:	+AA13*2000/90/43560
A:V14:	500
A:W14:	119
A:X14:	9
A:Y14:	+95*(X14*W14)^0.56*Y5*Z5*AA5*AB5
A:Z14:	1270
A:AA14:	+Y14+Z14
A:AB14:	+AA14*2000/90/43560
A:V15:	100
A:W15:	89
A:X15:	6
A:Y15:	+95*(X15*W15)^0.56*Y5*Z5*AA5*AB5
A:Z15:	980
A:AA15:	+Y15+Z15
A:AB15:	+AA15*2000/90/43560
A:V16:	50
A:W16:	70

Computation of Sediment Yields, EC1DB

A:X16:	5
A:Y16:	+95*(X16*W16)^0.56*Y5*Z5*AA5*AB5
A:Z16:	790
A:AA16:	+Y16+Z16
A:AB16:	+AA16*2000/90/43560
A:V17:	25
A:W17:	52
A:X17:	4
A:Y17:	+95*(X17*W17)^0.56*Y5*Z5*AA5*AB5
A:Z17:	650
A:AA17:	+Y17+Z17
A:AB17:	+AA17*2000/90/43560
A:V18:	10
A:W18:	31
A:X18:	2
A:Y18:	+95*(X18*W18)^0.56*Y5*Z5*AA5*AB5
A:Z18:	500
A:AA18:	+Y18+Z18
A:AB18:	+AA18*2000/90/43560
A:V19:	5
A:W19:	16
A:X19:	1
A:Y19:	+95*(X19*W19)^0.56*Y5*Z5*AA5*AB5
A:Z19:	250
A:AA19:	+Y19+Z19
A:AB19:	+AA19*2000/90/43560

A:AD9:	Qp (cfs)
A:AE9:	V (ac-ft)
A:AF9:	Ys (tons)
A:AG9:	Yb (tons)
A:AH9:	Ys+Yb(tons)
A:AI9:	Ys+Yb (ac-ft)
A:AC10:	PMP
A:AD10:	1109
A:AE10:	80
A:AF10:	+95*(AE10*AD10)^0.56*Y6*Z6*AA6*AB6
A:AG10:	7370
A:AH10:	+AF10+AG10
A:AI10:	+AH10*2000/90/43560
A:AC11:	10000
A:AD11:	433
A:AE11:	39
A:AF11:	+95*(AE11*AD11)^0.56*Y6*Z6*AA6*AB6
A:AG11:	4110
A:AH11:	+AF11+AG11
A:AI11:	+AH11*2000/90/43560

Computation of Sediment Yields, EC1DB

A:AC12: 8000
A:AD12: 375
A:AE12: 33
A:AF12: +95*(AE12*AD12)^0.56*Y6*Z6*AA6*AB6
A:AG12: 3570
A:AH12: +AF12+AG12
A:AI12: +AH12*2000/90/43560
A:AC13: 1000
A:AD13: 261
A:AE13: 23
A:AF13: +95*(AE13*AD13)^0.56*Y6*Z6*AA6*AB6
A:AG13: 2560
A:AH13: +AF13+AG13
A:AI13: +AH13*2000/90/43560
A:AC14: 500
A:AD14: 171
A:AE14: 15
A:AF14: +95*(AE14*AD14)^0.56*Y6*Z6*AA6*AB6
A:AG14: 1670
A:AH14: +AF14+AG14
A:AI14: +AH14*2000/90/43560
A:AC15: 100
A:AD15: 127
A:AE15: 11
A:AF15: +95*(AE15*AD15)^0.56*Y6*Z6*AA6*AB6
A:AG15: 1240
A:AH15: +AF15+AG15
A:AI15: +AH15*2000/90/43560
A:AC16: 50
A:AD16: 100
A:AE16: 8
A:AF16: +95*(AE16*AD16)^0.56*Y6*Z6*AA6*AB6
A:AG16: 1040
A:AH16: +AF16+AG16
A:AI16: +AH16*2000/90/43560
A:AC17: 25
A:AD17: 73
A:AE17: 6
A:AF17: +95*(AE17*AD17)^0.56*Y6*Z6*AA6*AB6
A:AG17: 770
A:AH17: +AF17+AG17
A:AI17: +AH17*2000/90/43560
A:AC18: 10
A:AD18: 43
A:AE18: 4
A:AF18: +95*(AE18*AD18)^0.56*Y6*Z6*AA6*AB6
A:AG18: 490
A:AH18: +AF18+AG18
A:AI18: +AH18*2000/90/43560
A:AC19: 5

Computation of Sediment Yields, EC1DB

A:AD19:	22
A:AE19:	2
A:AF19:	+95*(AE19*AD19)^0.56*Y6*Z6*AA6*AB6
A:AG19:	280
A:AH19:	+AF19+AG19
A:AI19:	+AH19*2000/90/43560

HEC-6 MODEL OUTPUT

```
*****************************************************     ************************************
*  SCOUR AND DEPOSITION IN RIVERS AND RESERVOIRS    *     *  U.S. ARMY CORPS OF ENGINEERS    *
*       Version: 4.1.00 -  OCTOBER 1993             *     *  HYDROLOGIC ENGINEERING CENTER   *
*  INPUT FILE:  C4C-1000.DAT                        *     *  609 SECOND STREET               *
*  OUTPUT FILE: C4C-1000.OUT                        *     *  DAVIS, CALIFORNIA 95616-4687    *
*  RUN DATE: 18 SEP 97     RUN TIME: 21:24:55       *     *  (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
                    X     X  XXXXXXX   XXXXX          XXXXX

          ************************************************************************
          *  MAXIMUM LIMITS FOR THIS VERSION ARE:                                *
          *       10  Stream Segments (Main Stem + Tributaries)                  *
          *      500  Cross Sections                                             *
          *      200  Elevation/Station Points per Cross Section                 *
          *       20  Grain Sizes                                                *
          *       10  Control Points                                             *
          ************************************************************************

T1      EAST C-1 DETENSION BASIN      RETURN INTERVAL = 1000 YEARS
T2      SUB-BASIN C4C
T3      SEDIMENTATION BASIN AND EROSION STUDY

N values...  Left   Channel   Right    Contraction    Expansion
           0.0500   0.0300   0.0500       1.1000     0.7000

SECTION NO.      0.100
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      0.350
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      0.600
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      0.800
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

TRIBUTARY ENTRY POINT  1 occurs upstream from Section No.      0.800  at Control Point #  2

SECTION NO.      0.900
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

TRIBUTARY ENTRY POINT  2 occurs upstream from Section No.      0.900  at Control Point #  3

SECTION NO.      1.000
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      1.100
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      1.670
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      2.240
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      2.810
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      3.380
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

NO. OF CROSS SECTIONS IN STREAM SEGMENT= 11
NO. OF INPUT DATA MESSAGES =    0

-------------------------------------------------------------------------------------------------------------

T1      SUB-BASIN C4CC
T2
T3

N values...  Left   Channel   Right    Contraction    Expansion
           0.0500   0.0300   0.0500       1.1000     0.7000

SECTION NO.      0.000
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      0.080
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      0.370
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      0.660
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      0.950
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

SECTION NO.      1.240
...DEPTH of the Bed Sediment Control Volume =   10.00 ft.

NO. OF CROSS SECTIONS IN STREAM SEGMENT=  6
NO. OF INPUT DATA MESSAGES =    0

-------------------------------------------------------------------------------------------------------------

T1      SUB-BASIN C4CB
```

T2
T3

N values... Left Channel Right Contraction Expansion
0.0500 0.0300 0.0500 1.1000 0.7000

SECTION NO. 0.000
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

SECTION NO. 0.070
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

SECTION NO. 0.160
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

SECTION NO. 0.440
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

SECTION NO. 0.720
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

SECTION NO. 1.000
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

SECTION NO. 1.280
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

SECTION NO. 1.560
...DEPTH of the Bed Sediment Control Volume = 10.00 ft.

NO. OF CROSS SECTIONS IN STREAM SEGMENT= 8
NO. OF INPUT DATA MESSAGES = 0

TOTAL NO. OF CROSS SECTIONS IN THE NETWORK = 25
TOTAL NO. OF STREAM SEGMENTS IN THE NETWORK= 3
END OF GEOMETRIC DATA

T4 BED GRADATIONS FROM FIELD SAMPLES SUB-BASIN C4C
T5 SEDIMENT TRANSPORT BY TOFFALETI AND MEYER-PETER AND MULLER COMBINATION
T6
T7
T8

EAST C-1 DETENSION BASIN RETURN INTERVAL = 100 YEARS
SUB-BASIN C4C
SEDIMENTATION BASIN AND EROSION STUDY

SEDIMENT PROPERITES AND PARAMETERS

	SPI	IBG	MNQ	SPGF	ACGR	NFALL	IBSHER
I1	5.	0	1	1.000	32.174	2	1

SANDS - BOULDERS ARE PRESENT

	MTC	LASA	LASA	SPGS	GSF	BSAB	PSI	UWDLB
I4	12	1	10	2.650	0.667	0.500	30.000	93.000

USING TRANSPORT CAPACITY RELATIONSHIP # 12, TOFFALETI-MPM
GRAIN SIZES UTILIZED (mean diameter - mm)

VERY FINE SAND....	0.088	VERY FINE GRAVEL..	2.828
FINE SAND.....	0.177	FINE GRAVEL.....	5.657
MEDIUM SAND.....	0.354	MEDIUM GRAVEL.....	11.314
COARSE SAND.....	0.707	COARSE GRAVEL.....	22.627
VERY COARSE SAND..	1.414	VERY COARSE GRAVEL	45.255

SEDIMENT LOAD TABLE FOR STREAM SEGMENT # 1
LOAD BY GRAIN SIZE CLASS (tons/day)

LQ		1.00000	50.0000	1000.00	5000.00	10000.0	21000.0
LF	VFS	0.700000	7.00000	70.0000	700.000	3500.00	7000.00
LF	FS	0.500000	5.00000	50.0000	500.000	2500.00	5000.00
LF	MS	0.600000	6.00000	60.0000	600.000	3000.00	6000.00
LF	CS	1.00000	10.0000	100.000	1000.00	5000.00	10000.0
LF	VCS	0.900000	9.00000	90.0000	900.000	4500.00	9000.00
LF	VFG	1.20000	12.0000	120.000	1200.00	6000.00	12000.0
LF	FG	1.90000	19.0000	190.000	1900.00	9500.00	19000.0
LF	MG	1.50000	15.0000	150.000	1500.00	7500.00	15000.0
LF	CG	1.10000	11.0000	110.000	1100.00	5500.00	11000.0
LF	VCG	0.400000	4.00000	40.0000	400.000	2000.00	4000.00
TOTAL		9.80000	98.0000	980.000	9800.00	49000.0	98000.0

REACH GEOMETRY FOR STREAM SEGMENT 1

CROSS SECTION NO.	REACH LENGTH (ft)	MOVABLE BED WIDTH	INITIAL BED-ELEVATIONS LEFT SIDE (ft)	THALWEG (ft)	RIGHT SIDE (ft)	ACCUMULATED CHANNEL DISTANCE FROM DOWNSTREAM (ft)	(miles)
	0.000						
0.100		440.000	2360.000	2320.000	2360.000	0.000	0.000
	1330.000						
0.350		440.000	2400.000	2360.000	2400.000	1330.000	0.252
	1330.000						
0.600		440.000	2440.000	2400.000	2440.000	2660.000	0.504
	1100.000						
0.800		440.000	2480.000	2440.000	2480.000	3760.000	0.712
	580.000						
0.900		570.000	2520.000	2462.000	2520.000	4340.000	0.822

	350.000					
1.000		630.000	2520.000	2474.000	2520.000	4690.000	0.888
	410.000					
1.100		600.000	2520.000	2485.000	2503.000	5100.000	0.966
	3000.000					
1.670		600.000	2630.000	2597.000	2615.000	8100.000	1.534
	3000.000					
2.240		600.000	2740.000	2709.000	2727.000	11100.000	2.102
	3000.000					
2.810		600.000	2850.000	2821.000	2839.000	14100.000	2.670
	3000.000					
3.380		600.000	2962.000	2933.000	2951.000	17100.000	3.239

BED MATERIAL GRADATION

SECNO	SAE	DMAX (ft)	DXPI (ft)	XPI	TOTAL BED	BED MATERIAL FRACTIONS per grain size											
0.100	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
0.350	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
0.600	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
0.800	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
0.900	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
1.000	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
1.100	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
1.670	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
2.240	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
2.810	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									
3.380	1.000	0.210	0.210	1.000	1.000	VF	SAND	0.070	VC	SAND	0.090	M	GRVL	0.150			
						F	SAND	0.050	VF	GRVL	0.120	C	GRVL	0.110			
						M	SAND	0.060	F	GRVL	0.190	VC	GRVL	0.060			
						C	SAND	0.100									

T4 BED GRADATIONS FROM FIELD SAMPLES SUB-BASIN C4CC
T5 SEDIMENT TRANSPORT BY TOFFALETI AND MEYER-PETER AND MULLER COMBINATION
T6
T7
T8

SUB-BASIN C4CC

SEDIMENT LOAD TABLE FOR STREAM SEGMENT # 2
LOAD BY GRAIN SIZE CLASS (tons/day)

LQL		1.00000	50.0000	100.000	500.000	1000.00	2500.00
LFL	VFS	0.700000	7.00000	35.0000	70.0000	350.000	700.000
LFL	FS	0.500000	5.00000	25.0000	50.0000	250.000	500.000
LFL	MS	0.600000	6.00000	30.0000	60.0000	300.000	600.000
LFL	CS	1.00000	10.0000	50.0000	100.000	500.000	1000.00
LFL	VCS	0.900000	9.00000	45.0000	90.0000	450.000	900.000
LFL	VFG	1.20000	12.0000	60.0000	120.000	600.000	1200.00
LFL	FG	1.90000	19.0000	95.0000	190.000	950.000	1900.00
LFL	MG	1.50000	15.0000	75.0000	150.000	750.000	1500.00
LFL	CG	1.10000	11.0000	55.0000	110.000	550.000	1100.00
LFL	VCG	0.400000	4.00000	20.0000	40.0000	200.000	400.000
TOTAL		9.80000	98.0000	490.000	980.000	4900.00	9800.00

REACH GEOMETRY FOR STREAM SEGMENT 2

CROSS SECTION NO.	REACH LENGTH (ft)	MOVABLE BED WIDTH	INITIAL BED-ELEVATIONS LEFT SIDE (ft)	THALWEG (ft)	RIGHT SIDE (ft)	ACCUMULATED CHANNEL DISTANCE FROM DOWNSTREAM (ft)	(miles)
	0.000						
0.000		350.000	2468.000	2441.000	2468.000	0.000	0.000
	430.000						
0.080		350.000	2480.000	2452.000	2480.000	430.000	0.081
	1550.000						
0.370		350.000	2520.000	2497.000	2520.000	1980.000	0.375
	1550.000						
0.660		350.000	2582.000	2559.000	2582.000	3530.000	0.669
	1550.000						
0.950		350.000	2644.000	2621.000	2644.000	5080.000	0.962
	1550.000						
1.240		350.000	2706.000	2683.000	2706.000	6630.000	1.256

BED MATERIAL GRADATION

SECNO	SAE	DMAX (ft)	DXPI (ft)	XPI	TOTAL BED	BED MATERIAL FRACTIONS per grain size								
0.000	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150			
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110			
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060			
						C SAND	0.100							
0.080	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150			
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110			
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060			
						C SAND	0.100							
0.370	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150			
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110			
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060			
						C SAND	0.100							
0.660	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150			
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110			
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060			
						C SAND	0.100							
0.950	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150			
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110			
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060			
						C SAND	0.100							
1.240	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150			
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110			
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060			
						C SAND	0.100							

T4 BED GRADATIONS FROM FIELD SAMPLES SUB-BASIN C4CB
T5 SEDIMENT TRANSPORT BY TOFFALETI AND MEYER-PETER AND MULLER COMBINATION
T6
T7
T8

SUB-BASIN C4CB

SEDIMENT LOAD TABLE FOR STREAM SEGMENT # 3
LOAD BY GRAIN SIZE CLASS (tons/day)

LQL		1.00000	50.0000	100.000	500.000	1000.00	2500.00
LFL	VFS	0.700000	7.00000	35.0000	70.0000	350.000	700.000
LFL	FS	0.500000	5.00000	25.0000	50.0000	250.000	500.000
LFL	MS	0.600000	6.00000	30.0000	60.0000	300.000	600.000
LFL	CS	1.00000	10.0000	50.0000	100.000	500.000	1000.00
LFL	VCS	0.900000	9.00000	45.0000	90.0000	450.000	900.000
LFL	VFG	1.20000	12.0000	60.0000	120.000	600.000	1200.00
LFL	FG	1.90000	19.0000	95.0000	190.000	950.000	1900.00
LFL	MG	1.50000	15.0000	75.0000	150.000	750.000	1500.00
LFL	CG	1.10000	11.0000	55.0000	110.000	550.000	1100.00
LFL	VCG	0.400000	4.00000	20.0000	40.0000	200.000	400.000
TOTAL		9.80000	98.0000	490.000	980.000	4900.00	9800.00

REACH GEOMETRY FOR STREAM SEGMENT 3

CROSS SECTION NO.	REACH LENGTH (ft)	MOVABLE BED WIDTH	INITIAL BED-ELEVATIONS LEFT SIDE (ft)	THALWEG (ft)	RIGHT SIDE (ft)	ACCUMULATED CHANNEL DISTANCE FROM DOWNSTREAM (ft)	(miles)
	0.000						
0.000		350.000	2470.000	2462.000	2506.000	0.000	0.000
	350.000						
0.070		350.000	2484.000	2476.000	2520.000	350.000	0.066
	480.000						
0.160		480.000	2503.000	2493.000	2520.000	830.000	0.157
	1500.000						
0.440		480.000	2563.000	2553.000	2580.000	2330.000	0.441
	1500.000						

0.720		480.000	2623.000	2613.000	2640.000	3830.000	0.725
	1500.000						
1.000		480.000	2683.000	2673.000	2700.000	5330.000	1.009
	1500.000						
1.280		480.000	2743.000	2733.000	2760.000	6830.000	1.294
	1500.000						
1.560		480.000	2803.000	2793.000	2820.000	8330.000	1.578

BED MATERIAL GRADATION

SECNO	SAE	DMAX (ft)	DXPI (ft)	XPI	TOTAL BED	BED MATERIAL FRACTIONS per grain size					
0.000	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				
0.070	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				
0.160	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				
0.440	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				
0.720	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				
1.000	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				
1.280	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				
1.560	1.000	0.210	0.210	1.000	1.000	VF SAND	0.070	VC SAND	0.090	M GRVL	0.150
						F SAND	0.050	VF GRVL	0.120	C GRVL	0.110
						M SAND	0.060	F GRVL	0.190	VC GRVL	0.060
						C SAND	0.100				

BED SEDIMENT CONTROL VOLUMES

STREAM SEGMENT # 1: EAST C-1 DETENSION BASIN RETURN INTERVAL = 100 YEARS

SECTION NUMBER	LENGTH (ft)	WIDTH (ft)	DEPTH (ft)	VOLUME (cu.ft)	VOLUME (cu.yd)
0.100	665.000	440.000	10.000	0.292600E+07	108370.
0.350	1330.000	440.000	10.000	0.585200E+07	216741.
0.600	1215.000	440.000	10.000	0.534600E+07	198000.
0.800	840.000	454.960	10.000	0.382167E+07	141543.
0.900	465.000	550.502	10.000	0.255983E+07	94808.6
1.000	380.000	615.395	10.000	0.233850E+07	86611.1
1.100	1705.000	601.202	10.000	0.102505E+08	379648.
1.670	3000.000	600.000	10.000	0.180000E+08	666667.
2.240	3000.000	600.000	10.000	0.180000E+08	666667.
2.810	3000.000	600.000	10.000	0.180000E+08	666667.
3.380	1500.000	600.000	10.000	0.900000E+07	333333.

BED SEDIMENT CONTROL VOLUMES

STREAM SEGMENT # 2: SUB-BASIN C4CC

SECTION NUMBER	LENGTH (ft)	WIDTH (ft)	DEPTH (ft)	VOLUME (cu.ft)	VOLUME (cu.yd)
0.000	215.000	350.000	10.000	752500.	27870.4
0.080	990.000	350.000	10.000	0.346500E+07	128333.
0.370	1550.000	350.000	10.000	0.542500E+07	200926.
0.660	1550.000	350.000	10.000	0.542500E+07	200926.
0.950	1550.000	350.000	10.000	0.542500E+07	200926.
1.240	775.000	350.000	10.000	0.271250E+07	100463.

BED SEDIMENT CONTROL VOLUMES

STREAM SEGMENT # 3: SUB-BASIN C4CB

SECTION NUMBER	LENGTH (ft)	WIDTH (ft)	DEPTH (ft)	VOLUME (cu.ft)	VOLUME (cu.yd)
0.000	175.000	350.000	10.000	612500.	22685.2
0.070	415.000	375.060	10.000	0.155650E+07	57648.1
0.160	990.000	469.495	10.000	0.464800E+07	172148.
0.440	1500.000	480.000	10.000	0.720000E+07	266667.
0.720	1500.000	480.000	10.000	0.720000E+07	266667.
1.000	1500.000	480.000	10.000	0.720000E+07	266667.
1.280	1500.000	480.000	10.000	0.720000E+07	266667.
1.560	750.000	480.000	10.000	0.360000E+07	133333.

NO. OF INPUT DATA MESSAGES= 0
END OF SEDIMENT DATA

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$HYD
BEGIN COMPUTATIONS.

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$RATING

Downstream Boundary Condition - Rating Curve
  Elevation      Stage      Discharge |  Elevation      Stage      Discharge
 -----------------------------------|-----------------------------------
   2320.030   2320.030        0.000 |  2323.890   2323.890   5000.000
   2320.710   2320.710      250.000 |  2323.990   2323.990   5250.000
   2321.070   2321.070      500.000 |  2324.090   2324.090   5500.000
   2321.350   2321.350      750.000 |  2324.190   2324.190   5750.000
   2321.590   2321.590     1000.000 |  2324.280   2324.280   6000.000
   2321.810   2321.810     1250.000 |  2324.380   2324.380   6250.000
   2322.000   2322.000     1500.000 |  2324.470   2324.470   6500.000
   2322.190   2322.190     1750.000 |  2324.560   2324.560   6750.000
   2322.360   2322.360     2000.000 |  2324.650   2324.650   7000.000
   2322.520   2322.520     2250.000 |  2324.730   2324.730   7250.000
   2322.670   2322.670     2500.000 |  2324.820   2324.820   7500.000
   2322.810   2322.810     2750.000 |  2324.900   2324.900   7750.000
   2322.950   2322.950     3000.000 |  2324.980   2324.980   8000.000
   2323.080   2323.080     3250.000 |  2325.060   2325.060   8250.000
   2323.210   2323.210     3500.000 |  2325.140   2325.140   8500.000
   2323.330   2323.330     3750.000 |  2325.220   2325.220   8750.000
   2323.450   2323.450     4000.000 |  2325.290   2325.290   9000.000
   2323.560   2323.560     4250.000 |  2325.370   2325.370   9250.000
   2323.670   2323.670     4500.000 |  2325.440   2325.440   9500.000
   2323.780   2323.780     4750.000 |  2325.520   2325.520   9750.000

===========================================================================================
TIME STEP #       1
*   A

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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                             22.000        60.00       2320.090

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH      BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.003 DAYS.**                    **ELOEQ**
****      22.000  2320.200  2320.319    0.119    1.000    51.876  2320.047   0.000    2.762    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =       0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  8.    2360.201      2352.477
  9.    2360.222      2346.842      2360.172
****      22.000  2360.222  2360.280    0.058    1.000    52.665  2360.006   0.000    1.930    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =       0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2400.133      2392.980
  1.    2400.227      2375.207      2400.177
****      22.000  2400.227  2400.282    0.055    1.000    52.725  2400.006   0.000    1.886    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =       0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2440.165      2419.749
  1.    2440.239      2411.192      2440.189
****      22.000  2440.239  2440.289    0.050    1.000    52.866  2440.006   0.000    1.791    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:     3.000        60.00
                    Total:     19.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =       0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2462.141      2444.858
  1.    2462.166      2443.781      2462.116
****      19.000  2462.166  2462.186    0.020    1.008   102.396  2462.001   0.000    1.138    0.430
                                                 FLOW DISTRIBUTION (%) =     0.000   99.689    0.311

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:     3.000        60.00
                    Total:     16.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =       0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
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  0.   2475.392     2462.209
  1.   2474.084     2467.382     2474.128
****     16.000  2474.084  2474.299   0.215    1.006    52.388  2474.001   0.000   3.724   1.416
                                               FLOW DISTRIBUTION (%) =    0.000  99.738   0.262

SECTION NO.       1.100
****     16.000  2485.200  2485.237   0.037    1.021    54.432  2485.002   0.000   1.543   0.590
                                               FLOW DISTRIBUTION (%) =    0.000  99.103   0.897

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2597.175     2517.079
  1.   2597.194     2512.094     2597.144
****     16.000  2597.194  2597.234   0.040    1.021    54.273  2597.004   0.000   1.602   0.612
                                               FLOW DISTRIBUTION (%) =    0.000  99.134   0.866

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2709.196     2625.426
  1.   2709.084     2684.277     2709.128
****     16.000  2709.084  2709.302   0.218    1.009    51.854  2709.001   0.000   3.750   1.422
                                               FLOW DISTRIBUTION (%) =    0.000  99.621   0.379

SECTION NO.       2.810
****     16.000  2821.172  2821.222   0.049    1.019    53.836  2821.001   0.000   1.790   0.683
                                               FLOW DISTRIBUTION (%) =    0.000  99.222   0.778

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2933.115     2898.180
  1.   2933.209     2851.173     2933.159
****     16.000  2933.209  2933.243   0.034    1.022    54.592  2933.004   0.000   1.488   0.569
                                               FLOW DISTRIBUTION (%) =    0.000  99.071   0.929

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              3.000       60.00       2440.239

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH      BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.003 DAYS.**                    **BLOEQ**
****      3.000  2441.271  2441.366   0.095    1.000     9.850  2441.148   0.000   2.474   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  6.   2452.388     2445.502
  7.   2452.321     2449.327     2452.271
****      3.000  2452.321  2452.354   0.033    1.000    12.834  2452.160   0.000   1.457   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2497.366     2468.501
  1.   2497.379     2467.119     2497.329
****      3.000  2497.379  2497.417   0.038    1.000    10.095  2497.189   0.000   1.570   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2559.261     2530.307
  1.   2559.358     2513.965     2559.308
****      3.000  2559.358  2559.406   0.048    1.000     9.556  2559.179   0.000   1.752   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2646.622     2559.411
  1.   2621.282     2593.519     2621.326
****      3.000  2621.282  2621.407   0.125    1.000     7.515  2621.141   0.000   2.833   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
SECTION NO.       1.240 TIME =      0.003 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  8.   2683.282     2690.680
  9.   2683.316     2671.498     2683.326
****      3.000  2683.316  2683.395   0.078    1.000     8.438  2683.158   0.000   2.247   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
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                              (cfs)        (deg F)        (ft)
                               3.000        60.00       2462.166

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.003 DAYS.**                    **ELOEQ**
****       3.000  2462.318  2462.449   0.131    1.000      7.542  2462.181   0.000   2.901   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.070
SECTION NO.       0.070 TIME =      0.003 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  4.   2476.282      2478.160
  5.   2476.320      2473.342      2476.326
****       3.000  2476.320  2476.391   0.070    1.000      8.806  2476.160   0.000   2.128   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.003 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2495.440      2476.398
  1.   2493.227      2493.104      2493.271
****       3.000  2493.227  2493.359   0.132    1.000      9.078  2493.113   0.000   2.912   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.003 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2553.295      2536.769
  1.   2553.306      2531.602      2553.256
****       3.000  2553.306  2553.346   0.040    1.000     12.256  2553.153   0.000   1.598   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.003 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2635.179      2553.350
  1.   2613.227      2591.515      2613.271
****       3.000  2613.227  2613.359   0.132    1.000      9.078  2613.113   0.000   2.912   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.003 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
 11.   2673.273      2668.933
 12.   2673.321      2646.063      2673.271
****       3.000  2673.321  2673.354   0.033    1.000     12.834  2673.160   0.000   1.457   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.003 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2930.598      2673.357
  1.   2733.227      2705.979      2733.271
****       3.000  2733.227  2733.359   0.132    1.000      9.078  2733.113   0.000   2.912   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.003 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
 11.   2793.277      2786.340
 12.   2793.321      2766.063      2793.271
****       3.000  2793.321  2793.354   0.033    1.000     12.834  2793.160   0.000   1.457   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

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TIME STEP #       2
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               28.000        60.00       2320.106

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.007 DAYS.**                    **ELOEQ**
****      28.000  2320.228  2320.364   0.137    1.000     52.215  2320.047   0.000   2.967   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.350
SECTION NO.       0.350 TIME =      0.007 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2360.222      2354.121
  1.   2360.183      2367.666      2360.227
****      28.000  2360.183  2360.322   0.139    1.000     52.197  2360.004   0.000   2.993   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.600
SECTION NO.       0.600 TIME =      0.007 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
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  0.   2400.227     2393.254
  1.   2400.183     2408.305     2400.227
****     28.000  2400.183  2400.323   0.139    1.000    52.197  2400.004   0.000    2.993   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2440.239     2424.971
  1.   2440.183     2439.984     2440.227
****     28.000  2440.183  2440.322   0.139    1.000    52.197  2440.004   0.000    2.993   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
        Tributary Inflow:        4.000        60.00
                   Total:       24.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.   2462.076     2471.396
  2.   2462.170     2448.628     2462.120
****     24.000  2462.170  2462.202   0.032    1.008   102.406  2462.004   0.000    1.431   0.541
                                                FLOW DISTRIBUTION (%) =    0.000   99.688   0.312

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
        Tributary Inflow:        4.000        60.00
                   Total:       20.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2474.107     2468.180
  1.   2474.201     2464.991     2474.151
****     20.000  2474.201  2474.252   0.051    1.015    55.934  2473.999   0.000    1.819   0.702
                                                FLOW DISTRIBUTION (%) =    0.000   99.357   0.643
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2485.200     2479.327
  1.   2485.129     2483.825     2485.173
****     20.000  2485.129  2485.274   0.145    1.014    52.821  2485.003   0.000    3.063   1.165
                                                FLOW DISTRIBUTION (%) =    0.000   99.426   0.574
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  2.   2597.162     2606.226
  3.   2597.223     2548.437     2597.173
****     20.000  2597.223  2597.270   0.047    1.023    54.887  2597.006   0.000    1.745   0.667
                                                FLOW DISTRIBUTION (%) =    0.000   99.012   0.988
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2709.107     2673.739
  1.   2709.201     2630.378     2709.151
****     20.000  2709.201  2709.258   0.057    1.021    54.453  2709.002   0.000    1.919   0.733
                                                FLOW DISTRIBUTION (%) =    0.000   99.099   0.901
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2821.172     2759.763
  1.   2821.129     2785.902     2821.173
****     20.000  2821.129  2821.274   0.145    1.014    52.820  2821.002   0.000    3.063   1.165
                                                FLOW DISTRIBUTION (%) =    0.000   99.426   0.574
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  2.   2933.168     2930.947
  3.   2933.221     2884.437     2933.171
****     20.000  2933.221  2933.268   0.047    1.023    54.885  2933.003   0.000    1.745   0.667
                                                FLOW DISTRIBUTION (%) =    0.000   99.013   0.987

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                                4.000        60.00       2440.183

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
         (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.007 DAYS.**                    **ELOEQ**
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****      4.000  2441.293  2441.406   0.113    1.000    10.881  2441.157   0.000   2.700   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
SECTION NO.       0.080 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  4.   2452.321      2452.832
  5.   2452.346      2450.397      2452.001
****      4.000  2452.346  2452.390   0.043    1.000    13.837  2452.173   0.000   1.672   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2497.379      2473.765
  1.   2497.326      2482.478      2497.370
****      4.000  2497.326  2497.450   0.124    1.000     8.687  2497.163   0.000   2.827   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2559.358      2541.290
  1.   2559.326      2554.313      2559.370
****      4.000  2559.326  2559.451   0.124    1.000     8.688  2559.163   0.000   2.827   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2621.324      2616.679
  1.   2621.418      2586.511      2621.368
****      4.000  2621.418  2621.463   0.045    1.000    11.166  2621.208   0.000   1.710   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2683.314      2650.346
  1.   2683.408      2637.284      2683.358
****      4.000  2683.408  2683.458   0.050    1.000    10.907  2683.204   0.000   1.793   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000


SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            4.000         60.00       2462.170

****  DISCHARGE    WATER     ENERGY   VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.007 DAYS.**                    **ELOEQ**
****      4.000  2462.366  2462.483   0.117    1.000     8.957  2462.203   0.000   2.740   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2476.318      2475.421
  1.   2476.412      2468.593      2476.362
****      4.000  2476.412  2476.459   0.046    1.000    11.282  2476.207   0.000   1.729   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2493.280      2485.068
  1.   2493.374      2480.660      2493.324
****      4.000  2493.374  2493.406   0.032    1.000    14.947  2493.187   0.000   1.432   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2553.306      2512.502
  1.   2553.271      2517.943      2553.315
****      4.000  2553.271  2553.387   0.115    1.000    10.836  2553.136   0.000   2.726   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
SECTION NO.       0.720 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  3.   2613.280      2613.705
  4.   2613.322      2593.389      2613.324
****      4.000  2613.322  2613.380   0.058    1.000    12.860  2613.162   0.000   1.935   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.007 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2673.321      2639.564
  1.   2673.270      2653.350      2673.314
```

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****      4.000  2673.270  2673.386   0.116    1.000    10.832  2673.135   0.000   2.727   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
 10.    2733.291      2726.574
 11.    2733.330      2709.924      2733.280
****      4.000  2733.330  2733.382   0.052    1.000    13.238  2733.164   0.000   1.825   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.007 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2793.321      2757.620
  1.    2793.270      2769.866      2793.314
****      4.000  2793.270  2793.386   0.116    1.000    10.833  2793.135   0.000   2.727   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       3
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           35.000        60.00       2320.125

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.010 DAYS.**                    **ELOEQ**
****     35.000  2320.247  2320.422   0.175    1.000    52.443  2320.048   0.000   3.356   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
****     35.000  2360.209  2360.336   0.126    1.000    52.865  2359.977   0.000   2.851   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  8.    2400.229      2393.503
  9.    2400.275      2384.440      2400.225
****     35.000  2400.275  2400.370   0.094    1.000    53.298  2400.009   0.000   2.466   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2440.181      2429.990
  1.    2440.275      2416.193      2440.225
****     35.000  2440.275  2440.369   0.094    1.000    53.300  2440.008   0.000   2.464   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:      6.000       60.00
                   Total:     29.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2462.170      2446.699
  1.    2462.088      2456.026      2462.131
****     29.000  2462.088  2462.270   0.182    1.004   101.218  2462.003   0.000   3.428   1.293
                                                FLOW DISTRIBUTION (%) =    0.000  99.842   0.158

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:      5.000       60.00
                   Total:     24.000       60.00

SECTION NO.       1.000
SECTION NO.       1.000 TIME =      0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2474.201      2474.258
  1.    2474.246      2470.085      2473.995
****     24.000  2474.246  2474.296   0.050    1.018    57.119  2474.006   0.000   1.803   0.700
                                                FLOW DISTRIBUTION (%) =    0.000  99.232   0.768

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2485.152      2481.873
  1.    2485.246      2478.058      2485.196
****     24.000  2485.246  2485.301   0.055    1.026    55.402  2485.006   0.000   1.887   0.723
                                                FLOW DISTRIBUTION (%) =    0.000  98.910   1.090

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.010 DAYS.
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TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2597.223      2519.721
  1.   2597.129      2558.271      2597.173
****      24.000  2597.129  2597.338   0.209    1.014     52.821  2597.003   0.000   3.676   1.398
                                                FLOW DISTRIBUTION (%) =     0.000  99.426   0.574

SECTION NO.       2.240
SECTION NO.       2.240 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  1.   2709.201      2708.380
  2.   2709.164      2762.772      2709.171
****      24.000  2709.164  2709.288   0.125    1.018     53.631  2709.002   0.000   2.840   1.082
                                                FLOW DISTRIBUTION (%) =     0.000  99.263   0.737

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
 10.   2821.177      2808.114
 11.   2821.245      2762.733      2821.195
****      24.000  2821.245  2821.300   0.055    1.026     55.395  2821.006   0.000   1.890   0.724
                                                FLOW DISTRIBUTION (%) =     0.000  98.911   1.089

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2933.221      2855.370
  1.   2933.125      2894.449      2933.169
****      24.000  2933.125  2933.334   0.209    1.014     52.818  2932.999   0.000   3.676   1.398
                                                FLOW DISTRIBUTION (%) =     0.000  99.426   0.574


SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                6.000        60.00       2440.275

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.010 DAYS.**                    **ELOEQ**
****       6.000  2441.345  2441.470   0.125    1.000     13.004  2441.182   0.000   2.832   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  7.   2452.417      2449.100
  8.   2452.394      2450.606      2452.344
****       6.000  2452.394  2452.453   0.059    1.000     15.728  2452.198   0.000   1.941   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2497.379      2485.156
  1.   2497.473      2471.534      2497.423
****       6.000  2497.473  2497.536   0.063    1.000     12.587  2497.237   0.000   2.021   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2559.379      2527.811
  1.   2559.473      2515.282      2559.423
****       6.000  2559.473  2559.537   0.064    1.000     12.575  2559.237   0.000   2.025   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2621.418      2583.700
  1.   2621.381      2589.379      2621.424
****       6.000  2621.381  2621.531   0.150    1.000     10.149  2621.190   0.000   3.107   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.010 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2683.362      2681.261
  1.   2683.456      2652.845      2683.406
****       6.000  2683.456  2683.524   0.068    1.000     12.366  2683.224   0.000   2.086   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000


SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                5.000        60.00       2462.088

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
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        (CFS)      SURFACE    LINE      HEAD              WIDTH      BED         1         2         3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.010 DAYS.**                    **ELOEQ**
****       5.000  2462.363  2462.545    0.182    1.000      8.955  2462.200    0.000    3.423    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =       0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  2.    2476.370      2475.847
  3.    2476.422      2471.404      2476.372
****       5.000  2476.422  2476.488    0.066    1.000     11.546  2476.212    0.000    2.064    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =       0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.374      2482.726
  1.    2493.283      2488.781      2493.327
****       5.000  2493.283  2493.437    0.154    1.000     11.277  2493.142    0.000    3.146    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =       0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 10.    2553.329      2546.534
 11.    2553.363      2532.404      2553.313
****       5.000  2553.363  2553.419    0.056    1.000     14.531  2553.182    0.000    1.894    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =       0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.276      2594.858
  1.    2613.370      2574.124      2613.320
****       5.000  2613.370  2613.424    0.053    1.000     14.697  2613.187    0.000    1.854    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =       0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.268      2654.576
  1.    2673.362      2634.144      2673.312
****       5.000  2673.362  2673.418    0.056    1.000     14.523  2673.180    0.000    1.896    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =       0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.330      2700.193
  1.    2733.279      2712.383      2733.323
****       5.000  2733.279  2733.433    0.154    1.000     11.263  2733.138    0.000    3.151    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =       0.010 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 10.    2793.327      2786.737
 11.    2793.362      2772.180      2793.312
****       5.000  2793.362  2793.418    0.055    1.000     14.556  2793.180    0.000    1.887    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       4
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             44.000        60.00       2320.150

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD              WIDTH      BED         1         2         3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.014 DAYS.**                    **ELOEQ**
****      44.000  2320.271  2320.484    0.213    1.000     52.773  2320.046    0.000    3.704    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =       0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  8.    2360.288      2357.477
  9.    2360.356      2344.912      2360.306
****      44.000  2360.356  2360.444    0.088    1.000     54.261  2360.015    0.000    2.377    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =       0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2400.229      2385.178
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  1.   2400.323     2375.449     2400.273
****     44.000  2400.323  2400.431   0.108    1.000    53.866  2400.013   0.000   2.630   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2440.229     2425.891
  1.   2440.323     2415.396     2440.273
****     44.000  2440.323  2440.433   0.110    1.000    53.821  2440.016   0.000   2.663   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                          DISCHARGE    TEMPERATURE
                            (cfs)        (deg F)
          Tributary Inflow:      7.000        60.00
                    Total:      37.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2462.110     2453.347
  1.   2462.204     2445.983     2462.154
****     37.000  2462.204  2462.252   0.048    1.010   103.023  2461.996   0.000   1.752   0.662
                                              FLOW DISTRIBUTION (%) =    0.000  99.608   0.392

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                          DISCHARGE    TEMPERATURE
                            (cfs)        (deg F)
          Tributary Inflow:      6.000        60.00
                    Total:      31.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2474.246     2465.640
  1.   2474.181     2467.370     2474.225
****     31.000  2474.181  2474.344   0.163    1.013    55.185  2474.004   0.000   3.249   1.251
                                              FLOW DISTRIBUTION (%) =    0.000  99.437   0.563

SECTION NO.       1.100
SECTION NO.       1.100 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  1.   2485.246     2484.938
  2.   2485.216     2487.900     2485.229
****     31.000  2485.216  2485.338   0.123    1.023    54.693  2485.007   0.000   2.820   1.078
                                              FLOW DISTRIBUTION (%) =    0.000  99.051   0.949

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2597.196     2575.619
  1.   2597.290     2530.298     2597.240
****     31.000  2597.290  2597.355   0.065    1.030    56.370  2597.008   0.000   2.054   0.789
                                              FLOW DISTRIBUTION (%) =    0.000  98.719   1.281

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2709.187     2650.860
  1.   2709.280     2626.595     2709.230
****     31.000  2709.280  2709.349   0.069    1.029    56.193  2709.006   0.000   2.115   0.812
                                              FLOW DISTRIBUTION (%) =    0.000  98.754   1.246

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2821.245     2747.936
  1.   2821.184     2767.910     2821.228
****     31.000  2821.184  2821.352   0.168    1.019    54.028  2821.004   0.000   3.299   1.259
                                              FLOW DISTRIBUTION (%) =    0.000  99.183   0.817

SECTION NO.       3.380
SECTION NO.       3.380 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  6.   2933.192     2935.396
  7.   2933.219     2911.528     2933.236
****     31.000  2933.219  2933.328   0.109    1.024    54.965  2932.998   0.000   2.656   1.016
                                              FLOW DISTRIBUTION (%) =    0.000  98.997   1.003


SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE    TEMPERATURE  WATER SURFACE
                            (cfs)        (deg F)        (ft)
                              7.000        60.00       2440.323

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.014 DAYS.**                    **ELOEQ**
****      7.000  2441.356  2441.501   0.145    1.000    13.511  2441.186   0.000   3.058   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
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SECTION NO.       0.080 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  4.    2452.394      2452.957
  5.    2452.422      2450.757      2452.002
****       7.000  2452.422  2452.483   0.061    1.000    16.820  2452.212   0.000   1.981   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.473      2474.223
  1.    2497.383      2487.804      2497.427
****       7.000  2497.383  2497.587   0.204    1.000    10.156  2497.192   0.000   3.622   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.    2559.384      2573.351
  2.    2559.478      2537.395      2559.428
****       7.000  2559.478  2559.562   0.084    1.000    12.667  2559.241   0.000   2.329   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2621.422      2591.380
  1.    2621.516      2578.338      2621.466
****       7.000  2621.516  2621.578   0.061    1.000    13.708  2621.260   0.000   1.989   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.456      2640.090
  1.    2683.358      2652.406      2683.402
****       7.000  2683.358  2683.565   0.207    1.000    10.074  2683.168   0.000   3.651   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            6.000         60.00       2462.204

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD              WIDTH      BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.014 DAYS.**                    **ELOEQ**
****       6.000  2462.381  2462.579   0.198    1.000     9.604  2462.206   0.000   3.566   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.    2476.386      2477.144
  2.    2476.480      2469.931      2476.430
****       6.000  2476.480  2476.538   0.058    1.000    13.066  2476.243   0.000   1.936   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.325      2485.414
  1.    2493.419      2481.309      2493.369
****       6.000  2493.419  2493.465   0.046    1.000    16.704  2493.210   0.000   1.721   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2553.363      2514.275
  1.    2553.327      2519.806      2553.371
****       6.000  2553.327  2553.451   0.124    1.000    13.033  2553.164   0.000   2.827   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.370      2593.031
  1.    2613.330      2608.286      2613.374
****       6.000  2613.330  2613.454   0.124    1.000    13.047  2613.167   0.000   2.824   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.362      2653.831
  1.    2673.324      2668.336      2673.368
****       6.000  2673.324  2673.449   0.124    1.000    13.022  2673.161   0.000   2.829   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
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SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.321      2728.237
  1.    2733.415      2699.375      2733.365
****       6.000  2733.415  2733.460    0.045    1.000    16.778  2733.205    0.000    1.702    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.014 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.362      2753.609
  1.    2793.323      2759.329      2793.367
****       6.000  2793.323  2793.448    0.124    1.000    13.018  2793.160    0.000    2.830    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #        5
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               55.000        60.00       2320.180

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP        AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED          1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.017 DAYS.**                    **ELOEQ**
****      55.000  2320.345  2320.531    0.186    1.000    53.682  2320.048    0.000    3.456    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2360.356      2345.877
  1.    2360.283      2358.074      2360.327
****      55.000  2360.283  2360.504    0.222    1.000    53.382  2360.010    0.000    3.775    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  8.    2400.311      2397.575
  9.    2400.371      2387.305      2400.321
****      55.000  2400.371  2400.498    0.126    1.000    54.432  2400.017    0.000    2.852    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2440.277      2423.564
  1.    2440.371      2415.091      2440.321
****      55.000  2440.371  2440.499    0.128    1.000    54.408  2440.018    0.000    2.869    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      9.000        60.00
                    Total:      46.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2462.204      2447.232
  1.    2462.124      2453.407      2462.168
****      46.000  2462.124  2462.322    0.198    1.006   101.851  2461.996    0.000    3.570    1.347
                                                 FLOW DISTRIBUTION (%) =     0.000   99.759    0.241

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      8.000        60.00
                    Total:      38.000        60.00

SECTION NO.       1.000
SECTION NO.       1.000 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  5.    2474.223      2475.941
  6.    2474.266      2472.154      2474.267
****      38.000  2474.266  2474.373    0.107    1.019    57.674  2474.008    0.000    2.638    1.026
                                                 FLOW DISTRIBUTION (%) =     0.000   99.174    0.826

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2485.213      2484.827
  1.    2485.307      2480.118      2485.257
****      38.000  2485.307  2485.395    0.088    1.032    56.699  2485.012    0.000    2.391    0.919
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                                                FLOW DISTRIBUTION (%) =    0.000  98.655   1.345
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2597.290      2523.887
  1.    2597.227      2541.413      2597.271
****      38.000  2597.227  2597.389    0.162    1.024    54.993  2597.005   0.000   3.241   1.241
                                                FLOW DISTRIBUTION (%) =    0.000  98.991   1.009
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2709.280      2662.513
  1.    2709.226      2692.805      2709.270
****      38.000  2709.226  2709.388    0.162    1.024    54.992  2709.004   0.000   3.241   1.241
                                                FLOW DISTRIBUTION (%) =    0.000  98.991   1.009
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2821.237      2798.139
  1.    2821.330      2756.975      2821.280
****      38.000  2821.330  2821.404    0.074    1.034    57.275  2821.010   0.000   2.192   0.844
                                                FLOW DISTRIBUTION (%) =    0.000  98.542   1.458
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2933.217      2869.374
  1.    2933.311      2849.760      2933.261
****      38.000  2933.311  2933.390    0.079    1.033    57.013  2933.001   0.000   2.274   0.875
                                                FLOW DISTRIBUTION (%) =    0.000  98.593   1.407

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              9.000         60.00      2440.371

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
          (CFS)     SURFACE    LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.017 DAYS.**                    **ELOEQ**
****       9.000  2441.393  2441.546    0.153    1.000    15.109  2441.203   0.000   3.139   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
****       9.000  2452.388  2452.478    0.090    1.000    17.312  2452.172   0.000   2.406   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.436      2492.865
  1.    2497.529      2477.240      2497.479
****       9.000  2497.529  2497.621    0.092    1.000    14.063  2497.266   0.000   2.429   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2559.432      2534.350
  1.    2559.526      2520.383      2559.476
****       9.000  2559.526  2559.622    0.096    1.000    13.906  2559.265   0.000   2.487   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2621.516      2584.232
  1.    2621.454      2593.564      2621.498
****       9.000  2621.454  2621.627    0.173    1.000    11.997  2621.229   0.000   3.340   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.411      2674.759
  1.    2683.505      2652.431      2683.455
****       9.000  2683.505  2683.590    0.085    1.000    14.246  2683.235   0.000   2.337   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              8.000         60.00      2462.124

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
          (CFS)     SURFACE    LINE      HEAD               WIDTH     BED         1        2        3
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SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.017 DAYS.**                    **ELOEQ**
****       8.000  2462.444  2462.616    0.172    1.000    11.475  2462.234    0.000    3.326    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =       0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.480      2471.444
  1.    2476.430      2474.676      2476.474
****       8.000  2476.430  2476.592    0.162    1.000    11.690  2476.218    0.000    3.224    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =       0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.419      2487.930
  1.    2493.373      2492.397      2493.417
****       8.000  2493.373  2493.506    0.133    1.000    14.801  2493.188    0.000    2.925    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =       0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2553.369      2544.314
  1.    2553.462      2519.685      2553.412
****       8.000  2553.462  2553.518    0.055    1.000    18.425  2553.232    0.000    1.886    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =       0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.372      2580.112
  1.    2613.466      2568.897      2613.416
****       8.000  2613.466  2613.521    0.055    1.000    18.446  2613.236    0.000    1.884    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =       0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.366      2639.840
  1.    2673.460      2628.755      2673.410
****       8.000  2673.460  2673.514    0.055    1.000    18.474  2673.229    0.000    1.874    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =       0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.415      2692.563
  1.    2733.362      2699.411      2733.406
****       8.000  2733.362  2733.496    0.134    1.000    14.747  2733.177    0.000    2.935    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =       0.017 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.365      2783.534
  1.    2793.459      2759.295      2793.409
****       8.000  2793.459  2793.513    0.054    1.000    18.503  2793.227    0.000    1.867    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       6
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)       (ft)
                                67.000       60.00       2320.212

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
         (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.021 DAYS.**                    **ELOEQ**
****      67.000  2320.365  2320.612    0.248    1.000    53.877  2320.053    0.000    3.992    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =       0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2360.336      2358.976
  1.    2360.430      2345.110      2360.380
****      67.000  2360.430  2360.567    0.137    1.000    55.144  2360.021    0.000    2.973    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =       0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2400.325      2385.042
  1.    2400.419      2377.043      2400.369
****      67.000  2400.419  2400.565    0.146    1.000    54.999  2400.022    0.000    3.065    0.000
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                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2440.325      2422.334
  1.    2440.419      2415.097      2440.369
****      67.000  2440.419  2440.568   0.149    1.000    54.951  2440.025   0.000   3.097   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.        0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
         Tributary Inflow:      10.000       60.00
                    Total:      57.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2462.147      2452.525
  1.    2462.241      2446.775      2462.191
****      57.000  2462.241  2462.318   0.077    1.011   103.644  2461.990   0.000   2.235   0.845
                                                FLOW DISTRIBUTION (%) =    0.000  99.528   0.472

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.        0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
         Tributary Inflow:       9.000       60.00
                    Total:      48.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2474.264      2467.438
  1.    2474.357      2465.554      2474.307
****      48.000  2474.357  2474.451   0.094    1.024    60.182  2474.021   0.000   2.464   0.968
                                                FLOW DISTRIBUTION (%) =    0.000  98.914   1.086
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2485.307      2480.064
  1.    2485.275      2481.098      2485.319
****      48.000  2485.275  2485.454   0.179    1.028    55.963  2485.011   0.000   3.409   1.308
                                                FLOW DISTRIBUTION (%) =    0.000  98.799   1.201
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2597.269      2570.363
  1.    2597.363      2534.791      2597.313
****      48.000  2597.363  2597.460   0.097    1.037    57.979  2597.013   0.000   2.514   0.970
                                                FLOW DISTRIBUTION (%) =    0.000  98.405   1.595
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2709.268      2647.264
  1.    2709.362      2628.640      2709.312
****      48.000  2709.362  2709.459   0.097    1.037    57.979  2709.011   0.000   2.513   0.970
                                                FLOW DISTRIBUTION (%) =    0.000  98.405   1.595
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2821.330      2745.730
  1.    2821.270      2758.719      2821.314
****      48.000  2821.270  2821.449   0.179    1.028    55.958  2821.006   0.000   3.410   1.308
                                                FLOW DISTRIBUTION (%) =    0.000  98.800   1.200
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2933.311      2883.086
  1.    2933.259      2905.277      2933.303
****      48.000  2933.259  2933.438   0.179    1.028    55.945  2932.996   0.000   3.410   1.309
                                                FLOW DISTRIBUTION (%) =    0.000  98.803   1.197

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                10.000       60.00       2440.419

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
          (CFS)     SURFACE    LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.021 DAYS.**                    **ELOEQ**
****      10.000  2441.434  2441.558   0.124    1.000    16.775  2441.223   0.000   2.827   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
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** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  7.   2452.435      2452.020
  8.   2452.480      2449.462      2452.430
****      10.000  2452.480  2452.556    0.076    1.000    19.008  2452.243    0.000    2.218    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2497.529      2476.403
  1.   2497.453      2486.879      2497.497
****      10.000  2497.453  2497.667    0.214    1.000    11.993  2497.228    0.000    3.713    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  1.   2559.456      2561.402
  2.   2559.550      2534.538      2559.500
****      10.000  2559.550  2559.650    0.100    1.000    14.517  2559.279    0.000    2.537    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2621.496      2589.770
  1.   2621.590      2578.652      2621.540
****      10.000  2621.590  2621.665    0.075    1.000    15.587  2621.298    0.000    2.200    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2683.505      2639.952
  1.   2683.443      2645.943      2683.487
****      10.000  2683.443  2683.596    0.153    1.000    12.933  2683.196    0.000    3.136    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000


SUB-BASIN C4CB


SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            9.000       60.00       2462.241

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.021 DAYS.**                    **ELOEQ**
****       9.000  2462.461  2462.648    0.187    1.000    11.921  2462.244    0.000    3.468    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.070
SECTION NO.       0.070 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  2.   2476.428      2476.561
  3.   2476.455      2474.483      2476.472
****       9.000  2476.455  2476.617    0.163    1.000    12.375  2476.230    0.000    3.237    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.160
SECTION NO.       0.160 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  4.   2493.371      2494.160
  5.   2493.410      2489.965      2493.415
****       9.000  2493.410  2493.526    0.116    1.000    16.253  2493.207    0.000    2.730    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2553.462      2520.573
  1.   2553.384      2538.578      2553.428
****       9.000  2553.384  2553.534    0.150    1.000    15.242  2553.194    0.000    3.103    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2613.466      2584.860
  1.   2613.388      2607.192      2613.431
****       9.000  2613.388  2613.537    0.149    1.000    15.259  2613.197    0.000    3.100    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2673.460      2643.975
  1.   2673.377      2667.326      2673.421
****       9.000  2673.377  2673.527    0.150    1.000    15.205  2673.187    0.000    3.110    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.280
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** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.360      2731.437
  1.    2733.454      2703.881      2733.404
****       9.000  2733.454  2733.522    0.068    1.000    18.524  2733.221    0.000    2.091    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.021 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.459      2752.206
  1.    2793.375      2763.823      2793.419
****       9.000  2793.375  2793.526    0.151    1.000    15.197  2793.185    0.000    3.112    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       7
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE    TEMPERATURE   WATER SURFACE
                              (cfs)         (deg F)         (ft)
                             79.000         60.00        2320.245

****  DISCHARGE     WATER     ENERGY   VELOCITY    ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD                WIDTH      BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.024 DAYS.**                    **ELOEQ**
****      79.000  2320.397  2320.679    0.282    1.000     54.266  2320.056    0.000    4.261    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2360.430      2350.232
  1.    2360.382      2357.201      2360.426
****      79.000  2360.382  2360.627    0.245    1.000     54.568  2360.017    0.000    3.970    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2400.373      2394.844
  1.    2400.467      2383.642      2400.417
****      79.000  2400.467  2400.629    0.162    1.000     55.567  2400.027    0.000    3.228    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2440.373      2420.498
  1.    2440.467      2414.494      2440.417
****      79.000  2440.467  2440.629    0.163    1.000     55.553  2440.027    0.000    3.236    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)         (deg F)
          Tributary Inflow:    11.000         60.00
                     Total:    68.000         60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2462.241      2447.848
  1.    2462.172      2451.776      2462.216
****      68.000  2462.172  2462.383    0.211    1.008    102.643  2461.990    0.000    3.687    1.393
                                                 FLOW DISTRIBUTION (%) =     0.000   99.657    0.343

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)         (deg F)
          Tributary Inflow:    11.000         60.00
                     Total:    57.000         60.00

SECTION NO.       1.000
****      57.000  2474.273  2474.496    0.222    1.020     57.980  2474.006    0.000    3.797    1.479
                                                 FLOW DISTRIBUTION (%) =     0.000   99.142    0.858

SECTION NO.       1.100
SECTION NO.       1.100 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  4.    2485.317      2486.125
  5.    2485.357      2483.811      2485.360
****      57.000  2485.357  2485.502    0.145    1.036     57.754  2485.016    0.000    3.079    1.188
                                                 FLOW DISTRIBUTION (%) =     0.000   98.449    1.551

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2597.363      2531.731
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  1.   2597.282     2554.877     2597.326
****     57.000  2597.282  2597.514   0.232    1.029    56.200  2597.008   0.000   3.885   1.492
                                              FLOW DISTRIBUTION (%) =    0.000  98.753   1.247
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2709.362     2663.116
  1.   2709.281     2700.870     2709.325
****     57.000  2709.281  2709.513   0.232    1.029    56.199  2709.006   0.000   3.885   1.492
                                              FLOW DISTRIBUTION (%) =    0.000  98.753   1.247
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2821.312     2795.375
  1.   2821.406     2761.748     2821.356
****     57.000  2821.406  2821.513   0.107    1.041    58.963  2821.014   0.000   2.640   1.022
                                              FLOW DISTRIBUTION (%) =    0.000  98.215   1.785
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2933.301     2865.895
  1.   2933.395     2850.867     2933.345
****     57.000  2933.395  2933.501   0.106    1.041    58.983  2933.001   0.000   2.627   1.017
                                              FLOW DISTRIBUTION (%) =    0.000  98.211   1.789

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             11.000        60.00       2440.467

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.024 DAYS.**                    **ELOEQ**
****     11.000  2441.447  2441.579   0.131    1.000    17.344  2441.229   0.000   2.908   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  1.   2452.432     2453.484
  2.   2452.526     2448.344     2452.476
****     11.000  2452.526  2452.591   0.065    1.000    20.790  2452.267   0.000   2.041   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2497.506     2477.272
  1.   2497.600     2468.992     2497.550
****     11.000  2497.600  2497.684   0.084    1.000    15.893  2497.302   0.000   2.326   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2559.550     2519.591
  1.   2559.514     2523.554     2559.557
****     11.000  2559.514  2559.676   0.163    1.000    13.484  2559.262   0.000   3.237   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2621.590     2587.575
  1.   2621.513     2601.254     2621.557
****     11.000  2621.513  2621.676   0.163    1.000    13.482  2621.261   0.000   3.237   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.024 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2683.441     2663.271
  1.   2683.535     2647.328     2683.485
****     11.000  2683.535  2683.619   0.084    1.000    15.717  2683.233   0.000   2.322   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             11.000        60.00       2462.172

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH      BED        1        2        3
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SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.024 DAYS.**                    **ELOEQ**
****      11.000  2462.492  2462.704   0.212    1.000    12.763  2462.259   0.000   3.697   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.496      2474.219
  1.    2476.590      2469.551      2476.540
****      11.000  2476.590  2476.674   0.084    1.000    16.140  2476.297   0.000   2.325   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.408      2486.176
  1.    2493.502      2482.419      2493.452
****      11.000  2493.502  2493.580   0.078    1.000    19.868  2493.254   0.000   2.234   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2553.426      2522.909
  1.    2553.520      2511.246      2553.470
****      11.000  2553.520  2553.587   0.067    1.000    20.625  2553.263   0.000   2.072   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.429      2579.695
  1.    2613.523      2569.586      2613.473
****      11.000  2613.523  2613.590   0.067    1.000    20.639  2613.266   0.000   2.072   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.419      2639.383
  1.    2673.513      2629.413      2673.463
****      11.000  2673.513  2673.578   0.066    1.000    20.667  2673.254   0.000   2.057   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.454      2693.835
  1.    2733.410      2698.988      2733.454
****      11.000  2733.410  2733.556   0.146    1.000    16.899  2733.198   0.000   3.067   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.024 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.417      2778.676
  1.    2793.511      2758.855      2793.461
****      11.000  2793.511  2793.576   0.065    1.000    20.700  2793.252   0.000   2.048   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

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TIME STEP #        8
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           91.000        60.00       2320.278

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED         1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.028 DAYS.**                    **ELOEQ**
****      91.000  2320.474  2320.723   0.249    1.000    55.183  2320.062   0.000   4.005   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2360.434      2348.792
  1.    2360.528      2340.563      2360.478
****      91.000  2360.528  2360.692   0.164    1.000    56.326  2360.031   0.000   3.247   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2400.467      2378.439
  1.    2400.428      2380.997      2400.472
****      91.000  2400.428  2400.687   0.259    1.000    55.096  2400.023   0.000   4.080   0.000
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                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2440.467      2422.083
  1.   2440.429      2425.398      2440.473
****      91.000  2440.429  2440.688   0.259    1.000    55.096  2440.025   0.000   4.080   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.        0.800 ---
                             DISCHARGE   TEMPERATURE
                               (cfs)       (deg F)
        Tributary Inflow:       12.000       60.00
                   Total:       79.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2462.225      2452.966
  1.   2462.319      2447.762      2462.269
****      79.000  2462.319  2462.403   0.084    1.015   104.813  2461.988   0.000   2.337   0.885
                                                FLOW DISTRIBUTION (%) =    0.000  99.378   0.622

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.        0.900 ---
                             DISCHARGE   TEMPERATURE
                               (cfs)       (deg F)
        Tributary Inflow:       12.000       60.00
                   Total:       67.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2474.326      2466.508
  1.   2474.420      2465.270      2474.370
****      67.000  2474.420  2474.543   0.123    1.028    62.162  2474.022   0.000   2.833   1.121
                                                FLOW DISTRIBUTION (%) =    0.000  98.713   1.287
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2485.355      2480.868
  1.   2485.449      2478.845      2485.399
****      67.000  2485.449  2485.573   0.124    1.044    59.718  2485.026   0.000   2.854   1.107
                                                FLOW DISTRIBUTION (%) =    0.000  98.069   1.931
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2597.335      2533.859
  1.   2597.429      2518.362      2597.379
****      67.000  2597.429  2597.561   0.132    1.043    59.429  2597.017   0.000   2.942   1.140
                                                FLOW DISTRIBUTION (%) =    0.000  98.125   1.875
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2709.334      2648.549
  1.   2709.427      2631.975      2709.377
****      67.000  2709.427  2709.560   0.132    1.043    59.431  2709.016   0.000   2.940   1.139
                                                FLOW DISTRIBUTION (%) =    0.000  98.124   1.876
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2821.406      2746.781
  1.   2821.323      2762.616      2821.367
****      67.000  2821.323  2821.559   0.237    1.034    57.162  2821.007   0.000   3.927   1.512
                                                FLOW DISTRIBUTION (%) =    0.000  98.564   1.436
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2933.395      2878.928
  1.   2933.309      2909.060      2933.353
****      67.000  2933.309  2933.546   0.237    1.034    57.142  2932.993   0.000   3.928   1.512
                                                FLOW DISTRIBUTION (%) =    0.000  98.568   1.432

 SUB-BASIN C4CC

 SUB-BASIN C4CC

 --- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                             DISCHARGE   TEMPERATURE  WATER SURFACE
                               (cfs)       (deg F)        (ft)
                              12.000        60.00       2440.429

 ****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
         (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

 SECTION NO.       0.000
 ** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.028 DAYS.**                    **ELOEQ**
 ****      12.000  2441.441  2441.602   0.161    1.000    17.210  2441.225   0.000   3.219   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

 SECTION NO.       0.080
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****     12.000  2452.514  2452.628    0.114    1.000    18.877  2452.279    0.000    2.703    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.600      2478.013
  1.    2497.510      2491.546      2497.554
****     12.000  2497.510  2497.704    0.194    1.000    13.468  2497.258    0.000    3.535    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2559.511      2548.365
  1.    2559.605      2528.755      2559.555
****     12.000  2559.605  2559.706    0.101    1.000    15.891  2559.309    0.000    2.545    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2621.511      2591.483
  1.    2621.605      2580.494      2621.555
****     12.000  2621.605  2621.707    0.102    1.000    15.852  2621.309    0.000    2.558    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.535      2640.496
  1.    2683.415      2653.759      2683.459
****     12.000  2683.415  2683.622    0.207    1.000    13.054  2683.163    0.000    3.648    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000


SUB-BASIN C4CB


SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           12.000        60.00       2462.319

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD                WIDTH     BED        1        2        3

 SECTION NO.       0.000
 ** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.028 DAYS.**                    **ELOEQ**
 ****     12.000  2462.515  2462.709    0.194    1.000    13.623  2462.266    0.000    3.532    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

 SECTION NO.       0.070
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       0.070 TIME =      0.028 DAYS.
 TRIAL     TRIAL        COMPUTED      CRITICAL
  NO.        WS            WS            WS
   0.    2476.590      2469.740
   1.    2476.509      2473.500      2476.552
 ****     12.000  2476.509  2476.692    0.183    1.000    13.877  2476.257    0.000    3.431    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

 SECTION NO.       0.160
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       0.160 TIME =      0.028 DAYS.
 TRIAL     TRIAL        COMPUTED      CRITICAL
  NO.        WS            WS            WS
   0.    2493.502      2486.920
   1.    2493.434      2492.175      2493.478
 ****     12.000  2493.434  2493.605    0.171    1.000    17.035  2493.222    0.000    3.319    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

 SECTION NO.       0.440
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       0.440 TIME =      0.028 DAYS.
 TRIAL     TRIAL        COMPUTED      CRITICAL
  NO.        WS            WS            WS
   0.    2553.520      2524.457
   1.    2553.432      2546.761      2553.476
 ****     12.000  2553.432  2553.603    0.171    1.000    17.021  2553.219    0.000    3.322    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

 SECTION NO.       0.720
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       0.720 TIME =      0.028 DAYS.
 TRIAL     TRIAL        COMPUTED      CRITICAL
  NO.        WS            WS            WS
   0.    2613.523      2584.566
   1.    2613.436      2606.734      2613.480
 ****     12.000  2613.436  2613.607    0.171    1.000    17.043  2613.223    0.000    3.317    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

 SECTION NO.       1.000
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       1.000 TIME =      0.028 DAYS.
 TRIAL     TRIAL        COMPUTED      CRITICAL
  NO.        WS            WS            WS
   0.    2673.513      2643.341
   1.    2673.417      2666.991      2673.461
 ****     12.000  2673.417  2673.591    0.173    1.000    16.939  2673.205    0.000    3.338    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

 SECTION NO.       1.280
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       1.280 TIME =      0.028 DAYS.
 TRIAL     TRIAL        COMPUTED      CRITICAL
  NO.        WS            WS            WS
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 0.   2733.408     2726.712
 1.   2733.502     2703.425     2733.452
****     12.000  2733.502  2733.579   0.077    1.000    20.701  2733.242   0.000   2.226   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.028 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 0.   2793.511     2751.747
 1.   2793.415     2763.354     2793.459
****     12.000  2793.415  2793.589   0.173    1.000    16.928  2793.203   0.000   3.340   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       9
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                             DISCHARGE   TEMPERATURE  WATER SURFACE
                               (cfs)       (deg F)        (ft)
                              102.000       60.00       2320.307

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.031 DAYS.**                    **ELOEQ**
****    102.000  2320.504  2320.783   0.279    1.000    55.479  2320.070   0.000   4.238   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.031 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 0.   2360.528     2343.676
 1.   2360.450     2351.011     2360.494
****    102.000  2360.450  2360.739   0.289    1.000    55.391  2360.023   0.000   4.309   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.031 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 0.   2400.470     2389.920
 1.   2400.564     2381.733     2400.514
****    102.000  2400.564  2400.745   0.181    1.000    56.722  2400.037   0.000   3.414   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.031 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 0.   2440.471     2416.942
 1.   2440.565     2412.802     2440.515
****    102.000  2440.565  2440.745   0.180    1.000    56.747  2440.036   0.000   3.400   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                             DISCHARGE   TEMPERATURE
                               (cfs)       (deg F)
          Tributary Inflow:     13.000       60.00
                    Total:      89.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.031 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 0.   2462.319     2446.338
 1.   2462.212     2450.383     2462.256
****     89.000  2462.212  2462.446   0.234    1.010   103.276  2461.987   0.000   3.885   1.469
                                              FLOW DISTRIBUTION (%) =    0.000  99.575   0.425

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                             DISCHARGE   TEMPERATURE
                               (cfs)       (deg F)
          Tributary Inflow:     14.000       60.00
                    Total:      75.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.031 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 0.   2474.420     2469.306
 1.   2474.360     2471.466     2474.404
****     75.000  2474.360  2474.575   0.215    1.025    60.456  2474.014   0.000   3.737   1.470
                                              FLOW DISTRIBUTION (%) =    0.000  98.886   1.114

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.031 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
 0.   2485.449     2481.553
 1.   2485.379     2484.049     2485.423
****     75.000  2485.379  2485.606   0.227    1.038    58.146  2485.022   0.000   3.850   1.486
                                              FLOW DISTRIBUTION (%) =    0.000  98.372   1.628

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.031 DAYS.
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TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2597.429      2540.607
  1.   2597.370      2557.000      2597.414
****      75.000  2597.370  2597.597   0.227    1.038    58.132  2597.013   0.000   3.850   1.487
                                                FLOW DISTRIBUTION (%) =    0.000  98.375   1.625
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2709.427      2652.445
  1.   2709.368      2668.996      2709.412
****      75.000  2709.368  2709.595   0.227    1.038    58.129  2709.011   0.000   3.850   1.487
                                                FLOW DISTRIBUTION (%) =    0.000  98.376   1.624
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2821.365      2781.134
  1.   2821.458      2757.228      2821.408
****      75.000  2821.458  2821.599   0.141    1.046    60.179  2821.015   0.000   3.033   1.178
                                                FLOW DISTRIBUTION (%) =    0.000  97.981   2.019
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2933.351      2868.988
  1.   2933.445      2854.584      2933.395
****      75.000  2933.445  2933.584   0.140    1.046    60.177  2933.000   0.000   3.025   1.174
                                                FLOW DISTRIBUTION (%) =    0.000  97.982   2.018

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             13.000       60.00       2440.565

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.031 DAYS.**                    **ELOEQ**
****      13.000  2441.476  2441.617   0.141    1.000    18.514  2441.243   0.000   3.013   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  1.   2452.461      2453.579
  2.   2452.555      2448.654      2452.505
****      13.000  2452.555  2452.630   0.075    1.000    21.807  2452.283   0.000   2.195   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2497.552      2477.369
  1.   2497.646      2469.387      2497.596
****      13.000  2497.646  2497.734   0.088    1.000    17.066  2497.326   0.000   2.386   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2559.605      2517.770
  1.   2559.518      2526.632      2559.562
****      13.000  2559.518  2559.745   0.227    1.000    13.506  2559.266   0.000   3.819   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2621.605      2596.959
  1.   2621.520      2617.580      2621.564
****      13.000  2621.520  2621.747   0.226    1.000    13.515  2621.268   0.000   3.817   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.031 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2683.413      2676.453
  1.   2683.507      2655.651      2683.457
****      13.000  2683.507  2683.617   0.110    1.000    15.859  2683.199   0.000   2.660   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             14.000       60.00       2462.212
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**** DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
       (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.031 DAYS.**                    **ELOEQ**
****     14.000  2462.576  2462.746   0.171    1.000    15.201  2462.298   0.000    3.312    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =       0.031 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2476.550      2471.667
  1.   2476.644      2468.476      2476.594
****     14.000  2476.644  2476.741   0.097    1.000    17.572  2476.325   0.000    2.498    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =       0.031 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2493.476      2485.258
  1.   2493.570      2482.112      2493.520
****     14.000  2493.570  2493.647   0.077    1.000    22.442  2493.291   0.000    2.232    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =       0.031 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2553.474      2519.839
  1.   2553.567      2510.340      2553.517
****     14.000  2553.567  2553.645   0.078    1.000    22.396  2553.288   0.000    2.240    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =       0.031 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2613.478      2579.977
  1.   2613.571      2570.410      2613.521
****     14.000  2613.571  2613.649   0.078    1.000    22.418  2613.293   0.000    2.239    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =       0.031 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2673.459      2639.632
  1.   2673.553      2630.218      2673.503
****     14.000  2673.553  2673.630   0.077    1.000    22.410  2673.272   0.000    2.224    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =       0.031 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2733.502      2693.232
  1.   2733.426      2701.788      2733.470
****     14.000  2733.426  2733.616   0.190    1.000    17.830  2733.201   0.000    3.496    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =       0.031 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2793.457      2781.915
  1.   2793.551      2761.676      2793.501
****     14.000  2793.551  2793.627   0.076    1.000    22.441  2793.269   0.000    2.215    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       10
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             115.000       60.00       2320.343

**** DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
       (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.035 DAYS.**                    **ELOEQ**
****    115.000  2320.539  2320.848   0.309    1.000    55.856  2320.077   0.000    4.456    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =       0.035 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2360.503      2349.293
  1.   2360.597      2341.800      2360.547
****    115.000  2360.597  2360.799   0.202    1.000    57.154  2360.038   0.000    3.601    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =       0.035 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
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  0.   2400.564     2377.586
  1.   2400.508     2380.634     2400.552
****    115.000  2400.508  2400.796   0.288    1.000    56.051  2400.031   0.000   4.303   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2440.565     2419.077
  1.   2440.507     2422.847     2440.551
****    115.000  2440.507  2440.795   0.288    1.000    56.051  2440.031   0.000   4.303   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                             DISCHARGE   TEMPERATURE
                               (cfs)       (deg F)
        Tributary Inflow:      14.000       60.00
                   Total:     101.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2462.265     2452.197
  1.   2462.359     2447.912     2462.309
****    101.000  2462.359  2462.467   0.108    1.017   105.425  2461.986   0.000   2.646   1.003
                                               FLOW DISTRIBUTION (%) =    0.000  99.299   0.701

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                             DISCHARGE   TEMPERATURE
                               (cfs)       (deg F)
        Tributary Inflow:      15.000       60.00
                   Total:      86.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2474.402     2466.464
  1.   2474.496     2465.392     2474.446
****     86.000  2474.496  2474.638   0.142    1.033    64.314  2474.032   0.000   3.041   1.213
                                               FLOW DISTRIBUTION (%) =    0.000  98.498   1.502

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2485.420     2480.532
  1.   2485.514     2478.875     2485.464
****     86.000  2485.514  2485.668   0.154    1.050    61.114  2485.033   0.000   3.176   1.236
                                               FLOW DISTRIBUTION (%) =    0.000  97.803   2.197

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2597.412     2530.889
  1.   2597.505     2518.112     2597.455
****     86.000  2597.505  2597.658   0.153    1.050    61.122  2597.023   0.000   3.167   1.233
                                               FLOW DISTRIBUTION (%) =    0.000  97.802   2.198

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2709.410     2642.510
  1.   2709.504     2629.862     2709.454
****     86.000  2709.504  2709.656   0.152    1.050    61.134  2709.020   0.000   3.162   1.231
                                               FLOW DISTRIBUTION (%) =    0.000  97.800   2.200

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2821.458     2746.725
  1.   2821.374     2760.051     2821.418
****     86.000  2821.374  2821.655   0.281    1.039    58.363  2821.007   0.000   4.281   1.654
                                               FLOW DISTRIBUTION (%) =    0.000  98.331   1.669

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.035 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2933.445     2880.558
  1.   2933.358     2906.666     2933.402
****     86.000  2933.358  2933.639   0.281    1.039    58.335  2932.991   0.000   4.282   1.654
                                               FLOW DISTRIBUTION (%) =    0.000  98.336   1.664

 SUB-BASIN C4CC

 SUB-BASIN C4CC

 --- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                             DISCHARGE   TEMPERATURE  WATER SURFACE
                               (cfs)       (deg F)        (ft)
                              14.000       60.00       2440.507

 ****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
         (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

 SECTION NO.       0.000
 ** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.035 DAYS.**                    **ELOEQ**
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****      14.000  2441.464  2441.640   0.177    1.000    18.156  2441.235   0.000   3.371   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
****      14.000  2452.473  2452.593   0.120    1.000    20.124  2452.223   0.000   2.778   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.646      2476.745
  1.    2497.557      2488.534      2497.601
****      14.000  2497.557  2497.746   0.189    1.000    14.655  2497.283   0.000   3.487   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2559.571      2539.428
  1.    2559.665      2524.342      2559.615
****      14.000  2559.665  2559.761   0.096    1.000    17.387  2559.341   0.000   2.484   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2621.573      2585.524
  1.    2621.667      2577.233      2621.617
****      14.000  2621.667  2621.763   0.096    1.000    17.394  2621.343   0.000   2.484   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.507      2641.001
  1.    2683.419      2649.288      2683.462
****      14.000  2683.419  2683.625   0.207    1.000    14.007  2683.145   0.000   3.648   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           15.000        60.00       2462.359

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD              WIDTH      BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.035 DAYS.**                    **ELOEQ**
****      15.000  2462.580  2462.764   0.184    1.000    15.433  2462.297   0.000   3.439   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.644      2469.104
  1.    2476.555      2472.385      2476.599
****      15.000  2476.555  2476.759   0.204    1.000    15.094  2476.281   0.000   3.627   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.570      2485.914
  1.    2493.464      2493.321      2493.508
****      15.000  2493.464  2493.677   0.213    1.000    18.059  2493.240   0.000   3.698   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.    2553.461      2554.892
  2.    2553.555      2529.108      2553.505
****      15.000  2553.555  2553.655   0.100    1.000    21.808  2553.283   0.000   2.533   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.571      2574.599
  1.    2613.466      2588.984      2613.509
****      15.000  2613.466  2613.678   0.212    1.000    18.066  2613.241   0.000   3.697   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.035 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.    2673.438      2675.342
  2.    2673.532      2649.422      2673.482
****      15.000  2673.532  2673.633   0.101    1.000    21.641  2673.260   0.000   2.553   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
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SECTION NO.      1.280 TIME =      0.035 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2733.424      2709.059
  1.   2733.518      2695.941      2733.468
****     15.000  2733.518  2733.618   0.100    1.000    21.665  2733.244   0.000   2.532   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.560 TIME =      0.035 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2793.551      2753.756
  1.   2793.436      2769.034      2793.480
****     15.000  2793.436  2793.653   0.217    1.000    17.888  2793.211   0.000   3.734   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #      11
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....      0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           134.000       60.00       2320.394

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH      BED        1       2       3

SECTION NO.      0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.038 DAYS.**                    **ELOEQ**
****    134.000  2320.615  2320.927   0.312    1.000    56.734  2320.088   0.000   4.480   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.350 TIME =      0.038 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2360.597      2343.680
  1.   2360.549      2347.211      2360.593
****    134.000  2360.549  2360.876   0.327    1.000    56.576  2360.033   0.000   4.589   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.600 TIME =      0.038 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2400.561      2387.486
  1.   2400.655      2381.079      2400.605
****    134.000  2400.655  2400.882   0.227    1.000    57.810  2400.048   0.000   3.821   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.800 TIME =      0.038 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2440.560      2417.026
  1.   2440.654      2413.412      2440.604
****    134.000  2440.654  2440.880   0.226    1.000    57.821  2440.047   0.000   3.815   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.      0.800 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:    16.000       60.00
                   Total:   118.000       60.00

SECTION NO.      0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.900 TIME =      0.038 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2462.359      2447.122
  1.   2462.309      2448.589      2462.353
****    118.000  2462.309  2462.507   0.198    1.015   104.700  2461.986   0.000   3.575   1.353
                                               FLOW DISTRIBUTION (%) =    0.000  99.392   0.608

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.      0.900 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:    18.000       60.00
                   Total:   100.000       60.00

SECTION NO.      1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.000 TIME =      0.038 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2474.496      2467.565
  1.   2474.438      2468.720      2474.482
****    100.000  2474.438  2474.687   0.250    1.029    62.702  2474.023   0.000   4.031   1.599
                                               FLOW DISTRIBUTION (%) =    0.000  98.659   1.341

SECTION NO.      1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.100 TIME =      0.038 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.      WS           WS            WS
  0.   2485.514      2481.762
  1.   2485.461      2483.293      2485.505
****    100.000  2485.461  2485.727   0.267    1.045    59.905  2485.030   0.000   4.177   1.621
                                               FLOW DISTRIBUTION (%) =    0.000  98.034   1.966
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SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2597.505      2538.756
  1.    2597.449      2551.105      2597.492
****     100.000  2597.449  2597.715   0.267    1.045    59.881  2597.018   0.000   4.178   1.621
                                                FLOW DISTRIBUTION (%) =    0.000  98.038   1.962

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2709.504      2650.274
  1.    2709.444      2663.101      2709.488
****     100.000  2709.444  2709.711   0.267    1.045    59.872  2709.013   0.000   4.178   1.621
                                                FLOW DISTRIBUTION (%) =    0.000  98.040   1.960

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2821.427      2778.987
  1.    2821.521      2758.805      2821.471
****     100.000  2821.521  2821.709   0.188    1.052    61.599  2821.018   0.000   3.516   1.370
                                                FLOW DISTRIBUTION (%) =    0.000  97.711   2.289

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2933.411      2873.000
  1.    2933.505      2859.087      2933.455
****     100.000  2933.505  2933.691   0.187    1.052    61.605  2933.000   0.000   3.501   1.364
                                                FLOW DISTRIBUTION (%) =    0.000  97.710   2.290


SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           16.000        60.00       2440.654

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.038 DAYS.**                    **ELOEQ**
****      16.000  2441.510  2441.669   0.160    1.000    19.902  2441.259   0.000   3.204   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
SECTION NO.       0.080 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  3.    2452.515      2452.879
  4.    2452.552      2450.922      2452.559
****      16.000  2452.552  2452.671   0.119    1.000    21.552  2452.284   0.000   2.770   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2497.599      2485.015
  1.    2497.692      2474.532      2497.642
****      16.000  2497.692  2497.795   0.103    1.000    18.258  2497.351   0.000   2.568   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2559.665      2517.871
  1.    2559.611      2522.619      2559.655
****      16.000  2559.611  2559.791   0.180    1.000    15.885  2559.315   0.000   3.404   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2621.667      2589.391
  1.    2621.617      2596.790      2621.661
****      16.000  2621.617  2621.797   0.179    1.000    15.917  2621.321   0.000   3.397   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2683.416      2664.151
  1.    2683.510      2649.902      2683.460
****      16.000  2683.510  2683.635   0.125    1.000    16.923  2683.176   0.000   2.831   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
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                          18.000        60.00        2462.309

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.038 DAYS.**                    **ELOEQ**
****     18.000  2462.629  2462.828    0.199    1.000    16.580  2462.326   0.000    3.582    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =       0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.607      2471.943
  1.    2476.701      2468.904      2476.651
****     18.000  2476.701  2476.818    0.116    1.000    19.050  2476.356   0.000    2.735    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =       0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.517      2486.076
  1.    2493.611      2482.864      2493.561
****     18.000  2493.611  2493.710    0.099    1.000    23.938  2493.314   0.000    2.526    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =       0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2553.509      2524.520
  1.    2553.603      2513.891      2553.553
****     18.000  2553.603  2553.707    0.104    1.000    23.653  2553.308   0.000    2.586    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =       0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.518      2584.961
  1.    2613.612      2574.080      2613.562
****     18.000  2613.612  2613.713    0.101    1.000    23.872  2613.316   0.000    2.543    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =       0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.486      2644.315
  1.    2673.580      2633.767      2673.530
****     18.000  2673.580  2673.682    0.102    1.000    23.651  2673.283   0.000    2.562    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =       0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.472      2703.896
  1.    2733.566      2693.486      2733.516
****     18.000  2733.566  2733.665    0.100    1.000    23.721  2733.266   0.000    2.531    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =       0.038 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.489      2763.260
  1.    2793.583      2753.093      2793.533
****     18.000  2793.583  2793.682    0.099    1.000    23.815  2793.283   0.000    2.526    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       12
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE    TEMPERATURE   WATER SURFACE
                              (cfs)         (deg F)         (ft)
                             163.000        60.00        2320.473

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.042 DAYS.**                    **ELOEQ**
****    163.000  2320.694  2321.051    0.357    1.000    57.603  2320.103   0.000    4.790    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =       0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2360.645      2345.056
  1.    2360.739      2339.936      2360.689
****    163.000  2360.739  2360.995    0.255    1.000    58.868  2360.056   0.000    4.052    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =       0.042 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2400.653      2379.095
  1.    2400.747      2375.486      2400.697
****     163.000   2400.747  2401.000   0.253     1.000     58.908  2400.061   0.000   4.035   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2440.652      2415.742
  1.    2440.746      2412.810      2440.696
****     163.000   2440.746  2440.998   0.252     1.000     58.926  2440.059   0.000   4.024   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
          Tributary Inflow:      22.000        60.00
                     Total:     141.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2462.351      2448.117
  1.    2462.445      2446.060      2462.395
****     141.000   2462.445  2462.583   0.138     1.021    106.669  2461.987   0.000   2.994   1.136
                                                  FLOW DISTRIBUTION (%) =     0.000  99.140   0.860

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
          Tributary Inflow:      21.000        60.00
                     Total:     120.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2474.490      2466.671
  1.    2474.584      2465.732      2474.534
****     120.000   2474.584  2474.790   0.206     1.036     66.375  2474.061   0.000   3.663   1.472
                                                  FLOW DISTRIBUTION (%) =     0.000  98.295   1.705

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2485.513      2481.200
  1.    2485.607      2479.622      2485.557
****     120.000   2485.607  2485.812   0.205     1.059     63.239  2485.039   0.000   3.669   1.436
                                                  FLOW DISTRIBUTION (%) =     0.000  97.403   2.597

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2597.501      2532.206
  1.    2597.595      2520.920      2597.545
****     120.000   2597.595  2597.803   0.207     1.058     63.138  2597.030   0.000   3.693   1.445
                                                  FLOW DISTRIBUTION (%) =     0.000  97.422   2.578

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2709.497      2644.715
  1.    2709.591      2633.271      2709.541
****     120.000   2709.591  2709.798   0.207     1.058     63.127  2709.025   0.000   3.693   1.445
                                                  FLOW DISTRIBUTION (%) =     0.000  97.424   2.576

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2821.475      2759.856
  1.    2821.569      2747.470      2821.519
****     120.000   2821.569  2821.793   0.224     1.056     62.667  2821.022   0.000   3.837   1.500
                                                  FLOW DISTRIBUTION (%) =     0.000  97.510   2.490

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2933.459      2874.501
  1.    2933.552      2861.287      2933.502
****     120.000   2933.552  2933.773   0.220     1.057     62.720  2933.001   0.000   3.804   1.487
                                                  FLOW DISTRIBUTION (%) =     0.000  97.500   2.500

 SUB-BASIN C4CC

 SUB-BASIN C4CC

 --- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                                22.000        60.00       2440.746

 ****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
         (CFS)       SURFACE    LINE     HEAD               WIDTH     BED        1       2       3
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SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.042 DAYS.**                    **ELOEQ**
****      22.000  2441.574  2441.763   0.189    1.000    22.378  2441.292   0.000   3.485   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  6.    2452.605      2451.762
  7.    2452.643      2450.139      2452.593
****      22.000  2452.643  2452.764   0.121    1.000    25.186  2452.330   0.000   2.791   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.646      2484.967
  1.    2497.740      2475.734      2497.690
****      22.000  2497.740  2497.889   0.149    1.000    19.510  2497.376   0.000   3.094   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2559.664      2529.713
  1.    2559.758      2520.419      2559.708
****      22.000  2559.758  2559.900   0.142    1.000    19.763  2559.390   0.000   3.027   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2621.670      2590.991
  1.    2621.764      2581.975      2621.714
****      22.000  2621.764  2621.908   0.144    1.000    19.741  2621.398   0.000   3.042   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.508      2649.145
  1.    2683.602      2641.461      2683.552
****      22.000  2683.602  2683.725   0.123    1.000    19.809  2683.208   0.000   2.815   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               21.000        60.00       2462.445

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.042 DAYS.**                    **ELOEQ**
****      21.000  2462.666  2462.870   0.205    1.000    17.772  2462.340   0.000   3.630   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.701      2469.805
  1.    2476.657      2471.156      2476.701
****      21.000  2476.657  2476.863   0.206    1.000    17.831  2476.334   0.000   3.642   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.611      2486.864
  1.    2493.569      2489.098      2493.613
****      21.000  2493.569  2493.756   0.187    1.000    22.073  2493.295   0.000   3.473   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2553.603      2528.247
  1.    2553.565      2535.124      2553.609
****      21.000  2553.565  2553.753   0.188    1.000    22.044  2553.291   0.000   3.477   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.042 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.612      2587.538
  1.    2613.570      2595.101      2613.614
****      21.000  2613.570  2613.758   0.187    1.000    22.084  2613.296   0.000   3.471   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.042 DAYS.
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TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2673.580      2646.487
  1.   2673.528      2655.612      2673.572
****     21.000  2673.528  2673.721   0.193    1.000    21.775  2673.254   0.000    3.520   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.042 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2733.566      2706.199
  1.   2733.509      2716.446      2733.553
****     21.000  2733.509  2733.704   0.195    1.000    21.635  2733.235   0.000    3.543   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.042 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2793.583      2766.954
  1.   2793.531      2776.393      2793.575
****     21.000  2793.531  2793.723   0.192    1.000    21.795  2793.257   0.000    3.517   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

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TIME STEP #       13
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             216.000       60.00       2320.618

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.045 DAYS.**                    **BLOEQ**
****    216.000  2320.838  2321.249   0.410    1.000    59.257  2320.129   0.000    5.138   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.045 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2360.781      2342.990
  1.   2360.875      2339.061      2360.825
****    216.000  2360.875  2361.185   0.310    1.000    60.499  2360.076   0.000    4.468   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.045 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2400.789      2378.434
  1.   2400.883      2375.480      2400.833
****    216.000  2400.883  2401.191   0.309    1.000    60.528  2400.082   0.000    4.457   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.045 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2440.744      2416.592
  1.   2440.838      2413.906      2440.788
****    216.000  2440.838  2441.181   0.343    1.000    60.031  2440.072   0.000    4.698   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      33.000       60.00
                   Total:     183.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.045 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2462.399      2449.114
  1.   2462.493      2447.042      2462.443
****    183.000  2462.493  2462.681   0.189    1.023   107.392  2461.986   0.000    3.498   1.328
                                               FLOW DISTRIBUTION (%) =    0.000   99.049   0.951

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      29.000       60.00
                   Total:     154.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.045 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2474.582      2466.942
  1.   2474.676      2466.060      2474.626
****    154.000  2474.676  2474.918   0.242    1.041    68.986  2474.078   0.000    3.978   1.613
                                               FLOW DISTRIBUTION (%) =    0.000   98.043   1.957

SECTION NO.       1.100
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** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2485.605      2481.012
  1.    2485.699      2479.693      2485.649
****     154.000  2485.699  2485.945    0.246     1.066     65.269  2485.048    0.000    4.031    1.586
                                                  FLOW DISTRIBUTION (%) =     0.000   97.027    2.973

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2597.593      2530.597
  1.    2597.687      2521.039      2597.637
****     154.000  2597.687  2597.934    0.247     1.066     65.213  2597.037    0.000    4.038    1.588
                                                  FLOW DISTRIBUTION (%) =     0.000   97.037    2.963

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2709.589      2643.662
  1.    2709.683      2633.821      2709.633
****     154.000  2709.683  2709.936    0.253     1.065     65.049  2709.039    0.000    4.089    1.608
                                                  FLOW DISTRIBUTION (%) =     0.000   97.068    2.932

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2821.611      2753.341
  1.    2821.705      2744.108      2821.655
****     154.000  2821.705  2821.937    0.232     1.068     65.642  2821.037    0.000    3.916    1.542
                                                  FLOW DISTRIBUTION (%) =     0.000   96.959    3.041

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2933.550      2864.618
  1.    2933.644      2855.594      2933.594
****     154.000  2933.644  2933.893    0.249     1.065     65.051  2932.995    0.000    4.053    1.593
                                                  FLOW DISTRIBUTION (%) =     0.000   97.067    2.933


SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           33.000       60.00       2440.838

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.045 DAYS.**                    **ELOEQ**
****      33.000  2441.669  2441.895    0.225     1.000     26.203  2441.339    0.000    3.809    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2452.685      2452.493
  1.    2452.779      2449.199      2452.729
****      33.000  2452.779  2452.905    0.126     1.000     30.550  2452.400    0.000    2.848    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.793      2478.022
  1.    2497.887      2471.913      2497.837
****      33.000  2497.887  2498.049    0.162     1.000     23.407  2497.450    0.000    3.227    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2559.811      2523.887
  1.    2559.905      2517.423      2559.855
****      33.000  2559.905  2560.062    0.157     1.000     23.638  2559.465    0.000    3.177    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2621.817      2585.641
  1.    2621.911      2579.268      2621.861
****      33.000  2621.911  2622.070    0.159     1.000     23.597  2621.474    0.000    3.200    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.045 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.600      2646.808
  1.    2683.694      2640.817      2683.644
****      33.000  2683.694  2683.851    0.157     1.000     22.699  2683.237    0.000    3.183    0.000
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                                        FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           29.000        60.00       2462.493

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.045 DAYS.**                    **ELOEQ**
****     29.000  2462.768  2462.993   0.225    1.000    20.426  2462.395   0.000   3.802   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.045 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2476.754     2470.535
  1.    2476.848     2468.426     2476.798
****     29.000  2476.848  2476.989   0.141    1.000    23.052  2476.430   0.000   3.011   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.045 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2493.666     2484.560
  1.    2493.760     2482.320     2493.710
****     29.000  2493.760  2493.869   0.110    1.000    29.657  2493.392   0.000   2.659   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.045 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2553.662     2516.884
  1.    2553.756     2510.220     2553.706
****     29.000  2553.756  2553.866   0.110    1.000    29.616  2553.388   0.000   2.663   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.045 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2613.667     2576.891
  1.    2613.761     2570.216     2613.711
****     29.000  2613.761  2613.871   0.110    1.000    29.667  2613.393   0.000   2.659   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.045 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2673.581     2640.423
  1.    2673.675     2632.763     2673.625
****     29.000  2673.675  2673.814   0.139    1.000    27.753  2673.325   0.000   2.988   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.045 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2733.562     2705.450
  1.    2733.655     2695.914     2733.605
****     29.000  2733.655  2733.795   0.140    1.000    27.610  2733.305   0.000   2.998   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.045 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2793.584     2765.720
  1.    2793.678     2756.058     2793.628
****     29.000  2793.678  2793.818   0.140    1.000    27.706  2793.329   0.000   3.003   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       14
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          307.000        60.00       2320.792

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =      0.049 DAYS.**                    **ELOEQ**
****    307.000  2321.057  2321.549   0.492    1.000    61.761  2320.173   0.000   5.626   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.049 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2360.972      2341.549
  1.    2361.066      2338.590      2361.016
****     307.000  2361.066  2361.471   0.405    1.000    62.790  2360.108   0.000   5.107   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2400.979      2378.544
  1.    2401.073      2376.100      2401.023
****     307.000  2401.073  2401.477   0.404    1.000    62.812  2400.115   0.000   5.101   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2440.959      2415.838
  1.    2441.053      2413.772      2441.003
****     307.000  2441.053  2441.470   0.417    1.000    62.629  2440.107   0.000   5.180   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      54.000       60.00
                   Total:     253.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2462.491      2448.582
  1.    2462.585      2447.051      2462.535
****     253.000  2462.585  2462.838   0.253    1.027   108.773  2461.984   0.000   4.058   1.543
                                                FLOW DISTRIBUTION (%) =    0.000  98.874   1.126

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      43.000       60.00
                   Total:     210.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2474.729      2466.817
  1.    2474.823      2466.113      2474.773
****     210.000  2474.823  2475.104   0.281    1.048    73.239  2474.104   0.000   4.298   1.766
                                                FLOW DISTRIBUTION (%) =    0.000  97.645   2.355
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2485.752      2480.429
  1.    2485.846      2479.466      2485.796
****     210.000  2485.846  2486.141   0.295    1.078    68.586  2485.062   0.000   4.421   1.754
                                                FLOW DISTRIBUTION (%) =    0.000  96.425   3.575
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2597.740      2526.597
  1.    2597.834      2519.322      2597.784
****     210.000  2597.834  2598.133   0.299    1.078    68.447  2597.055   0.000   4.452   1.765
                                                FLOW DISTRIBUTION (%) =    0.000  96.450   3.550
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2709.735      2639.780
  1.    2709.829      2632.238      2709.779
****     210.000  2709.829  2710.135   0.305    1.077    68.283  2709.057   0.000   4.500   1.784
                                                FLOW DISTRIBUTION (%) =    0.000  96.479   3.521
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2821.747      2750.932
  1.    2821.840      2743.578      2821.790
****     210.000  2821.840  2822.132   0.291    1.078    68.647  2821.053   0.000   4.397   1.744
                                                FLOW DISTRIBUTION (%) =    0.000  96.414   3.586
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2933.697      2862.001
  1.    2933.791      2854.862      2933.741
****     210.000  2933.791  2934.089   0.297    1.077    68.337  2933.009   0.000   4.442   1.761
                                                FLOW DISTRIBUTION (%) =    0.000  96.470   3.530

 SUB-BASIN C4CC

 SUB-BASIN C4CC
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--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)       (ft)
                               54.000        60.00      2441.053

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.049 DAYS.**                    **ELOEQ**
****      54.000  2441.829  2442.085   0.256    1.000    32.421  2441.419   0.000    4.062    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2452.832      2451.588
  1.    2452.926      2449.115      2452.876
****      54.000  2452.926  2453.096   0.170    1.000    36.303  2452.476   0.000    3.307    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.984      2477.246
  1.    2498.078      2472.202      2498.028
****      54.000  2498.078  2498.276   0.198    1.000    28.479  2497.546   0.000    3.569    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.001      2521.642
  1.    2560.095      2516.715      2560.045
****      54.000  2560.095  2560.291   0.195    1.000    28.658  2559.564   0.000    3.545    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.007      2584.155
  1.    2622.101      2579.118      2622.051
****      54.000  2622.101  2622.304   0.203    1.000    28.474  2621.577   0.000    3.615    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.692      2647.999
  1.    2683.786      2642.745      2683.736
****      54.000  2683.786  2684.019   0.233    1.000    26.072  2683.251   0.000    3.870    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)       (ft)
                               43.000        60.00      2462.585

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.049 DAYS.**                    **ELOEQ**
****      43.000  2462.860  2463.164   0.304    1.000    23.050  2462.438   0.000    4.421    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.890      2470.764
  1.    2476.984      2468.862      2476.934
****      43.000  2476.984  2477.153   0.169    1.000    26.816  2476.497   0.000    3.298    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.758      2485.043
  1.    2493.851      2482.980      2493.801
****      43.000  2493.851  2494.008   0.156    1.000    33.120  2493.442   0.000    3.170    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2553.754      2520.987
  1.    2553.848      2513.865      2553.798
****      43.000  2553.848  2554.001   0.154    1.000    33.202  2553.436   0.000    3.146    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =       0.049 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
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 NO.       WS            WS            WS
  0.   2613.759     2580.412
  1.   2613.853     2573.462     2613.803
****     43.000  2613.853  2614.005   0.152    1.000    33.334  2613.440   0.000    3.124   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.049 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2673.728     2638.538
  1.   2673.822     2632.157     2673.772
****     43.000  2673.822  2673.962   0.140    1.000    33.701  2673.396   0.000    3.000   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.049 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2733.697     2697.577
  1.   2733.791     2691.549     2733.741
****     43.000  2733.791  2733.938   0.147    1.000    33.176  2733.369   0.000    3.071   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.049 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2793.731     2757.985
  1.   2793.824     2751.770     2793.774
****     43.000  2793.824  2793.967   0.143    1.000    33.584  2793.402   0.000    3.029   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

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TIME STEP #       15
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)         (deg F)        (ft)
                                458.000         60.00       2321.010

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)       SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.052 DAYS.**                    **ELOEQ**
****    458.000  2321.373  2321.971   0.598    1.000    65.428  2320.245   0.000    6.203   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.052 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2361.243     2340.044
  1.   2361.337     2337.916     2361.287
****    458.000  2361.337  2361.876   0.539    1.000    66.070  2360.160   0.000    5.891   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.052 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2401.250     2378.479
  1.   2401.344     2376.550     2401.294
****    458.000  2401.344  2401.882   0.538    1.000    66.093  2400.167   0.000    5.885   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.052 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2441.274     2414.928
  1.   2441.368     2413.437     2441.318
****    458.000  2441.368  2441.878   0.510    1.000    66.460  2440.165   0.000    5.731   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)         (deg F)
          Tributary Inflow:      88.000         60.00
                     Total:     370.000         60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.052 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2462.681     2447.472
  1.   2462.775     2446.547     2462.725
****    370.000  2462.775  2463.080   0.304    1.035   111.594  2461.985   0.000    4.455   1.699
                                               FLOW DISTRIBUTION (%) =    0.000   98.519   1.481

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)         (deg F)
          Tributary Inflow:      67.000         60.00
                     Total:     303.000         60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
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SECTION NO.       1.000 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2474.920      2466.368
  1.    2475.014      2465.904      2474.964
****     303.000  2475.014  2475.367   0.353    1.056    78.744  2474.145   0.000   4.823   2.014
                                                FLOW DISTRIBUTION (%) =    0.000  97.150   2.850

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2485.943      2480.406
  1.    2486.037      2479.653      2485.987
****     303.000  2486.037  2486.423   0.387    1.092    72.767  2485.091   0.000   5.080   2.035
                                                FLOW DISTRIBUTION (%) =    0.000  95.687   4.313

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2597.931      2526.261
  1.    2598.024      2520.294      2597.974
****     303.000  2598.024  2598.415   0.390    1.092    72.643  2597.082   0.000   5.103   2.043
                                                FLOW DISTRIBUTION (%) =    0.000  95.708   4.292

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2709.926      2639.032
  1.    2710.020      2632.921      2709.970
****     303.000  2710.020  2710.416   0.396    1.091    72.502  2709.083   0.000   5.142   2.058
                                                FLOW DISTRIBUTION (%) =    0.000  95.733   4.267

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2821.937      2750.345
  1.    2822.031      2744.361      2821.981
****     303.000  2822.031  2822.413   0.382    1.092    72.845  2821.080   0.000   5.049   2.023
                                                FLOW DISTRIBUTION (%) =    0.000  95.673   4.327

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2933.888      2861.280
  1.    2933.982      2855.498      2933.932
****     303.000  2933.982  2934.366   0.384    1.092    72.600  2933.031   0.000   5.062   2.027
                                                FLOW DISTRIBUTION (%) =    0.000  95.716   4.284


SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           88.000       60.00       2441.368

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.052 DAYS.**                    **ELOEQ**
****      88.000  2442.008  2442.315   0.307    1.000    39.568  2441.508   0.000   4.442   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2453.023      2450.800
  1.    2453.116      2448.952      2453.066
****      88.000  2453.116  2453.330   0.214    1.000    43.811  2452.575   0.000   3.709   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.199      2476.277
  1.    2498.293      2472.224      2498.243
****      88.000  2498.293  2498.546   0.253    1.000    34.211  2497.655   0.000   4.034   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.217      2521.248
  1.    2560.311      2517.180      2560.261
****      88.000  2560.311  2560.564   0.254    1.000    34.319  2559.676   0.000   4.040   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.223      2584.241
  1.    2622.317      2579.975      2622.267
****      88.000  2622.317  2622.583   0.267    1.000    34.055  2621.693   0.000   4.142   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
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SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.883      2645.362
  1.    2683.976      2641.440      2683.926
****      88.000  2683.976  2684.236    0.259    1.000    31.973  2683.303    0.000    4.086    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                67.000       60.00       2462.775

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH      BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.052 DAYS.**                    **ELOEQ**
****      67.000  2463.051  2463.366    0.315    1.000    28.468  2462.528    0.000    4.504    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.036      2470.253
  1.    2477.130      2468.815      2477.080
****      67.000  2477.130  2477.366    0.236    1.000    30.810  2476.572    0.000    3.895    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2493.904      2485.739
  1.    2493.998      2483.804      2493.948
****      67.000  2493.998  2494.202    0.203    1.000    38.765  2493.521    0.000    3.619    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2553.900      2521.261
  1.    2553.994      2515.019      2553.944
****      67.000  2553.994  2554.192    0.197    1.000    38.971  2553.512    0.000    3.564    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2613.906      2580.285
  1.    2614.000      2574.305      2613.950
****      67.000  2614.000  2614.193    0.194    1.000    39.164  2613.515    0.000    3.530    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.875      2638.167
  1.    2673.968      2632.752      2673.918
****      67.000  2673.968  2674.145    0.177    1.000    39.635  2673.468    0.000    3.374    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.844      2696.472
  1.    2733.938      2691.542      2733.888
****      67.000  2733.938  2734.117    0.179    1.000    39.322  2733.435    0.000    3.391    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.052 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.877      2756.875
  1.    2793.971      2751.813      2793.921
****      67.000  2793.971  2794.152    0.181    1.000    39.465  2793.474    0.000    3.415    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       16
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                668.000      60.00       2321.258

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH      BED         1        2        3
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SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.056 DAYS.**                    **ELOEQ**
****     668.000  2321.701  2322.471   0.770    1.000    69.232  2320.330   0.000    7.037   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2361.612      2339.010
  1.    2361.706      2337.449      2361.656
****     668.000  2361.706  2362.359   0.653    1.000    70.520  2360.244   0.000    6.480   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2401.620      2376.909
  1.    2401.714      2375.556      2401.664
****     668.000  2401.714  2402.368   0.655    1.000    70.509  2400.254   0.000    6.490   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2441.600      2414.400
  1.    2441.694      2413.278      2441.644
****     668.000  2441.694  2442.355   0.661    1.000    70.399  2440.239   0.000    6.523   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     134.000       60.00
                   Total:     534.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2462.872      2447.606
  1.    2462.966      2446.909      2462.916
****     534.000  2462.966  2463.368   0.402    1.043   114.417  2461.987   0.000    5.128   1.961
                                                FLOW DISTRIBUTION (%) =     0.000   98.167   1.833

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     100.000       60.00
                   Total:     434.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2475.135      2466.471
  1.    2475.229      2466.107      2475.179
****     434.000  2475.229  2475.679   0.450    1.063    84.900  2474.200   0.000    5.460   2.317
                                                FLOW DISTRIBUTION (%) =     0.000   96.623   3.377
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.213      2480.289
  1.    2486.307      2479.719      2486.257
****     434.000  2486.307  2486.770   0.463    1.110    78.669  2485.139   0.000    5.585   2.267
                                                FLOW DISTRIBUTION (%) =     0.000   94.684   5.316
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2598.201      2521.633
  1.    2598.295      2517.394      2598.245
****     434.000  2598.295  2598.758   0.464    1.110    78.597  2597.127   0.000    5.588   2.267
                                                FLOW DISTRIBUTION (%) =     0.000   94.696   5.304
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.196      2633.963
  1.    2710.290      2629.673      2710.240
****     434.000  2710.290  2710.759   0.469    1.110    78.464  2709.128   0.000    5.621   2.280
                                                FLOW DISTRIBUTION (%) =     0.000   94.718   5.282
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2822.196      2746.074
  1.    2822.290      2741.767      2822.240
****     434.000  2822.290  2822.756   0.466    1.110    78.539  2821.124   0.000    5.599   2.272
                                                FLOW DISTRIBUTION (%) =     0.000   94.705   5.295
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =       0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2934.103      2859.296
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  1.   2934.197     2854.815     2934.147
****    434.000  2934.197  2934.689   0.493    1.107    77.565  2933.053   0.000   5.754   2.330
                                              FLOW DISTRIBUTION (%) =    0.000  94.868   5.132

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)       (ft)
                             134.000       60.00      2441.694

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)    SURFACE    LINE     HEAD               WIDTH    BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.056 DAYS.**                    **HLOEQ**
****    134.000  2442.191  2442.551   0.359    1.000    46.896  2441.597   0.000   4.809   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2453.213     2450.389
  1.    2453.307     2448.928     2453.257
****    134.000  2453.307  2453.571   0.264    1.000    51.353  2452.674   0.000   4.121   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2498.414     2476.061
  1.    2498.508     2472.620     2498.458
****    134.000  2498.508  2498.825   0.317    1.000    39.933  2497.765   0.000   4.514   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2560.432     2521.627
  1.    2560.526     2518.070     2560.476
****    134.000  2560.526  2560.850   0.324    1.000    39.934  2559.791   0.000   4.568   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2622.493     2582.867
  1.    2622.587     2579.411     2622.537
****    134.000  2622.587  2622.883   0.296    1.000    41.103  2621.840   0.000   4.366   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2683.974     2644.507
  1.    2684.068     2641.398     2684.018
****    134.000  2684.068  2684.422   0.354    1.000    35.832  2683.285   0.000   4.773   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)       (ft)
                             100.000       60.00      2462.966

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)    SURFACE    LINE     HEAD               WIDTH    BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.056 DAYS.**                    **HLOEQ**
****    100.000  2463.241  2463.603   0.362    1.000    33.618  2462.625   0.000   4.823   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2477.227     2469.805
  1.    2477.321     2468.695     2477.271
****    100.000  2477.321  2477.602   0.281    1.000    36.028  2476.668   0.000   4.254   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2494.095     2485.027
  1.    2494.189     2483.542     2494.139
****    100.000  2494.189  2494.416   0.227    1.000    46.164  2493.623   0.000   3.826   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS           WS           WS
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  0.   2554.091     2517.315
  1.   2554.185     2512.780     2554.135
****    100.000  2554.185  2554.403   0.218    1.000    46.482  2553.611   0.000   3.749   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2614.096     2576.613
  1.   2614.190     2572.246     2614.140
****    100.000  2614.190  2614.409   0.218    1.000    46.537  2613.617   0.000   3.749   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2674.021     2636.883
  1.   2674.115     2632.507     2674.065
****    100.000  2674.115  2674.341   0.226    1.000    45.523  2673.539   0.000   3.813   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2733.980     2696.477
  1.   2734.074     2692.183     2734.024
****    100.000  2734.074  2734.292   0.219    1.000    45.425  2733.487   0.000   3.752   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.056 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2794.024     2756.766
  1.   2794.118     2752.394     2794.068
****    100.000  2794.118  2794.349   0.231    1.000    45.368  2793.546   0.000   3.853   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       17
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             930.000       60.00       2321.523

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.059 DAYS.**                    **ELOEQ**
****    930.000  2322.120  2323.011   0.892    1.000    73.993  2320.460   0.000   7.575   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2361.982     2338.008
  1.   2362.076     2336.845     2362.026
****    930.000  2362.076  2362.871   0.796    1.000    74.954  2360.342   0.000   7.155   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2401.989     2376.637
  1.   2402.083     2375.565     2402.033
****    930.000  2402.083  2402.884   0.801    1.000    74.915  2400.354   0.000   7.178   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2441.969     2414.173
  1.   2442.063     2413.293     2442.013
****    930.000  2442.063  2442.864   0.800    1.000    74.874  2440.332   0.000   7.177   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     186.000       60.00
                   Total:     744.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2463.087     2447.710
  1.   2463.181     2447.188     2463.131
****    744.000  2463.181  2463.691   0.510    1.053   117.643  2461.988   0.000   5.784   2.219
                                               FLOW DISTRIBUTION (%) =    0.000  97.770   2.230
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--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:       141.000       60.00
                  Total:        603.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2475.405      2466.479
  1.    2475.499      2466.203      2475.449
****     603.000  2475.499  2476.023   0.524    1.072    92.644  2474.275   0.000   5.905   2.553
                                                FLOW DISTRIBUTION (%) =    0.000  95.999   4.001
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2486.483      2480.216
  1.    2486.577      2479.784      2486.527
****     603.000  2486.577  2487.148   0.571    1.126    84.573  2485.195   0.000   6.226   2.558
                                                FLOW DISTRIBUTION (%) =    0.000  93.725   6.275
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2598.471      2520.722
  1.    2598.565      2517.276      2598.515
****     603.000  2598.565  2599.132   0.567    1.126    84.562  2597.179   0.000   6.207   2.550
                                                FLOW DISTRIBUTION (%) =    0.000  93.727   6.273
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2710.466      2632.845
  1.    2710.560      2629.382      2710.510
****     603.000  2710.560  2711.135   0.575    1.126    84.408  2709.181   0.000   6.245   2.565
                                                FLOW DISTRIBUTION (%) =    0.000  93.751   6.249
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2822.467      2745.072
  1.    2822.560      2741.579      2822.510
****     603.000  2822.560  2823.133   0.572    1.126    84.449  2821.179   0.000   6.233   2.560
                                                FLOW DISTRIBUTION (%) =    0.000  93.744   6.256
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2934.373      2856.904
  1.    2934.467      2853.441      2934.417
****     603.000  2934.467  2935.041   0.574    1.124    83.868  2933.080   0.000   6.240   2.560
                                                FLOW DISTRIBUTION (%) =    0.000  93.837   6.163

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               186.000       60.00       2442.063

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.059 DAYS.**                    **ELOEQ**
****     186.000  2442.383  2442.759   0.376    1.000    54.568  2441.690   0.000   4.921   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2453.404      2449.509
  1.    2453.498      2448.414      2453.448
****     186.000  2453.498  2453.793   0.295    1.000    58.904  2452.773   0.000   4.360   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2498.630      2474.582
  1.    2498.724      2471.774      2498.674
****     186.000  2498.724  2499.084   0.361    1.000    45.609  2497.877   0.000   4.818   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2560.647      2520.750
  1.    2560.741      2517.746      2560.691
****     186.000  2560.741  2561.118   0.377    1.000    45.499  2559.911   0.000   4.925   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
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** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.708      2583.170
  1.    2622.802      2580.061      2622.752
****     186.000  2622.802  2623.164    0.362     1.000     46.464  2621.972    0.000    4.823    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2684.022      2644.169
  1.    2684.116      2641.521      2684.066
****     186.000  2684.116  2684.525    0.408     1.000     39.501  2683.198    0.000    5.126    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               141.000       60.00       2463.181

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.059 DAYS.**                    **ELOBQ**
****     141.000  2463.446  2463.835    0.389     1.000     39.194  2462.727    0.000    5.003    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.418      2469.295
  1.    2477.511      2468.447      2477.461
****     141.000  2477.511  2477.835    0.324     1.000     41.305  2476.763    0.000    4.563    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.285      2484.541
  1.    2494.379      2483.364      2494.329
****     141.000  2494.379  2494.632    0.252     1.000     53.558  2493.726    0.000    4.031    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.238      2516.626
  1.    2554.332      2512.794      2554.282
****     141.000  2554.332  2554.605    0.273     1.000     52.260  2553.688    0.000    4.192    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.243      2577.891
  1.    2614.337      2573.763      2614.287
****     141.000  2614.337  2614.611    0.274     1.000     52.287  2613.695    0.000    4.200    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2674.168      2637.463
  1.    2674.262      2633.463      2674.212
****     141.000  2674.262  2674.533    0.271     1.000     51.573  2673.607    0.000    4.174    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2734.116      2696.369
  1.    2734.209      2692.604      2734.159
****     141.000  2734.209  2734.474    0.265     1.000     51.220  2733.543    0.000    4.129    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.059 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.171      2756.874
  1.    2794.265      2752.983      2794.215
****     141.000  2794.265  2794.545    0.280     1.000     51.285  2793.617    0.000    4.245    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

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TIME STEP #       18
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000
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--- Downstream Boundary Condition Data for STREAM SEGMENT NO. 1 at Control Point # 1 ---

DISCHARGE (cfs)	TEMPERATURE (deg F)	WATER SURFACE (ft)
1232.000	60.00	2321.794

****	DISCHARGE (CFS)	WATER SURFACE	ENERGY LINE	VELOCITY HEAD	ALPHA	TOP WIDTH	AVG BED	AVG VEL (by subsection) 1	2	3
SECTION NO.	0.100									
** CRITICAL WATER SURFACE USED AT SECTION NO.		0.100 AT TIME =		0.062 DAYS.**						**ELOEQ**
****	1232.000	2322.559	2323.566	1.007	1.000	78.905	2320.619	0.000	8.048	0.000
					FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO.	0.350									
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO.	0.350 TIME =		0.062 DAYS.							
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2362.352	2337.396								
1.	2362.445	2336.479	2362.395							
****	1232.000	2362.445	2363.383	0.937	1.000	79.405	2360.447	0.000	7.765	0.000
					FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO.	0.600									
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO.	0.600 TIME =		0.062 DAYS.							
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2402.359	2376.506								
1.	2402.453	2375.626	2402.403							
****	1232.000	2402.453	2403.397	0.945	1.000	79.349	2400.461	0.000	7.796	0.000
					FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO.	0.800									
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO.	0.800 TIME =		0.062 DAYS.							
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2442.339	2414.110								
1.	2442.433	2413.392	2442.383							
****	1232.000	2442.433	2443.374	0.941	1.000	79.336	2440.437	0.000	7.781	0.000
					FLOW DISTRIBUTION (%) =			0.000	100.000	0.000

--- TRIBUTARY JUNCTION - CONTROL POINT # 2 is upstream of Section No. 0.800 ---

	DISCHARGE (cfs)	TEMPERATURE (deg F)
Tributary Inflow:	235.000	60.00
Total:	997.000	60.00

SECTION NO.	0.900										
** SUPERCRITICAL ** Using Critical Water Surface +											
SECTION NO.	0.900 TIME =		0.062 DAYS.								
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS								
0.	2463.302	2447.971									
1.	2463.396	2447.560	2463.346								
****	997.000	2463.396	2464.026	0.630	1.062	121.016	2461.981	0.000	6.440	2.479	
					FLOW DISTRIBUTION (%) =			0.000	97.359	2.641	

--- TRIBUTARY JUNCTION - CONTROL POINT # 3 is upstream of Section No. 0.900 ---

	DISCHARGE (cfs)	TEMPERATURE (deg F)
Tributary Inflow:	188.000	60.00
Total:	809.000	60.00

SECTION NO.	1.000										
** SUPERCRITICAL ** Using Critical Water Surface +											
SECTION NO.	1.000 TIME =		0.062 DAYS.								
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS								
0.	2475.675	2466.600									
1.	2475.769	2466.387	2475.719								
****	809.000	2475.769	2476.377	0.608	1.079	100.454	2474.355	0.000	6.375	2.802	
					FLOW DISTRIBUTION (%) =			0.000	95.411	4.589	
SECTION NO.	1.100										
** SUPERCRITICAL ** Using Critical Water Surface +											
SECTION NO.	1.100 TIME =		0.062 DAYS.								
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS								
0.	2486.754	2480.316									
1.	2486.848	2479.969	2486.798								
****	809.000	2486.848	2487.542	0.694	1.141	90.541	2485.256	0.000	6.891	2.864	
					FLOW DISTRIBUTION (%) =			0.000	92.798	7.202	
SECTION NO.	1.670										
** SUPERCRITICAL ** Using Critical Water Surface +											
SECTION NO.	1.670 TIME =		0.062 DAYS.								
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS								
0.	2598.742	2520.945									
1.	2598.836	2517.973	2598.786								
****	809.000	2598.836	2599.525	0.690	1.140	90.525	2597.238	0.000	6.869	2.855	
					FLOW DISTRIBUTION (%) =			0.000	92.800	7.200	
SECTION NO.	2.240										
** SUPERCRITICAL ** Using Critical Water Surface +											
SECTION NO.	2.240 TIME =		0.062 DAYS.								
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS								
0.	2710.737	2633.032									
1.	2710.831	2630.049	2710.781								
****	809.000	2710.831	2711.529	0.698	1.140	90.368	2709.241	0.000	6.908	2.870	
					FLOW DISTRIBUTION (%) =			0.000	92.824	7.176	
SECTION NO.	2.810										
** SUPERCRITICAL ** Using Critical Water Surface +											
SECTION NO.	2.810 TIME =		0.062 DAYS.								
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS								
0.	2822.737	2745.210									
1.	2822.831	2742.208	2822.781								

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****     809.000  2822.831  2823.526   0.694    1.140    90.420  2821.238   0.000   6.892   2.864
                                                FLOW DISTRIBUTION (%) =    0.000  92.816   7.184
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2934.643      2856.502
  1.    2934.737      2853.588      2934.687
****     809.000  2934.737  2935.420   0.683    1.139    89.956  2933.124   0.000   6.834   2.837
                                                FLOW DISTRIBUTION (%) =    0.000  92.887   7.113

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               235.000       60.00       2442.433

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.062 DAYS.**                    **ELOEQ**
****     235.000  2442.518  2442.929   0.410    1.000    59.983  2441.756   0.000   5.139   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2453.550      2449.348
  1.    2453.644      2448.397      2453.594
****     235.000  2453.644  2453.973   0.328    1.000    64.632  2452.853   0.000   4.595   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.776      2474.841
  1.    2498.870      2472.246      2498.820
****     235.000  2498.870  2499.291   0.421    1.000    49.436  2497.957   0.000   5.203   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.838      2520.895
  1.    2560.932      2518.103      2560.882
****     235.000  2560.932  2561.343   0.411    1.000    50.358  2560.024   0.000   5.143   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.899      2582.120
  1.    2622.993      2579.433      2622.943
****     235.000  2622.993  2623.381   0.388    1.000    51.541  2622.080   0.000   4.998   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2684.116      2640.965
  1.    2684.052      2642.462      2684.096
****     235.000  2684.052  2684.580   0.528    1.000    40.455  2683.055   0.000   5.829   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               188.000       60.00       2463.396

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.062 DAYS.**                    **ELOEQ**
****     188.000  2463.617  2464.057   0.441    1.000    43.863  2462.812   0.000   5.325   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.608      2469.110
  1.    2477.702      2468.415      2477.652
****     188.000  2477.702  2478.058   0.356    1.000    46.575  2476.858   0.000   4.784   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.476      2484.436
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  1.   2494.570     2483.425     2494.520
****    188.000  2494.570  2494.864   0.294    1.000    60.164  2493.851   0.000   4.346   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2554.384     2516.384
  1.   2554.478     2512.982     2554.428
****    188.000  2554.478  2554.788   0.310    1.000    58.379  2553.757   0.000   4.467   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2614.434     2576.195
  1.   2614.528     2572.769     2614.478
****    188.000  2614.528  2614.820   0.293    1.000    59.605  2613.801   0.000   4.341   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2674.315     2635.495
  1.   2674.409     2632.279     2674.359
****    188.000  2674.409  2674.711   0.302    1.000    57.749  2673.670   0.000   4.410   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2734.207     2696.401
  1.   2734.301     2693.053     2734.251
****    188.000  2734.301  2734.630   0.328    1.000    55.659  2733.566   0.000   4.597   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.062 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2794.317     2757.426
  1.   2794.411     2753.793     2794.361
****    188.000  2794.411  2794.732   0.321    1.000    57.203  2793.688   0.000   4.542   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       19
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          1549.000       60.00       2322.037

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.066 DAYS.**                    **BLOEQ**
****    1549.000  2322.956  2324.095   1.140    1.000    83.235  2320.783   0.000   8.564   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2362.721     2337.134
  1.   2362.815     2336.383     2362.765
****    1549.000  2362.815  2363.860   1.045    1.000    83.842  2360.562   0.000   8.202   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2402.729     2376.112
  1.   2402.822     2375.387     2402.772
****    1549.000  2402.822  2403.880   1.058    1.000    83.743  2400.580   0.000   8.250   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2442.708     2413.864
  1.   2442.802     2413.275     2442.752
****    1549.000  2442.802  2443.853   1.051    1.000    83.750  2440.553   0.000   8.224   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
          Tributary Inflow:   270.000       60.00
                    Total:   1279.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
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SECTION NO.      0.900 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2463.493      2448.153
  1.   2463.587      2447.828      2463.537
****   1279.000  2463.587  2464.322   0.735    1.071   124.590  2461.933   0.000   6.968   2.691
                                                FLOW DISTRIBUTION (%) =    0.000  96.929   3.071

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:     235.000        60.00
                    Total:     1044.000        60.00

SECTION NO.      1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.000 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2475.945      2466.667
  1.   2476.039      2466.508      2475.989
****   1044.000  2476.039  2476.730   0.690    1.085   108.212  2474.442   0.000   6.807   3.037
                                                FLOW DISTRIBUTION (%) =    0.000  94.863   5.137
SECTION NO.      1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.100 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2487.080      2480.298
  1.   2487.173      2480.025      2487.123
****   1044.000  2487.173  2487.945   0.771    1.156    97.627  2485.341   0.000   7.296   3.072
                                                FLOW DISTRIBUTION (%) =    0.000  91.750   8.250
SECTION NO.      1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.670 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2599.056      2518.573
  1.   2599.150      2516.208      2599.100
****   1044.000  2599.150  2599.921   0.770    1.155    97.450  2597.314   0.000   7.292   3.069
                                                FLOW DISTRIBUTION (%) =    0.000  91.776   8.224
SECTION NO.      2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      2.240 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2711.063      2630.373
  1.   2711.157      2628.026      2711.107
****   1044.000  2711.157  2711.923   0.766    1.155    97.564  2709.318   0.000   7.273   3.062
                                                FLOW DISTRIBUTION (%) =    0.000  91.760   8.240
SECTION NO.      2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      2.810 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2823.063      2742.205
  1.   2823.157      2739.873      2823.107
****   1044.000  2823.157  2823.922   0.765    1.156    97.594  2821.316   0.000   7.265   3.058
                                                FLOW DISTRIBUTION (%) =    0.000  91.755   8.245
SECTION NO.      3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      3.380 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2934.914      2854.671
  1.   2935.007      2852.308      2934.957
****   1044.000  2935.007  2935.798   0.790    1.152    96.022  2933.172   0.000   7.378   3.098
                                                FLOW DISTRIBUTION (%) =    0.000  91.983   8.017

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE    TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                             270.000        60.00       2442.802

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE      LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.      0.000
****    270.000  2442.802  2443.051   0.248    1.000    72.895  2441.876   0.000   3.997   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.080 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2453.642      2447.213
  1.   2453.736      2446.688      2453.686
****    270.000  2453.736  2454.092   0.356    1.000    68.095  2452.907   0.000   4.783   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.370 TIME =      0.066 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2498.923      2473.961
  1.   2499.017      2471.599      2498.967
****    270.000  2499.017  2499.433   0.416    1.000    53.268  2498.038   0.000   5.175   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.660 TIME =      0.066 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.985      2519.209
  1.    2561.078      2516.802      2561.028
****     270.000  2561.078  2561.499    0.421     1.000     54.054  2560.119    0.000    5.204    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2623.034      2581.385
  1.    2623.128      2578.940      2623.078
****     270.000  2623.128  2623.536    0.407     1.000     54.998  2622.170    0.000    5.120    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2684.052      2639.853
  1.    2683.921      2642.527      2683.965
****     270.000  2683.921  2684.517    0.595     1.000     40.644  2682.848    0.000    6.189    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             235.000       60.00       2463.587

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.066 DAYS.**                    **ELOEQ**
****     235.000  2463.752  2464.246    0.494     1.000     47.637  2462.877    0.000    5.636    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.755      2469.193
  1.    2477.849      2468.569      2477.799
****     235.000  2477.849  2478.247    0.398     1.000     50.630  2476.931    0.000    5.060    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.623      2484.542
  1.    2494.717      2483.618      2494.667
****     235.000  2494.717  2495.047    0.330     1.000     65.700  2493.940    0.000    4.607    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.531      2516.184
  1.    2554.625      2513.079      2554.575
****     235.000  2554.625  2554.965    0.340     1.000     63.967  2553.840    0.000    4.681    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.580      2576.093
  1.    2614.674      2572.956      2614.624
****     235.000  2614.674  2615.006    0.332     1.000     64.977  2613.891    0.000    4.620    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2674.407      2635.657
  1.    2674.500      2632.689      2674.450
****     235.000  2674.500  2674.842    0.341     1.000     62.177  2673.694    0.000    4.688    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2734.343      2694.805
  1.    2734.437      2691.971      2734.387
****     235.000  2734.437  2734.770    0.333     1.000     61.587  2733.613    0.000    4.631    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.066 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.464      2754.710
  1.    2794.558      2751.835      2794.508
****     235.000  2794.558  2794.894    0.336     1.000     63.136  2793.757    0.000    4.649    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000
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TIME STEP #       20
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            1852.000       60.00       2322.259

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA     TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD              WIDTH     BED         1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.069 DAYS.**                    **HLOEQ**
****   1852.000  2323.345  2324.571   1.226    1.000    87.416  2320.960   0.000   8.881   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2363.036      2336.884
  1.    2363.130      2336.242      2363.080
****   1852.000  2363.130  2364.274   1.144    1.000    87.616  2360.666   0.000   8.580   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2403.054      2375.926
  1.    2403.148      2375.300      2403.098
****   1852.000  2403.148  2404.299   1.150    1.000    87.614  2400.691   0.000   8.604   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2443.023      2413.720
  1.    2443.117      2413.216      2443.067
****   1852.000  2443.117  2444.260   1.143    1.000    87.586  2440.652   0.000   8.576   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     286.000       60.00
                   Total:    1566.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2463.708      2448.373
  1.    2463.802      2448.100      2463.752
****   1566.000  2463.802  2464.637   0.835    1.080   127.913  2461.931   0.000   7.440   2.883
                                                FLOW DISTRIBUTION (%) =    0.000  96.534   3.466

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     273.000       60.00
                   Total:    1293.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.205      2466.812
  1.    2476.299      2466.695      2476.249
****   1293.000  2476.299  2477.057   0.759    1.090   115.701  2474.528   0.000   7.150   3.233
                                                FLOW DISTRIBUTION (%) =    0.000  94.368   5.632
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2487.350      2480.412
  1.    2487.444      2480.183      2487.394
****   1293.000  2487.444  2488.322   0.878    1.167   103.511  2485.419   0.000   7.812   3.322
                                                FLOW DISTRIBUTION (%) =    0.000  90.922   9.078
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2599.327      2518.503
  1.    2599.420      2516.404      2599.370
****   1293.000  2599.420  2600.290   0.870    1.166   103.399  2597.385   0.000   7.776   3.306
                                                FLOW DISTRIBUTION (%) =    0.000  90.937   9.063
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2711.333      2630.151
  1.    2711.427      2628.078      2711.377
****   1293.000  2711.427  2712.294   0.867    1.167   103.496  2709.389   0.000   7.764   3.302
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                                                  FLOW DISTRIBUTION (%) =    0.000  90.924   9.076
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2823.333      2742.082
  1.    2823.427      2740.015      2823.377
****    1293.000  2823.427  2824.294   0.867    1.167   103.503  2821.389   0.000   7.762   3.301
                                                  FLOW DISTRIBUTION (%) =    0.000  90.923   9.077
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2935.129      2854.279
  1.    2935.223      2852.211      2935.173
****    1293.000  2935.223  2936.111   0.888    1.163   101.402  2933.174   0.000   7.849   3.326
                                                  FLOW DISTRIBUTION (%) =    0.000  91.216   8.784

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               286.000       60.00       2443.117

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.000
****    286.000  2443.117  2443.274   0.157    1.000    84.769  2442.055   0.000   3.176   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2453.690      2446.028
  1.    2453.784      2445.739      2453.734
****    286.000  2453.784  2454.153   0.369    1.000    69.701  2452.942   0.000   4.871   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2499.017      2473.153
  1.    2498.957      2474.718      2499.001
****    286.000  2498.957  2499.500   0.543    1.000    51.466  2498.017   0.000   5.910   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2561.076      2522.376
  1.    2561.170      2519.521      2561.120
****    286.000  2561.170  2561.589   0.418    1.000    56.216  2560.190   0.000   5.189   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2623.126      2581.320
  1.    2623.220      2578.925      2623.170
****    286.000  2623.220  2623.641   0.421    1.000    56.972  2622.255   0.000   5.204   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.921      2637.766
  1.    2683.657      2642.497      2683.701
****    286.000  2683.657  2684.284   0.627    1.000    39.471  2682.516   0.000   6.351   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               273.000       60.00       2463.802

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.069 DAYS.**                    **ELOEQ**
****    273.000  2463.844  2464.384   0.540    1.000    50.181  2462.921   0.000   5.896   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.847      2469.409
  1.    2477.941      2468.809      2477.891
****    273.000  2477.941  2478.383   0.442    1.000    53.160  2476.978   0.000   5.333   0.000
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                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.759      2484.553
  1.    2494.852      2483.694      2494.802
****     273.000  2494.852  2495.191    0.339     1.000    70.809  2494.026   0.000   4.668   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.667      2514.669
  1.    2554.761      2511.974      2554.711
****     273.000  2554.761  2555.104    0.343     1.000    69.087  2553.920   0.000   4.699   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.716      2574.382
  1.    2614.810      2571.695      2614.760
****     273.000  2614.810  2615.146    0.336     1.000    70.126  2613.973   0.000   4.653   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2674.498      2634.351
  1.    2674.592      2631.773      2674.542
****     273.000  2674.592  2674.949    0.357     1.000    66.062  2673.730   0.000   4.794   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2734.437      2692.748
  1.    2734.368      2694.709      2734.412
****     273.000  2734.368  2734.838    0.470     1.000    60.272  2733.545   0.000   5.501   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.069 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.556      2757.964
  1.    2794.650      2754.664      2794.600
****     273.000  2794.650  2795.002    0.352     1.000    67.054  2793.795   0.000   4.762   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       21
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE    TEMPERATURE   WATER SURFACE
                              (cfs)         (deg F)         (ft)
                            2116.000        60.00        2322.434

****  DISCHARGE     WATER     ENERGY   VELOCITY    ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD                WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.073 DAYS.**                    **BLOEQ**
****    2116.000  2323.654  2324.973    1.319     1.000    90.601  2321.119   0.000   9.212   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2363.251      2337.228
  1.    2363.345      2336.622      2363.295
****    2116.000  2363.345  2364.605    1.260     1.000    90.200  2360.740   0.000   9.004   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2403.313      2376.118
  1.    2403.407      2375.549      2403.357
****    2116.000  2403.407  2404.635    1.227     1.000    90.706  2400.782   0.000   8.887   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2443.239      2413.879
  1.    2443.332      2413.415      2443.282
****    2116.000  2443.332  2444.587    1.254     1.000    90.209  2440.721   0.000   8.983   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
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                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:      285.000       60.00
                  Total:      1831.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2463.899      2448.671
  1.    2463.993      2448.423      2463.943
****    1831.000  2463.993  2464.903    0.910     1.087   130.927  2461.926   0.000   7.779   3.023
                                                  FLOW DISTRIBUTION (%) =     0.000  96.181   3.819

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:      300.000       60.00
                  Total:      1531.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2476.395      2466.970
  1.    2476.489      2466.867      2476.439
****    1531.000  2476.489  2477.333    0.843     1.093   121.310  2474.589   0.000   7.548   3.444
                                                  FLOW DISTRIBUTION (%) =     0.000  94.016   5.984

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2487.621      2480.524
  1.    2487.714      2480.324      2487.664
****    1531.000  2487.714  2488.650    0.936     1.177   109.421  2485.500   0.000   8.092   3.474
                                                  FLOW DISTRIBUTION (%) =     0.000  90.126   9.874

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2599.586      2517.212
  1.    2599.680      2515.398      2599.630
****    1531.000  2599.680  2600.612    0.933     1.176   109.102  2597.456   0.000   8.077   3.466
                                                  FLOW DISTRIBUTION (%) =     0.000  90.168   9.832

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2711.592      2629.008
  1.    2711.686      2627.206      2711.636
****    1531.000  2711.686  2712.617    0.931     1.176   109.191  2709.462   0.000   8.070   3.464
                                                  FLOW DISTRIBUTION (%) =     0.000  90.156   9.844

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2823.592      2740.976
  1.    2823.686      2739.177      2823.636
****    1531.000  2823.686  2824.617    0.931     1.176   109.196  2821.462   0.000   8.069   3.463
                                                  FLOW DISTRIBUTION (%) =     0.000  90.155   9.845

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2935.344      2853.258
  1.    2935.438      2851.455      2935.388
****    1531.000  2935.438  2936.400    0.962     1.172   106.380  2933.201   0.000   8.191   3.499
                                                  FLOW DISTRIBUTION (%) =     0.000  90.532   9.468


SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               285.000       60.00       2443.332

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.000
****     285.000  2443.332  2443.452    0.119     1.000    92.341  2442.218   0.000   2.770   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2453.784      2445.444
  1.    2453.723      2445.576      2453.767
****     285.000  2453.723  2454.164    0.441     1.000    66.795  2452.922   0.000   5.324   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
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  0.   2498.999      2476.650
  1.   2499.093      2473.910      2499.043
**** .   285.000  2499.093  2499.512   0.419    1.000     55.003  2498.095   0.000   5.193   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2561.170      2517.297
  1.   2561.088      2519.411      2561.132
****    285.000  2561.088  2561.620   0.532    1.000     53.359  2560.176   0.000   5.851   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2623.220      2582.613
  1.   2623.142      2585.127      2623.186
****    285.000  2623.142  2623.653   0.511    1.000     54.424  2622.229   0.000   5.737   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2683.657      2639.990
  1.   2683.395      2645.512      2683.439
****    285.000  2683.395  2684.050   0.656    1.000     37.732  2682.232   0.000   6.495   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               300.000       60.00       2463.993

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH      BED         1       2       3

SECTION NO.       0.000
****    300.000  2463.993  2464.429   0.436    1.000     55.479  2462.972   0.000   5.295   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2477.939      2468.408
  1.   2478.032      2467.951      2477.982
****    300.000  2478.032  2478.475   0.442    1.000     55.709  2477.023   0.000   5.335   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2494.850      2484.404
  1.   2494.944      2483.610      2494.894
****    300.000  2494.944  2495.297   0.353    1.000     74.027  2494.094   0.000   4.768   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2554.759      2514.622
  1.   2554.853      2512.022      2554.803
****    300.000  2554.853  2555.208   0.355    1.000     72.264  2553.984   0.000   4.780   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2614.808      2574.385
  1.   2614.902      2571.786      2614.852
****    300.000  2614.902  2615.254   0.353    1.000     73.240  2614.042   0.000   4.763   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2674.592      2632.679
  1.   2674.498      2635.282      2674.542
****    300.000  2674.498  2674.999   0.501    1.000     63.200  2673.662   0.000   5.680   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.073 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2734.366      2699.082
  1.   2734.460      2695.855      2734.410
****    300.000  2734.460  2734.864   0.404    1.000     64.898  2733.553   0.000   5.097   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.073 DAYS.
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NO.       WS           WS           WS
  0.   2794.650     2753.065
  1.   2794.579     2755.142     2794.623
****    300.000  2794.579  2795.055   0.476    1.000    64.855  2793.743   0.000   5.535   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #      22
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          2316.000       60.00       2322.560

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED         1        2        3

SECTION NO.      0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.076 DAYS.**                    **ELOEQ**
****   2316.000  2323.923  2325.283   1.360    1.000    93.299  2321.270   0.000   9.355   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.350 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2363.442     2337.091
  1.   2363.536     2336.536     2363.486
****   2316.000  2363.536  2364.843   1.308    1.000    92.492  2360.806   0.000   9.173   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.600 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2403.460     2376.258
  1.   2403.554     2375.708     2403.504
****   2316.000  2403.554  2404.874   1.320    1.000    92.446  2400.836   0.000   9.217   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.800 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2443.429     2414.033
  1.   2443.523     2413.599     2443.473
****   2316.000  2443.523  2444.822   1.299    1.000    92.522  2440.785   0.000   9.143   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.      0.800 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:    269.000       60.00
                   Total:   2047.000       60.00

SECTION NO.      0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.900 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2464.035     2448.801
  1.   2464.129     2448.577     2464.079
****   2047.000  2464.129  2465.096   0.968    1.093   133.229  2461.911   0.000   8.031   3.128
                                               FLOW DISTRIBUTION (%) =    0.000  95.913   4.087

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.      0.900 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:    314.000       60.00
                   Total:   1733.000       60.00

SECTION NO.      1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.000 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2476.542     2467.094
  1.   2476.636     2467.000     2476.586
****   1733.000  2476.636  2477.547   0.911    1.096   125.655  2474.635   0.000   7.852   3.606
                                               FLOW DISTRIBUTION (%) =    0.000  93.755   6.245

SECTION NO.      1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.100 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2487.811     2480.673
  1.   2487.905     2480.488     2487.855
****   1733.000  2487.905  2488.909   1.004    1.183   113.566  2485.562   0.000   8.400   3.629
                                               FLOW DISTRIBUTION (%) =    0.000  89.587  10.413

SECTION NO.      1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.670 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2599.776     2517.146
  1.   2599.870     2515.458     2599.820
****   1733.000  2599.870  2600.865   0.995    1.183   113.287  2597.512   0.000   8.361   3.611
                                               FLOW DISTRIBUTION (%) =    0.000  89.623  10.377

SECTION NO.      2.240
** SUPERCRITICAL **  Using Critical Water Surface +
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SECTION NO.      2.240 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2711.783     2628.811
  1.   2711.877     2627.142     2711.827
****   1733.000  2711.877  2712.870    0.993    1.183   113.378  2709.518   0.000   8.354   3.609
                                               FLOW DISTRIBUTION (%) =    0.000  89.612  10.388

SECTION NO.      2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      2.810 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2823.783     2740.753
  1.   2823.877     2739.089     2823.827
****   1733.000  2823.877  2824.868    0.991    1.183   113.400  2821.517   0.000   8.347   3.606
                                               FLOW DISTRIBUTION (%) =    0.000  89.609  10.391

SECTION NO.      3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      3.380 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2935.491     2853.145
  1.   2935.585     2851.473     2935.535
****   1733.000  2935.585  2936.621    1.036    1.177   109.839  2933.211   0.000   8.518   3.659
                                               FLOW DISTRIBUTION (%) =    0.000  90.072   9.928

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                               269.000        60.00       2443.523

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1       2       3

SECTION NO.      0.000
****    269.000  2443.523  2443.614    0.091    1.000    98.954  2442.402   0.000   2.424   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.080 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2453.677     2445.381
  1.   2453.771     2445.229     2453.721
****    269.000  2453.771  2454.127    0.356    1.000    68.592  2452.952   0.000   4.784   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.370 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2499.093     2470.983
  1.   2498.944     2474.784     2498.988
****    269.000  2498.944  2499.469    0.525    1.000    50.683  2498.031   0.000   5.814   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.660 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2561.086     2523.247
  1.   2561.180     2520.164     2561.130
****    269.000  2561.180  2561.596    0.416    1.000    55.623  2560.245   0.000   5.171   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.950 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2623.140     2581.587
  1.   2623.234     2579.079     2623.184
****    269.000  2623.234  2623.625    0.391    1.000    56.885  2622.291   0.000   5.016   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.240 TIME =      0.076 DAYS.
TRIAL    TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2683.395     2637.109
  1.   2683.095     2642.113     2683.139
****    269.000  2683.095  2683.752    0.657    1.000    35.570  2681.932   0.000   6.503   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                               314.000        60.00       2464.129

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1       2       3

SECTION NO.      0.000
****    314.000  2464.129  2464.506    0.377    1.000    58.966  2463.047   0.000   4.926   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.070
** SUPERCRITICAL **  Using Critical Water Surface +
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2478.032      2467.762
  1.    2477.966      2468.033      2478.010
****     314.000  2477.966  2478.523    0.557     1.000     53.835  2476.992    0.000    5.985    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.076 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2494.898      2485.579
  1.    2494.992      2484.595      2494.942
****     314.000  2494.992  2495.365    0.373     1.000     75.367  2494.141    0.000    4.896    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.076 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2554.853      2514.128
  1.    2554.799      2515.737      2554.843
****     314.000  2554.799  2555.268    0.469     1.000     69.390  2553.976    0.000    5.496    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.076 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.856      2579.464
  1.    2614.950      2576.047      2614.900
****     314.000  2614.950  2615.334    0.384     1.000     74.207  2614.099    0.000    4.973    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.076 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2674.496      2635.713
  1.    2674.590      2633.101      2674.540
****     314.000  2674.590  2674.987    0.397     1.000     67.803  2673.674    0.000    5.056    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.076 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2734.460      2691.632
  1.    2734.347      2694.535      2734.391
****     314.000  2734.347  2734.845    0.498     1.000     62.243  2733.456    0.000    5.662    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.076 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2794.577      2758.374
  1.    2794.671      2755.206      2794.621
****     314.000  2794.671  2795.081    0.410     1.000     68.685  2793.781    0.000    5.139    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

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TIME STEP #       23
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          2448.000       60.00       2322.639

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.080 DAYS.**                    **ELOEQ**
****   2448.000  2324.082  2325.497    1.415     1.000     94.746  2321.374    0.000    9.541    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2363.578      2337.156
  1.    2363.671      2336.637      2363.621
****   2448.000  2363.671  2364.997    1.326     1.000     94.110  2360.855    0.000    9.236    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2403.607      2375.984
  1.    2403.701      2375.471      2403.651
****   2448.000  2403.701  2405.032    1.331     1.000     94.170  2400.892    0.000    9.255    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2443.521      2414.016
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 1.   2443.615     2413.597     2443.565
****   2448.000  2443.615  2444.970   1.356    1.000    93.642  2440.816   0.000   9.340   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      244.000       60.00
                   Total:     2204.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2464.127     2448.996
  1.   2464.220     2448.777     2464.170
****   2204.000  2464.220  2465.231   1.011    1.097   134.794  2461.900   0.000   8.215   3.204
                                              FLOW DISTRIBUTION (%) =    0.000  95.732   4.268

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      316.000       60.00
                   Total:     1888.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2476.678     2467.152
  1.   2476.772     2467.077     2476.722
****   1888.000  2476.772  2477.697   0.925    1.098   129.750  2474.674   0.000   7.920   3.658
                                              FLOW DISTRIBUTION (%) =    0.000  93.517   6.483

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2487.958     2480.675
  1.   2488.052     2480.508     2488.002
****   1888.000  2488.052  2489.103   1.051    1.188   116.703  2485.617   0.000   8.610   3.738
                                              FLOW DISTRIBUTION (%) =    0.000  89.191  10.809

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2599.923     2516.946
  1.   2600.017     2515.353     2599.967
****   1888.000  2600.017  2601.049   1.032    1.187   116.512  2597.556   0.000   8.529   3.701
                                              FLOW DISTRIBUTION (%) =    0.000  89.215  10.785

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2711.919     2628.516
  1.   2712.013     2626.945     2711.963
****   1888.000  2712.013  2713.049   1.037    1.187   116.399  2709.555   0.000   8.551   3.710
                                              FLOW DISTRIBUTION (%) =    0.000  89.229  10.771

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2823.919     2740.663
  1.   2824.013     2739.081     2823.963
****   1888.000  2824.013  2825.051   1.039    1.187   116.381  2821.557   0.000   8.558   3.713
                                              FLOW DISTRIBUTION (%) =    0.000  89.231  10.769

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2935.627     2852.486
  1.   2935.720     2850.936     2935.670
****   1888.000  2935.720  2936.775   1.055    1.182   113.016  2933.220   0.000   8.608   3.716
                                              FLOW DISTRIBUTION (%) =    0.000  89.659  10.341

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             244.000       60.00       2443.615

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED         1       2       3

SECTION NO.       0.000
****    244.000  2443.615  2443.687   0.072    1.000   102.254  2442.505   0.000   2.150   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.080 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2453.771     2445.004
  1.   2453.645     2445.165     2453.689
****    244.000  2453.645  2454.064   0.420    1.000    62.905  2452.898   0.000   5.196   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
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SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.944      2476.366
  1.    2498.908      2477.609      2498.951
****     244.000  2498.908  2499.390    0.482     1.000     49.478  2498.022    0.000    5.570    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2561.180      2518.700
  1.    2561.073      2522.150      2561.117
****     244.000  2561.073  2561.539    0.466     1.000     51.933  2560.215    0.000    5.478    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2623.234      2579.862
  1.    2623.094      2584.225      2623.138
****     244.000  2623.094  2623.553    0.459     1.000     52.359  2622.237    0.000    5.434    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2683.095      2638.565
  1.    2682.768      2645.179      2682.812
****     244.000  2682.768  2683.416    0.649     1.000     33.105  2681.627    0.000    6.460    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE    TEMPERATURE  WATER SURFACE
                              (cfs)         (deg F)        (ft)
                             316.000         60.00       2464.220

****  DISCHARGE     WATER     ENERGY   VELOCITY    ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD                WIDTH     BED         1        2        3

SECTION NO.       0.000
****     316.000  2464.220  2464.567    0.347     1.000     60.804  2463.121    0.000    4.726    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.964      2467.907
  1.    2478.058      2467.559      2478.008
****     316.000  2478.058  2478.528    0.470     1.000     56.347  2477.039    0.000    5.500    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.992      2484.212
  1.    2494.933      2484.755      2494.977
****     316.000  2494.933  2495.398    0.466     1.000     72.035  2494.131    0.000    5.474    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.841      2518.829
  1.    2554.935      2515.561      2554.885
****     316.000  2554.935  2555.300    0.366     1.000     74.550  2554.061    0.000    4.852    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.904      2575.583
  1.    2614.998      2572.827      2614.948
****     316.000  2614.998  2615.377    0.379     1.000     75.438  2614.149    0.000    4.937    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2674.590      2631.758
  1.    2674.456      2635.217      2674.500
****     316.000  2674.456  2674.938    0.482     1.000     64.109  2673.571    0.000    5.567    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2734.347      2695.611
  1.    2734.284      2697.599      2734.328
****     316.000  2734.284  2734.807    0.523     1.000     61.126  2733.393    0.000    5.803    0.000
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                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.080 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2794.671      2755.453
  1.    2794.604      2757.690      2794.648
****     316.000  2794.604  2795.077   0.473    1.000    66.348  2793.741   0.000   5.518   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       24
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                              2510.000       60.00       2322.676

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =      0.083 DAYS.**                    **ELOEQ**
****   2510.000  2324.272  2325.681   1.409    1.000    96.157  2321.531   0.000   9.521   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2363.671      2336.939
  1.    2363.597      2337.370      2363.641
****   2510.000  2363.597  2365.068   1.471    1.000    93.209  2360.829   0.000   9.730   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2403.655      2376.859
  1.    2403.749      2376.339      2403.699
****   2510.000  2403.749  2405.106   1.358    1.000    94.705  2400.913   0.000   9.347   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2443.569      2414.100
  1.    2443.663      2413.685      2443.613
****   2510.000  2443.663  2445.039   1.376    1.000    94.226  2440.832   0.000   9.410   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:     213.000       60.00
                    Total:     2297.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2464.220      2448.936
  1.    2464.121      2449.170      2464.165
****   2297.000  2464.121  2465.279   1.158    1.095   133.897  2461.853   0.000   8.789   3.425
                                                FLOW DISTRIBUTION (%) =    0.000  95.835   4.165

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:     306.000       60.00
                    Total:     1991.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2476.769      2467.509
  1.    2476.863      2467.417      2476.813
****   1991.000  2476.863  2477.832   0.968    1.099   131.796  2474.734   0.000   8.106   3.756
                                                FLOW DISTRIBUTION (%) =    0.000  93.400   6.600

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2488.050      2480.834
  1.    2488.144      2480.668      2488.094
****   1991.000  2488.144  2489.231   1.087    1.190   118.633  2485.655   0.000   8.766   3.816
                                                FLOW DISTRIBUTION (%) =    0.000  88.951  11.049

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2600.015      2516.962
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  1.   2600.109     2515.418     2600.059
****   1991.000  2600.109  2601.164   1.056    1.190   118.546  2597.582   0.000   8.637   3.759
                                              FLOW DISTRIBUTION (%) =    0.000  88.962  11.038

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2712.010     2628.322
  1.   2712.104     2626.809     2712.054
****   1991.000  2712.104  2713.167   1.063    1.190   118.413  2709.584   0.000   8.667   3.771
                                              FLOW DISTRIBUTION (%) =    0.000  88.979  11.021

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2824.011     2740.511
  1.   2824.105     2738.985     2824.055
****   1991.000  2824.105  2825.170   1.065    1.190   118.393  2821.586   0.000   8.675   3.775
                                              FLOW DISTRIBUTION (%) =    0.000  88.981  11.019

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2935.720     2850.672
  1.   2935.599     2852.593     2935.643
****   1991.000  2935.599  2936.799   1.200    1.180   111.535  2933.098   0.000   9.173   3.950
                                              FLOW DISTRIBUTION (%) =    0.000  89.851  10.149

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             213.000       60.00       2443.663

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED        1       2       3

SECTION NO.       0.000
****    213.000  2443.663  2443.721   0.058    1.000   103.616  2442.597   0.000   1.928   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2453.645     2444.953
  1.   2453.541     2445.065     2453.585
****    213.000  2453.541  2453.976   0.435    1.000    58.353  2452.851   0.000   5.288   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2498.908     2476.425
  1.   2498.801     2480.623     2498.845
****    213.000  2498.801  2499.286   0.485    1.000    46.289  2497.977   0.000   5.589   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2561.073     2521.340
  1.   2561.004     2523.994     2561.048
****    213.000  2561.004  2561.455   0.451    1.000    49.349  2560.203   0.000   5.386   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2623.094     2582.570
  1.   2623.012     2585.619     2623.056
****    213.000  2623.012  2623.460   0.448    1.000    49.498  2622.211   0.000   5.370   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2682.768     2638.609
  1.   2682.452     2645.301     2682.496
****    213.000  2682.452  2683.050   0.598    1.000    30.846  2681.339   0.000   6.204   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             306.000       60.00       2464.121

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED        1       2       3

SECTION NO.       0.000
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****    306.000  2464.121  2464.543   0.423    1.000    57.341  2463.097   0.000   5.215   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2478.058      2468.045
  1.    2477.963      2468.498      2478.007
****    306.000  2477.963  2478.514   0.550    1.000    53.441  2477.001   0.000   5.951   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.931      2485.677
  1.    2495.025      2484.657      2494.975
****    306.000  2495.025  2495.392   0.367    1.000    75.649  2494.193   0.000   4.863   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.935      2513.116
  1.    2554.828      2516.353      2554.872
****    306.000  2554.828  2555.299   0.472    1.000    69.310  2554.026   0.000   5.509   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.998      2576.915
  1.    2614.939      2579.158      2614.982
****    306.000  2614.939  2615.382   0.443    1.000    71.994  2614.143   0.000   5.340   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2674.456      2636.309
  1.    2674.380      2638.875      2674.423
****    306.000  2674.380  2674.889   0.509    1.000    61.909  2673.516   0.000   5.724   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2734.284      2695.411
  1.    2734.189      2698.478      2734.233
****    306.000  2734.189  2734.707   0.518    1.000    59.518  2733.298   0.000   5.771   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.083 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.604      2756.376
  1.    2794.580      2757.220      2794.623
****    306.000  2794.580  2795.039   0.459    1.000    65.643  2793.722   0.000   5.435   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       25
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            2513.000       60.00       2322.677

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.087 DAYS.**                    **ELOEQ**
****    2513.000  2324.318  2325.755   1.437    1.000    96.138  2321.599   0.000   9.615   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2363.639      2337.395
  1.    2363.733      2336.884      2363.683
****    2513.000  2363.733  2365.070   1.338    1.000    94.848  2360.877   0.000   9.277   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2403.749      2375.520
  1.    2403.640      2376.105      2403.684
****    2513.000  2403.640  2405.111   1.471    1.000    93.395  2400.874   0.000   9.728   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
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** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2443.663      2414.282
  1.    2443.612      2414.504      2443.656
****    2513.000  2443.612  2445.043    1.431     1.000     93.609  2440.815    0.000    9.597    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.        0.800 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
          Tributary Inflow:      183.000        60.00
                     Total:     2330.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2464.075      2449.377
  1.    2464.169      2449.143      2464.119
****    2330.000  2464.169  2465.238    1.069     1.098    135.464  2461.791    0.000    8.452    3.298
                                                  FLOW DISTRIBUTION (%) =     0.000   95.655    4.345

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.        0.900 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
          Tributary Inflow:      289.000        60.00
                     Total:     2041.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.916      2467.225
  1.    2477.010      2467.150      2476.960
****    2041.000  2477.010  2477.958    0.948     1.100    134.694  2474.850    0.000    8.024    3.733
                                                  FLOW DISTRIBUTION (%) =     0.000   93.238    6.762

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2488.142      2480.804
  1.    2488.235      2480.650      2488.185
****    2041.000  2488.235  2489.300    1.064     1.193    120.569  2485.694    0.000    8.682    3.790
                                                  FLOW DISTRIBUTION (%) =     0.000   88.714   11.286

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2600.109      2515.471
  1.    2600.029      2516.763      2600.073
****    2041.000  2600.029  2601.219    1.190     1.188    116.803  2597.557    0.000    9.161    3.977
                                                  FLOW DISTRIBUTION (%) =     0.000   89.179   10.821

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2712.058      2630.376
  1.    2712.152      2628.769      2712.102
****    2041.000  2712.152  2713.224    1.072     1.191    119.459  2709.599    0.000    8.707    3.795
                                                  FLOW DISTRIBUTION (%) =     0.000   88.850   11.150

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2824.059      2740.330
  1.    2824.152      2738.837      2824.102
****    2041.000  2824.152  2825.227    1.074     1.191    119.435  2821.602    0.000    8.718    3.799
                                                  FLOW DISTRIBUTION (%) =     0.000   88.853   11.147

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2935.597      2852.144
  1.    2935.691      2850.693      2935.641
****    2041.000  2935.691  2936.797    1.106     1.184    113.989  2933.071    0.000    8.818    3.811
                                                  FLOW DISTRIBUTION (%) =     0.000   89.536   10.464

 SUB-BASIN C4CC

 SUB-BASIN C4CC

 --- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                               183.000        60.00       2443.612

 ****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
         (CFS)       SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

 SECTION NO.       0.000
 ****     183.000  2443.612  2443.666    0.054     1.000    100.185  2442.631    0.000    1.862    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

 SECTION NO.       0.080
 ** SUPERCRITICAL **  Using Critical Water Surface +
 SECTION NO.       0.080 TIME =      0.087 DAYS.
 TRIAL     TRIAL        COMPUTED      CRITICAL
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 NO.       WS           WS           WS
  0.   2453.541     2444.987
  1.   2453.492     2445.050     2453.536
****    183.000  2453.492  2453.868   0.376    1.000    56.150  2452.830   0.000   4.917   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2498.801     2476.166
  1.   2498.717     2479.536     2498.761
****    183.000  2498.717  2499.171   0.454    1.000    43.747  2497.943   0.000   5.405   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2561.004     2521.699
  1.   2560.946     2524.159     2560.990
****    183.000  2560.946  2561.362   0.416    1.000    47.037  2560.194   0.000   5.173   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2623.012     2582.841
  1.   2622.938     2585.812     2622.982
****    183.000  2622.938  2623.357   0.418    1.000    46.893  2622.186   0.000   5.189   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2682.452     2638.351
  1.   2682.105     2646.207     2682.149
****    183.000  2682.105  2682.703   0.598    1.000    28.047  2681.053   0.000   6.206   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000


SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           289.000       60.00       2464.169

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
****    289.000  2464.169  2464.528   0.359    1.000    58.279  2463.137   0.000   4.806   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2477.963     2467.901
  1.   2477.910     2468.133     2477.954
****    289.000  2477.910  2478.451   0.541    1.000    52.098  2476.970   0.000   5.899   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2495.025     2484.624
  1.   2494.952     2485.426     2494.996
****    289.000  2494.952  2495.375   0.423    1.000    71.562  2494.178   0.000   5.218   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2554.826     2519.056
  1.   2554.920     2515.626     2554.870
****    289.000  2554.920  2555.279   0.359    1.000    72.621  2554.092   0.000   4.806   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2614.937     2576.291
  1.   2615.030     2573.274     2614.980
****    289.000  2615.030  2615.384   0.354    1.000    74.994  2614.223   0.000   4.770   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.087 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2674.380     2633.500
  1.   2674.314     2635.313     2674.358
****    289.000  2674.314  2674.787   0.473    1.000    60.717  2673.451   0.000   5.515   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.087 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2734.189     2694.188
  1.    2734.105     2696.761      2734.149
****     289.000  2734.105  2734.588   0.484    1.000    58.150  2733.214   0.000   5.578   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.087 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2794.580     2754.805
  1.    2794.498     2757.582      2794.542
****     289.000  2794.498  2794.984   0.486    1.000    62.757  2793.675   0.000   5.593   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       26
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            2471.000       60.00       2322.653

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.090 DAYS.**                    **ELOEQ**
****    2471.000  2324.373  2325.789   1.416    1.000    96.136  2321.681   0.000   9.547   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2363.733     2336.742
  1.    2363.595     2337.496      2363.639
****    2471.000  2363.595  2365.021   1.426    1.000    93.201  2360.827   0.000   9.579   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2403.638     2376.564
  1.    2403.732     2376.054      2403.682
****    2471.000  2403.732  2405.067   1.335    1.000    94.472  2400.910   0.000   9.268   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2443.612     2413.747
  1.    2443.579     2413.892      2443.623
****    2471.000  2443.579  2445.007   1.427    1.000    93.133  2440.811   0.000   9.583   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:    158.000       60.00
                    Total:    2313.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2464.169     2448.955
  1.    2464.007     2449.356      2464.051
****    2313.000  2464.007  2465.136   1.130    1.095   134.226  2461.698   0.000   8.682   3.384
                                                FLOW DISTRIBUTION (%) =    0.000  95.798   4.202

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:    265.000       60.00
                    Total:    2048.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2477.010     2467.241
  1.    2476.922     2467.325      2476.966
****    2048.000  2476.922  2477.972   1.050    1.099   132.022  2474.822   0.000   8.442   3.913
                                                FLOW DISTRIBUTION (%) =    0.000  93.387   6.613
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2488.235     2480.935
  1.    2488.140     2481.114      2488.184
****    2048.000  2488.140  2489.318   1.179    1.190   118.308  2485.676   0.000   9.126   3.971
                                                FLOW DISTRIBUTION (%) =    0.000  88.991  11.009
SECTION NO.       1.670
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** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2600.027      2518.987
  1.    2600.121      2517.344      2600.071
****    2048.000  2600.121  2601.225   1.104    1.190   118.819  2597.585   0.000   8.836   3.847
                                                FLOW DISTRIBUTION (%) =    0.000  88.929  11.071

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2712.152      2627.397
  1.    2712.035      2629.320      2712.079
****    2048.000  2712.035  2713.232   1.197    1.188   116.880  2709.563   0.000   9.189   3.990
                                                FLOW DISTRIBUTION (%) =    0.000  89.169  10.831

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2824.152      2741.013
  1.    2824.038      2743.006      2824.082
****    2048.000  2824.038  2825.234   1.196    1.188   116.920  2821.566   0.000   9.188   3.989
                                                FLOW DISTRIBUTION (%) =    0.000  89.164  10.836

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2935.691      2851.915
  1.    2935.524      2854.679      2935.568
****    2048.000  2935.524  2936.754   1.230    1.179   111.183  2932.976   0.000   9.285   3.996
                                                FLOW DISTRIBUTION (%) =    0.000  89.897  10.103

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             158.000       60.00       2443.579

****  DISCHARGE     WATER     ENERGY   VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
****     158.000  2443.579  2443.627   0.048    1.000    97.713  2442.657   0.000   1.754   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2453.492      2444.900
  1.    2453.402      2445.020      2453.446
****     158.000  2453.402  2453.782   0.379    1.000    52.121  2452.789   0.000   4.941   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.717      2477.662
  1.    2498.632      2481.667      2498.676
****     158.000  2498.632  2499.068   0.436    1.000    41.150  2497.907   0.000   5.299   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.946      2522.438
  1.    2560.863      2526.433      2560.907
****     158.000  2560.863  2561.286   0.423    1.000    43.873  2560.173   0.000   5.217   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.938      2584.287
  1.    2622.831      2589.477      2622.875
****     158.000  2622.831  2623.265   0.434    1.000    43.317  2622.141   0.000   5.284   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2682.105      2640.383
  1.    2681.813      2648.266      2681.857
****     158.000  2681.813  2682.389   0.576    1.000    25.896  2680.811   0.000   6.089   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             265.000       60.00       2464.007
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**** DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
       (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
****    265.000  2464.007  2464.469   0.463    1.000    52.800  2463.087   0.000    5.456    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2477.910      2468.678
  1.    2477.857      2469.002      2477.901
****    265.000  2477.857  2478.369   0.511    1.000    50.607  2476.944   0.000    5.736    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2494.906      2485.598
  1.    2495.000      2484.500      2494.950
****    265.000  2495.000  2495.335   0.335    1.000    73.144  2494.220   0.000    4.643    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2554.920      2512.720
  1.    2554.812      2516.161      2554.855
****    265.000  2554.812  2555.241   0.429    1.000    67.032  2554.060   0.000    5.257    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2615.030      2576.059
  1.    2614.925      2580.405      2614.969
****    265.000  2614.925  2615.363   0.438    1.000    68.894  2614.200   0.000    5.309    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2674.314      2635.205
  1.    2674.181      2639.875      2674.224
****    265.000  2674.181  2674.654   0.473    1.000    57.455  2673.345   0.000    5.519    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2734.105      2693.614
  1.    2733.982      2697.509      2734.026
****    265.000  2733.982  2734.461   0.479    1.000    55.326  2733.119   0.000    5.549    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.090 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2794.498      2755.625
  1.    2794.444      2757.590      2794.488
****    265.000  2794.444  2794.902   0.458    1.000    60.884  2793.642   0.000    5.431    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       27
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          2388.000       60.00       2322.603

**** DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
       (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.094 DAYS.**                    **ELOEQ**
****   2388.000  2324.477  2325.849   1.372    1.000    96.149  2321.834   0.000    9.395    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2363.595      2337.169
  1.    2363.499      2337.739      2363.543
****   2388.000  2363.499  2364.930   1.431    1.000    92.028  2360.795   0.000    9.597    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2403.732      2375.912
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  1.   2403.559     2376.888     2403.603
****   2388.000  2403.559  2404.985   1.426    1.000    92.281  2400.858   0.000   9.580   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2443.579     2414.238
  1.   2443.495     2414.625     2443.539
****   2388.000  2443.495  2444.927   1.432    1.000    92.012  2440.791   0.000   9.598   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     137.000       60.00
                   Total:    2251.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2464.007     2448.801
  1.   2463.755     2449.450     2463.798
****   2251.000  2463.755  2464.871   1.117    1.093   133.230  2461.484   0.000   8.628   3.360
                                              FLOW DISTRIBUTION (%) =    0.000  95.913   4.087

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     239.000       60.00
                   Total:    2012.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2476.920     2467.115
  1.   2477.014     2467.020     2476.964
****   2012.000  2477.014  2477.955   0.941    1.100   134.367  2474.872   0.000   7.994   3.718
                                              FLOW DISTRIBUTION (%) =    0.000  93.256   6.744
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2488.094     2480.887
  1.   2488.188     2480.728     2488.138
****   2012.000  2488.188  2489.280   1.092    1.191   119.362  2485.692   0.000   8.789   3.830
                                              FLOW DISTRIBUTION (%) =    0.000  88.862  11.138
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2600.121     2515.538
  1.   2600.028     2517.065     2600.072
****   2012.000  2600.028  2601.184   1.156    1.188   116.787  2597.556   0.000   9.032   3.921
                                              FLOW DISTRIBUTION (%) =    0.000  89.181  10.819
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2712.033     2629.983
  1.   2712.127     2628.391     2712.077
****   2012.000  2712.127  2713.193   1.066    1.190   118.889  2709.592   0.000   8.681   3.780
                                              FLOW DISTRIBUTION (%) =    0.000  88.920  11.080
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2824.036     2740.369
  1.   2824.130     2738.861     2824.080
****   2012.000  2824.130  2825.196   1.066    1.191   118.926  2821.596   0.000   8.681   3.780
                                              FLOW DISTRIBUTION (%) =    0.000  88.916  11.084
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2935.467     2852.215
  1.   2935.561     2850.755     2935.511
****   2012.000  2935.561  2936.671   1.110    1.181   112.322  2932.950   0.000   8.828   3.806
                                              FLOW DISTRIBUTION (%) =    0.000  89.750  10.250

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             137.000       60.00       2443.495

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)    SURFACE     LINE      HEAD                WIDTH     BED        1        2        3

SECTION NO.       0.000
****   137.000  2443.495  2443.544   0.048    1.000    92.296  2442.655   0.000   1.766   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
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SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2453.402      2445.017
  1.    2453.352      2445.102      2453.396
****     137.000  2453.352  2453.694    0.342    1.000     49.866  2452.767    0.000    4.691    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.632      2477.786
  1.    2498.575      2480.548      2498.619
****     137.000  2498.575  2498.970    0.395    1.000     39.367  2497.885    0.000    5.041    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.817      2525.776
  1.    2560.911      2521.170      2560.861
****     137.000  2560.911  2561.206    0.295    1.000     44.981  2560.212    0.000    4.355    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.831      2582.008
  1.    2622.795      2583.467      2622.839
****     137.000  2622.795  2623.173    0.378    1.000     41.910  2622.132    0.000    4.932    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2681.813      2640.245
  1.    2681.566      2646.920      2681.610
****     137.000  2681.566  2682.104    0.537    1.000     24.215  2680.604    0.000    5.880    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          239.000        60.00       2463.755

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.094 DAYS.**                    **ELOEQ**
****     239.000  2463.920  2464.427    0.507    1.000     49.012  2463.066    0.000    5.713    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.857      2468.977
  1.    2477.798      2469.383      2477.842
****     239.000  2477.798  2478.269    0.471    1.000     49.032  2476.913    0.000    5.505    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2495.000      2483.987
  1.    2494.860      2485.654      2494.904
****     239.000  2494.860  2495.291    0.431    1.000     65.726  2494.170    0.000    5.268    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.766      2522.083
  1.    2554.859      2517.787      2554.809
****     239.000  2554.859  2555.191    0.331    1.000     68.429  2554.103    0.000    4.616    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.879      2577.647
  1.    2614.973      2574.134      2614.923
****     239.000  2614.973  2615.303    0.330    1.000     70.609  2614.239    0.000    4.610    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.094 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2674.181      2633.756
  1.    2674.089      2636.611      2674.133
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****    239.000  2674.089  2674.550   0.461    1.000    54.736  2673.287   0.000    5.448   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.094 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2733.982      2693.349
  1.   2733.820      2698.825      2733.864
****    239.000  2733.820  2734.311   0.491    1.000    51.641  2732.997   0.000    5.621   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.094 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2794.444      2755.798
  1.   2794.379      2758.349      2794.423
****    239.000  2794.379  2794.810   0.431    1.000    58.612  2793.605   0.000    5.268   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       28
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                              2284.000       60.00       2322.540

****  DISCHARGE     WATER     ENERGY   VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE       HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.097 DAYS.**                    **ELOBQ**
****   2284.000  2324.415  2325.776   1.361    1.000    94.922  2321.844   0.000    9.359   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.097 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2363.499      2337.400
  1.   2363.423      2337.867      2363.467
****   2284.000  2363.423  2364.812   1.389    1.000    91.089  2360.771   0.000    9.455   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.097 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2403.559      2376.339
  1.   2403.489      2376.755      2403.533
****   2284.000  2403.489  2404.873   1.384    1.000    91.360  2400.840   0.000    9.436   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.097 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2443.495      2414.131
  1.   2443.415      2414.508      2443.459
****   2284.000  2443.415  2444.805   1.390    1.000    91.057  2440.763   0.000    9.457   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:     122.000       60.00
                    Total:     2162.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.097 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2463.755      2449.071
  1.   2463.605      2449.499      2463.649
****   2162.000  2463.605  2464.737   1.132    1.089   131.765  2461.425   0.000    8.680   3.375
                                                FLOW DISTRIBUTION (%) =    0.000  96.083   3.917

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:     214.000       60.00
                    Total:     1948.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.097 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2477.014      2466.993
  1.   2476.864      2467.166      2476.908
****   1948.000  2476.864  2477.898   1.034    1.098   129.911  2474.819   0.000    8.373   3.870
                                                FLOW DISTRIBUTION (%) =    0.000  93.506   6.494
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.097 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
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  0.   2488.188     2480.873
  1.   2488.046     2481.148     2488.090
****   1948.000  2488.046  2489.212   1.166    1.187   116.163  2485.651   0.000   9.065   3.932
                                               FLOW DISTRIBUTION (%) =    0.000  89.258  10.742

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2600.028     2517.811
  1.   2599.973     2518.798     2600.017
****   1948.000  2599.973  2601.112   1.139    1.186   115.589  2597.539   0.000   8.957   3.882
                                               FLOW DISTRIBUTION (%) =    0.000  89.331  10.669

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2712.127     2627.538
  1.   2711.981     2630.002     2712.025
****   1948.000  2711.981  2713.119   1.138    1.186   115.696  2709.548   0.000   8.953   3.880
                                               FLOW DISTRIBUTION (%) =    0.000  89.317  10.683

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2824.130     2739.546
  1.   2823.985     2741.993     2824.029
****   1948.000  2823.985  2825.122   1.137    1.186   115.748  2821.552   0.000   8.950   3.880
                                               FLOW DISTRIBUTION (%) =    0.000  89.311  10.689

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2935.561     2850.717
  1.   2935.374     2853.749     2935.418
****   1948.000  2935.374  2936.554   1.180    1.176   109.091  2932.859   0.000   9.086   3.898
                                               FLOW DISTRIBUTION (%) =    0.000  90.172   9.828

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           122.000       60.00       2443.415

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)    SURFACE     LINE      HEAD               WIDTH      BED         1         2         3

SECTION NO.       0.000
****    122.000  2443.415  2443.467   0.052    1.000    86.971  2442.646   0.000   1.823   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2453.352     2445.173
  1.   2453.290     2445.316     2453.334
****    122.000  2453.290  2453.634   0.344    1.000    47.049  2452.739   0.000   4.703   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2498.575     2478.997
  1.   2498.531     2481.365     2498.575
****    122.000  2498.531  2498.896   0.366    1.000    37.947  2497.868   0.000   4.850   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2560.911     2519.136
  1.   2560.765     2526.411     2560.809
****    122.000  2560.765  2561.151   0.387    1.000    39.865  2560.151   0.000   4.988   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2622.795     2586.613
  1.   2622.754     2588.920     2622.798
****    122.000  2622.754  2623.105   0.351    1.000    40.400  2622.119   0.000   4.752   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2681.566     2640.790
  1.   2681.373     2646.235     2681.417
****    122.000  2681.373  2681.872   0.499    1.000    23.021  2680.438   0.000   5.669   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB
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--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             214.000       60.00       2463.605

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.097 DAYS.**                    **ELOEQ**
****     214.000  2463.881  2464.331   0.451    1.000    47.803  2463.049   0.000   5.385   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2477.798     2468.672
  1.    2477.710     2469.286     2477.754
****     214.000  2477.710  2478.183   0.473    1.000    46.413  2476.874   0.000   5.517   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2494.858     2485.423
  1.    2494.952     2484.216     2494.902
****     214.000  2494.952  2495.232   0.280    1.000    69.604  2494.228   0.000   4.247   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2554.859     2511.686
  1.    2554.746     2515.442     2554.790
****     214.000  2554.746  2555.132   0.387    1.000    62.635  2554.061   0.000   4.989   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.973     2575.864
  1.    2614.871     2580.501     2614.915
****     214.000  2614.871  2615.256   0.386    1.000    64.802  2614.208   0.000   4.982   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2674.089     2636.628
  1.    2674.007     2639.810     2674.051
****     214.000  2674.007  2674.439   0.432    1.000    52.466  2673.233   0.000   5.270   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2733.820     2693.954
  1.    2733.704     2698.021     2733.748
****     214.000  2733.704  2734.159   0.455    1.000    49.334  2732.903   0.000   5.413   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.097 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2794.379     2754.630
  1.    2794.304     2757.556     2794.348
****     214.000  2794.304  2794.709   0.405    1.000    56.180  2793.557   0.000   5.102   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       29
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             2168.000      60.00       2322.468

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =      0.101 DAYS.**                    **ELOEQ**
****    2168.000  2324.386  2325.687   1.301    1.000    94.111  2321.868   0.000   9.149   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.101 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2363.423     2337.131
  1.    2363.328     2337.728     2363.372
****    2168.000  2363.328  2364.678   1.349    1.000    89.919  2360.741   0.000   9.318   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
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SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2403.489      2376.159
  1.    2403.399      2376.708      2403.443
****    2168.000  2403.399  2404.743   1.344    1.000    90.204  2400.815   0.000   9.299   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2443.415      2413.981
  1.    2443.317      2414.458      2443.361
****    2168.000  2443.317  2444.668   1.350    1.000    89.875  2440.729   0.000   9.321   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:      114.000       60.00
                   Total:     2054.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2463.605      2449.091
  1.    2463.510      2449.378      2463.554
****    2054.000  2463.510  2464.589   1.079    1.087   130.927  2461.381   0.000   8.471   3.291
                                                FLOW DISTRIBUTION (%) =    0.000  96.181   3.819

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:      194.000       60.00
                   Total:     1860.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.864      2466.938
  1.    2476.798      2467.017      2476.842
****    1860.000  2476.798  2477.798   1.000    1.097   128.180  2474.787   0.000   8.230   3.794
                                                FLOW DISTRIBUTION (%) =    0.000  93.606   6.394
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2488.000      2481.013
  1.    2488.094      2480.824      2488.044
****    1860.000  2488.094  2489.116   1.022    1.188   117.181  2485.670   0.000   8.494   3.690
                                                FLOW DISTRIBUTION (%) =    0.000  89.131  10.869
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2599.973      2515.359
  1.    2599.861      2517.294      2599.905
****    1860.000  2599.861  2601.013   1.152    1.182   113.127  2597.506   0.000   8.995   3.884
                                                FLOW DISTRIBUTION (%) =    0.000  89.644  10.356
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2711.981      2629.405
  1.    2711.870      2631.498      2711.914
****    1860.000  2711.870  2713.020   1.150    1.183   113.237  2709.515   0.000   8.991   3.883
                                                FLOW DISTRIBUTION (%) =    0.000  89.630  10.370
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2823.985      2741.353
  1.    2823.871      2743.492      2823.915
****    1860.000  2823.871  2825.021   1.150    1.183   113.255  2821.516   0.000   8.990   3.882
                                                FLOW DISTRIBUTION (%) =    0.000  89.627  10.373
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2935.374      2852.483
  1.    2935.235      2854.952      2935.279
****    1860.000  2935.235  2936.415   1.179    1.172   106.773  2932.788   0.000   9.072   3.877
                                                FLOW DISTRIBUTION (%) =    0.000  90.481   9.519

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                114.000       60.00       2443.317
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**** DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
       (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
****    114.000  2443.317  2443.383   0.065    1.000    80.345  2442.626   0.000    2.052    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2453.288      2445.764
  1.   2453.382      2445.439     2453.332
****    114.000  2453.382  2453.602   0.221    1.000    50.856  2452.787   0.000    3.767    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2498.531      2473.507
  1.   2498.497      2474.841     2498.541
****    114.000  2498.497  2498.859   0.363    1.000    36.818  2497.856   0.000    4.831    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2560.763      2526.360
  1.   2560.857      2521.277     2560.807
****    114.000  2560.857  2561.124   0.267    1.000    42.482  2560.209   0.000    4.145    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2622.752      2583.452
  1.   2622.846      2579.550     2622.796
****    114.000  2622.846  2623.100   0.254    1.000    42.708  2622.185   0.000    4.040    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2681.373      2637.381
  1.   2681.145      2642.378     2681.188
****    114.000  2681.145  2681.652   0.507    1.000    21.861  2680.232   0.000    5.713    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)       (ft)
                           194.000       60.00      2463.510

**** DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
       (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.101 DAYS.**                    **ELOEQ**
****    194.000  2463.830  2464.270   0.440    1.000    45.944  2463.036   0.000    5.318    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2477.710      2468.814
  1.   2477.630      2469.426     2477.674
****    194.000  2477.630  2478.092   0.462    1.000    44.379  2476.829   0.000    5.455    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2494.952      2483.920
  1.   2494.820      2485.724     2494.863
****    194.000  2494.820  2495.184   0.365    1.000    62.471  2494.179   0.000    4.845    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2554.700      2521.516
  1.   2554.794      2516.979     2554.744
****    194.000  2554.794  2555.088   0.295    1.000    64.195  2554.100   0.000    4.355    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.101 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2614.869      2576.845
  1.   2614.963      2573.150     2614.913
****    194.000  2614.963  2615.234   0.271    1.000    68.145  2614.281   0.000    4.176    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
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** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2674.007      2632.334
  1.    2673.906      2635.459      2673.950
****     194.000  2673.906  2674.326    0.421     1.000     49.944  2673.159    0.000    5.203    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.704      2694.181
  1.    2733.589      2698.441      2733.633
****     194.000  2733.589  2734.033    0.443     1.000     46.921  2732.815    0.000    5.342    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.101 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.304      2754.666
  1.    2794.212      2758.518      2794.256
****     194.000  2794.212  2794.619    0.407     1.000     53.205  2793.499    0.000    5.119    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

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TIME STEP #       30
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                             2044.000       60.00       2322.388

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH      BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =      0.104 DAYS.**                    **ELOEQ**
****    2044.000  2324.386  2325.653    1.267     1.000     93.047  2321.953    0.000    9.030    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2363.328      2337.210
  1.    2363.222      2337.906      2363.266
****    2044.000  2363.222  2364.529    1.308     1.000     88.608  2360.707    0.000    9.173    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2403.399      2376.037
  1.    2403.297      2376.687      2403.341
****    2044.000  2403.297  2404.599    1.302     1.000     88.901  2400.785    0.000    9.153    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2443.317      2413.873
  1.    2443.208      2414.427      2443.252
****    2044.000  2443.208  2444.517    1.309     1.000     88.557  2440.693    0.000    9.176    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:    109.000       60.00
                    Total:    1935.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2463.510      2448.957
  1.    2463.404      2449.294      2463.448
****    1935.000  2463.404  2464.442    1.037     1.085    129.780  2461.348    0.000    8.301    3.222
                                                  FLOW DISTRIBUTION (%) =     0.000  96.315    3.685

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:    179.000       60.00
                    Total:    1756.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.798      2466.793
  1.    2476.700      2466.919      2476.744
****    1756.000  2476.700  2477.672    0.972     1.096    125.663  2474.737    0.000    8.109    3.725
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                                                  FLOW DISTRIBUTION (%) =    0.000  93.753   6.247
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2488.094      2480.602
  1.    2487.898      2480.987     2487.942
****    1756.000  2487.898  2489.004   1.106    1.182   112.654  2485.621   0.000   8.815   3.803
                                                  FLOW DISTRIBUTION (%) =    0.000  89.704  10.296

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2599.861      2517.919
  1.    2599.763      2519.857     2599.807
****    1756.000  2599.763  2600.890   1.127    1.179   110.967  2597.477   0.000   8.889   3.826
                                                  FLOW DISTRIBUTION (%) =    0.000  89.923  10.077

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2711.870      2629.980
  1.    2711.772      2631.915     2711.816
****    1756.000  2711.772  2712.898   1.126    1.179   111.080  2709.487   0.000   8.884   3.824
                                                  FLOW DISTRIBUTION (%) =    0.000  89.908  10.092

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2823.871      2741.957
  1.    2823.772      2743.910     2823.816
****    1756.000  2823.772  2824.898   1.126    1.179   111.085  2821.487   0.000   8.884   3.824
                                                  FLOW DISTRIBUTION (%) =    0.000  89.908  10.092

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2935.235      2851.616
  1.    2935.045      2855.022     2935.089
****    1756.000  2935.045  2936.189   1.143    1.168   104.198  2932.649   0.000   8.919   3.796
                                                  FLOW DISTRIBUTION (%) =    0.000  90.831   9.169

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               109.000       60.00       2443.208

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED         1       2       3

SECTION NO.       0.000
****     109.000  2443.208  2443.297   0.089    1.000    73.313  2442.587   0.000   2.392   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2453.382      2445.984
  1.    2453.250      2446.706     2453.294
****     109.000  2453.250  2453.583   0.333    1.000    44.941  2452.726   0.000   4.629   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.451      2484.403
  1.    2498.545      2478.816     2498.495
****     109.000  2498.545  2498.837   0.292    1.000    38.065  2497.884   0.000   4.335   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.857      2518.537
  1.    2560.758      2523.169     2560.802
****     109.000  2560.758  2561.115   0.357    1.000    38.827  2560.172   0.000   4.793   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.846      2583.311
  1.    2622.713      2590.990     2622.757
****     109.000  2622.713  2623.083   0.370    1.000    38.116  2622.127   0.000   4.883   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.104 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2681.145      2643.719
  1.    2680.969      2649.748     2681.013
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****     109.000  2680.969  2681.500   0.531    1.000    20.922  2680.078   0.000   5.848   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           179.000       60.00       2463.404

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)    SURFACE    LINE      HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.104 DAYS.**                    **ELOEQ**
****     179.000  2463.779  2464.224   0.445    1.000    44.121  2463.021   0.000   5.349   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.104 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2477.630     2469.210
  1.    2477.577     2469.663     2477.621
****     179.000  2477.577  2478.029   0.452    1.000    42.880  2476.803   0.000   5.394   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.104 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2494.774     2486.245
  1.    2494.868     2484.755     2494.818
****     179.000  2494.868  2495.151   0.283    1.000    64.244  2494.215   0.000   4.271   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.104 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2554.794     2513.433
  1.    2554.703     2517.058     2554.747
****     179.000  2554.703  2555.053   0.350    1.000    59.386  2554.067   0.000   4.744   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.104 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2614.963     2574.448
  1.    2614.811     2581.878     2614.855
****     179.000  2614.811  2615.189   0.379    1.000    60.329  2614.210   0.000   4.936   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.104 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2673.906     2638.607
  1.    2673.816     2642.832     2673.860
****     179.000  2673.816  2674.253   0.437    1.000    47.368  2673.104   0.000   5.306   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.104 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2733.589     2696.254
  1.    2733.504     2699.823     2733.548
****     179.000  2733.504  2733.936   0.433    1.000    45.119  2732.752   0.000   5.275   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.104 DAYS.
TRIAL     TRIAL       COMPUTED     CRITICAL
 NO.        WS           WS           WS
  0.    2794.212     2756.272
  1.    2794.157     2758.760     2794.201
****     179.000  2794.157  2794.552   0.396    1.000    51.387  2793.466   0.000   5.046   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       31
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          1924.000       60.00       2322.308

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)    SURFACE    LINE      HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.108 DAYS.**                    **ELOEQ**
****    1924.000  2324.306  2325.554   1.247    1.000    91.515 2321.960   0.000   8.959   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
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SECTION NO.       0.350 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2363.222      2337.378
  1.   2363.113      2338.125     2363.157
****   1924.000  2363.113  2364.382   1.268    1.000    87.272  2360.673   0.000   9.034   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2403.297      2376.008
  1.   2403.192      2376.706     2403.236
****   1924.000  2403.192  2404.455   1.263    1.000    87.570  2400.755   0.000   9.015   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2443.208      2413.834
  1.   2443.097      2414.428     2443.141
****   1924.000  2443.097  2444.366   1.270    1.000    87.211  2440.656   0.000   9.038   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
        Tributary Inflow:     108.000       60.00
                   Total:    1816.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2463.404      2448.859
  1.   2463.283      2449.271     2463.327
****   1816.000  2463.283  2464.296   1.013    1.081   128.376  2461.317   0.000   8.197   3.177
                                                FLOW DISTRIBUTION (%) =    0.000  96.480   3.520

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
        Tributary Inflow:     169.000       60.00
                   Total:    1647.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2476.700      2466.721
  1.   2476.583      2466.887     2476.627
****   1647.000  2476.583  2477.537   0.954    1.094   122.613  2474.680   0.000   8.029   3.671
                                                FLOW DISTRIBUTION (%) =    0.000  93.936   6.064

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2487.898      2480.749
  1.   2487.800      2480.974     2487.844
****   1647.000  2487.800  2488.883   1.083    1.178   110.323  2485.602   0.000   8.710   3.745
                                                FLOW DISTRIBUTION (%) =    0.000  90.007   9.993

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2599.763      2518.221
  1.   2599.697      2519.570     2599.740
****   1647.000  2599.697  2600.754   1.058    1.177   109.513  2597.458   0.000   8.604   3.695
                                                FLOW DISTRIBUTION (%) =    0.000  90.114   9.886

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2711.772      2629.381
  1.   2711.707      2630.669     2711.751
****   1647.000  2711.707  2712.763   1.056    1.177   109.634  2709.469   0.000   8.599   3.693
                                                FLOW DISTRIBUTION (%) =    0.000  90.098   9.902

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2823.772      2741.366
  1.   2823.707      2742.664     2823.750
****   1647.000  2823.707  2824.763   1.056    1.177   109.632  2821.469   0.000   8.599   3.693
                                                FLOW DISTRIBUTION (%) =    0.000  90.098   9.902

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2935.045      2851.445
  1.   2934.882      2854.442     2934.926
****   1647.000  2934.882  2935.992   1.110    1.164   101.760  2932.555   0.000   8.774   3.719
                                                FLOW DISTRIBUTION (%) =    0.000  91.169   8.831

SUB-BASIN C4CC
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SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO. 2 at Control Point # 2 ---

DISCHARGE (cfs)	TEMPERATURE (deg F)	WATER SURFACE (ft)
108.000	60.00	2443.097

**** DISCHARGE (CFS)	WATER SURFACE	ENERGY LINE	VELOCITY HEAD	ALPHA	TOP WIDTH	AVG BED	AVG VEL (by subsection) 1	2	3
SECTION NO. 0.000									
**** 108.000	2443.097	2443.242	0.145	1.000	65.353	2442.557	0.000	3.060	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.080									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.080 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2453.248	2448.509							
1.	2453.342	2447.562	2453.292						
**** 108.000	2453.342	2453.578	0.236	1.000	48.789	2452.773	0.000	3.896	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.370									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.370 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2498.545	2473.902							
1.	2498.461	2477.573	2498.505						
**** 108.000	2498.461	2498.843	0.382	1.000	35.487	2497.848	0.000	4.961	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.660									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.660 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2560.756	2529.267							
1.	2560.850	2523.395	2560.800						
**** 108.000	2560.850	2561.121	0.272	1.000	41.550	2560.228	0.000	4.182	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.950									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.950 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2622.755	2584.362							
1.	2622.849	2580.166	2622.799						
**** 108.000	2622.849	2623.093	0.244	1.000	42.266	2622.204	0.000	3.962	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 1.240									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 1.240 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2680.969	2639.991							
1.	2680.885	2641.966	2680.929						
**** 108.000	2680.885	2681.376	0.491	1.000	21.044	2679.972	0.000	5.622	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO. 3 at Control Point # 3 ---

DISCHARGE (cfs)	TEMPERATURE (deg F)	WATER SURFACE (ft)
169.000	60.00	2463.283

**** DISCHARGE (CFS)	WATER SURFACE	ENERGY LINE	VELOCITY HEAD	ALPHA	TOP WIDTH	AVG BED	AVG VEL (by subsection) 1	2	3
SECTION NO. 0.000									
** CRITICAL WATER SURFACE USED AT SECTION NO. 0.000 AT TIME = 0.108 DAYS.**									**ELOEQ**
**** 169.000	2463.770	2464.184	0.414	1.000	43.694	2463.021	0.000	5.163	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.070									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.070 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2477.531	2469.548							
1.	2477.625	2468.767	2477.575						
**** 169.000	2477.625	2477.977	0.352	1.000	44.322	2476.824	0.000	4.758	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.160									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.160 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2494.868	2483.716							
1.	2494.763	2485.118	2494.807						
**** 169.000	2494.763	2495.143	0.380	1.000	58.362	2494.177	0.000	4.944	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.440									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.440 TIME = 0.108 DAYS.									
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS						
0.	2554.657	2524.837							
1.	2554.751	2519.310	2554.701						
**** 169.000	2554.751	2555.034	0.283	1.000	61.117	2554.103	0.000	4.265	0.000
				FLOW DISTRIBUTION (%) =			0.000	100.000	0.000
SECTION NO. 0.720									
** SUPERCRITICAL ** Using Critical Water Surface *									
SECTION NO. 0.720 TIME = 0.108 DAYS.									

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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.809      2578.856
  1.    2614.903      2574.544      2614.853
****     169.000  2614.903  2615.174   0.271    1.000    64.176  2614.272   0.000   4.175   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2673.770      2637.436
  1.    2673.864      2634.045      2673.814
****     169.000  2673.864  2674.189   0.325    1.000    49.407  2673.116   0.000   4.576   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2733.504      2692.659
  1.    2733.435      2694.954      2733.479
****     169.000  2733.435  2733.844   0.409    1.000    44.152  2732.689   0.000   5.127   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.108 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2794.157      2756.395
  1.    2794.093      2759.394      2794.136
****     169.000  2794.093  2794.510   0.417    1.000    49.205  2793.430   0.000   5.181   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       32
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            1816.000        60.00       2322.235

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.111 DAYS.**                    **ELOEQ**
****   1816.000  2324.233  2325.455   1.222    1.000    90.152  2321.961   0.000   8.868   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2363.113      2337.554
  1.    2363.018      2338.240      2363.062
****   1816.000  2363.018  2364.245   1.226    1.000    86.100  2360.644   0.000   8.883   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2403.192      2376.009
  1.    2403.090      2376.728      2403.133
****   1816.000  2403.090  2404.322   1.232    1.000    86.267  2400.726   0.000   8.905   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2443.097      2413.894
  1.    2442.999      2414.441      2443.043
****   1816.000  2442.999  2444.226   1.228    1.000    86.030  2440.624   0.000   8.888   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:    108.000       60.00
                    Total:    1708.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2463.283      2448.815
  1.    2463.205      2449.094      2463.249
****   1708.000  2463.205  2464.156   0.951    1.079   127.581  2461.290   0.000   7.939   3.075
                                                 FLOW DISTRIBUTION (%) =    0.000  96.574   3.426

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:    162.000       60.00
                    Total:    1546.000       60.00

SECTION NO.       1.000
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** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2476.583      2466.580
  1.    2476.472      2466.740      2476.516
****    1546.000  2476.472  2477.412    0.940     1.092   119.660  2474.630   0.000   7.965   3.625
                                                  FLOW DISTRIBUTION (%) =     0.000  94.117   5.883

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2487.800      2480.754
  1.    2487.744      2480.892      2487.788
****    1546.000  2487.744  2488.765    1.021     1.176   108.923  2485.595   0.000   8.451   3.626
                                                  FLOW DISTRIBUTION (%) =     0.000  90.191   9.809

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2599.697      2517.177
  1.    2599.584      2519.497      2599.628
****    1546.000  2599.584  2600.627    1.043     1.173   107.052  2597.426   0.000   8.531   3.649
                                                  FLOW DISTRIBUTION (%) =     0.000  90.441   9.559

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2711.707      2629.236
  1.    2711.595      2631.551      2711.639
****    1546.000  2711.595  2712.637    1.041     1.173   107.177  2709.438   0.000   8.526   3.648
                                                  FLOW DISTRIBUTION (%) =     0.000  90.424   9.576

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2823.707      2741.215
  1.    2823.594      2743.548      2823.638
****    1546.000  2823.594  2824.636    1.041     1.173   107.165  2821.437   0.000   8.527   3.648
                                                  FLOW DISTRIBUTION (%) =     0.000  90.426   9.574

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2934.882      2852.082
  1.    2934.708      2855.534      2934.751
****    1546.000  2934.708  2935.814    1.106     1.158    99.020  2932.469   0.000   8.747   3.690
                                                  FLOW DISTRIBUTION (%) =     0.000  91.555   8.445

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           108.000       60.00       2442.999

****  DISCHARGE    WATER     ENERGY   VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.000
****     108.000  2442.999  2443.201    0.202     1.000    59.945  2442.499   0.000   3.606   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2453.342      2448.751
  1.    2453.262      2449.872      2453.306
****     108.000  2453.262  2453.586    0.324     1.000    45.136  2452.738   0.000   4.567   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2498.459      2484.206
  1.    2498.553      2478.642      2498.503
****     108.000  2498.553  2498.845    0.292     1.000    38.016  2497.898   0.000   4.336   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2560.850      2520.277
  1.    2560.776      2524.023      2560.820
****     108.000  2560.776  2561.144    0.368     1.000    38.690  2560.202   0.000   4.869   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2622.849      2585.077
  1.    2622.748      2591.217      2622.792
****     108.000  2622.748  2623.101    0.353     1.000    38.668  2622.162   0.000   4.769   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
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SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2680.885      2643.939
  1.    2680.757      2648.112      2680.801
****     108.000  2680.757  2681.267   0.509    1.000    20.663  2679.844   0.000   5.726   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             162.000       60.00       2463.205

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
         (CFS)     SURFACE     LINE      HEAD              WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.111 DAYS.**                    **ELOEQ**
****     162.000  2463.747  2464.156   0.409    1.000    42.941  2463.011   0.000   5.129   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.625      2468.705
  1.    2477.545      2469.359      2477.589
****     162.000  2477.545  2477.958   0.413    1.000    41.793  2476.793   0.000   5.154   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.761      2486.119
  1.    2494.855      2484.587      2494.805
****     162.000  2494.855  2495.125   0.271    1.000    62.455  2494.233   0.000   4.173   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.751      2514.691
  1.    2554.647      2519.461      2554.691
****     162.000  2554.647  2555.030   0.383    1.000    55.682  2554.061   0.000   4.967   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.903      2579.824
  1.    2614.826      2584.646      2614.870
****     162.000  2614.826  2615.179   0.353    1.000    59.303  2614.253   0.000   4.764   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.864      2635.654
  1.    2673.706      2642.739      2673.750
****     162.000  2673.706  2674.127   0.421    1.000    45.088  2673.016   0.000   5.205   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.435      2696.545
  1.    2733.348      2700.389      2733.392
****     162.000  2733.348  2733.780   0.432    1.000    42.403  2732.623   0.000   5.273   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.111 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.091      2759.310
  1.    2794.184      2754.933      2794.134
****     162.000  2794.184  2794.473   0.289    1.000    52.763  2793.472   0.000   4.310   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       33
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            1725.000       60.00       2322.171

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
         (CFS)     SURFACE     LINE      HEAD              WIDTH      BED        1        2        3
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SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.115 DAYS.**                    **ELOEQ**
****    1725.000  2324.213  2325.379    1.167    1.000    89.447  2321.987    0.000    8.664    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2363.018     2337.475
  1.    2362.898     2338.393      2362.942
****    1725.000  2362.898  2364.128    1.230    1.000    84.629  2360.607    0.000    8.896    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2403.090     2376.417
  1.    2402.983     2377.227      2403.027
****    1725.000  2402.983  2404.207    1.224    1.000    84.925  2400.695    0.000    8.877    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2442.999     2414.086
  1.    2442.876     2414.828      2442.920
****    1725.000  2442.876  2444.108    1.231    1.000    84.553  2440.584    0.000    8.901    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:    108.000        60.00
                    Total:    1617.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2463.205     2448.807
  1.    2463.112     2449.164      2463.156
****    1617.000  2463.112  2464.032    0.920    1.076   126.598  2461.260    0.000    7.805    3.020
                                                  FLOW DISTRIBUTION (%) =     0.000   96.691    3.309

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:    156.000        60.00
                    Total:    1461.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2476.472     2466.540
  1.    2476.398     2466.655      2476.441
****    1461.000  2476.398  2477.307    0.909    1.091   117.641  2474.598    0.000    7.829    3.551
                                                  FLOW DISTRIBUTION (%) =     0.000   94.244    5.756
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2487.744     2480.637
  1.    2487.653     2480.868      2487.697
****    1461.000  2487.653  2488.662    1.009    1.172   106.783  2485.575    0.000    8.392    3.588
                                                  FLOW DISTRIBUTION (%) =     0.000   90.476    9.524
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2599.584     2518.215
  1.    2599.486     2520.402      2599.530
****    1461.000  2599.486  2600.517    1.031    1.169   104.891  2597.399    0.000    8.474    3.612
                                                  FLOW DISTRIBUTION (%) =     0.000   90.733    9.267
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2711.595     2630.257
  1.    2711.497     2632.459      2711.541
****    1461.000  2711.497  2712.527    1.030    1.169   105.011  2709.410    0.000    8.468    3.610
                                                  FLOW DISTRIBUTION (%) =     0.000   90.717    9.283
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2823.594     2742.239
  1.    2823.495     2744.457      2823.539
****    1461.000  2823.495  2824.525    1.030    1.169   104.990  2821.408    0.000    8.469    3.610
                                                  FLOW DISTRIBUTION (%) =     0.000   90.720    9.280
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.115 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2934.708     2853.430
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  1.   2934.612     2855.423     2934.656
****   1461.000  2934.612  2935.659   1.047    1.156    97.679  2932.412   0.000   8.501   3.578
                                                FLOW DISTRIBUTION (%) =    0.000  91.747   8.253

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)       (ft)
                           108.000       60.00       2442.876

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH      BED        1       2       3

SECTION NO.       0.000
****    108.000  2442.876  2443.124   0.248    1.000    55.649  2442.391   0.000   3.995   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2453.260     2450.847
  1.   2453.354     2449.281     2453.304
****    108.000  2453.354  2453.588   0.234    1.000    48.997  2452.786   0.000   3.880   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2498.553     2474.150
  1.   2498.481     2477.326     2498.525
****    108.000  2498.481  2498.858   0.377    1.000    35.741  2497.867   0.000   4.926   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2560.817     2527.170
  1.   2560.911     2521.699     2560.861
****    108.000  2560.911  2561.157   0.246    1.000    42.976  2560.279   0.000   3.977   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2622.746     2584.774
  1.   2622.840     2580.552     2622.790
****    108.000  2622.840  2623.113   0.273    1.000    41.401  2622.218   0.000   4.192   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2680.757     2640.979
  1.   2680.628     2644.338     2680.672
****    108.000  2680.628  2681.157   0.528    1.000    20.293  2679.716   0.000   5.830   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)       (ft)
                           156.000       60.00       2463.112

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH      BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.115 DAYS.**                    **ELOEQ**
****    156.000  2463.709  2464.146   0.437    1.000    41.534  2463.000   0.000   5.303   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2477.545     2469.407
  1.   2477.480     2470.048     2477.524
****    156.000  2477.480  2477.927   0.447    1.000    40.161  2476.755   0.000   5.361   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2494.855     2485.049
  1.   2494.785     2486.295     2494.829
****    156.000  2494.785  2495.124   0.339    1.000    58.263  2494.212   0.000   4.670   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.115 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2551.689     2521.605
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  1.   2554.783     2516.591     2554.733
****    156.000  2554.783  2555.024   0.241    1.000    61.629  2554.140   0.000   3.939   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.115 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2614.824     2576.996
  1.   2614.918     2572.964     2614.868
****    156.000  2614.918  2615.171   0.253    1.000    63.521  2614.310   0.000   4.037   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.115 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2673.704     2636.281
  1.   2673.798     2633.012     2673.748
****    156.000  2673.798  2674.092   0.294    1.000    48.326  2673.056   0.000   4.349   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.115 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2733.348     2692.474
  1.   2733.292     2694.314     2733.336
****    156.000  2733.292  2733.704   0.412    1.000    41.834  2732.568   0.000   5.146   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.115 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2794.184     2753.342
  1.   2794.035     2760.253     2794.079
****    156.000  2794.035  2794.445   0.410    1.000    47.373  2793.394   0.000   5.138   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       34
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE    TEMPERATURE  WATER SURFACE
                              (cfs)         (deg F)        (ft)
                             1649.000        60.00       2322.113

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.118 DAYS.**                    **ELOEQ**
****   1649.000  2324.199  2325.327   1.128    1.000    88.772  2322.018   0.000   8.519   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.118 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2362.898     2337.780
  1.   2362.847     2338.196     2362.891
****   1649.000  2362.847  2364.026   1.179    1.000    83.981  2360.593   0.000   8.711   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.118 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2402.983     2376.500
  1.   2402.933     2376.888     2402.977
****   1649.000  2402.933  2404.107   1.174    1.000    84.276  2400.682   0.000   8.692   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.118 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2442.876     2414.208
  1.   2442.823     2414.541     2442.867
****   1649.000  2442.823  2444.004   1.181    1.000    83.900  2440.568   0.000   8.716   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)         (deg F)
          Tributary Inflow:    106.000        60.00
                    Total:    1543.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.118 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2463.112     2448.718
  1.   2462.990     2449.209     2463.034
****   1543.000  2462.990  2463.929   0.939    1.073   125.202  2461.230   0.000   7.880   3.045
                                              FLOW DISTRIBUTION (%) =    0.000  96.857   3.143

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
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                                DISCHARGE    TEMPERATURE
                                  (cfs)        (deg F)
          Tributary Inflow:      152.000        60.00
                    Total:      1391.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2476.398      2466.619
  1.    2476.338      2466.724      2476.382
****    1391.000  2476.338  2477.217   0.879    1.090   116.028  2474.573   0.000   7.698   3.482
                                                FLOW DISTRIBUTION (%) =     0.000  94.347   5.653
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2487.653      2480.625
  1.    2487.576      2480.828      2487.620
****    1391.000  2487.576  2488.572   0.996    1.169   105.010  2485.556   0.000   8.327   3.550
                                                FLOW DISTRIBUTION (%) =     0.000  90.716   9.284
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2599.440      2520.241
  1.    2599.534      2518.110      2599.484
****    1391.000  2599.534  2600.424   0.890    1.171   105.937  2597.412   0.000   7.875   3.362
                                                FLOW DISTRIBUTION (%) =     0.000  90.591   9.409
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2711.451      2629.337
  1.    2711.545      2627.411      2711.495
****    1391.000  2711.545  2712.434   0.889    1.171   106.054  2709.424   0.000   7.872   3.362
                                                FLOW DISTRIBUTION (%) =     0.000  90.575   9.425
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2823.449      2741.347
  1.    2823.543      2739.420      2823.493
****    1391.000  2823.543  2824.432   0.889    1.171   106.033  2821.422   0.000   7.873   3.362
                                                FLOW DISTRIBUTION (%) =     0.000  90.578   9.422
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2934.612      2850.808
  1.    2934.488      2853.233      2934.532
****    1391.000  2934.488  2935.528   1.040    1.152    95.784  2932.352   0.000   8.463   3.549
                                                FLOW DISTRIBUTION (%) =     0.000  92.022   7.978

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                                DISCHARGE    TEMPERATURE  WATER SURFACE
                                  (cfs)        (deg F)        (ft)
                                 106.000        60.00       2442.823

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED         1         2         3

SECTION NO.       0.000
****     106.000  2442.823  2443.025   0.202    1.000    56.400  2442.301   0.000   3.602   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2453.354      2448.298
  1.    2453.274      2449.366      2453.318
****     106.000  2453.274  2453.584   0.309    1.000    45.335  2452.750   0.000   4.462   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2498.479      2482.749
  1.    2498.572      2477.445      2498.522
****     106.000  2498.572  2498.850   0.277    1.000    38.288  2497.917   0.000   4.226   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2560.911      2518.127
  1.    2560.817      2522.529      2560.861
****     106.000  2560.817  2561.160   0.343    1.000    39.375  2560.244   0.000   4.695   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.118 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.840      2586.422
  1.    2622.772      2590.681      2622.815
****     106.000  2622.772  2623.128   0.356    1.000    38.624  2622.198   0.000   4.787   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2680.628      2643.982
  1.    2680.476      2649.019      2680.520
****     106.000  2680.476  2681.007   0.531    1.000    19.873  2679.563   0.000   5.843   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             152.000       60.00       2462.990

****  DISCHARGE    WATER     ENERGY  VELOCITY  ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.118 DAYS.**                    **ELOEQ**
****     152.000  2463.711  2464.134   0.423    1.000    41.390  2463.007   0.000   5.219   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.478      2469.855
  1.    2477.572      2468.984      2477.522
****     152.000  2477.572  2477.904   0.332    1.000    42.684  2476.802   0.000   4.626   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.783      2484.856
  1.    2494.877      2483.564      2494.827
****     152.000  2494.877  2495.124   0.247    1.000    62.485  2494.267   0.000   3.987   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.783      2513.005
  1.    2554.666      2518.086      2554.709
****     152.000  2554.666  2555.021   0.355    1.000    55.459  2554.092   0.000   4.780   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.918      2578.640
  1.    2614.824      2584.587      2614.868
****     152.000  2614.824  2615.174   0.350    1.000    58.070  2614.272   0.000   4.747   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.798      2636.291
  1.    2673.667      2642.390      2673.711
****     152.000  2673.667  2674.056   0.389    1.000    44.389  2672.982   0.000   5.000   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.292      2696.471
  1.    2733.221      2699.583      2733.265
****     152.000  2733.221  2733.649   0.428    1.000    40.668  2732.509   0.000   5.248   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.118 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.033      2760.044
  1.    2794.127      2755.408      2794.077
****     152.000  2794.127  2794.416   0.289    1.000    50.963  2793.435   0.000   4.314   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       35
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
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                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                              1580.000        60.00       2322.061

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.121 DAYS.**                    **ELOEQ**
****   1580.000  2324.158  2325.278   1.121    1.000    87.746  2322.037   0.000   8.493   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2362.847     2337.877
  1.    2362.751     2338.681      2362.795
****   1580.000  2362.751  2363.935   1.183    1.000    82.804  2360.565   0.000   8.726   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2402.933     2376.631
  1.    2402.838     2377.416      2402.882
****   1580.000  2402.838  2404.016   1.178    1.000    83.091  2400.654   0.000   8.707   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2442.823     2414.318
  1.    2442.770     2414.663      2442.814
****   1580.000  2442.770  2443.908   1.138    1.000    83.248  2440.553   0.000   8.559   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
                Tributary Inflow:     102.000        60.00
                           Total:    1478.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2462.944     2448.980
  1.    2463.038     2448.600      2462.988
****   1478.000  2463.038  2463.829   0.791    1.075   126.190  2461.209   0.000   7.234   2.798
                                                FLOW DISTRIBUTION (%) =    0.000  96.739   3.261

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE    TEMPERATURE
                                (cfs)        (deg F)
                Tributary Inflow:     148.000        60.00
                           Total:    1330.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2476.338     2466.147
  1.    2476.279     2466.253      2476.323
****   1330.000  2476.279  2477.138   0.859    1.089   114.429  2474.549   0.000   7.605   3.431
                                                FLOW DISTRIBUTION (%) =    0.000  94.449   5.551
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2487.530     2480.759
  1.    2487.624     2480.505      2487.574
****   1330.000  2487.624  2488.493   0.869    1.171   106.043  2485.573   0.000   7.782   3.323
                                                FLOW DISTRIBUTION (%) =    0.000  90.576   9.424
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2599.534     2514.618
  1.    2599.363     2518.163      2599.407
****   1330.000  2599.363  2600.339   0.975    1.164   102.193  2597.366   0.000   8.228   3.491
                                                FLOW DISTRIBUTION (%) =    0.000  91.105   8.895
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2711.545     2628.473
  1.    2711.375     2632.323      2711.419
****   1330.000  2711.375  2712.349   0.974    1.165   102.317  2709.378   0.000   8.222   3.490
                                                FLOW DISTRIBUTION (%) =    0.000  91.087   8.913
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.121 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2823.543     2740.465
  1.    2823.373     2744.322      2823.417
****   1330.000  2823.373  2824.347   0.974    1.164   102.293  2821.376   0.000   8.223   3.490
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                                                FLOW DISTRIBUTION (%) =    0.000  91.091   8.909
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2934.488      2853.669
  1.    2934.374      2856.243      2934.418
****    1330.000  2934.374  2935.409   1.035    1.148    94.078  2932.296   0.000   8.434   3.526
                                                FLOW DISTRIBUTION (%) =    0.000  92.272   7.728

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               102.000       60.00       2442.770

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.000
****     102.000  2442.770  2442.974   0.204    1.000    54.684  2442.255   0.000   3.623   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2453.272      2449.287
  1.    2453.366      2448.029      2453.316
****     102.000  2453.366  2453.573   0.207    1.000    49.202  2452.798   0.000   3.651   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2498.572      2471.641
  1.    2498.486      2475.042      2498.530
****     102.000  2498.486  2498.831   0.345    1.000    35.621  2497.878   0.000   4.712   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2560.815      2527.038
  1.    2560.909      2521.495      2560.859
****     102.000  2560.909  2561.155   0.246    1.000    42.164  2560.301   0.000   3.979   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2622.770      2584.782
  1.    2622.863      2580.415      2622.813
****     102.000  2622.863  2623.113   0.250    1.000    41.508  2622.251   0.000   4.010   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2680.476      2640.206
  1.    2680.358      2643.106      2680.402
****     102.000  2680.358  2680.865   0.507    1.000    19.559  2679.445   0.000   5.713   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               148.000       60.00       2463.038

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.121 DAYS.**                    **ELOEQ**
****     148.000  2463.679  2464.103   0.425    1.000    40.727  2462.983   0.000   5.227   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2477.572      2468.883
  1.    2477.458      2469.960      2477.502
****     148.000  2477.458  2477.888   0.430    1.000    39.504  2476.746   0.000   5.260   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2494.877      2484.833
  1.    2494.788      2486.457      2494.832
****     148.000  2494.788  2495.131   0.343    1.000    57.173  2494.237   0.000   4.695   0.000
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                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2554.663      2524.752
  1.    2554.757      2518.936      2554.707
****     148.000  2554.757  2555.016   0.258    1.000    59.464  2554.147   0.000   4.078   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2614.822      2579.726
  1.    2614.916      2574.970      2614.866
****     148.000  2614.916  2615.173   0.258    1.000    62.229  2614.332   0.000   4.073   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2673.667      2635.736
  1.    2673.631      2637.129      2673.675
****     148.000  2673.631  2674.007   0.376    1.000    43.966  2672.947   0.000   4.916   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2733.175      2699.196
  1.    2733.269      2695.215      2733.219
****     148.000  2733.269  2733.599   0.330    1.000    42.660  2732.516   0.000   4.606   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.121 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2794.127      2751.412
  1.    2794.020      2755.595      2794.063
****     148.000  2794.020  2794.392   0.373    1.000    47.150  2793.379   0.000   4.898   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       36
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            1512.000       60.00       2322.009

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.125 DAYS.**                    **ELOEQ**
****   1512.000  2324.150  2325.226   1.076    1.000    87.205  2322.066   0.000   8.321   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2362.751      2337.986
  1.    2362.699      2338.445      2362.743
****   1512.000  2362.699  2363.839   1.140    1.000    82.145  2360.550   0.000   8.566   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2402.838      2376.715
  1.    2402.785      2377.167      2402.829
****   1512.000  2402.785  2403.920   1.136    1.000    82.424  2400.639   0.000   8.548   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2442.770      2414.100
  1.    2442.674      2414.746      2442.718
****   1512.000  2442.674  2443.816   1.142    1.000    82.064  2440.524   0.000   8.572   0.000
                                                    FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:     94.000       60.00
                    Total:    1418.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
```

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 NO.       WS           WS           WS
  0.   2463.038     2448.369
  1.   2462.836     2449.231     2462.880
****   1418.000  2462.836  2463.731   0.895    1.069   123.769  2461.168   0.000   7.686   2.966
                                                FLOW DISTRIBUTION (%) =    0.000  97.028   2.972

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      142.000       60.00
                   Total:     1276.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2476.279     2466.504
  1.   2476.221     2466.616     2476.265
****   1276.000  2476.221  2477.068   0.846    1.088   112.829  2474.527   0.000   7.546   3.395
                                                FLOW DISTRIBUTION (%) =    0.000  94.554   5.446
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2487.624     2480.369
  1.   2487.489     2480.723     2487.533
****   1276.000  2487.489  2488.422   0.933    1.166   102.897  2485.541   0.000   8.050   3.420
                                                FLOW DISTRIBUTION (%) =    0.000  91.006   8.994
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2599.317     2520.119
  1.   2599.411     2517.894     2599.361
****   1276.000  2599.411  2600.264   0.853    1.166   103.239  2597.379   0.000   7.697   3.272
                                                FLOW DISTRIBUTION (%) =    0.000  90.960   9.040
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2711.329     2629.662
  1.   2711.423     2627.615     2711.373
****   1276.000  2711.423  2712.275   0.852    1.166   103.361  2709.392   0.000   7.694   3.271
                                                FLOW DISTRIBUTION (%) =    0.000  90.943   9.057
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2823.327     2741.637
  1.   2823.421     2739.594     2823.371
****   1276.000  2823.421  2824.272   0.851    1.166   103.354  2821.388   0.000   7.689   3.269
                                                FLOW DISTRIBUTION (%) =    0.000  90.944   9.056
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2934.374     2851.908
  1.   2934.299     2853.482     2934.343
****   1276.000  2934.299  2935.300   1.000    1.146    93.061  2932.254   0.000   8.286   3.458
                                                FLOW DISTRIBUTION (%) =    0.000  92.423   7.577

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                               94.000       60.00       2442.674

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED         1        2        3

SECTION NO.       0.000
****      94.000  2442.674  2442.893   0.219    1.000    51.034  2442.183   0.000   3.754   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2453.366     2447.976
  1.   2453.243     2449.785     2453.287
****      94.000  2453.243  2453.529   0.286    1.000    43.643  2452.741   0.000   4.290   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2498.486     2479.515
  1.   2498.426     2483.284     2498.469
****      94.000  2498.426  2498.793   0.368    1.000    33.713  2497.852   0.000   4.863   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
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  0.   2560.909     2521.887
  1.   2560.806     2528.535     2560.850
****     94.000  2560.806  2561.122   0.316    1.000    38.213  2560.260   0.000   4.506   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2622.863     2583.047
  1.   2622.753     2589.641     2622.797
****     94.000  2622.753  2623.073   0.320    1.000    37.547  2622.202   0.000   4.540   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2680.358     2642.606
  1.   2680.200     2647.627     2680.244
****     94.000  2680.200  2680.690   0.489    1.000    18.802  2679.310   0.000   5.612   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             142.000       60.00       2462.836

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.125 DAYS.**                    **ELOEQ**
****    142.000  2463.700  2464.086   0.386    1.000    40.962  2463.004   0.000   4.985   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2477.456     2469.494
  1.   2477.550     2468.657     2477.500
****    142.000  2477.550  2477.860   0.311    1.000    41.993  2476.793   0.000   4.470   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2494.786     2484.739
  1.   2494.880     2483.426     2494.830
****    142.000  2494.880  2495.118   0.238    1.000    61.531  2494.291   0.000   3.916   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2554.757     2514.085
  1.   2554.660     2518.664     2554.703
****    142.000  2554.660  2555.011   0.351    1.000    54.163  2554.108   0.000   4.755   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2614.916     2579.421
  1.   2614.854     2583.457     2614.898
****    142.000  2614.854  2615.161   0.307    1.000    58.545  2614.308   0.000   4.443   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2673.631     2638.607
  1.   2673.570     2641.612     2673.614
****    142.000  2673.570  2673.967   0.398    1.000    42.355  2672.907   0.000   5.058   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2733.269     2694.019
  1.   2733.149     2699.066     2733.193
****    142.000  2733.149  2733.536   0.386    1.000    39.982  2732.437   0.000   4.986   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.125 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2793.974     2759.501
  1.   2794.067     2754.899     2794.017
****    142.000  2794.067  2794.360   0.292    1.000    49.032  2793.400   0.000   4.338   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       37
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          1442.000       60.00       2321.956

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE      HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.128 DAYS.**                    **HLOEQ**
****   1442.000  2324.097  2325.185   1.088    1.000    85.876  2322.090   0.000   8.369   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2362.699      2338.269
  1.    2362.633      2338.865     2362.677
****   1442.000  2362.633  2363.739   1.106    1.000    81.328  2360.531   0.000   8.437   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2402.785      2376.473
  1.    2402.713      2377.088     2402.757
****   1442.000  2402.713  2403.815   1.102    1.000    81.583  2400.614   0.000   8.421   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2442.674      2414.217
  1.    2442.610      2414.665     2442.653
****   1442.000  2442.610  2443.717   1.107    1.000    81.255  2440.507   0.000   8.442   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:     84.000       60.00
                   Total:   1358.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2462.790      2449.101
  1.    2462.884      2448.669     2462.834
****   1358.000  2462.884  2463.640   0.756    1.071   124.663  2461.154   0.000   7.069   2.730
                                                FLOW DISTRIBUTION (%) =    0.000  96.921   3.079

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:    134.000       60.00
                   Total:   1224.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2476.221      2466.070
  1.    2476.150      2466.212     2476.194
****   1224.000  2476.150  2476.999   0.849    1.087   110.858  2474.499   0.000   7.553   3.386
                                                FLOW DISTRIBUTION (%) =    0.000  94.684   5.316
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2487.443      2480.756
  1.    2487.537      2480.491     2487.487
****   1224.000  2487.537  2488.356   0.819    1.167   103.912  2485.559   0.000   7.547   3.212
                                                FLOW DISTRIBUTION (%) =    0.000  90.866   9.134
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2599.411      2514.589
  1.    2599.265      2517.737     2599.309
****   1224.000  2599.265  2600.187   0.922    1.160   100.037  2597.340   0.000   7.989   3.378
                                                FLOW DISTRIBUTION (%) =    0.000  91.407   8.593
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2711.423      2628.484
  1.    2711.278      2631.909     2711.322
****   1224.000  2711.278  2712.199   0.921    1.161   100.163  2709.354   0.000   7.984   3.376
                                                FLOW DISTRIBUTION (%) =    0.000  91.389   8.611
SECTION NO.       2.810
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** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2823.421      2740.406
  1.    2823.272      2743.912      2823.316
****    1224.000  2823.272  2824.193   0.921    1.160   100.102  2821.347   0.000   7.987   3.377
                                                FLOW DISTRIBUTION (%) =    0.000  91.398   8.602

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2934.299      2853.551
  1.    2934.203      2855.809      2934.247
****    1224.000  2934.203  2935.182   0.979    1.143    91.784  2932.197   0.000   8.192   3.411
                                                FLOW DISTRIBUTION (%) =    0.000  92.615   7.385

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             84.000        60.00       2442.610

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED         1        2        3

SECTION NO.       0.000
****      84.000  2442.610  2442.819   0.209    1.000    48.509  2442.138   0.000   3.671   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2453.243      2449.097
  1.    2453.192      2449.996      2453.236
****      84.000  2453.192  2453.478   0.285    1.000    41.317  2452.718   0.000   4.284   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.380      2484.754
  1.    2498.474      2478.526      2498.424
****      84.000  2498.474  2498.728   0.254    1.000    34.995  2497.880   0.000   4.044   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.806      2521.170
  1.    2560.782      2522.542      2560.826
****      84.000  2560.782  2561.074   0.292    1.000    36.993  2560.258   0.000   4.334   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.753      2586.944
  1.    2622.711      2589.784      2622.755
****      84.000  2622.711  2623.022   0.310    1.000    35.880  2622.187   0.000   4.468   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2680.200      2642.287
  1.    2680.026      2648.102      2680.070
****      84.000  2680.026  2680.494   0.468    1.000    17.846  2679.168   0.000   5.488   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            134.000        60.00       2462.884

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.128 DAYS.**                    **ELOEQ**
****     134.000  2463.660  2464.036   0.376    1.000    39.999  2462.979   0.000   4.919   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.550      2468.365
  1.    2477.419      2469.538      2477.463
****     134.000  2477.419  2477.818   0.398    1.000    38.336  2476.729   0.000   5.064   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
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** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.880      2484.407
  1.    2494.772      2486.412      2494.816
****     134.000  2494.772  2495.105   0.333    1.000    55.259  2494.248   0.000   4.628   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.657      2525.135
  1.    2554.751      2518.978      2554.701
****     134.000  2554.751  2554.990   0.238    1.000    58.195  2554.163   0.000   3.917   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.808      2579.588
  1.    2614.902      2574.689      2614.852
****     134.000  2614.902  2615.146   0.244    1.000    60.524  2614.343   0.000   3.962   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.524      2638.558
  1.    2673.618      2634.724      2673.568
****     134.000  2673.618  2673.917   0.299    1.000    44.104  2672.925   0.000   4.389   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2733.149      2692.284
  1.    2733.054      2695.757      2733.098
****     134.000  2733.054  2733.453   0.399    1.000    38.290  2732.364   0.000   5.070   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.128 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2794.067      2754.109
  1.    2793.954      2759.773      2793.998
****     134.000  2793.954  2794.321   0.366    1.000    44.992  2793.341   0.000   4.855   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       38
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                            1365.000        60.00       2321.897

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)       SURFACE    LINE     HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.132 DAYS.**                    **ELOEQ**
****    1365.000  2324.118  2325.155   1.038    1.000    85.292  2322.159   0.000   8.172   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2362.633      2338.071
  1.    2362.537      2338.967      2362.581
****    1365.000  2362.537  2363.627   1.091    1.000    80.148  2360.504   0.000   8.377   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2402.713      2376.513
  1.    2402.613      2377.427      2402.657
****    1365.000  2402.613  2403.700   1.087    1.000    80.381  2400.583   0.000   8.362   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2442.610      2414.229
  1.    2442.515      2414.926      2442.559
****    1365.000  2442.515  2443.607   1.092    1.000    80.083  2440.482   0.000   8.381   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
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       Tributary Inflow:       73.000       60.00
                  Total:     1292.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2462.884      2448.387
  1.    2462.720      2449.166      2462.764
****    1292.000  2462.720  2463.543    0.823     1.066   122.621  2461.127    0.000    7.367    2.840
                                                 FLOW DISTRIBUTION (%) =     0.000   97.166    2.834

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                           DISCHARGE   TEMPERATURE
                             (cfs)       (deg F)
       Tributary Inflow:      124.000       60.00
                  Total:     1168.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2476.150      2466.368
  1.    2476.104      2466.463      2476.148
****    1168.000  2476.104  2476.922    0.818     1.086   109.593  2474.482    0.000    7.411    3.315
                                                 FLOW DISTRIBUTION (%) =     0.000   94.769    5.231

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2487.537      2480.289
  1.    2487.399      2480.674      2487.443
****    1168.000  2487.399  2488.284    0.885     1.161   100.591  2485.532    0.000    7.830    3.314
                                                 FLOW DISTRIBUTION (%) =     0.000   91.328    8.672

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2599.265      2518.626
  1.    2599.199      2520.305      2599.243
****    1168.000  2599.199  2600.105    0.906     1.157    98.582  2597.323    0.000    7.913    3.337
                                                 FLOW DISTRIBUTION (%) =     0.000   91.613    8.387

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2711.278      2630.680
  1.    2711.213      2632.345      2711.257
****    1168.000  2711.213  2712.118    0.905     1.158    98.714  2709.338    0.000    7.908    3.336
                                                 FLOW DISTRIBUTION (%) =     0.000   91.595    8.405

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2823.272      2742.713
  1.    2823.208      2744.346      2823.252
****    1168.000  2823.208  2824.113    0.905     1.158    98.667  2821.333    0.000    7.910    3.336
                                                 FLOW DISTRIBUTION (%) =     0.000   91.601    8.399

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2934.203      2852.695
  1.    2934.065      2855.949      2934.109
****    1168.000  2934.065  2935.018    0.953     1.140    90.253  2932.099    0.000    8.074    3.351
                                                 FLOW DISTRIBUTION (%) =     0.000   92.847    7.153


SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                           DISCHARGE   TEMPERATURE  WATER SURFACE
                             (cfs)       (deg F)        (ft)
                             73.000       60.00       2442.515

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)    SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.000
****      73.000  2442.515  2442.743    0.227     1.000    44.166  2442.083    0.000    3.823    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2453.192      2449.749
  1.    2453.127      2451.198      2453.171
****      73.000  2453.127  2453.417    0.290     1.000    38.374  2452.687    0.000    4.321    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2498.474      2476.498
  1.    2498.341      2485.646      2498.385
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****      73.000  2498.341  2498.656   0.314    1.000    30.974  2497.817   0.000   4.498   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2560.782      2524.642
  1.   2560.700      2531.099     2560.744
****      73.000  2560.700  2561.023   0.322    1.000    33.767  2560.226   0.000   4.555   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2622.711      2590.211
  1.   2622.677      2593.100     2622.721
****      73.000  2622.677  2622.962   0.285    1.000    34.301  2622.180   0.000   4.286   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2680.026      2641.342
  1.   2679.800      2649.248     2679.844
****      73.000  2679.800  2680.277   0.478    1.000    16.433  2678.998   0.000   5.543   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)       (ft)
                               124.000       60.00      2462.720

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE     HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.132 DAYS.**                    **ELOEQ**
****    124.000  2463.639  2464.004   0.365    1.000    38.884  2462.981   0.000   4.849   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2477.373      2469.694
  1.   2477.467      2468.760     2477.417
****    124.000  2477.467  2477.768   0.301    1.000    39.578  2476.755   0.000   4.402   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2494.770      2484.725
  1.   2494.864      2483.319     2494.814
****    124.000  2494.864  2495.075   0.211    1.000    59.745  2494.301   0.000   3.685   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2554.751      2512.530
  1.   2554.642      2517.570     2554.686
****    124.000  2554.642  2554.960   0.319    1.000    52.260  2554.118   0.000   4.528   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2614.902      2578.067
  1.   2614.799      2585.141     2614.843
****    124.000  2614.799  2615.117   0.317    1.000    54.652  2614.297   0.000   4.520   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2673.618      2636.573
  1.   2673.489      2643.166     2673.533
****    124.000  2673.489  2673.853   0.364    1.000    40.323  2672.853   0.000   4.840   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2733.054      2696.310
  1.   2732.967      2700.502     2733.010
****    124.000  2732.967  2733.375   0.408    1.000    36.494  2732.304   0.000   5.126   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.132 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
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  0.   2793.954     2758.335
  1.   2793.892     2762.078     2793.936
****    124.000  2793.892  2794.271   0.379    1.000    42.868  2793.307   0.000   4.939   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       39
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            1282.000       60.00       2321.834

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.135 DAYS.**                    **ELOEQ**
****   1282.000  2324.054  2325.060   1.006    1.000    84.092  2322.159   0.000   8.045   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2362.537     2338.166
  1.   2362.458     2338.937     2362.502
****   1282.000  2362.458  2363.499   1.041    1.000    79.191  2360.480   0.000   8.186   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2402.613     2376.483
  1.   2402.537     2377.208     2402.581
****   1282.000  2402.537  2403.574   1.038    1.000    79.424  2400.561   0.000   8.171   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2442.515     2414.158
  1.   2442.440     2414.733     2442.484
****   1282.000  2442.440  2443.482   1.042    1.000    79.140  2440.462   0.000   8.189   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      63.000       60.00
                   Total:    1219.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2462.720     2448.698
  1.   2462.650     2449.066     2462.694
****   1219.000  2462.650  2463.438   0.788    1.064   121.849  2461.108   0.000   7.206   2.775
                                               FLOW DISTRIBUTION (%) =    0.000  97.259   2.741

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:     113.000       60.00
                   Total:    1106.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2476.104     2466.257
  1.   2476.002     2466.498     2476.046
****   1106.000  2476.002  2476.837   0.835    1.084   106.762  2474.444   0.000   7.483   3.330
                                               FLOW DISTRIBUTION (%) =    0.000  94.963   5.037
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2487.399     2480.597
  1.   2487.293     2480.944     2487.337
****   1106.000  2487.293  2488.200   0.907    1.157    98.093  2485.510   0.000   7.914   3.335
                                               FLOW DISTRIBUTION (%) =    0.000  91.683   8.317
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2599.199     2519.855
  1.   2599.131     2521.732     2599.175
****   1106.000  2599.131  2600.012   0.881    1.155    97.083  2597.306   0.000   7.794   3.278
                                               FLOW DISTRIBUTION (%) =    0.000  91.829   8.171
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.135 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2711.213     2630.694
  1.    2711.145     2632.490     2711.189
****    1106.000  2711.145  2712.024   0.879    1.155    97.212  2709.321   0.000   7.789   3.277
                                                FLOW DISTRIBUTION (%) =    0.000  91.810   8.190

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2823.208     2742.673
  1.    2823.139     2744.492     2823.183
****    1106.000  2823.139  2824.019   0.880    1.155    97.158  2821.315   0.000   7.791   3.278
                                                FLOW DISTRIBUTION (%) =    0.000  91.818   8.182

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2934.065     2853.374
  1.    2933.926     2856.873     2933.970
****    1106.000  2933.926  2934.884   0.958    1.135    88.248  2932.035   0.000   8.084   3.343
                                                FLOW DISTRIBUTION (%) =    0.000  93.154   6.846

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             63.000        60.00       2442.440

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
****     63.000  2442.440  2442.667   0.227    1.000    40.907  2442.037   0.000   3.818   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2453.127     2450.388
  1.    2453.074     2451.759     2453.118
****     63.000  2453.074  2453.353   0.279    1.000    36.008  2452.661   0.000   4.238   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2498.341     2482.093
  1.    2498.292     2486.165     2498.336
****     63.000  2498.292  2498.581   0.289    1.000    29.417  2497.796   0.000   4.313   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2560.654     2531.606
  1.    2560.748     2523.756     2560.698
****     63.000  2560.748  2560.955   0.207    1.000    35.166  2560.257   0.000   3.650   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2622.677     2583.291
  1.    2622.621     2586.893     2622.665
****     63.000  2622.621  2622.901   0.280    1.000    32.112  2622.159   0.000   4.244   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2679.800     2643.449
  1.    2679.655     2649.121     2679.699
****     63.000  2679.655  2680.073   0.418    1.000    15.690  2678.881   0.000   5.188   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                            113.000        60.00       2462.650

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.135 DAYS.**                    **ELOEQ**
****    113.000  2463.568  2463.935   0.367    1.000    37.029  2462.940   0.000   4.858   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.135 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.467      2468.406
  1.    2477.325      2469.867      2477.369
****     113.000  2477.325  2477.705    0.380     1.000     35.634  2476.684    0.000    4.948    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.864      2483.985
  1.    2494.751      2486.202      2494.795
****     113.000  2494.751  2495.036    0.285     1.000     53.145  2494.254    0.000    4.282    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.596      2525.738
  1.    2554.690      2519.091      2554.640
****     113.000  2554.690  2554.922    0.232     1.000     54.189  2554.150    0.000    3.865    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.797      2579.441
  1.    2614.891      2574.189      2614.841
****     113.000  2614.891  2615.092    0.201     1.000     58.876  2614.357    0.000    3.594    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.489      2634.069
  1.    2673.408      2637.348      2673.452
****     113.000  2673.408  2673.788    0.380     1.000     38.025  2672.807    0.000    4.944    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2732.967      2697.443
  1.    2732.876      2702.292      2732.920
****     113.000  2732.876  2733.272    0.396     1.000     34.911  2732.235    0.000    5.050    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.135 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.846      2761.906
  1.    2793.940      2756.291      2793.890
****     113.000  2793.940  2794.200    0.260     1.000     44.895  2793.325    0.000    4.088    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

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TIME STEP #       40
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                          1193.000       60.00       2321.760

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1         2         3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.139 DAYS.**                    **ELOEQ**
****    1193.000  2323.980  2324.956    0.976     1.000     82.682  2322.159    0.000    7.923    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2362.458      2338.085
  1.    2362.360      2339.077      2362.404
****    1193.000  2362.360  2363.358    0.998     1.000     78.005  2360.452    0.000    8.015    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2402.537      2376.242
  1.    2402.441      2377.187      2402.485
****    1193.000  2402.441  2403.436    0.995     1.000     78.234  2400.535    0.000    8.000    0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2442.440      2413.948
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  1.   2442.346     2414.699     2442.390
****   1193.000  2442.346  2443.345   0.999     1.000    77.965  2440.437   0.000   8.017   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:     53.000       60.00
                    Total:    1140.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.139 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2462.650     2448.588
  1.   2462.547     2449.163     2462.591
****   1140.000  2462.547  2463.325   0.778     1.061   120.628  2461.088   0.000   7.156   2.753
                                                FLOW DISTRIBUTION (%) =    0.000  97.407   2.593

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:    101.000       60.00
                    Total:    1039.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.139 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2476.002     2466.369
  1.   2475.944     2466.517     2475.988
****   1039.000  2475.944  2476.739   0.794     1.083   105.183  2474.422   0.000   7.294   3.237
                                                FLOW DISTRIBUTION (%) =    0.000  95.073   4.927

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.139 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2487.247     2480.762
  1.   2487.341     2480.450     2487.291
****   1039.000  2487.341  2488.101   0.760     1.159    99.120  2485.527   0.000   7.248   3.060
                                                FLOW DISTRIBUTION (%) =    0.000  91.536   8.464

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.139 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2599.131     2516.609
  1.   2599.033     2519.119     2599.077
****   1039.000  2599.033  2599.909   0.876     1.150    94.921  2597.282   0.000   7.764   3.253
                                                FLOW DISTRIBUTION (%) =    0.000  92.144   7.856

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.139 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2711.145     2631.220
  1.   2711.047     2634.011     2711.091
****   1039.000  2711.047  2711.922   0.875     1.150    95.049  2709.297   0.000   7.759   3.252
                                                FLOW DISTRIBUTION (%) =    0.000  92.125   7.875

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.139 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2823.139     2743.202
  1.   2823.041     2746.015     2823.085
****   1039.000  2823.041  2823.916   0.875     1.150    94.989  2821.290   0.000   7.761   3.253
                                                FLOW DISTRIBUTION (%) =    0.000  92.134   7.866

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.139 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2933.926     2854.686
  1.   2933.823     2857.478     2933.867
****   1039.000  2933.823  2934.741   0.917     1.132    86.837  2931.984   0.000   7.904   3.259
                                                FLOW DISTRIBUTION (%) =    0.000  93.373   6.627

 SUB-BASIN C4CC

 SUB-BASIN C4CC

 --- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                             DISCHARGE   TEMPERATURE  WATER SURFACE
                               (cfs)       (deg F)        (ft)
                              53.000        60.00       2442.346

 ****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
         (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

 SECTION NO.       0.000
 ** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.139 DAYS.**                    **BLOEQ**
 ****      53.000  2442.388  2442.636   0.248     1.000    36.550  2442.025   0.000   3.998   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

 SECTION NO.       0.080
 ** SUPERCRITICAL **  Using Critical Water Surface +
 SECTION NO.       0.080 TIME =      0.139 DAYS.
 TRIAL     TRIAL       COMPUTED      CRITICAL
  NO.       WS           WS            WS
   0.   2453.074     2451.342
   1.   2453.033     2452.631     2453.077
 ****      53.000  2453.033  2453.278   0.245     1.000    34.133  2452.642   0.000   3.972   0.000
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                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.292      2480.247
  1.    2498.228      2485.739      2498.272
****      53.000  2498.228  2498.499    0.272    1.000    27.425  2497.765    0.000    4.181    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.748      2520.436
  1.    2560.606      2532.595      2560.650
****      53.000  2560.606  2560.895    0.289    1.000    29.759  2560.193    0.000    4.314    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.621      2590.749
  1.    2622.579      2595.037      2622.622
****      53.000  2622.579  2622.829    0.250    1.000    30.366  2622.144    0.000    4.014    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2679.655      2641.859
  1.    2679.452      2650.166      2679.496
****      53.000  2679.452  2679.873    0.421    1.000    14.293  2678.739    0.000    5.206    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             101.000       60.00       2462.547

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.139 DAYS.**                    **ELOEQ**
****     101.000  2463.534  2463.876    0.342    1.000    35.703  2462.931    0.000    4.691    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.325      2469.167
  1.    2477.270      2469.805      2477.314
****     101.000  2477.270  2477.632    0.362    1.000    34.113  2476.657    0.000    4.826    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.751      2485.486
  1.    2494.695      2486.818      2494.739
****     101.000  2494.695  2494.995    0.300    1.000    49.762  2494.233    0.000    4.391    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.690      2518.715
  1.    2554.577      2527.435      2554.620
****     101.000  2554.577  2554.882    0.305    1.000    48.007  2554.102    0.000    4.433    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.891      2577.200
  1.    2614.774      2586.175      2614.818
****     101.000  2614.774  2615.053    0.279    1.000    51.586  2614.312    0.000    4.236    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.408      2639.767
  1.    2673.346      2643.477      2673.390
****     101.000  2673.346  2673.688    0.342    1.000    36.745  2672.760    0.000    4.693    0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2732.876      2697.189
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  1.   2732.796     2701.501     2732.840
****    101.000  2732.796  2733.178   0.381    1.000    33.232  2732.183   0.000   4.954   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.139 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2793.940     2753.314
  1.   2793.801     2761.347     2793.845
****    101.000  2793.801  2794.126   0.324    1.000    40.085  2793.250   0.000   4.569   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       41
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                            1100.000       60.00       2321.678

****  DISCHARGE    WATER     ENERGY   VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.142 DAYS.**                    **ELOEQ**
****   1100.000  2323.898  2324.833   0.934    1.000    81.229  2322.152   0.000   7.754   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2362.360     2338.018
  1.   2362.252     2339.178     2362.296
****   1100.000  2362.252  2363.207   0.955    1.000    76.682  2360.422   0.000   7.839   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2402.441     2376.127
  1.   2402.333     2377.249     2402.377
****   1100.000  2402.333  2403.285   0.952    1.000    76.900  2400.505   0.000   7.826   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2442.346     2413.839
  1.   2442.240     2414.732     2442.284
****   1100.000  2442.240  2443.196   0.956    1.000    76.649  2440.410   0.000   7.841   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
        Tributary Inflow:      44.000       60.00
                   Total:    1056.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2462.547     2448.631
  1.   2462.453     2449.205     2462.497
****   1056.000  2462.453  2463.203   0.750    1.058   119.523  2461.069   0.000   7.020   2.698
                                               FLOW DISTRIBUTION (%) =    0.000  97.541   2.459

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
        Tributary Inflow:      89.000       60.00
                   Total:     967.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2475.944     2466.303
  1.   2475.873     2466.495     2475.917
****    967.000  2475.873  2476.630   0.757    1.081   103.219  2474.396   0.000   7.118   3.146
                                               FLOW DISTRIBUTION (%) =    0.000  95.211   4.789
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2487.341     2480.132
  1.   2487.152     2480.758     2487.196
****    967.000  2487.152  2487.992   0.840    1.150    94.698  2485.485   0.000   7.601   3.184
                                               FLOW DISTRIBUTION (%) =    0.000  92.176   7.824
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
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 NO.       WS           WS           WS
  0.   2599.033     2520.159
  1.   2598.935     2523.180     2598.979
****    967.000  2598.935  2599.795   0.860    1.145    92.759  2597.258   0.000   7.681   3.206
                                              FLOW DISTRIBUTION (%) =    0.000  92.464   7.536

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2711.047     2632.157
  1.   2710.949     2635.217     2710.992
****    967.000  2710.949  2711.807   0.859    1.146    92.876  2709.273   0.000   7.677   3.205
                                              FLOW DISTRIBUTION (%) =    0.000  92.446   7.554

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2823.041     2744.123
  1.   2822.940     2747.223     2822.984
****    967.000  2822.940  2823.800   0.859    1.146    92.807  2821.264   0.000   7.679   3.205
                                              FLOW DISTRIBUTION (%) =    0.000  92.457   7.543

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2933.823     2854.914
  1.   2933.698     2858.556     2933.742
****    967.000  2933.698  2934.593   0.896    1.127    84.956  2931.935   0.000   7.800   3.204
                                              FLOW DISTRIBUTION (%) =    0.000  93.669   6.331

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           44.000        60.00       2442.240

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH      BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.142 DAYS.**                          **ELOEQ**
****     44.000  2442.326  2442.543   0.218    1.000    34.254  2441.983   0.000   3.743   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2453.033     2450.633
  1.   2452.980     2452.342     2453.024
****     44.000  2452.980  2453.206   0.226    1.000    31.758  2452.617   0.000   3.812   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2498.228     2480.544
  1.   2498.133     2489.798     2498.177
****     44.000  2498.133  2498.427   0.293    1.000    24.536  2497.721   0.000   4.344   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2560.560     2536.795
  1.   2560.654     2526.143     2560.604
****     44.000  2560.654  2560.820   0.166    1.000    31.224  2560.223   0.000   3.271   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2622.579     2582.316
  1.   2622.502     2588.046     2622.545
****     44.000  2622.502  2622.763   0.262    1.000    27.429  2622.111   0.000   4.104   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.142 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2679.452     2644.712
  1.   2679.284     2653.286     2679.327
****     44.000  2679.284  2679.677   0.394    1.000    13.188  2678.621   0.000   5.033   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           89.000        60.00       2462.453

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
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       (CFS)      SURFACE    LINE      HEAD              WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.142 DAYS.**                    **ELOBQ**
****      89.000  2463.451  2463.818   0.367    1.000     32.992  2462.896   0.000    4.857    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.270      2469.620
  1.    2477.195      2470.699      2477.239
****      89.000  2477.195  2477.562   0.368    1.000     31.917  2476.621   0.000    4.863    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.649      2487.628
  1.    2494.743      2485.149      2494.693
****      89.000  2494.743  2494.939   0.196    1.000     52.035  2494.262   0.000    3.555    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.531      2521.320
  1.    2554.625      2515.393      2554.575
****      89.000  2554.625  2554.829   0.205    1.000     49.974  2554.134   0.000    3.629    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.728      2581.116
  1.    2614.822      2574.963      2614.772
****      89.000  2614.822  2615.010   0.188    1.000     53.680  2614.345   0.000    3.477    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.346      2634.669
  1.    2673.266      2638.387      2673.310
****      89.000  2673.266  2673.607   0.340    1.000     34.496  2672.715   0.000    4.679    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2732.796      2697.383
  1.    2732.707      2702.647      2732.751
****      89.000  2732.707  2733.069   0.362    1.000     31.488  2732.122   0.000    4.826    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.142 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.801      2757.235
  1.    2793.734      2761.772      2793.778
****      89.000  2793.734  2794.045   0.311    1.000     37.947  2793.210   0.000    4.476    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       42
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                            1009.000       60.00       2321.598

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD              WIDTH      BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.146 DAYS.**                    **ELOBQ**
****    1009.000  2323.818  2324.705   0.887    1.000     79.814  2322.144   0.000    7.553    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2362.252      2337.972
  1.    2362.131      2339.360      2362.175
****    1009.000  2362.131  2363.054   0.923    1.000     75.202  2360.390   0.000    7.705    0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2402.333      2376.238
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  1.   2402.212     2377.606     2402.256
****   1009.000  2402.212  2403.132   0.920    1.000    75.408  2400.473   0.000   7.693   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2442.240     2413.915
  1.   2442.121     2415.007     2442.165
****   1009.000  2442.121  2443.044   0.923    1.000    75.175  2440.379   0.000   7.707   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:       36.000       60.00
                   Total:      973.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2462.453     2448.691
  1.   2462.385     2449.144     2462.429
****    973.000  2462.385  2463.077   0.692    1.056   118.758  2461.053   0.000   6.742   2.589
                                              FLOW DISTRIBUTION (%) =    0.000  97.634   2.366

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:       78.000       60.00
                   Total:      895.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2475.873     2466.136
  1.   2475.772     2466.440     2475.816
****    895.000  2475.772  2476.520   0.748    1.079   100.404  2474.361   0.000   7.070   3.108
                                              FLOW DISTRIBUTION (%) =    0.000  95.414   4.586

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2487.152     2480.494
  1.   2487.087     2480.745     2487.131
****    895.000  2487.087  2487.875   0.788    1.146    93.156  2485.472   0.000   7.353   3.071
                                              FLOW DISTRIBUTION (%) =    0.000  92.404   7.596

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2598.935     2520.096
  1.   2598.867     2522.245     2598.911
****    895.000  2598.867  2599.673   0.806    1.142    91.258  2597.243   0.000   7.429   3.092
                                              FLOW DISTRIBUTION (%) =    0.000  92.689   7.311

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2710.949     2632.096
  1.   2710.880     2634.268     2710.924
****    895.000  2710.880  2711.685   0.805    1.142    91.369  2709.256   0.000   7.425   3.091
                                              FLOW DISTRIBUTION (%) =    0.000  92.673   7.327

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2822.940     2744.102
  1.   2822.872     2746.274     2822.916
****    895.000  2822.872  2823.677   0.805    1.142    91.302  2821.248   0.000   7.427   3.092
                                              FLOW DISTRIBUTION (%) =    0.000  92.683   7.317

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2933.698     2854.780
  1.   2933.593     2857.895     2933.637
****    895.000  2933.593  2934.441   0.848    1.123    83.436  2931.893   0.000   7.582   3.105
                                              FLOW DISTRIBUTION (%) =    0.000  93.911   6.089

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             36.000       60.00       2442.121

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.146 DAYS.**                    **ELOEQ**
****     36.000  2442.262  2442.462   0.201    1.000    31.527  2441.944   0.000   3.596   0.000
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                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2452.980      2450.592
  1.    2452.926      2452.506      2452.970
****      36.000  2452.926  2453.134    0.208    1.000    29.346  2452.590   0.000   3.654   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.133      2483.765
  1.    2498.093      2488.174      2498.137
****      36.000  2498.093  2498.337    0.244    1.000    23.265  2497.703   0.000   3.958   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.654      2520.036
  1.    2560.505      2535.801      2560.548
****      36.000  2560.505  2560.755    0.250    1.000    25.563  2560.153   0.000   4.011   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.502      2592.895
  1.    2622.452      2599.303      2622.496
****      36.000  2622.452  2622.686    0.233    1.000    25.568  2622.089   0.000   3.874   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2679.284      2644.984
  1.    2679.133      2653.302      2679.177
****      36.000  2679.133  2679.497    0.364    1.000    12.127  2678.520   0.000   4.839   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           78.000        60.00       2462.385

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
         (CFS)     SURFACE     LINE      HEAD              WIDTH      BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.146 DAYS.**                    **ELOEQ**
****      78.000  2463.427  2463.732    0.305    1.000    32.325  2462.883   0.000   4.432   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2477.195      2469.230
  1.    2477.143      2469.938      2477.187
****      78.000  2477.143  2477.474    0.331    1.000    30.633  2476.591   0.000   4.618   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.743      2484.135
  1.    2494.621      2487.253      2494.665
****      78.000  2494.621  2494.895    0.275    1.000    44.937  2494.208   0.000   4.204   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.625      2518.741
  1.    2554.527      2527.180      2554.570
****      78.000  2554.527  2554.779    0.252    1.000    44.537  2554.092   0.000   4.028   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.822      2576.185
  1.    2614.704      2585.846      2614.748
****      78.000  2614.704  2614.958    0.254    1.000    46.698  2614.291   0.000   4.046   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2673.266      2640.896
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  1.   2673.200     2645.577     2673.244
****     78.000  2673.200  2673.522   0.322    1.000    32.680  2672.676   0.000   4.555   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2732.707     2697.879
  1.   2732.615     2703.808     2732.659
****     78.000  2732.615  2732.973   0.358    1.000    29.488  2732.064   0.000   4.797   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.146 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2793.734     2758.488
  1.   2793.684     2762.205     2793.728
****     78.000  2793.684  2793.969   0.285    1.000    36.289  2793.182   0.000   4.282   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       43
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                             915.000       60.00       2321.508

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.149 DAYS.**                    **ELOEQ**
****     915.000  2323.718  2324.563   0.845    1.000    78.125  2322.130   0.000   7.375   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.149 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2362.131     2338.089
  1.   2361.991     2339.857     2362.035
****     915.000  2361.991  2362.889   0.898    1.000    73.489  2360.353   0.000   7.603   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.149 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2402.212     2376.558
  1.   2402.072     2378.336     2402.116
****     915.000  2402.072  2402.967   0.895    1.000    73.681  2400.436   0.000   7.591   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.149 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2442.121     2414.161
  1.   2441.982     2415.587     2442.026
****     915.000  2441.982  2442.881   0.899    1.000    73.468  2440.345   0.000   7.604   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:     30.000       60.00
                    Total:     885.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.149 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2462.385     2448.595
  1.   2462.285     2449.337     2462.329
****     885.000  2462.285  2462.944   0.659    1.052   117.544  2461.036   0.000   6.574   2.521
                                              FLOW DISTRIBUTION (%) =    0.000  97.782   2.218

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:     68.000       60.00
                    Total:     817.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.149 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2475.772     2466.143
  1.   2475.704     2466.364     2475.748
****     817.000  2475.704  2476.393   0.689    1.077    98.510  2474.337   0.000   6.781   2.969
                                              FLOW DISTRIBUTION (%) =    0.000  95.553   4.447

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.149 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
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 NO.       WS           WS           WS
  0.   2487.087     2480.216
  1.   2486.991     2480.595     2487.035
****    817.000  2486.991  2487.742   0.751    1.141    90.912  2485.451   0.000   7.171   2.983
                                              FLOW DISTRIBUTION (%) =    0.000  92.741   7.259
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2598.867     2519.379
  1.   2598.768     2522.619     2598.812
****    817.000  2598.768  2599.537   0.768    1.137    89.096  2597.220   0.000   7.243   3.002
                                              FLOW DISTRIBUTION (%) =    0.000  93.018   6.982
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2710.880     2631.370
  1.   2710.782     2634.633     2710.826
****    817.000  2710.782  2711.549   0.767    1.137    89.200  2709.234   0.000   7.239   3.001
                                              FLOW DISTRIBUTION (%) =    0.000  93.002   6.998
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2822.872     2743.364
  1.   2822.773     2746.640     2822.817
****    817.000  2822.773  2823.541   0.768    1.137    89.133  2821.225   0.000   7.242   3.002
                                              FLOW DISTRIBUTION (%) =    0.000  93.013   6.987
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2933.593     2854.331
  1.   2933.471     2858.145     2933.515
****    817.000  2933.471  2934.275   0.804    1.118    81.605  2931.849   0.000   7.372   3.008
                                              FLOW DISTRIBUTION (%) =    0.000  94.207   5.793

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           30.000       60.00       2441.982

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)    SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.149 DAYS.**                    **ELOEQ**
****      30.000  2442.203  2442.397   0.194    1.000    28.991  2441.910   0.000   3.530   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  1.   2452.859     2453.958
  2.   2452.952     2450.156     2452.902
****      30.000  2452.952  2453.077   0.124    1.000    30.465  2452.604   0.000   2.827   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2498.093     2475.254
  1.   2498.042     2479.328     2498.086
****      30.000  2498.042  2498.267   0.226    1.000    21.658  2497.678   0.000   3.811   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2560.459     2537.274
  1.   2560.552     2525.146     2560.502
****      30.000  2560.552  2560.691   0.139    1.000    27.100  2560.182   0.000   2.986   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2622.452     2584.027
  1.   2622.401     2588.695     2622.445
****      30.000  2622.401  2622.623   0.222    1.000    23.659  2622.065   0.000   3.777   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.149 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2679.133     2646.543
  1.   2679.010     2654.238     2679.054
****      30.000  2679.010  2679.345   0.335    1.000    11.275  2678.437   0.000   4.641   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB
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SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO. 3 at Control Point # 3 ---

DISCHARGE (cfs)	TEMPERATURE (deg F)	WATER SURFACE (ft)
68.000	60.00	2462.285

**** DISCHARGE (CFS)	WATER SURFACE	ENERGY LINE	VELOCITY HEAD	ALPHA	TOP WIDTH	AVG BED	AVG VEL (by subsection) 1	2	3	
SECTION NO. 0.000										
** CRITICAL WATER SURFACE USED AT SECTION NO. 0.000 AT TIME = 0.149 DAYS.**										**ELOEQ**
**** 68.000	2463.372	2463.664	0.293	1.000	30.551	2462.859	0.000	4.340	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 0.070										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 0.070 TIME = 0.149 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2477.143	2469.269								
1.	2477.093	2470.000	2477.137							
**** 68.000	2477.093	2477.401	0.308	1.000	29.146	2476.569	0.000	4.453	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 0.160										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 0.160 TIME = 0.149 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2494.575	2487.547								
1.	2494.669	2484.827	2494.619							
**** 68.000	2494.669	2494.840	0.171	1.000	47.291	2494.236	0.000	3.321	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 0.440										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 0.440 TIME = 0.149 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2554.527	2517.031								
1.	2554.451	2522.753	2554.494							
**** 68.000	2554.451	2554.741	0.290	1.000	40.244	2554.060	0.000	4.322	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 0.720										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 0.720 TIME = 0.149 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2614.704	2586.185								
1.	2614.665	2590.737	2614.709							
**** 68.000	2614.665	2614.905	0.239	1.000	44.327	2614.274	0.000	3.924	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 1.000										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 1.000 TIME = 0.149 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2673.200	2641.137								
1.	2673.146	2645.102	2673.190							
**** 68.000	2673.146	2673.439	0.292	1.000	31.233	2672.644	0.000	4.337	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 1.280										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 1.280 TIME = 0.149 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2732.615	2698.290								
1.	2732.542	2703.200	2732.586							
**** 68.000	2732.542	2732.878	0.336	1.000	27.909	2732.018	0.000	4.650	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 1.560										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 1.560 TIME = 0.149 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2793.684	2757.997								
1.	2793.600	2764.823	2793.644							
**** 68.000	2793.600	2793.902	0.302	1.000	33.369	2793.138	0.000	4.409	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	

TIME STEP # 44

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EAST C-1 DETENSION BASIN RETURN INTERVAL = 100 YEARS

ACCUMULATED TIME (yrs)..... 0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO. 1 at Control Point # 1 ---

DISCHARGE (cfs)	TEMPERATURE (deg F)	WATER SURFACE (ft)
825.000	60.00	2321.422

**** DISCHARGE (CFS)	WATER SURFACE	ENERGY LINE	VELOCITY HEAD	ALPHA	TOP WIDTH	AVG BED	AVG VEL (by subsection) 1	2	3	
SECTION NO. 0.100										
** CRITICAL WATER SURFACE USED AT SECTION NO. 0.100 AT TIME = 0.153 DAYS.**										**ELOEQ**
**** 825.000	2323.631	2324.434	0.802	1.000	76.478	2322.130	0.000	7.186	0.000	
					FLOW DISTRIBUTION (%) =		0.000	100.000	0.000	
SECTION NO. 0.350										
** SUPERCRITICAL ** Using Critical Water Surface +										
SECTION NO. 0.350 TIME = 0.153 DAYS.										
TRIAL NO.	TRIAL WS	COMPUTED WS	CRITICAL WS							
0.	2361.991	2338.468								
1.	2361.870	2340.151	2361.914							

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****    825.000  2361.870  2362.723   0.853    1.000    72.006  2360.323   0.000   7.407   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2402.072      2376.915
  1.    2401.951      2378.609      2401.994
****    825.000  2401.951  2402.801   0.850    1.000    72.186  2400.405   0.000   7.397   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2441.982      2414.434
  1.    2441.863      2415.791      2441.907
****    825.000  2441.863  2442.716   0.853    1.000    71.991  2440.316   0.000   7.408   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                             DISCHARGE    TEMPERATURE
                               (cfs)        (deg F)
        Tributary Inflow:       26.000        60.00
                   Total:      799.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2462.285      2448.599
  1.    2462.163      2449.624      2462.207
****    799.000  2462.163  2462.812   0.650    1.048   116.022  2461.019   0.000   6.522   2.497
                                                FLOW DISTRIBUTION (%) =    0.000  97.969   2.031

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                             DISCHARGE    TEMPERATURE
                               (cfs)        (deg F)
        Tributary Inflow:       58.000        60.00
                   Total:      741.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2475.704      2466.176
  1.    2475.590      2466.596      2475.634
****    741.000  2475.590  2476.266   0.676    1.074    95.319  2474.300   0.000   6.711   2.918
                                                FLOW DISTRIBUTION (%) =    0.000  95.793   4.207
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.991      2480.259
  1.    2486.859      2480.846      2486.903
****    741.000  2486.859  2487.611   0.751    1.134    87.837  2485.423   0.000   7.158   2.960
                                                FLOW DISTRIBUTION (%) =    0.000  93.212   6.788

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2598.768      2520.723
  1.    2598.659      2524.810      2598.702
****    741.000  2598.659  2599.399   0.740    1.131    86.677  2597.196   0.000   7.098   2.928
                                                FLOW DISTRIBUTION (%) =    0.000  93.393   6.607

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.782      2631.835
  1.    2710.672      2635.816      2710.716
****    741.000  2710.672  2711.411   0.739    1.132    86.775  2709.210   0.000   7.094   2.927
                                                FLOW DISTRIBUTION (%) =    0.000  93.378   6.622

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2822.773      2743.798
  1.    2822.662      2747.825      2822.706
****    741.000  2822.662  2823.402   0.740    1.131    86.701  2821.200   0.000   7.097   2.928
                                                FLOW DISTRIBUTION (%) =    0.000  93.389   6.611

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2933.471      2854.434
  1.    2933.331      2859.172      2933.375
****    741.000  2933.331  2934.100   0.769    1.113    79.555  2931.798   0.000   7.201   2.925
                                                FLOW DISTRIBUTION (%) =    0.000  94.542   5.458

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                             DISCHARGE    TEMPERATURE  WATER SURFACE
                               (cfs)        (deg F)        (ft)
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                                26.000        60.00        2441.863

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)       SURFACE    LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.153 DAYS.**                    **ELOEQ**
****      26.000  2442.139  2442.349    0.210     1.000     26.366  2441.871    0.000    3.676    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  1.    2452.850      2453.984
  2.    2452.944      2449.910      2452.894
****      26.000  2452.944  2453.043    0.099     1.000     30.012  2452.601    0.000    2.527    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2498.042      2473.860
  1.    2497.989      2477.848      2498.033
****      26.000  2497.989  2498.222    0.232     1.000     20.024  2497.653    0.000    3.868    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2560.552      2523.211
  1.    2560.422      2541.917      2560.465
****      26.000  2560.422  2560.658    0.237     1.000     22.108  2560.120    0.000    3.902    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2622.355      2606.196
  1.    2622.449      2591.126      2622.399
****      26.000  2622.449  2622.578    0.129     1.000     25.240  2622.092    0.000    2.882    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2679.010      2640.961
  1.    2678.917      2645.053      2678.961
****      26.000  2678.917  2679.226    0.309     1.000     10.685  2678.371    0.000    4.457    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                               58.000        60.00       2462.163

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)       SURFACE    LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.153 DAYS.**                    **ELOEQ**
****      58.000  2463.308  2463.584    0.277     1.000     28.634  2462.828    0.000    4.218    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2477.093      2469.032
  1.    2477.033      2469.953      2477.077
****      58.000  2477.033  2477.312    0.279     1.000     27.586  2476.537    0.000    4.234    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2494.669      2483.681
  1.    2494.541      2487.289      2494.585
****      58.000  2494.541  2494.789    0.249     1.000     39.902  2494.177    0.000    3.999    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2554.448      2528.923
  1.    2554.542      2519.338      2554.492
****      58.000  2554.542  2554.683    0.141     1.000     44.645  2554.111    0.000    3.009    0.000
                                                  FLOW DISTRIBUTION (%) =      0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =       0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.665      2574.977
  1.    2614.617      2578.408      2614.661
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****      58.000  2614.617  2614.849   0.231    1.000    41.345  2614.254   0.000   3.859   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2673.146     2640.859
  1.    2673.060     2648.056     2673.103
****      58.000  2673.060  2673.356   0.297    1.000    28.704  2672.597   0.000   4.371   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2732.542     2699.204
  1.    2732.480     2703.829     2732.524
****      58.000  2732.480  2732.773   0.292    1.000    26.634  2731.978   0.000   4.338   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.153 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2793.600     2758.503
  1.    2793.550     2762.610     2793.594
****      58.000  2793.550  2793.818   0.268    1.000    31.732  2793.110   0.000   4.151   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       45
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE    TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                             739.000        60.00       2321.338

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.156 DAYS.**                    **ELOEQ**
****     739.000  2323.558  2324.315   0.757    1.000    74.869  2322.144   0.000   6.981   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2361.870     2338.635
  1.    2361.772     2340.086     2361.816
****     739.000  2361.772  2362.553   0.781    1.000    70.811  2360.300   0.000   7.087   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2401.951     2376.704
  1.    2401.853     2378.127     2401.897
****     739.000  2401.853  2402.631   0.778    1.000    70.981  2400.382   0.000   7.077   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2441.863     2414.239
  1.    2441.768     2415.376     2441.811
****     739.000  2441.768  2442.548   0.781    1.000    70.801  2440.295   0.000   7.088   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)        (deg F)
        Tributary Inflow:      22.000        60.00
                   Total:     717.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2462.163     2448.656
  1.    2462.083     2449.379     2462.127
****     717.000  2462.083  2462.677   0.594    1.045   115.076  2461.005   0.000   6.233   2.384
                                                FLOW DISTRIBUTION (%) =    0.000  98.086   1.914

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE    TEMPERATURE
                              (cfs)        (deg F)
        Tributary Inflow:      50.000        60.00
                   Total:     667.000        60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
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  0.   2475.590     2466.123
  1.   2475.490     2466.534     2475.534
****    667.000  2475.490  2476.135   0.645    1.072    92.518  2474.268   0.000   6.550   2.831
                                              FLOW DISTRIBUTION (%) =    0.000  96.009   3.991

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2486.859     2480.403
  1.   2486.770     2480.851     2486.814
****    667.000  2486.770  2487.479   0.708    1.129    85.641  2485.412   0.000   6.938   2.857
                                              FLOW DISTRIBUTION (%) =    0.000  93.555   6.445

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2598.659     2521.169
  1.   2598.536     2526.179     2598.580
****    667.000  2598.536  2599.259   0.723    1.125    83.971  2597.170   0.000   7.004   2.874
                                              FLOW DISTRIBUTION (%) =    0.000  93.821   6.179

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2710.672     2633.150
  1.   2710.549     2638.185     2710.593
****    667.000  2710.549  2711.272   0.722    1.125    84.064  2709.184   0.000   7.000   2.873
                                              FLOW DISTRIBUTION (%) =    0.000  93.806   6.194

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2822.662     2745.166
  1.   2822.539     2750.194     2822.583
****    667.000  2822.539  2823.262   0.723    1.125    83.997  2821.174   0.000   7.003   2.874
                                              FLOW DISTRIBUTION (%) =    0.000  93.816   6.184

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2933.331     2854.882
  1.   2933.171     2860.856     2933.215
****    667.000  2933.171  2933.905   0.734    1.107    77.412  2931.728   0.000   7.023   2.840
                                              FLOW DISTRIBUTION (%) =    0.000  94.899   5.101

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           22.000        60.00       2441.768

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.156 DAYS.**                    **ELOEQ**
****     22.000  2442.087  2442.286   0.199    1.000    24.510  2441.836   0.000   3.574   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.   2452.809     2454.582
  2.   2452.902     2450.029     2452.852
****     22.000  2452.902  2452.995   0.092    1.000    28.116  2452.582   0.000   2.438   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2497.943     2478.730
  1.   2498.037     2471.436     2497.987
****     22.000  2498.037  2498.165   0.128    1.000    21.401  2497.679   0.000   2.868   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2560.419     2525.021
  1.   2560.513     2516.495     2560.463
****     22.000  2560.513  2560.612   0.099    1.000    25.318  2560.169   0.000   2.525   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2622.449     2576.528
  1.   2622.331     2585.628     2622.375
****     22.000  2622.331  2622.527   0.196    1.000    20.942  2622.035   0.000   3.550   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.156 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2678.917     2647.436
  1.    2678.795     2656.603      2678.839
****      22.000  2678.795  2679.107   0.312    1.000     9.785  2678.293   0.000   4.479   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              50.000       60.00       2462.083

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.156 DAYS.**                    **ELOEQ**
****      50.000  2463.232  2463.520   0.288    1.000    26.332  2462.790   0.000   4.304   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2477.033     2469.543
  1.    2476.970     2470.721      2477.014
****      50.000  2476.970  2477.245   0.275    1.000    25.719  2476.508   0.000   4.206   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2494.495     2488.134
  1.    2494.589     2484.876      2494.539
****      50.000  2494.589  2494.735   0.146    1.000    42.343  2494.204   0.000   3.069   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2554.542     2511.012
  1.    2554.390     2521.954      2554.434
****      50.000  2554.390  2554.627   0.237    1.000    36.445  2554.039   0.000   3.907   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.571     2593.711
  1.    2614.665     2581.693      2614.615
****      50.000  2614.665  2614.807   0.142    1.000    43.531  2614.285   0.000   3.023   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2673.060     2636.145
  1.    2673.010     2639.216      2673.054
****      50.000  2673.010  2673.279   0.269    1.000    27.300  2672.570   0.000   4.160   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2732.480     2697.401
  1.    2732.375     2705.647      2732.419
****      50.000  2732.375  2732.681   0.306    1.000    24.386  2731.913   0.000   4.436   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.156 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2793.550     2759.940
  1.    2793.491     2765.738      2793.535
****      50.000  2793.491  2793.749   0.258    1.000    29.715  2793.078   0.000   4.076   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       46
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             660.000       60.00       2321.249

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.160 DAYS.**                    **ELOEQ**
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****     660.000  2323.458  2324.172   0.714    1.000    73.227  2322.128   0.000   6.777   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2361.772      2338.488
  1.    2361.651      2340.453      2361.695
****     660.000  2361.651  2362.391   0.740    1.000    69.327  2360.272   0.000   6.902   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2401.853      2376.624
  1.    2401.732      2378.569      2401.775
****     660.000  2401.732  2402.470   0.738    1.000    69.485  2400.353   0.000   6.893   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2441.768      2414.168
  1.    2441.649      2415.721      2441.693
****     660.000  2441.649  2442.389   0.740    1.000    69.322  2440.269   0.000   6.902   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      19.000       60.00
                   Total:     641.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2462.083      2448.579
  1.    2461.974      2449.704      2462.018
****     641.000  2461.974  2462.551   0.578    1.042   113.718  2460.990   0.000   6.143   2.347
                                                 FLOW DISTRIBUTION (%) =    0.000  98.254   1.746

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      44.000       60.00
                   Total:     597.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2475.490      2466.241
  1.    2475.409      2466.613      2475.453
****     597.000  2475.409  2476.003   0.594    1.069    90.259  2474.243   0.000   6.278   2.699
                                                 FLOW DISTRIBUTION (%) =    0.000  96.187   3.813

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.770      2480.235
  1.    2486.676      2480.742      2486.720
****     597.000  2486.676  2487.342   0.666    1.123    83.395  2485.395   0.000   6.718   2.754
                                                 FLOW DISTRIBUTION (%) =    0.000  93.912   6.088

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2598.536      2522.258
  1.    2598.437      2526.640      2598.481
****     597.000  2598.437  2599.117   0.679    1.119    81.807  2597.151   0.000   6.779   2.769
                                                 FLOW DISTRIBUTION (%) =    0.000  94.169   5.831

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.549      2634.220
  1.    2710.451      2638.634      2710.495
****     597.000  2710.451  2711.130   0.679    1.119    81.893  2709.165   0.000   6.775   2.768
                                                 FLOW DISTRIBUTION (%) =    0.000  94.155   5.845

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2822.539      2746.218
  1.    2822.441      2750.643      2822.485
****     597.000  2822.441  2823.120   0.679    1.119    81.828  2821.154   0.000   6.778   2.769
                                                 FLOW DISTRIBUTION (%) =    0.000  94.165   5.835

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2933.171      2856.053
  1.    2933.048      2861.087      2933.092
****     597.000  2933.048  2933.731   0.683    1.101    75.626  2931.686   0.000   6.769   2.726
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                                                FLOW DISTRIBUTION (%) =    0.000  95.200   4.800

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)       (ft)
                                19.000        60.00     2441.649

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.160 DAYS.**                    **ELOEQ**
****     19.000  2442.067  2442.224   0.157    1.000    24.072  2441.819   0.000    3.182    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.    2452.767      2454.131
  2.    2452.860      2449.626      2452.810
****     19.000  2452.860  2452.952   0.091    1.000    26.212  2452.562   0.000    2.425    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2498.037      2470.007
  1.    2497.930      2478.606      2497.974
****     19.000  2497.930  2498.119   0.190    1.000    18.041  2497.628   0.000    3.494    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.513      2518.706
  1.    2560.373      2538.022      2560.417
****     19.000  2560.373  2560.557   0.184    1.000    20.157  2560.099   0.000    3.440    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.331      2596.176
  1.    2622.289      2604.092      2622.333
****     19.000  2622.289  2622.487   0.199    1.000    19.404  2622.015   0.000    3.574    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2678.795      2651.726
  1.    2678.716      2658.880      2678.760
****     19.000  2678.716  2679.009   0.293    1.000     9.223  2678.241   0.000    4.341    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)       (ft)
                                44.000        60.00     2461.974

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.160 DAYS.**                    **ELOEQ**
****     44.000  2463.207  2463.454   0.246    1.000    25.683  2462.777   0.000    3.981    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.970      2469.338
  1.    2476.921      2470.251      2476.965
****     44.000  2476.921  2477.181   0.259    1.000    24.466  2476.481   0.000    4.085    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.589      2484.022
  1.    2494.474      2487.960      2494.518
****     44.000  2494.474  2494.700   0.226    1.000    35.722  2494.151   0.000    3.809    0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.344      2536.537
  1.    2554.438      2523.490      2554.388
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****     44.000  2554.438  2554.584   0.146    1.000    38.662  2554.067   0.000   3.065   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2614.665      2573.462
  1.   2614.563      2582.254      2614.607
****     44.000  2614.563  2614.770   0.207    1.000    37.243  2614.240   0.000   3.654   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2673.010      2643.350
  1.   2672.946      2649.766      2672.989
****     44.000  2672.946  2673.216   0.271    1.000    25.537  2672.533   0.000   4.173   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2732.375      2701.767
  1.   2732.316      2707.338      2732.360
****     44.000  2732.316  2732.605   0.290    1.000    23.148  2731.875   0.000   4.317   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.160 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2793.491      2761.380
  1.   2793.443      2766.498      2793.487
****     44.000  2793.443  2793.693   0.249    1.000    28.103  2793.053   0.000   4.005   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       47
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               587.000       60.00       2321.167

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA     TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED         1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.163 DAYS.**                    **ELOEQ**
****    587.000  2323.333  2324.031   0.698    1.000    71.256  2322.104   0.000   6.702   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2361.651      2339.194
  1.   2361.543      2341.184      2361.587
****    587.000  2361.543  2362.233   0.690    1.000    68.007  2360.247   0.000   6.663   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2401.732      2376.795
  1.   2401.624      2378.684      2401.667
****    587.000  2401.624  2402.312   0.688    1.000    68.154  2400.329   0.000   6.655   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2441.649      2414.275
  1.   2441.542      2415.798      2441.586
****    587.000  2441.542  2442.232   0.690    1.000    68.005  2440.247   0.000   6.663   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:     16.000       60.00
                    Total:     571.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2461.974      2448.783
  1.   2461.910      2449.506      2461.954
****    571.000  2461.910  2462.426   0.516    1.039   112.962  2460.979   0.000   5.801   2.214
                                                FLOW DISTRIBUTION (%) =    0.000  98.348   1.652

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
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                                (cfs)        (deg F)
        Tributary Inflow:        38.000       60.00
                  Total:        533.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2475.409      2466.019
  1.    2475.309      2466.513      2475.353
****     533.000  2475.309  2475.876   0.567    1.066    87.459  2474.213   0.000   6.131   2.618
                                                FLOW DISTRIBUTION (%) =    0.000  96.412   3.588

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.676      2480.246
  1.    2486.599      2480.692      2486.643
****     533.000  2486.599  2487.207   0.608    1.118    81.578  2485.382   0.000   6.412   2.619
                                                FLOW DISTRIBUTION (%) =    0.000  94.205   5.795

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2598.437      2521.881
  1.    2598.358      2525.551      2598.402
****     533.000  2598.358  2598.978   0.620    1.114    80.063  2597.136   0.000   6.468   2.633
                                                FLOW DISTRIBUTION (%) =    0.000  94.453   5.547

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.451      2633.838
  1.    2710.372      2637.526      2710.416
****     533.000  2710.372  2710.991   0.619    1.114    80.145  2709.150   0.000   6.465   2.632
                                                FLOW DISTRIBUTION (%) =    0.000  94.440   5.560

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2822.441      2745.836
  1.    2822.361      2749.536      2822.405
****     533.000  2822.361  2822.981   0.620    1.114    80.082  2821.139   0.000   6.467   2.632
                                                FLOW DISTRIBUTION (%) =    0.000  94.450   5.550

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2933.048      2855.670
  1.    2932.905      2861.935      2932.949
****     533.000  2932.905  2933.571   0.665    1.095    73.453  2931.646   0.000   6.669   2.672
                                                FLOW DISTRIBUTION (%) =    0.000  95.573   4.427

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           16.000        60.00       2441.542

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED          1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.163 DAYS.**                    **ELOEQ**
****      16.000  2441.985  2442.201   0.215    1.000    20.391  2441.774   0.000   3.724   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.080
****      16.000  2452.794  2452.893   0.099    1.000    23.570  2452.525   0.000   2.527   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.930      2477.909
  1.    2497.877      2484.202      2497.921
****      16.000  2497.877  2498.074   0.197    1.000    16.411  2497.603   0.000   3.559   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.373      2535.045
  1.    2560.334      2543.573      2560.378
****      16.000  2560.334  2560.515   0.181    1.000    18.581  2560.082   0.000   3.417   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.243      2610.803
  1.    2622.337      2591.519      2622.287
****      16.000  2622.337  2622.442   0.105    1.000    20.919  2622.042   0.000   2.598   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
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SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2678.716       2641.864
  1.    2678.615       2647.678      2678.659
****       16.000  2678.615  2678.898    0.282    1.000      8.523  2678.175    0.000   4.263   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                                38.000        60.00       2461.910

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.163 DAYS.**                    **ELOEQ**
****       38.000  2463.144  2463.397    0.253    1.000     23.717  2462.747    0.000   4.037   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2476.921       2469.767
  1.    2476.871       2470.878      2476.915
****       38.000  2476.871  2477.120    0.250    1.000     22.966  2476.458    0.000   4.008   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2494.428       2488.913
  1.    2494.522       2485.027      2494.472
****       38.000  2494.522  2494.651    0.129    1.000     38.222  2494.177    0.000   2.879   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2554.438       2513.582
  1.    2554.310       2525.308      2554.354
****       38.000  2554.310  2554.559    0.248    1.000     31.556  2554.009    0.000   3.995   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2614.517       2599.847
  1.    2614.611       2584.176      2614.561
****       38.000  2614.611  2614.731    0.120    1.000     39.741  2614.267    0.000   2.780   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2672.946       2635.835
  1.    2672.889       2639.738      2672.933
****       38.000  2672.889  2673.142    0.253    1.000     24.098  2672.498    0.000   4.034   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2732.316       2701.651
  1.    2732.249       2708.312      2732.293
****       38.000  2732.249  2732.530    0.281    1.000     21.651  2731.836    0.000   4.251   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.560 TIME =      0.163 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS             WS            WS
  0.    2793.443       2762.103
  1.    2793.385       2769.122      2793.429
****       38.000  2793.385  2793.634    0.249    1.000     26.104  2793.022    0.000   4.005   0.000
                                                  FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

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TIME STEP #       48
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                                520.000       60.00       2321.092

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED        1       2       3
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SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.167 DAYS.**                    **ELOEQ**
****     520.000  2323.233  2323.891   0.658    1.000    69.669  2322.086   0.000   6.509   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2361.543      2339.397
  1.    2361.432      2341.667      2361.476
****     520.000  2361.432  2362.080   0.648    1.000    66.653  2360.224   0.000   6.458   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2401.624      2376.951
  1.    2401.513      2379.096      2401.557
****     520.000  2401.513  2402.159   0.647    1.000    66.789  2400.306   0.000   6.450   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2441.542      2414.386
  1.    2441.433      2416.120      2441.477
****     520.000  2441.433  2442.081   0.648    1.000    66.654  2440.225   0.000   6.458   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:       14.000       60.00
                  Total:       506.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2461.910      2448.601
  1.    2461.833      2449.550      2461.877
****     506.000  2461.833  2462.307   0.473    1.037   112.020  2460.969   0.000   5.555   2.119
                                                 FLOW DISTRIBUTION (%) =    0.000  98.466   1.534

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
        Tributary Inflow:       33.000       60.00
                  Total:       473.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2475.309      2465.998
  1.    2475.209      2466.553      2475.252
****     473.000  2475.209  2475.751   0.542    1.063    84.642  2474.184   0.000   5.991   2.540
                                                 FLOW DISTRIBUTION (%) =    0.000  96.645   3.355
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.599      2480.185
  1.    2486.502      2480.794      2486.546
****     473.000  2486.502  2487.075   0.573    1.112    79.317  2485.365   0.000   6.212   2.525
                                                 FLOW DISTRIBUTION (%) =    0.000  94.576   5.424
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2598.358      2521.574
  1.    2598.260      2526.510      2598.304
****     473.000  2598.260  2598.843   0.583    1.108    77.897  2597.118   0.000   6.263   2.538
                                                 FLOW DISTRIBUTION (%) =    0.000  94.812   5.188
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.372      2633.512
  1.    2710.274      2638.474      2710.317
****     473.000  2710.274  2710.856   0.583    1.108    77.974  2709.132   0.000   6.261   2.537
                                                 FLOW DISTRIBUTION (%) =    0.000  94.800   5.200
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2822.361      2745.508
  1.    2822.263      2750.485      2822.307
****     473.000  2822.263  2822.846   0.583    1.108    77.914  2821.121   0.000   6.263   2.538
                                                 FLOW DISTRIBUTION (%) =    0.000  94.810   5.190
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.167 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2932.905      2857.117
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  1.   2932.790     2862.794     2932.834
****    473.000  2932.790  2933.412   0.622    1.089    71.719  2931.614   0.000   6.440   2.570
                                              FLOW DISTRIBUTION (%) =    0.000  95.874   4.126

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             14.000       60.00       2441.433

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.167 DAYS.**                    **ELOEQ**
****     14.000  2441.965  2442.132   0.167    1.000    20.259  2441.754   0.000   3.282   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  2.   2452.754     2452.981
  3.   2452.808     2450.024     2452.758
****     14.000  2452.808  2452.881   0.073    1.000    23.830  2452.537   0.000   2.164   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2497.831     2481.198
  1.   2497.925     2471.967     2497.875
****     14.000  2497.925  2498.034   0.109    1.000    17.811  2497.628   0.000   2.645   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2560.288     2533.639
  1.   2560.382     2520.438     2560.332
****     14.000  2560.382  2560.481   0.099    1.000    20.231  2560.108   0.000   2.527   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2622.337     2580.116
  1.   2622.245     2591.033     2622.289
****     14.000  2622.245  2622.407   0.163    1.000    17.544  2621.998   0.000   3.237   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2678.615     2652.256
  1.   2678.537     2660.346     2678.581
****     14.000  2678.537  2678.819   0.281    1.000     7.970  2678.125   0.000   4.255   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             33.000       60.00       2461.833

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.167 DAYS.**                    **ELOEQ**
****     33.000  2463.104  2463.337   0.233    1.000    22.570  2462.727   0.000   3.872   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2476.871     2469.702
  1.   2476.823     2470.811     2476.867
****     33.000  2476.823  2477.057   0.235    1.000    21.722  2476.432   0.000   3.886   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2494.522     2484.023
  1.   2494.430     2487.593     2494.474
****     33.000  2494.430  2494.609   0.179    1.000    32.847  2494.134   0.000   3.395   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.167 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
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  0.   2554.308     2531.763
  1.   2554.402     2519.304     2554.352
****     33.000  2554.402  2554.512   0.109    1.000    36.135  2554.058   0.000    2.653   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.167 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2614.611     2571.179
  1.   2614.480     2582.835     2614.524
****     33.000  2614.480  2614.703   0.223    1.000    31.801  2614.206   0.000    3.788   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.167 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2672.889     2648.528
  1.   2672.823     2657.700     2672.867
****     33.000  2672.823  2673.080   0.257    1.000    22.346  2672.460   0.000    4.063   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.167 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2732.249     2704.319
  1.   2732.196     2710.552     2732.239
****     33.000  2732.196  2732.460   0.265    1.000    20.456  2731.805   0.000    4.127   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.167 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2793.339     2770.154
  1.   2793.433     2758.719     2793.383
****     33.000  2793.433  2793.577   0.144    1.000    27.906  2793.044   0.000    3.041   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

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TIME STEP #       49
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             461.000       60.00       2321.014

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.170 DAYS.**                    **ELOEQ**
****    461.000  2323.154  2323.759   0.604    1.000    68.411  2322.074   0.000    6.236   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2361.432     2339.510
  1.   2361.335     2341.671     2361.378
****    461.000  2361.335  2361.938   0.603    1.000    65.463  2360.204   0.000    6.230   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2401.513     2377.220
  1.   2401.405     2379.551     2401.449
****    461.000  2401.405  2402.018   0.614    1.000    65.457  2400.284   0.000    6.284   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2441.433     2414.776
  1.   2441.337     2416.488     2441.381
****    461.000  2441.337  2441.940   0.603    1.000    65.467  2440.206   0.000    6.229   0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:    12.000       60.00
                    Total:    449.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2461.833     2448.606
  1.   2461.728     2450.108     2461.772
****    449.000  2461.728  2462.206   0.477    1.033   110.669  2460.959   0.000    5.573   2.122
                                               FLOW DISTRIBUTION (%) =    0.000   98.635   1.365
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--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      29.000       60.00
                    Total:      420.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2475.209      2466.343
  1.    2475.126      2466.887      2475.170
****     420.000  2475.126  2475.631   0.505    1.060    82.379  2474.159   0.000   5.774   2.434
                                                FLOW DISTRIBUTION (%) =    0.000  96.835   3.165
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2486.502      2480.175
  1.    2486.381      2481.059      2486.425
****     420.000  2486.381  2486.956   0.575    1.104    76.466  2485.345   0.000   6.215   2.511
                                                FLOW DISTRIBUTION (%) =    0.000  95.052   4.948
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2598.260      2524.187
  1.    2598.161      2530.079      2598.205
****     420.000  2598.161  2598.718   0.557    1.101    75.716  2597.100   0.000   6.111   2.464
                                                FLOW DISTRIBUTION (%) =    0.000  95.180   4.820
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2710.274      2634.782
  1.    2710.175      2640.429      2710.218
****     420.000  2710.175  2710.731   0.556    1.102    75.787  2709.114   0.000   6.108   2.464
                                                FLOW DISTRIBUTION (%) =    0.000  95.168   4.832
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2822.263      2746.743
  1.    2822.163      2752.440      2822.207
****     420.000  2822.163  2822.720   0.557    1.101    75.726  2821.102   0.000   6.111   2.464
                                                FLOW DISTRIBUTION (%) =    0.000  95.178   4.822
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.170 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2932.790      2858.387
  1.    2932.666      2865.331      2932.710
****     420.000  2932.666  2933.269   0.603    1.083    69.807  2931.584   0.000   6.329   2.515
                                                FLOW DISTRIBUTION (%) =    0.000  96.211   3.789

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                12.000       60.00       2441.337

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED        1        2        3

 SECTION NO.       0.000
 ** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.170 DAYS.**                    **ELOEQ**
 ****      12.000  2441.935  2442.084   0.149    1.000    19.273  2441.734   0.000   3.097   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
 SECTION NO.       0.080
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       0.080 TIME =      0.170 DAYS.
 TRIAL     TRIAL       COMPUTED      CRITICAL
  NO.        WS           WS            WS
   2.    2452.737      2452.086
   3.    2452.785      2449.533      2452.735
 ****      12.000  2452.785  2452.849   0.064    1.000    22.757  2452.526   0.000   2.034   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
 SECTION NO.       0.370
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       0.370 TIME =      0.170 DAYS.
 TRIAL     TRIAL       COMPUTED      CRITICAL
  NO.        WS           WS            WS
   0.    2497.925      2468.899
   1.    2497.825      2477.754      2497.869
 ****      12.000  2497.825  2497.993   0.168    1.000    14.784  2497.578   0.000   3.292   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
 SECTION NO.       0.660
 ** SUPERCRITICAL **  Using Critical Water Surface *
 SECTION NO.       0.660 TIME =      0.170 DAYS.
 TRIAL     TRIAL       COMPUTED      CRITICAL
  NO.        WS           WS            WS
   0.    2560.382      2524.449
   1.    2560.287      2543.905      2560.331
 ****      12.000  2560.287  2560.448   0.161    1.000    16.619  2560.062   0.000   3.215   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
 SECTION NO.       0.950
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** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.245      2599.255
  1.    2622.202      2610.065      2622.246
****      12.000  2622.202  2622.376   0.173    1.000    15.993  2621.978   0.000   3.341   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2678.537      2656.246
  1.    2678.477      2663.909      2678.521
****      12.000  2678.477  2678.735   0.258    1.000     7.531  2678.086   0.000   4.076   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             29.000        60.00       2461.728

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.170 DAYS.**                    **ELOEQ**
****      29.000  2463.078  2463.284   0.206    1.000    21.826  2462.713   0.000   3.640   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.823      2469.639
  1.    2476.769      2470.946      2476.813
****      29.000  2476.769  2477.012   0.242    1.000    20.206  2476.406   0.000   3.949   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.430      2486.997
  1.    2494.390      2489.136      2494.434
****      29.000  2494.390  2494.577   0.188    1.000    30.466  2494.116   0.000   3.474   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.402      2517.781
  1.    2554.267      2538.214      2554.311
****      29.000  2554.267  2554.476   0.210    1.000    28.827  2553.993   0.000   3.672   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.478      2597.447
  1.    2614.572      2581.427      2614.522
****      29.000  2614.572  2614.667   0.095    1.000    36.970  2614.254   0.000   2.468   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2672.777      2639.498
  1.    2672.871      2633.032      2672.821
****      29.000  2672.871  2673.021   0.150    1.000    23.947  2672.481   0.000   3.105   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2732.196      2696.257
  1.    2732.132      2701.536      2732.176
****      29.000  2732.132  2732.406   0.274    1.000    18.984  2731.768   0.000   4.203   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.170 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.433      2756.295
  1.    2793.301      2773.546      2793.345
****      29.000  2793.301  2793.533   0.232    1.000    23.193  2792.977   0.000   3.867   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

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TIME STEP #       50
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EAST C-1 DETENSION BASIN      RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000
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--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               408.000       60.00       2320.938

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH      BED        1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.174 DAYS.**                    **ELOEQ**
****     408.000  2323.078  2323.633    0.555    1.000    67.197  2322.062    0.000    5.975    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2361.335      2339.501
  1.    2361.225      2342.173      2361.269
****     408.000  2361.225  2361.804    0.579    1.000    64.133  2360.183    0.000    6.103    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2401.405      2377.999
  1.    2401.307      2380.425      2401.351
****     408.000  2401.307  2401.885    0.578    1.000    64.250  2400.266    0.000    6.097    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2441.337      2415.006
  1.    2441.228      2417.184      2441.272
****     408.000  2441.228  2441.807    0.579    1.000    64.137  2440.186    0.000    6.103    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      10.000       60.00
                    Total:      398.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2461.728      2449.292
  1.    2461.667      2450.340      2461.711
****     398.000  2461.667  2462.103    0.436    1.030   109.917  2460.951    0.000    5.324    2.026
                                                 FLOW DISTRIBUTION (%) =     0.000   98.730    1.270

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      25.000       60.00
                    Total:      373.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2475.126      2466.300
  1.    2475.026      2467.041      2475.070
****     373.000  2475.026  2475.522    0.496    1.057    79.584  2474.133    0.000    5.717    2.392
                                                 FLOW DISTRIBUTION (%) =     0.000   97.076    2.924

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.381      2480.628
  1.    2486.329      2481.062      2486.373
****     373.000  2486.329  2486.838    0.509    1.100    75.215  2485.339    0.000    5.840    2.352
                                                 FLOW DISTRIBUTION (%) =     0.000   95.265    4.735

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2598.161      2523.904
  1.    2598.082      2528.822      2598.125
****     373.000  2598.082  2598.599    0.517    1.096    73.971  2597.087    0.000    5.883    2.363
                                                 FLOW DISTRIBUTION (%) =     0.000   95.478    4.522

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.175      2635.797
  1.    2710.095      2640.767      2710.139
****     373.000  2710.095  2710.612    0.517    1.096    74.035  2709.101    0.000    5.880    2.362
                                                 FLOW DISTRIBUTION (%) =     0.000   95.467    4.533

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2822.163      2747.794
  1.    2822.083      2752.779      2822.127
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****    373.000  2822.083  2822.600    0.517    1.096    73.977  2821.089   0.000    5.882   2.363
                                                FLOW DISTRIBUTION (%) =    0.000   95.477   4.523
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2932.666      2859.974
  1.    2932.586      2864.887      2932.630
****    373.000  2932.586  2933.131    0.545    1.078    68.614  2931.563   0.000    6.014   2.382
                                                FLOW DISTRIBUTION (%) =    0.000   96.424   3.576

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)         (deg F)        (ft)
                                10.000         60.00       2441.228

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.174 DAYS.**                    **ELOEQ**
****     10.000  2441.905  2442.035    0.131    1.000    18.161  2441.715   0.000    2.900   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.080
****     10.000  2452.702  2452.800    0.098    1.000    18.706  2452.489   0.000    2.510   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.825      2483.800
  1.    2497.782      2491.750      2497.826
****     10.000  2497.782  2497.952    0.170    1.000    13.474  2497.558   0.000    3.305   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.241      2553.504
  1.    2560.335      2528.424      2560.285
****     10.000  2560.335  2560.411    0.076    1.000    18.302  2560.088   0.000    2.212   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.156      2594.407
  1.    2622.250      2580.992      2622.200
****     10.000  2622.250  2622.332    0.081    1.000    17.642  2622.003   0.000    2.290   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2678.477      2643.226
  1.    2678.406      2648.338      2678.450
****     10.000  2678.406  2678.647    0.241    1.000     6.989  2678.042   0.000    3.936   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE    TEMPERATURE  WATER SURFACE
                                (cfs)         (deg F)        (ft)
                                25.000         60.00       2461.667

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.174 DAYS.**                    **ELOEQ**
****     25.000  2463.022  2463.239    0.217    1.000    20.019  2462.687   0.000    3.736   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.769      2470.493
  1.    2476.746      2471.162      2476.790
****     25.000  2476.746  2476.953    0.207    1.000    19.526  2476.395   0.000    3.646   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.174 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.344      2489.558
  1.    2494.438      2484.813      2494.388
****     25.000  2494.438  2494.539    0.101    1.000    33.022  2494.141   0.000    2.553   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.174 DAYS.
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TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2554.221     2526.895
  1.    2554.315     2515.902     2554.265
****      25.000  2554.315  2554.429   0.115    1.000    31.159  2554.019   0.000   2.715   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.174 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.572     2571.439
  1.    2614.444     2585.473     2614.488
****      25.000  2614.444  2614.621   0.177    1.000    29.360  2614.192   0.000   3.379   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.174 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2672.871     2639.094
  1.    2672.735     2656.659     2672.778
****      25.000  2672.735  2672.971   0.236    1.000    19.837  2672.411   0.000   3.897   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.174 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2732.086     2714.294
  1.    2732.180     2701.897     2732.130
****      25.000  2732.180  2732.331   0.152    1.000    20.425  2731.788   0.000   3.124   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.174 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2793.255     2761.975
  1.    2793.349     2752.864     2793.299
****      25.000  2793.349  2793.477   0.128    1.000    24.981  2793.000   0.000   2.871   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       51
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                             360.000        60.00       2320.868

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.177 DAYS.**                    **ELOEQ**
****     360.000  2322.965  2323.518   0.553    1.000    65.442  2322.043   0.000   5.966   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.177 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2361.225     2340.978
  1.    2361.147     2343.253     2361.191
****     360.000  2361.147  2361.675   0.528    1.000    63.175  2360.169   0.000   5.827   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.177 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2401.307     2378.103
  1.    2401.229     2380.192     2401.273
****     360.000  2401.229  2401.756   0.527    1.000    63.284  2400.252   0.000   5.821   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.177 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2441.228     2415.281
  1.    2441.151     2416.978     2441.195
****     360.000  2441.151  2441.679   0.528    1.000    63.180  2440.173   0.000   5.826   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)        (deg F)
          Tributary Inflow:      8.000        60.00
                    Total:     352.000        60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.177 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2461.667     2449.170
  1.    2461.606     2450.308     2461.649
****     352.000  2461.606  2462.007   0.402    1.028   109.156  2460.943   0.000   5.109   1.943
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                                                  FLOW DISTRIBUTION (%) =    0.000  98.826   1.174

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      21.000       60.00
                    Total:      331.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2475.026      2466.472
  1.    2474.970      2466.934      2475.014
****     331.000  2474.970  2475.415   0.444    1.055    78.031  2474.118   0.000   5.410   2.254
                                                  FLOW DISTRIBUTION (%) =    0.000  97.213   2.787
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.329      2480.263
  1.    2486.243      2481.012      2486.287
****     331.000  2486.243  2486.730   0.487    1.094    73.198  2485.326   0.000   5.703   2.287
                                                  FLOW DISTRIBUTION (%) =    0.000  95.611   4.389
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2598.082      2524.996
  1.    2597.994      2531.133      2598.038
****     331.000  2597.994  2598.488   0.494    1.090    72.045  2597.074   0.000   5.742   2.296
                                                  FLOW DISTRIBUTION (%) =    0.000  95.813   4.187
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.095      2636.873
  1.    2710.007      2643.072      2710.051
****     331.000  2710.007  2710.501   0.494    1.090    72.101  2709.087   0.000   5.740   2.296
                                                  FLOW DISTRIBUTION (%) =    0.000  95.803   4.197
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2822.083      2748.908
  1.    2821.995      2755.083      2822.039
****     331.000  2821.995  2822.489   0.494    1.090    72.050  2821.075   0.000   5.742   2.296
                                                  FLOW DISTRIBUTION (%) =    0.000  95.812   4.188
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2932.586      2860.374
  1.    2932.477      2867.911      2932.521
****     331.000  2932.477  2933.007   0.530    1.072    66.921  2931.540   0.000   5.922   2.336
                                                  FLOW DISTRIBUTION (%) =    0.000  96.729   3.271

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                8.000         60.00      2441.151

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.177 DAYS.**                    **ELOEQ**
****       8.000  2441.851  2441.997   0.146    1.000    15.792  2441.686   0.000   3.065   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
****       8.000  2452.658  2452.731   0.073    1.000    18.005  2452.453   0.000   2.168   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.782      2480.726
  1.    2497.759      2484.660      2497.802
****       8.000  2497.759  2497.895   0.136    1.000    12.738  2497.546   0.000   2.959   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2560.335      2520.329
  1.    2560.224      2545.056      2560.268
****       8.000  2560.224  2560.362   0.138    1.000    14.121  2560.034   0.000   2.977   0.000
                                                  FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
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  0.   2622.250     2585.623
  1.   2622.140     2613.464     2622.184
****      8.000  2622.140  2622.289   0.149    1.000    13.589  2621.950   0.000   3.094   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2678.406     2654.548
  1.   2678.332     2665.479     2678.376
****      8.000  2678.332  2678.545   0.213    1.000     6.441  2677.996   0.000   3.700   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                           DISCHARGE   TEMPERATURE  WATER SURFACE
                             (cfs)       (deg F)        (ft)
                            21.000       60.00       2461.606

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.177 DAYS.**                    **ELOEQ**
****      21.000  2462.989  2463.174   0.184    1.000    19.111  2462.670   0.000   3.443   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2476.746     2469.425
  1.   2476.688     2471.065     2476.732
****      21.000  2476.688  2476.891   0.203    1.000    17.969  2476.364   0.000   3.614   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2494.438     2483.742
  1.   2494.298     2491.539     2494.342
****      21.000  2494.298  2494.514   0.216    1.000    25.056  2494.073   0.000   3.732   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2554.315     2524.610
  1.   2554.221     2545.469     2554.265
****      21.000  2554.221  2554.387   0.166    1.000    26.043  2553.975   0.000   3.271   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2614.398     2602.074
  1.   2614.492     2582.617     2614.442
****      21.000  2614.492  2614.582   0.090    1.000    31.940  2614.218   0.000   2.404   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2672.689     2642.158
  1.   2672.783     2634.023     2672.733
****      21.000  2672.783  2672.906   0.123    1.000    21.377  2672.434   0.000   2.817   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2732.180     2689.289
  1.   2732.033     2700.570     2732.077
****      21.000  2732.033  2732.265   0.232    1.000    16.820  2731.709   0.000   3.861   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.177 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2793.349     2755.242
  1.   2793.199     2778.338     2793.242
****      21.000  2793.199  2793.435   0.237    1.000    19.631  2792.925   0.000   3.904   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       52
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                           DISCHARGE   TEMPERATURE  WATER SURFACE
                             (cfs)       (deg F)        (ft)
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                                317.000        60.00        2320.806

****  DISCHARGE     WATER     ENERGY   VELOCITY    ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD                WIDTH      BED        1         2         3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.180 DAYS.**                          **ELOEQ**
****     317.000  2322.903  2323.408    0.505    1.000     64.383  2322.039    0.000     5.700     0.000
                                                  FLOW DISTRIBUTION (%) =     0.000   100.000     0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2361.147      2340.759
  1.    2361.060      2343.483      2361.104
****     317.000  2361.060  2361.553    0.493    1.000     62.116  2360.154    0.000     5.632     0.000
                                                  FLOW DISTRIBUTION (%) =     0.000   100.000     0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2401.229      2378.194
  1.    2401.143      2380.754      2401.187
****     317.000  2401.143  2401.635    0.492    1.000     62.218  2400.237    0.000     5.627     0.000
                                                  FLOW DISTRIBUTION (%) =     0.000   100.000     0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2441.151      2415.339
  1.    2441.065      2417.429      2441.109
****     317.000  2441.065  2441.558    0.493    1.000     62.123  2440.159    0.000     5.632     0.000
                                                  FLOW DISTRIBUTION (%) =     0.000   100.000     0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:       6.000       60.00
                    Total:      311.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2461.606      2449.302
  1.    2461.532      2450.886      2461.575
****     311.000  2461.532  2461.923    0.391    1.025    108.218  2460.936    0.000     5.041     1.915
                                                  FLOW DISTRIBUTION (%) =     0.000    98.944     1.056

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      18.000       60.00
                    Total:      293.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2474.970      2466.564
  1.    2474.856      2467.695      2474.900
****     293.000  2474.856  2475.320    0.464    1.050     74.850  2474.090    0.000     5.520     2.279
                                                  FLOW DISTRIBUTION (%) =     0.000    97.497     2.503

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2486.243      2480.813
  1.    2486.165      2481.658      2486.209
****     293.000  2486.165  2486.626    0.461    1.088     71.366  2485.316    0.000     5.542     2.213
                                                  FLOW DISTRIBUTION (%) =     0.000    95.931     4.069

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2597.994      2526.786
  1.    2597.915      2533.090      2597.959
****     293.000  2597.915  2598.382    0.468    1.084     70.299  2597.062    0.000     5.578     2.221
                                                  FLOW DISTRIBUTION (%) =     0.000    96.120     3.880

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2710.007      2638.682
  1.    2709.927      2645.021      2709.971
****     293.000  2709.927  2710.395    0.467    1.084     70.351  2709.075    0.000     5.576     2.221
                                                  FLOW DISTRIBUTION (%) =     0.000    96.110     3.890

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =       0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2821.995      2750.685
  1.    2821.916      2757.033      2821.960
****     293.000  2821.916  2822.383    0.468    1.084     70.303  2821.063    0.000     5.578     2.221
                                                  FLOW DISTRIBUTION (%) =     0.000    96.119     3.881

SECTION NO.       3.380
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** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.    2932.477       2862.541
  1.    2932.385       2869.836      2932.428
****     293.000  2932.385  2932.884    0.499     1.067     65.550  2931.517    0.000    5.741    2.257
                                                 FLOW DISTRIBUTION (%) =     0.000   96.980    3.020

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE    TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                                6.000        60.00        2441.065

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)       SURFACE    LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.180 DAYS.**                    **ELOEQ**
****       6.000  2441.829  2441.930    0.101     1.000     14.995  2441.672    0.000    2.545    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.080
****       6.000  2452.605  2452.681    0.076     1.000     15.430  2452.430    0.000    2.214    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.    2497.759       2480.467
  1.    2497.705       2492.095      2497.748
****       6.000  2497.705  2497.838    0.133     1.000     11.095  2497.520    0.000    2.926    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.    2560.224       2536.239
  1.    2560.172       2555.841      2560.216
****       6.000  2560.172  2560.316    0.144     1.000     12.098  2560.009    0.000    3.045    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  1.    2622.088       2628.717
  2.    2622.182       2592.973      2622.132
****       6.000  2622.182  2622.238    0.056     1.000     15.000  2621.972    0.000    1.906    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.    2678.332       2639.848
  1.    2678.249       2645.987      2678.293
****       6.000  2678.249  2678.434    0.185     1.000      5.773  2677.948    0.000    3.448    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE    TEMPERATURE  WATER SURFACE
                              (cfs)        (deg F)        (ft)
                               18.000        60.00        2461.532

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)       SURFACE    LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.180 DAYS.**                    **ELOEQ**
****      18.000  2462.952  2463.126    0.173     1.000     17.976  2462.652    0.000    3.338    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.    2476.688       2470.119
  1.    2476.649       2471.370      2476.693
****      18.000  2476.649  2476.846    0.197     1.000     16.771  2476.348    0.000    3.561    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.    2494.296       2490.093
  1.    2494.390       2484.516      2494.340
****      18.000  2494.390  2494.466    0.076     1.000     30.165  2494.119    0.000    2.207    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.    2554.175       2523.159
```

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  1.   2554.269     2512.655     2554.219
****     18.000  2554.269  2554.355   0.086    1.000    28.424  2554.000   0.000   2.357   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2614.492     2571.574
  1.   2614.399     2582.193     2614.443
****     18.000  2614.399  2614.544   0.144    1.000    26.295  2614.175   0.000   3.048   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2672.783     2637.921
  1.   2672.632     2660.175     2672.676
****     18.000  2672.632  2672.870   0.238    1.000    16.792  2672.358   0.000   3.912   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2732.033     2710.503
  1.   2731.978     2720.887     2732.022
****     18.000  2731.978  2732.205   0.227    1.000    15.642  2731.677   0.000   3.818   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.180 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2793.196     2773.106
  1.   2793.290     2757.890     2793.240
****     18.000  2793.290  2793.383   0.092    1.000    22.987  2792.969   0.000   2.439   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       53
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.000

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               279.000       60.00       2320.752

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED         1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.184 DAYS.**                    **ELOEQ**
****    279.000  2322.848  2323.310   0.462    1.000    63.376  2322.041   0.000   5.452   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2361.060     2340.999
  1.   2360.981     2343.714     2361.025
****    279.000  2360.981  2361.440   0.458    1.000    61.157  2360.141   0.000   5.430   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2401.143     2378.627
  1.   2401.065     2381.223     2401.109
****    279.000  2401.065  2401.522   0.457    1.000    61.252  2400.225   0.000   5.425   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2441.065     2415.684
  1.   2440.988     2417.804     2441.032
****    279.000  2440.988  2441.446   0.458    1.000    61.164  2440.148   0.000   5.430   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:      5.000       60.00
                    Total:     274.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.   2461.486     2450.878
  1.   2461.579     2448.767     2461.529
****    274.000  2461.579  2461.835   0.256    1.028   108.934  2460.933   0.000   4.076   1.550
                                                FLOW DISTRIBUTION (%) =    0.000  98.854   1.146

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
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                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:     15.000       60.00
                  Total:     259.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.    2474.856     2465.700
  1.    2474.800     2466.140     2474.844
****     259.000  2474.800  2475.221   0.422    1.048    73.295  2474.076   0.000   5.260   2.161
                                                FLOW DISTRIBUTION (%) =     0.000  97.639   2.361
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.    2486.165     2480.832
  1.    2486.113     2481.428     2486.157
****     259.000  2486.113  2486.528   0.414    1.083    70.112  2485.311   0.000   5.248   2.089
                                                FLOW DISTRIBUTION (%) =     0.000  96.152   3.848
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.    2597.915     2526.916
  1.    2597.860     2531.480     2597.904
****     259.000  2597.860  2598.280   0.420    1.080    69.095  2597.055   0.000   5.280   2.097
                                                FLOW DISTRIBUTION (%) =     0.000  96.334   3.666
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.    2709.927     2638.805
  1.    2709.873     2643.394     2709.917
****     259.000  2709.873  2710.292   0.420    1.080    69.144  2709.068   0.000   5.278   2.096
                                                FLOW DISTRIBUTION (%) =     0.000  96.325   3.675
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.    2821.916     2750.804
  1.    2821.861     2755.406     2821.905
****     259.000  2821.861  2822.281   0.420    1.080    69.098  2821.056   0.000   5.280   2.097
                                                FLOW DISTRIBUTION (%) =     0.000  96.333   3.667
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.    2932.385     2862.245
  1.    2932.313     2868.142     2932.357
****     259.000  2932.313  2932.760   0.447    1.064    64.590  2931.494   0.000   5.427   2.129
                                                FLOW DISTRIBUTION (%) =     0.000  97.156   2.844

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                             5.000       60.00       2440.988

****  DISCHARGE    WATER     ENERGY   VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.184 DAYS.**                    **ELOEQ**
****       5.000  2441.803  2441.898   0.094    1.000    13.910  2441.657   0.000   2.463   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.080
SECTION NO.       0.080 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  1.    2452.605     2451.991
  2.    2452.578     2454.696     2452.595
****       5.000  2452.578  2452.666   0.088    1.000    13.581  2452.423   0.000   2.382   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  9.    2497.690     2496.332
 10.    2497.753     2480.411     2497.703
****       5.000  2497.753  2497.810   0.057    1.000    12.517  2497.544   0.000   1.916   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.184 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.    2560.126     2537.694
  1.    2560.220     2518.373     2560.170
****       5.000  2560.220  2560.279   0.059    1.000    13.812  2560.034   0.000   1.949   0.000
                                                FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.184 DAYS.
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TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2622.182     2577.260
  1.    2622.046     2604.749     2622.090
****       5.000  2622.046  2622.238    0.192    1.000    10.082  2621.905   0.000   3.519   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  1.    2678.184     2686.334
  2.    2678.278     2661.730     2678.228
****       5.000  2678.278  2678.378    0.100    1.000     6.139  2677.957   0.000   2.538   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             15.000        60.00       2461.579

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD              WIDTH      BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.184 DAYS.**                    **BLOEQ**
****      15.000  2462.917  2463.074    0.157    1.000    16.823  2462.636   0.000   3.178   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2476.649     2469.845
  1.    2476.591     2471.893     2476.635
****      15.000  2476.591  2476.792    0.201    1.000    15.234  2476.317   0.000   3.594   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2494.390     2483.455
  1.    2494.277     2490.380     2494.321
****      15.000  2494.277  2494.415    0.138    1.000    23.719  2494.065   0.000   2.980   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2554.269     2517.702
  1.    2554.159     2539.492     2554.203
****      15.000  2554.159  2554.313    0.153    1.000    22.489  2553.947   0.000   3.143   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.399     2591.939
  1.    2614.335     2611.485     2614.379
****      15.000  2614.335  2614.529    0.194    1.000    22.330  2614.145   0.000   3.530   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
SECTION NO.       1.000 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  6.    2672.586     2676.392
  7.    2672.634     2662.707     2672.630
****      15.000  2672.634  2672.795    0.161    1.000    16.906  2672.358   0.000   3.215   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2731.978     2704.438
  1.    2731.916     2714.769     2731.959
****      15.000  2731.916  2732.147    0.231    1.000    14.194  2731.642   0.000   3.857   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.184 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2793.290     2753.913
  1.    2793.152     2778.008     2793.196
****      15.000  2793.152  2793.321    0.169    1.000    18.043  2792.900   0.000   3.299   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       54
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
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                              (cfs)        (deg F)        (ft)
                             245.000        60.00        2320.696

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)    SURFACE     LINE      HEAD               WIDTH     BED         1         2         3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.187 DAYS.**                    **ELOEQ**
****     245.000  2322.793  2323.218   0.425    1.000    62.378  2322.042   0.000    5.229    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2360.981      2341.258
  1.    2360.883      2345.128     2360.927
****     245.000  2360.883  2361.336   0.453    1.000    59.966  2360.126   0.000    5.396    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2401.065      2379.862
  1.    2400.967      2383.843     2401.011
****     245.000  2400.967  2401.419   0.452    1.000    60.051  2400.211   0.000    5.392    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2440.988      2416.698
  1.    2440.891      2419.955     2440.935
****     245.000  2440.891  2441.343   0.452    1.000    59.974  2440.134   0.000    5.396    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:      4.000       60.00
                    Total:     241.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2461.579      2448.089
  1.    2461.424      2451.993     2461.468
****     241.000  2461.424  2461.763   0.339    1.021   106.868  2460.925   0.000    4.689    1.779
                                                 FLOW DISTRIBUTION (%) =    0.000   99.115    0.885

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:     13.000       60.00
                    Total:     228.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2474.800      2467.071
  1.    2474.743      2467.793     2474.787
****     228.000  2474.743  2475.127   0.384    1.045    71.741  2474.063   0.000    5.015    2.051
                                                 FLOW DISTRIBUTION (%) =    0.000   97.783    2.217
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2486.113      2480.636
  1.    2486.031      2481.694     2486.075
****     228.000  2486.031  2486.439   0.408    1.077    68.103  2485.304   0.000    5.201    2.061
                                                 FLOW DISTRIBUTION (%) =    0.000   96.511    3.489
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2597.860      2528.227
  1.    2597.773      2536.881     2597.816
****     228.000  2597.773  2598.186   0.413    1.073    67.168  2597.044   0.000    5.231    2.068
                                                 FLOW DISTRIBUTION (%) =    0.000   96.680    3.320
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2709.873      2640.121
  1.    2709.785      2648.795     2709.829
****     228.000  2709.785  2710.199   0.413    1.073    67.213  2709.057   0.000    5.229    2.067
                                                 FLOW DISTRIBUTION (%) =    0.000   96.672    3.328
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2821.861      2752.144
  1.    2821.774      2760.807     2821.817
****     228.000  2821.774  2822.187   0.413    1.073    67.172  2821.045   0.000    5.231    2.067
                                                 FLOW DISTRIBUTION (%) =    0.000   96.680    3.320
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SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2932.313      2863.149
  1.   2932.206      2873.558      2932.250
****     228.000  2932.206  2932.643   0.437    1.058    63.078  2931.466   0.000   5.364   2.096
                                                FLOW DISTRIBUTION (%) =    0.000  97.437   2.563

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                4.000        60.00       2440.891

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.187 DAYS.**                    **ELOEQ**
****       4.000  2441.754  2441.875   0.121    1.000    11.690  2441.632   0.000   2.789   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
SECTION NO.       0.080 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  5.   2452.578      2454.375
  6.   2452.623      2449.904      2452.269
****       4.000  2452.623  2452.656   0.033    1.000    15.552  2452.446   0.000   1.453   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2497.753      2465.330
  1.   2497.618      2482.760      2497.662
****       4.000  2497.618  2497.793   0.175    1.000     8.464  2497.477   0.000   3.354   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.660 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  1.   2560.132      2575.206
  2.   2560.226      2528.631      2560.176
****       4.000  2560.226  2560.262   0.036    1.000    13.979  2560.038   0.000   1.523   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.950 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2622.044      2588.284
  1.   2622.137      2574.747      2622.087
****       4.000  2622.137  2622.178   0.040    1.000    13.327  2621.951   0.000   1.612   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2678.278      2634.675
  1.   2678.132      2644.862      2678.176
****       4.000  2678.132  2678.301   0.169    1.000     4.817  2677.880   0.000   3.295   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                               13.000        60.00       2461.424

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)      SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.187 DAYS.**                    **ELOEQ**
****      13.000  2462.867  2462.970   0.103    1.000    17.431  2462.577   0.000   2.568   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2476.545      2470.329
  1.   2476.639      2467.816      2476.589
****      13.000  2476.639  2476.747   0.108    1.000    16.560  2476.341   0.000   2.636   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS             WS            WS
  0.   2494.277      2484.957
  1.   2494.234      2487.380      2494.278
****      13.000  2494.234  2494.394   0.160    1.000    21.279  2494.044   0.000   3.210   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
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SECTION NO.       0.440
SECTION NO.       0.440 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  6.    2554.114      2556.491
  7.    2554.143      2545.077      2554.157
****      13.000  2554.143  2554.280    0.137    1.000     21.559  2553.940    0.000    2.966    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2614.333      2602.578
  1.    2614.427      2579.964      2614.377
****      13.000  2614.427  2614.487    0.060    1.000     27.825  2614.190    0.000    1.968    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2672.634      2634.803
  1.    2672.591      2638.877      2672.635
****      13.000  2672.591  2672.764    0.173    1.000     15.459  2672.339    0.000    3.337    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2731.914      2712.396
  1.    2732.007      2697.958      2731.957
****      13.000  2732.007  2732.097    0.090    1.000     16.717  2731.684    0.000    2.407    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.187 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2793.152      2753.927
  1.    2793.096      2760.640      2793.140
****      13.000  2793.096  2793.297    0.202    1.000     16.073  2792.871    0.000    3.601    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

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TIME STEP #       55
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           213.000       60.00       2320.609

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.191 DAYS.**                    **ELOEQ**
****     213.000  2322.706  2323.124    0.418    1.000     60.992  2322.033    0.000    5.187    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2360.883      2343.466
  1.    2360.829      2346.038      2360.873
****     213.000  2360.829  2361.226    0.397    1.000     59.305  2360.119    0.000    5.056    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2400.967      2380.414
  1.    2400.914      2382.766      2400.958
****     213.000  2400.914  2401.310    0.397    1.000     59.384  2400.204    0.000    5.052    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2440.891      2417.141
  1.    2440.838      2419.055      2440.882
****     213.000  2440.838  2441.235    0.397    1.000     59.313  2440.128    0.000    5.056    0.000
                                                 FLOW DISTRIBUTION (%) =     0.000  100.000    0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:     3.000       60.00
                   Total:   210.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2461.378      2451.747
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  1.   2461.472     2448.987     2461.422
****    210.000  2461.472  2461.682   0.211    1.023   107.576  2460.922   0.000   3.697   1.403
                                              FLOW DISTRIBUTION (%) =    0.000  99.026   0.974

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:      10.000       60.00
                   Total:     200.000       60.00

SECTION NO.      1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.000 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2474.743     2465.574
  1.   2474.686     2466.097     2474.730
****    200.000  2474.686  2475.037   0.351    1.043    70.169  2474.050   0.000   4.794   1.951
                                              FLOW DISTRIBUTION (%) =    0.000  97.931   2.069
SECTION NO.      1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.100 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2486.031     2480.831
  1.   2485.952     2482.007     2485.996
****    200.000  2485.952  2486.351   0.399    1.070    66.263  2485.295   0.000   5.136   2.026
                                              FLOW DISTRIBUTION (%) =    0.000  96.845   3.155
SECTION NO.      1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.670 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2597.773     2532.940
  1.   2597.693     2542.644     2597.737
****    200.000  2597.693  2598.097   0.404    1.067    65.422  2597.034   0.000   5.163   2.032
                                              FLOW DISTRIBUTION (%) =    0.000  96.999   3.001
SECTION NO.      2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      2.240 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2709.785     2644.812
  1.   2709.706     2654.557     2709.750
****    200.000  2709.706  2710.110   0.404    1.067    65.462  2709.047   0.000   5.162   2.032
                                              FLOW DISTRIBUTION (%) =    0.000  96.992   3.008
SECTION NO.      2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      2.810 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2821.774     2756.820
  1.   2821.694     2766.569     2821.738
****    200.000  2821.694  2822.098   0.404    1.067    65.425  2821.035   0.000   5.163   2.032
                                              FLOW DISTRIBUTION (%) =    0.000  96.999   3.001
SECTION NO.      3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      3.380 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2932.206     2868.522
  1.   2932.142     2876.030     2932.185
****    200.000  2932.142  2932.536   0.394    1.054    62.143  2931.451   0.000   5.090   1.984
                                              FLOW DISTRIBUTION (%) =    0.000  97.612   2.388

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              3.000       60.00       2440.838

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)    SURFACE     LINE      HEAD               WIDTH      BED         1        2        3

SECTION NO.      0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.191 DAYS.**                    **ELOEQ**
****      3.000  2441.741  2441.820   0.079    1.000    11.265  2441.623   0.000   2.249   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.080 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  2.   2452.560     2451.088
  3.   2452.590     2448.556     2452.540
****      3.000  2452.590  2452.618   0.027    1.000    14.101  2452.430   0.000   1.326   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.370 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2497.616     2476.752
  1.   2497.710     2464.996     2497.660
****      3.000  2497.710  2497.742   0.032    1.000    11.215  2497.523   0.000   1.433   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.660
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.660 TIME =      0.191 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2560.226     2507.361
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  1.   2560.078     2528.307     2560.122
****       3.000  2560.078  2560.230   0.152    1.000     8.449  2559.965   0.000   3.129   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
****       3.000  2622.008  2622.076   0.068    1.000    10.144  2621.866   0.000   2.088   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2678.132     2649.890
  1.   2678.071     2660.617     2678.115
****       3.000  2678.071  2678.222   0.151    1.000     4.289  2677.847   0.000   3.114   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                               10.000       60.00       2461.472

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.191 DAYS.**                    **BLOEQ**
****      10.000  2462.834  2462.969   0.135    1.000    14.271  2462.596   0.000   2.948   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2476.639     2467.790
  1.   2476.497     2473.290     2476.541
****      10.000  2476.497  2476.694   0.197    1.000    12.501  2476.272   0.000   3.562   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.   2494.179     2497.520
  2.   2494.273     2486.701     2494.223
****      10.000  2494.273  2494.337   0.064    1.000    23.453  2494.063   0.000   2.032   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2554.143     2517.904
  1.   2554.066     2532.594     2554.110
****      10.000  2554.066  2554.262   0.196    1.000    17.296  2553.903   0.000   3.550   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  2.   2614.330     2606.248
  3.   2614.375     2590.287     2614.325
****      10.000  2614.375  2614.434   0.058    1.000    24.632  2614.166   0.000   1.935   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2672.591     2635.225
  1.   2672.535     2641.802     2672.579
****      10.000  2672.535  2672.697   0.162    1.000    13.770  2672.310   0.000   3.234   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2732.007     2691.274
  1.   2731.849     2715.950     2731.893
****      10.000  2731.849  2732.006   0.158    1.000    12.740  2731.602   0.000   3.184   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.191 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2793.050     2780.620
  1.   2793.144     2759.284     2793.094
****      10.000  2793.144  2793.222   0.079    1.000    17.836  2792.894   0.000   2.249   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       56
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
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                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                           186.000       60.00       2320.536

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP      AVG       AVG VEL (by subsection)
        (CFS)    SURFACE    LINE     HEAD              WIDTH    BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.194 DAYS.**                    **ELOEQ**
****    186.000  2322.633  2323.036   0.403    1.000    59.880  2322.023   0.000   5.092   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2360.829     2343.929
  1.   2360.730     2349.622     2360.774
****    186.000  2360.730  2361.139   0.408    1.000    58.105  2360.106   0.000   5.125   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2400.914     2381.877
  1.   2400.815     2387.484     2400.859
****    186.000  2400.815  2401.223   0.408    1.000    58.174  2400.191   0.000   5.122   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2440.838     2418.344
  1.   2440.740     2422.941     2440.784
****    186.000  2440.740  2441.148   0.408    1.000    58.112  2440.115   0.000   5.125   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:     2.000       60.00
                  Total:    184.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2461.472     2448.494
  1.   2461.337     2453.001     2461.381
****    184.000  2461.337  2461.618   0.281    1.018   105.782  2460.916   0.000   4.264   1.616
                                                FLOW DISTRIBUTION (%) =    0.000  99.254   0.746

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                          DISCHARGE   TEMPERATURE
                            (cfs)       (deg F)
        Tributary Inflow:     8.000       60.00
                  Total:    176.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2474.686     2467.077
  1.   2474.616     2468.185     2474.660
****    176.000  2474.616  2474.959   0.342    1.040    68.231  2474.036   0.000   4.731   1.913
                                                FLOW DISTRIBUTION (%) =    0.000  98.115   1.885
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2485.906     2482.259
  1.   2486.000     2480.724     2485.950
****    176.000  2486.000  2486.268   0.268    1.074    67.351  2485.302   0.000   4.209   1.665
                                                FLOW DISTRIBUTION (%) =    0.000  96.647   3.353
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2597.647     2529.718
  1.   2597.741     2521.056     2597.691
****    176.000  2597.741  2598.011   0.270    1.071    66.471  2597.040   0.000   4.227   1.668
                                                FLOW DISTRIBUTION (%) =    0.000  96.807   3.193
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2709.660     2641.522
  1.   2709.754     2632.842     2709.704
****    176.000  2709.754  2710.024   0.270    1.071    66.512  2709.053   0.000   4.226   1.668
                                                FLOW DISTRIBUTION (%) =    0.000  96.800   3.200
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.194 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2821.648     2753.525
  1.   2821.742     2744.848     2821.692
****    176.000  2821.742  2822.012   0.270    1.071    66.476  2821.041   0.000   4.226   1.668
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                                                FLOW DISTRIBUTION (%) =    0.000  96.806   3.194
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2932.142      2858.613
  1.    2932.078      2864.433      2932.122
****     176.000  2932.078  2932.441   0.363    1.051    61.202  2931.438   0.000   4.879   1.896
                                                FLOW DISTRIBUTION (%) =    0.000  97.790   2.210

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              2.000        60.00       2440.740

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.194 DAYS.**                    **BLOEQ**
****       2.000  2441.696  2441.772   0.076    1.000     9.273  2441.599   0.000   2.211   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
****       2.000  2452.488  2452.524   0.036    1.000    10.777  2452.366   0.000   1.514   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2497.710      2463.009
  1.    2497.564      2492.308      2497.608
****       2.000  2497.564  2497.668   0.104    1.000     6.818  2497.450   0.000   2.585   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO,        WS            WS            WS
 10.    2560.110      2538.765
 11.    2560.126      2531.453      2560.076
****       2.000  2560.126  2560.157   0.031    1.000    10.244  2559.988   0.000   1.419   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2622.008      2586.176
  1.    2621.951      2605.065      2621.995
****       2.000  2621.951  2622.123   0.172    1.000     6.561  2621.859   0.000   3.330   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
****       2.000  2678.012  2678.089   0.078    1.000     4.131  2677.795   0.000   2.237   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              8.000        60.00       2461.337

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH      BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.194 DAYS.**                    **BLOEQ**
****       8.000  2462.783  2462.862   0.078    1.000    14.639  2462.540   0.000   2.245   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2476.451      2470.588
  1.    2476.545      2467.555      2476.495
****       8.000  2476.545  2476.627   0.082    1.000    13.906  2476.295   0.000   2.301   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2494.273      2481.700
  1.    2494.180      2486.432      2494.224
****       8.000  2494.180  2494.293   0.113    1.000    18.220  2494.018   0.000   2.696   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.440 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2554.064      2548.602
  1.    2554.158      2520.260      2554.108
****       8.000  2554.158  2554.205   0.047    1.000    22.077  2553.950   0.000   1.745   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
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** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2614.375      2567.677
  1.    2614.240      2587.676      2614.284
****       8.000  2614.240  2614.423   0.183    1.000    16.564  2614.099   0.000   3.427   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
****       8.000  2672.488  2672.611   0.123    1.000    13.212  2672.273   0.000   2.808   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2731.849      2702.763
  1.    2731.801      2712.205      2731.845
****       8.000  2731.801  2731.948   0.147    1.000    11.597  2731.577   0.000   3.072   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.194 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2793.144      2753.385
  1.    2793.025      2779.181      2793.069
****       8.000  2793.025  2793.173   0.148    1.000    13.611  2792.835   0.000   3.089   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       57
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             161.000       60.00       2320.468

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =      0.198 DAYS.**                    **ELOEQ**
****     161.000  2322.609  2322.936   0.328    1.000    59.516  2322.019   0.000   4.591   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2360.730      2344.208
  1.    2360.662      2348.405      2360.706
****     161.000  2360.662  2361.048   0.385    1.000    57.277  2360.098   0.000   4.979   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2400.815      2384.741
  1.    2400.748      2389.549      2400.791
****     161.000  2400.748  2401.132   0.385    1.000    57.340  2400.183   0.000   4.976   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2440.740      2420.713
  1.    2440.673      2424.637      2440.717
****     161.000  2440.673  2441.058   0.385    1.000    57.285  2440.108   0.000   4.979   0.000
                                                 FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:       2.000       60.00
                   Total:     159.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.    2461.337      2451.584
  1.    2461.290      2453.833      2461.334
****     159.000  2461.290  2461.552   0.262    1.016   105.183  2460.912   0.000   4.117   1.559
                                                 FLOW DISTRIBUTION (%) =    0.000  99.330   0.670

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
        Tributary Inflow:       7.000       60.00
                   Total:     152.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
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  0.   2474.616      2467.396
  1.   2474.560      2468.437      2474.604
****     152.000  2474.560  2474.872   0.312    1.037     66.680  2474.025   0.000    4.516   1.816
                                                FLOW DISTRIBUTION (%) =     0.000   98.265   1.735
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2486.000      2479.864
  1.   2485.855      2482.239      2485.899
****     152.000  2485.855  2486.178   0.323    1.061     63.966  2485.286   0.000    4.612   1.809
                                                FLOW DISTRIBUTION (%) =     0.000   97.268   2.732
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2597.741      2523.241
  1.   2597.594      2541.226      2597.638
****     152.000  2597.594  2597.920   0.326    1.059     63.239  2597.024   0.000    4.633   1.813
                                                FLOW DISTRIBUTION (%) =     0.000   97.403   2.597
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2709.754      2635.079
  1.   2709.607      2653.110      2709.651
****     152.000  2709.607  2709.933   0.326    1.059     63.273  2709.037   0.000    4.632   1.813
                                                FLOW DISTRIBUTION (%) =     0.000   97.397   2.603
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2821.742      2747.041
  1.   2821.595      2765.123      2821.639
****     152.000  2821.595  2821.921   0.326    1.059     63.240  2821.024   0.000    4.633   1.813
                                                FLOW DISTRIBUTION (%) =     0.000   97.403   2.597
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2932.078      2867.459
  1.   2932.004      2877.760      2932.048
****     152.000  2932.004  2932.345   0.341    1.046     60.048  2931.426   0.000    4.727   1.832
                                                FLOW DISTRIBUTION (%) =     0.000   98.009   1.991

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            2.000         60.00      2440.673

****  DISCHARGE     WATER     ENERGY   VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH      BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.198 DAYS.**                    **ELOEQ**
****       2.000  2441.683  2441.778   0.094    1.000     8.786  2441.591   0.000    2.463   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  3.   2457.120      2441.787
  4.   2452.536      2450.945      2452.486
****       2.000  2452.536  2452.562   0.026    1.000    11.699  2452.403   0.000    1.285   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2497.562      2483.438
  1.   2497.656      2466.376      2497.606
****       2.000  2497.656  2497.682   0.027    1.000     9.574  2497.496   0.000    1.311   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2560.126      2512.647
  1.   2560.034      2532.488      2560.078
****       2.000  2560.034  2560.194   0.160    1.000     6.815  2559.943   0.000    3.206   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.198 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  3.   2643.162      2560.210
  4.   2622.043      2606.382      2621.993
****       2.000  2622.043  2622.076   0.034    1.000     9.872  2621.905   0.000    1.471   0.000
                                                FLOW DISTRIBUTION (%) =     0.000  100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.198 DAYS.
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TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2677.966      2654.488
  1.   2678.060      2641.350      2678.010
****       2.000  2678.060  2678.131   0.071    1.000     4.221  2677.838   0.000   2.142   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                                7.000         60.00       2461.290

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD                WIDTH     BED         1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =       0.198 DAYS.**                    **ELOEQ**
****       7.000  2462.763  2462.836   0.073    1.000    13.944  2462.531   0.000   2.165   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.198 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2476.545      2466.971
  1.   2476.427      2470.783      2476.471
****       7.000  2476.427  2476.615   0.188    1.000    10.590  2476.237   0.000   3.474   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.198 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  7.   2494.216      2487.998
  8.   2494.228      2486.778      2494.178
****       7.000  2494.228  2494.279   0.050    1.000    20.868  2494.042   0.000   1.799   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.440 TIME =      0.198 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2554.158      2508.889
  1.   2554.025      2531.312      2554.069
****       7.000  2554.025  2554.196   0.171    1.000    14.986  2553.884   0.000   3.315   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.198 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  9.   2614.311      2595.801
 10.   2614.332      2588.402      2614.282
****       7.000  2614.332  2614.377   0.045    1.000    22.025  2614.144   0.000   1.695   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.198 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2672.442      2645.440
  1.   2672.536      2633.042      2672.486
****       7.000  2672.536  2672.615   0.078    1.000    13.823  2672.311   0.000   2.246   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.198 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2731.801      2698.966
  1.   2731.774      2703.283      2731.818
****       7.000  2731.774  2731.915   0.141    1.000    10.953  2731.561   0.000   3.011   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.198 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS           WS            WS
  0.   2792.979      2790.254
  1.   2793.073      2761.672      2793.023
****       7.000  2793.073  2793.143   0.070    1.000    15.352  2792.858   0.000   2.124   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       58
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)        (deg F)        (ft)
                                140.000       60.00       2320.411

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD                WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.201 DAYS.**                    **ELOEQ**
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****    140.000  2322.551  2322.857   0.306    1.000    58.640  2322.013   0.000   4.434   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2360.616      2348.928
  1.    2360.710      2342.810      2360.660
****    140.000  2360.710  2360.958   0.248    1.000    57.851  2360.104   0.000   3.992   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2400.702      2382.433
  1.    2400.795      2377.617      2400.745
****    140.000  2400.795  2401.043   0.248    1.000    57.915  2400.190   0.000   3.992   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2440.627      2418.792
  1.    2440.721      2414.811      2440.671
****    140.000  2440.721  2440.969   0.248    1.000    57.849  2440.115   0.000   3.998   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:     1.000       60.00
                    Total:    139.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2461.244      2451.214
  1.    2461.338      2447.960      2461.288
****    139.000  2461.338  2461.493   0.155    1.018   105.870  2460.911   0.000   3.171   1.202
                                                FLOW DISTRIBUTION (%) =    0.000  99.243   0.757

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:     6.000       60.00
                    Total:    133.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2474.560      2465.721
  1.    2474.515      2466.297      2474.559
****    133.000  2474.515  2474.799   0.284    1.035    65.440  2474.016   0.000   4.307   1.725
                                                FLOW DISTRIBUTION (%) =    0.000  98.387   1.613
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.100 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2485.855      2481.272
  1.    2485.801      2482.420      2485.845
****    133.000  2485.801  2486.105   0.305    1.056    62.697  2485.281   0.000   4.475   1.749
                                                FLOW DISTRIBUTION (%) =    0.000  97.504   2.496
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.670 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2597.594      2535.623
  1.    2597.539      2544.599      2597.583
****    133.000  2597.539  2597.847   0.307    1.054    62.034  2597.018   0.000   4.494   1.753
                                                FLOW DISTRIBUTION (%) =    0.000  97.629   2.371
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.240 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2709.607      2647.440
  1.    2709.552      2656.477      2709.596
****    133.000  2709.552  2709.860   0.307    1.054    62.065  2709.031   0.000   4.493   1.753
                                                FLOW DISTRIBUTION (%) =    0.000  97.624   2.376
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       2.810 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2821.595      2759.475
  1.    2821.540      2768.489      2821.584
****    133.000  2821.540  2821.847   0.307    1.054    62.035  2821.019   0.000   4.494   1.753
                                                FLOW DISTRIBUTION (%) =    0.000  97.629   2.371
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       3.380 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.    2932.004      2871.351
  1.    2931.944      2881.106      2931.988
****    133.000  2931.944  2932.264   0.320    1.042    59.127  2931.417   0.000   4.577   1.769
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                                        FLOW DISTRIBUTION (%) =    0.000  98.186   1.814

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)       (ft)
                              1.000        60.00       2440.721

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.201 DAYS.**                    **ELOEQ**
****       1.000  2441.635  2441.713   0.078    1.000     6.511  2441.566   0.000    2.240    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.080
****       1.000  2452.458  2452.478   0.020    1.000     8.804  2452.358   0.000    1.134    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2497.656     2459.162
  1.    2497.510     2486.526     2497.553
****       1.000  2497.510  2497.588   0.079    1.000     5.171  2497.424   0.000    2.248    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.660
SECTION NO.       0.660 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  1.    2560.034     2554.043
  2.    2560.007     2586.640     2560.024
****       1.000  2560.007  2560.084   0.077    1.000     5.785  2559.929   0.000    2.226    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  2.    2621.969     2605.878
  3.    2621.990     2593.232     2621.940
****       1.000  2621.990  2622.010   0.020    1.000     7.959  2621.879   0.000    1.131    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.240 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2678.060     2630.328
  1.    2677.895     2647.453     2677.939
****       1.000  2677.895  2678.003   0.108    1.000     2.688  2677.754   0.000    2.640    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)       (ft)
                              6.000        60.00       2461.338

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA      TOP      AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.201 DAYS.**                    **ELOEQ**
****       6.000  2462.732  2462.805   0.073    1.000    12.928  2462.518   0.000    2.162    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.070 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2476.425     2470.228
  1.    2476.519     2467.034     2476.469
****       6.000  2476.519  2476.576   0.057    1.000    13.204  2476.282   0.000    1.914    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.160 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2494.228     2481.113
  1.    2494.139     2485.536     2494.183
****       6.000  2494.139  2494.252   0.113    1.000    15.781  2493.998   0.000    2.698    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.440
SECTION NO.       0.440 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  7.    2554.023     2560.133
  8.    2554.061     2540.607     2554.067
****       6.000  2554.061  2554.140   0.079    1.000    16.841  2553.903   0.000    2.251    0.000
                                                 FLOW DISTRIBUTION (%) =    0.000  100.000    0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.720 TIME =      0.201 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.        WS           WS            WS
  0.    2614.332     2574.289
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  1.   2614.241     2598.426     2614.285
****       6.000  2614.241  2614.344   0.103    1.000    16.572  2614.100   0.000    2.569   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2672.536     2642.392
  1.   2672.453     2664.810     2672.496
****       6.000  2672.453  2672.580   0.128    1.000    11.323  2672.268   0.000    2.867   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.280 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2731.774     2710.943
  1.   2731.727     2724.893     2731.771
****       6.000  2731.727  2731.888   0.160    1.000     9.815  2731.537   0.000    3.213   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.560 TIME =      0.201 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  1.   2792.969     2794.650
  2.   2793.063     2761.848     2793.013
****       6.000  2793.063  2793.119   0.056    1.000    15.001  2792.853   0.000    1.906   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

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TIME STEP #       59
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             121.000       60.00       2320.359

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD               WIDTH     BED         1        2        3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.205 DAYS.**                    **ELOEQ**
****     121.000  2322.500  2322.780   0.280    1.000    57.853  2322.007   0.000    4.248   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.350 TIME =      0.205 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2360.710     2340.145
  1.   2360.564     2349.891     2360.608
****     121.000  2360.564  2360.883   0.318    1.000    56.085  2360.088   0.000    4.526   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.600 TIME =      0.205 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2400.795     2379.654
  1.   2400.650     2390.451     2400.694
****     121.000  2400.650  2400.968   0.318    1.000    56.138  2400.174   0.000    4.523   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000
SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.800 TIME =      0.205 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2440.721     2416.511
  1.   2440.577     2425.367     2440.621
****     121.000  2440.577  2440.895   0.318    1.000    56.093  2440.100   0.000    4.525   0.000
                                                FLOW DISTRIBUTION (%) =    0.000  100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:     1.000       60.00
                    Total:    120.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.900 TIME =      0.205 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2461.338     2448.657
  1.   2461.230     2453.711     2461.274
****     120.000  2461.230  2461.435   0.205    1.014   104.435  2460.907   0.000    3.638   1.377
                                                FLOW DISTRIBUTION (%) =    0.000   99.426   0.574

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                            DISCHARGE   TEMPERATURE
                              (cfs)       (deg F)
          Tributary Inflow:     5.000       60.00
                    Total:    115.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.000 TIME =      0.205 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
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 NO.       WS            WS            WS
  0.   2474.515     2467.249
  1.   2474.458     2468.482     2474.502
****    115.000  2474.458  2474.727   0.269    1.032    63.890  2474.006   0.000   4.186   1.667
                                               FLOW DISTRIBUTION (%) =    0.000  98.540   1.460
SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2485.801     2481.585
  1.   2485.757     2482.648     2485.801
****    115.000  2485.757  2486.030   0.273    1.052    61.681  2485.277   0.000   4.233   1.650
                                               FLOW DISTRIBUTION (%) =    0.000  97.696   2.304
SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2597.539     2536.388
  1.   2597.496     2544.244     2597.540
****    115.000  2597.496  2597.771   0.275    1.050    61.070  2597.015   0.000   4.249   1.654
                                               FLOW DISTRIBUTION (%) =    0.000  97.812   2.188
SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2709.552     2648.234
  1.   2709.508     2656.110     2709.552
****    115.000  2709.508  2709.784   0.275    1.050    61.099  2709.027   0.000   4.249   1.654
                                               FLOW DISTRIBUTION (%) =    0.000  97.806   2.194
SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2821.540     2760.233
  1.   2821.496     2768.122     2821.540
****    115.000  2821.496  2821.771   0.275    1.050    61.071  2821.015   0.000   4.249   1.654
                                               FLOW DISTRIBUTION (%) =    0.000  97.811   2.189
SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2931.944     2872.080
  1.   2931.896     2880.687     2931.940
****    115.000  2931.896  2932.182   0.286    1.039    58.390  2931.410   0.000   4.322   1.667
                                               FLOW DISTRIBUTION (%) =    0.000  98.328   1.672

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            1.000       60.00       2440.577

****  DISCHARGE    WATER     ENERGY   VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.205 DAYS.**                    **ELOEQ**
****      1.000  2441.631  2441.646   0.015    1.000     9.907  2441.527   0.000   0.967   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2452.458     2446.298
  1.   2452.399     2451.324     2452.443
****      1.000  2452.399  2452.518   0.119    1.000     5.636  2452.335   0.000   2.768   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  3.   2514.523     2452.530
  4.   2497.601     2480.837     2497.551
****      1.000  2497.601  2497.616   0.014    1.000     7.927  2497.469   0.000   0.956   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2559.986     2526.538
  1.   2560.080     2507.887     2560.030
****      1.000  2560.080  2560.096   0.017    1.000     8.469  2559.966   0.000   1.039   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2621.990     2573.785
  1.   2621.896     2600.336     2621.940
****      1.000  2621.896  2622.075   0.179    1.000     4.594  2621.832   0.000   3.396   0.000
                                               FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
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SECTION NO.      1.240 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  5.   2681.057      2622.094
  6.   2677.987      2665.798      2677.937
****      1.000  2677.987  2678.021   0.034    1.000      3.582  2677.799   0.000   1.487   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                              5.000         60.00       2461.230

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.      0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.205 DAYS.**                    **ELOEQ**
****      5.000  2462.730  2462.783   0.054    1.000     12.715  2462.518   0.000   1.862   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.      0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.070 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2476.519      2465.883
  1.   2476.372      2470.372      2476.416
****      5.000  2476.372  2476.550   0.178    1.000      9.062  2476.209   0.000   3.388   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.      0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.160 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  8.   2494.165      2489.877
  9.   2494.187      2487.174      2494.137
****      5.000  2494.187  2494.228   0.042    1.000     18.487  2494.022   0.000   1.638   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.      0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.440 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2554.061      2515.719
  1.   2554.017      2524.710      2554.061
****      5.000  2554.017  2554.119   0.102    1.000     14.423  2553.882   0.000   2.560   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.      0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.720 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  9.   2614.244      2599.979
 10.   2614.289      2583.407      2614.239
****      5.000  2614.289  2614.328   0.039    1.000     19.313  2614.125   0.000   1.578   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.      1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.000 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2672.453      2636.753
  1.   2672.407      2644.029      2672.451
****      5.000  2672.407  2672.554   0.147    1.000      9.975  2672.244   0.000   3.078   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.      1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.280 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  9.   2731.717      2726.351
 10.   2731.775      2707.537      2731.725
****      5.000  2731.775  2731.843   0.068    1.000     11.103  2731.560   0.000   2.091   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000
SECTION NO.      1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.560 TIME =      0.205 DAYS.
TRIAL    TRIAL        COMPUTED      CRITICAL
 NO.       WS            WS            WS
  0.   2793.063      2747.538
  1.   2792.925      2773.817      2792.969
****      5.000  2792.925  2793.118   0.193    1.000     10.075  2792.784   0.000   3.522   0.000
                                               FLOW DISTRIBUTION (%) =     0.000 100.000   0.000

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TIME STEP #       60
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....       0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                            DISCHARGE   TEMPERATURE  WATER SURFACE
                              (cfs)       (deg F)        (ft)
                             105.000         60.00       2320.316

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1       2       3

SECTION NO.      0.100
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** CRITICAL WATER SURFACE USED AT SECTION NO.      0.100 AT TIME =      0.208 DAYS.**
****    105.000  2322.412  2322.724   0.312    1.000    56.545  2321.998   0.000   4.477   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.350
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.350 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2360.518      2355.532
  1.   2360.612      2346.199     2360.562
****    105.000  2360.612  2360.810   0.198    1.000    56.660  2360.093   0.000   3.569   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.600
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.600 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2400.604      2382.988
  1.   2400.698      2377.232     2400.648
****    105.000  2400.698  2400.896   0.198    1.000    56.712  2400.180   0.000   3.571   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.      0.800
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.800 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2440.531      2419.205
  1.   2440.625      2414.453     2440.575
****    105.000  2440.625  2440.823   0.198    1.000    56.665  2440.106   0.000   3.571   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.      0.800 ---
                           DISCHARGE   TEMPERATURE
                             (cfs)       (deg F)
        Tributary Inflow:      1.000       60.00
                   Total:    104.000       60.00

SECTION NO.      0.900
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.900 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2461.230      2448.954
  1.   2461.185      2451.032     2461.228
****    104.000  2461.185  2461.391   0.206    1.012   103.837  2460.904   0.000   3.650   1.380
                                                FLOW DISTRIBUTION (%) =    0.000  99.503   0.497

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.      0.900 ---
                           DISCHARGE   TEMPERATURE
                             (cfs)       (deg F)
        Tributary Inflow:      4.000       60.00
                   Total:    100.000       60.00

SECTION NO.      1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.000 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2474.458      2468.115
  1.   2474.414      2469.378     2474.457
****    100.000  2474.414  2474.663   0.250    1.029    62.651  2473.998   0.000   4.033   1.599
                                                FLOW DISTRIBUTION (%) =    0.000  98.664   1.336

SECTION NO.      1.100
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.100 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2485.757      2481.707
  1.   2485.703      2483.256     2485.747
****    100.000  2485.703  2485.968   0.265    1.047    60.410  2485.273   0.000   4.164   1.618
                                                FLOW DISTRIBUTION (%) =    0.000  97.937   2.063

SECTION NO.      1.670
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.670 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2597.496      2539.322
  1.   2597.441      2551.227     2597.485
****    100.000  2597.441  2597.708   0.267    1.045    59.865  2597.010   0.000   4.178   1.621
                                                FLOW DISTRIBUTION (%) =    0.000  98.041   1.959

SECTION NO.      2.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      2.240 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2709.508      2651.159
  1.   2709.454      2663.092     2709.498
****    100.000  2709.454  2709.720   0.267    1.045    59.891  2709.023   0.000   4.177   1.621
                                                FLOW DISTRIBUTION (%) =    0.000  98.036   1.964

SECTION NO.      2.810
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      2.810 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2821.496      2763.157
  1.   2821.441      2775.105     2821.485
****    100.000  2821.441  2821.708   0.267    1.045    59.866  2821.010   0.000   4.178   1.621
                                                FLOW DISTRIBUTION (%) =    0.000  98.041   1.959

SECTION NO.      3.380
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      3.380 TIME =      0.208 DAYS.
TRIAL    TRIAL        COMPUTED     CRITICAL
 NO.       WS            WS           WS
  0.   2931.896      2875.002
  1.   2931.837      2887.670     2931.881
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****    100.000  2931.837  2932.113   0.276    1.035    57.473  2931.402   0.000   4.242   1.632
                                                FLOW DISTRIBUTION (%) =    0.000  98.506   1.494

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            1.000         60.00       2440.625

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.208 DAYS.**                    **ELOEQ**
****      1.000  2441.645  2441.700   0.055    1.000     7.090  2441.570   0.000   1.889   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.080 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  3.    2460.282      2441.706
  4.    2452.471      2450.660     2452.421
****      1.000  2452.471  2452.491   0.020    1.000     8.839  2452.371   0.000   1.125   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.370 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2497.601      2464.425
  1.    2497.510      2486.088     2497.554
****      1.000  2497.510  2497.588   0.079    1.000     5.171  2497.424   0.000   2.248   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.660
****      1.000  2560.024  2560.071   0.046    1.000     6.572  2559.936   0.000   1.725   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.950
SECTION NO.       0.950 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  8.    2621.919      2633.276
  9.    2621.954      2603.149     2621.963
****      1.000  2621.954  2621.995   0.040    1.000     6.673  2621.861   0.000   1.610   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       1.240 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2677.987      2642.693
  1.    2677.891      2666.879     2677.935
****      1.000  2677.891  2677.999   0.108    1.000     2.687  2677.750   0.000   2.641   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            4.000         60.00       2461.185

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.208 DAYS.**                    **ELOEQ**
****      4.000  2462.676  2462.740   0.064    1.000    10.882  2462.495   0.000   2.037   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.070 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2476.370      2470.764
  1.    2476.464      2466.861     2476.414
****      4.000  2476.464  2476.505   0.042    1.000    11.667  2476.254   0.000   1.634   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.160 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2494.187      2480.378
  1.    2494.084      2485.832     2494.128
****      4.000  2494.084  2494.204   0.120    1.000    12.711  2493.971   0.000   2.773   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.440
SECTION NO.       0.440 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
  0.    2554.017      2549.482
  1.    2553.975      2584.054     2554.019
****      4.000  2553.975  2554.107   0.132    1.000    12.092  2553.861   0.000   2.915   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.       0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.       0.720 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED     CRITICAL
 NO.        WS            WS           WS
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  1.   2614.189      2639.429
  2.   2614.283      2582.707      2614.233
****       4.000  2614.283  2614.310   0.027    1.000    18.891  2614.122   0.000   1.320   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2672.361      2641.538
  1.   2672.455      2629.357      2672.405
****       4.000  2672.455  2672.509   0.054    1.000    11.460  2672.268   0.000   1.865   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.280
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.280 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2731.775      2688.457
  1.   2731.668      2704.930      2731.712
****       4.000  2731.668  2731.801   0.133    1.000     8.392  2731.505   0.000   2.927   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       1.560
SECTION NO.       1.560 TIME =      0.208 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  5.   2792.923      2794.579
  6.   2792.964      2774.488      2792.967
****       4.000  2792.964  2793.036   0.072    1.000    11.520  2792.803   0.000   2.154   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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TIME STEP #       61
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EAST C-1 DETENSION BASIN       RETURN INTERVAL = 100 YEARS
ACCUMULATED TIME (yrs).....        0.001

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  1 at Control Point #  1 ---
                              DISCHARGE   TEMPERATURE  WATER SURFACE
                                (cfs)       (deg F)        (ft)
                                 90.000       60.00       2320.275

****  DISCHARGE     WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG        AVG VEL (by subsection)
        (CFS)     SURFACE     LINE      HEAD              WIDTH     BED         1       2       3

SECTION NO.       0.100
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.100 AT TIME =       0.212 DAYS.**                    **ELOEQ**
****      90.000  2322.372  2322.650   0.278    1.000    55.967  2321.991   0.000   4.231   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.350
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.350 TIME =      0.212 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2360.612      2342.431
  1.   2360.486      2354.648      2360.529
****      90.000  2360.486  2360.738   0.253    1.000    55.125  2360.081   0.000   4.034   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.600
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.600 TIME =      0.212 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2400.698      2379.091
  1.   2400.572      2390.004      2400.616
****      90.000  2400.572  2400.825   0.253    1.000    55.170  2400.168   0.000   4.032   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SECTION NO.       0.800
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.800 TIME =      0.212 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2440.625      2415.992
  1.   2440.499      2424.985      2440.543
****      90.000  2440.499  2440.752   0.253    1.000    55.132  2440.094   0.000   4.033   0.000
                                                FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

--- TRIBUTARY JUNCTION - CONTROL POINT #  2 is upstream of Section No.       0.800 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:       1.000       60.00
                    Total:       89.000       60.00

SECTION NO.       0.900
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.900 TIME =      0.212 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
 NO.        WS            WS            WS
  0.   2461.139      2456.527
  1.   2461.233      2449.822      2461.183
****      89.000  2461.233  2461.341   0.109    1.014   104.513  2460.903   0.000   2.650   1.003
                                                FLOW DISTRIBUTION (%) =    0.000  99.416   0.584

--- TRIBUTARY JUNCTION - CONTROL POINT #  3 is upstream of Section No.       0.900 ---
                              DISCHARGE   TEMPERATURE
                                (cfs)       (deg F)
          Tributary Inflow:       3.000       60.00
                    Total:       86.000       60.00

SECTION NO.       1.000
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.000 TIME =      0.212 DAYS.
TRIAL     TRIAL        COMPUTED      CRITICAL
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 NO.       WS           WS           WS
  0.   2474.414     2465.791
  1.   2474.344     2467.103     2474.388
****     86.000  2474.344  2474.609    0.266    1.025    60.718  2473.988   0.000    4.154    1.635
                                               FLOW DISTRIBUTION (%) =    0.000   98.860    1.140

SECTION NO.       1.100
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.100 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  1.   2485.635     2485.861
  2.   2485.729     2482.206     2485.679
****     86.000  2485.729  2485.903    0.174    1.050    60.998  2485.276   0.000    3.377    1.314
                                               FLOW DISTRIBUTION (%) =    0.000   97.825    2.175

SECTION NO.       1.670
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       1.670 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2597.441     2529.806
  1.   2597.372     2542.912     2597.416
****     86.000  2597.372  2597.653    0.281    1.039    58.359  2597.005   0.000    4.281    1.654
                                               FLOW DISTRIBUTION (%) =    0.000   98.331    1.669

SECTION NO.       2.240
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.240 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2709.454     2661.082
  1.   2709.385     2682.651     2709.429
****     86.000  2709.385  2709.666    0.281    1.039    58.381  2709.018   0.000    4.281    1.654
                                               FLOW DISTRIBUTION (%) =    0.000   98.327    1.673

SECTION NO.       2.810
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       2.810 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2821.441     2773.075
  1.   2821.373     2794.663     2821.417
****     86.000  2821.373  2821.653    0.281    1.039    58.360  2821.005   0.000    4.281    1.654
                                               FLOW DISTRIBUTION (%) =    0.000   98.331    1.669

SECTION NO.       3.380
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       3.380 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2931.837     2884.838
  1.   2931.766     2907.288     2931.809
****     86.000  2931.766  2932.055    0.289    1.030    56.329  2931.395   0.000    4.337    1.664
                                               FLOW DISTRIBUTION (%) =    0.000   98.729    1.271

SUB-BASIN C4CC

SUB-BASIN C4CC

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  2 at Control Point #  2 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                            1.000       60.00       2440.499

****  DISCHARGE    WATER     ENERGY  VELOCITY   ALPHA      TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE     LINE     HEAD               WIDTH     BED        1        2        3

SECTION NO.       0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.       0.000 AT TIME =      0.212 DAYS.**                    **ELOEQ**
****      1.000  2441.620  2441.640    0.020    1.000     9.205  2441.523   0.000    1.120    0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SECTION NO.       0.080
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.080 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  1.   2452.399     2454.392
  2.   2452.492     2445.301     2452.442
****      1.000  2452.492  2452.506    0.013    1.000     9.763  2452.381   0.000    0.922    0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SECTION NO.       0.370
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.370 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2497.508     2476.728
  1.   2497.602     2461.757     2497.552
****      1.000  2497.602  2497.616    0.014    1.000     7.932  2497.470   0.000    0.955    0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SECTION NO.       0.660
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.660 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2559.979     2528.960
  1.   2560.072     2508.819     2560.022
****      1.000  2560.072  2560.092    0.019    1.000     8.176  2559.963   0.000    1.115    0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SECTION NO.       0.950
** SUPERCRITICAL **  Using Critical Water Surface *
SECTION NO.       0.950 TIME =      0.212 DAYS.
TRIAL     TRIAL       COMPUTED      CRITICAL
 NO.       WS           WS           WS
  0.   2621.954     2583.526
  1.   2621.897     2606.290     2621.941
****      1.000  2621.897  2622.076    0.179    1.000     4.597  2621.833   0.000    3.394    0.000
                                               FLOW DISTRIBUTION (%) =    0.000  100.000    0.000

SECTION NO.       1.240
** SUPERCRITICAL **  Using Critical Water Surface *
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SECTION NO.      1.240 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  5.   2681.051     2622.095
  6.   2677.983     2665.801     2677.933
****      1.000  2677.983  2678.017   0.034    1.000     3.580  2677.795   0.000   1.487   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

SUB-BASIN C4CB

SUB-BASIN C4CB

--- Downstream Boundary Condition Data for STREAM SEGMENT NO.  3 at Control Point #  3 ---
                          DISCHARGE   TEMPERATURE  WATER SURFACE
                            (cfs)       (deg F)        (ft)
                             3.000       60.00       2461.233

****  DISCHARGE    WATER    ENERGY  VELOCITY   ALPHA     TOP       AVG       AVG VEL (by subsection)
        (CFS)     SURFACE    LINE     HEAD              WIDTH     BED        1       2       3

SECTION NO.      0.000
** CRITICAL WATER SURFACE USED AT SECTION NO.      0.000 AT TIME =      0.212 DAYS.**                    **ELOEQ**
****      3.000  2462.645  2462.695   0.050    1.000    10.039  2462.478   0.000   1.795   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.070
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.070 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2476.464     2465.534
  1.   2476.328     2470.716     2476.372
****      3.000  2476.328  2476.443   0.115    1.000     7.841  2476.187   0.000   2.715   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.160
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.160 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  9.   2494.092     2491.912
 10.   2494.132     2485.866     2494.082
****      3.000  2494.132  2494.164   0.031    1.000    15.390  2493.995   0.000   1.419   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.440
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.440 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2553.929     2539.102
  1.   2554.023     2512.521     2553.973
****      3.000  2554.023  2554.058   0.035    1.000    14.603  2553.886   0.000   1.500   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      0.720
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      0.720 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2614.283     2565.183
  1.   2614.146     2598.469     2614.190
****      3.000  2614.146  2614.289   0.144    1.000    10.783  2614.054   0.000   3.040   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      1.000
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.000 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  2.   2672.403     2666.290
  3.   2672.445     2648.448     2672.395
****      3.000  2672.445  2672.479   0.034    1.000    11.166  2672.263   0.000   1.473   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      1.280
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.280 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  0.   2731.668     2692.030
  1.   2731.623     2699.172     2731.667
****      3.000  2731.623  2731.756   0.134    1.000     7.259  2731.482   0.000   2.933   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000
SECTION NO.      1.560
** SUPERCRITICAL **  Using Critical Water Surface +
SECTION NO.      1.560 TIME =     0.212 DAYS.
TRIAL    TRIAL       COMPUTED     CRITICAL
 NO.       WS           WS           WS
  2.   2792.916     2786.103
  3.   2792.963     2765.337     2792.913
****      3.000  2792.963  2793.004   0.041    1.000    11.465  2792.802   0.000   1.631   0.000
                                              FLOW DISTRIBUTION (%) =    0.000 100.000   0.000

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SUB-BASIN C4CB
       ACCUMULATED TIME (yrs).....      0.001
       FLOW DURATION (days).......      0.003

UPSTREAM BOUNDARY CONDITIONS
-------------------------------------------------------------------------
Stream Segment # 3     |   DISCHARGE   | SEDIMENT LOAD | TEMPERATURE
Section No.     1.560 |     (cfs)     |   (tons/day)  |   (deg F)
-------------------------------------------------------------------------
                INFLOW |          3.00 |         18.71 |       60.00

TABLE SA-1. TRAP EFFICIENCY ON STREAM SEGMENT #  3
            SUB-BASIN C4CB
            ACCUMULATED AC-FT ENTERING AND LEAVING THIS STREAM SEGMENT
**************************************************
    TIME       ENTRY *              SAND              *
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DAYS	POINT *	INFLOW	OUTFLOW	TRAP EFF *
0.21	1.560 *	0.03		*
TOTAL=	0.000 *	0.03	0.93	-27.79 *

TABLE SB-1: SEDIMENT LOAD PASSING THE BOUNDARIES OF STREAM SEGMENT # 3

SEDIMENT INFLOW at the Upstream Boundary:

GRAIN SIZE	LOAD (tons/day)	GRAIN SIZE	LOAD (tons/day)
VERY FINE SAND....	1.34	VERY FINE GRAVEL..	2.29
FINE SAND.....	0.95	FINE GRAVEL.....	3.63
MEDIUM SAND.....	1.15	MEDIUM GRAVEL.....	2.86
COARSE SAND.....	1.91	COARSE GRAVEL.....	2.10
VERY COARSE SAND..	1.72	VERY COARSE GRAVEL	0.76
		TOTAL =	18.71

SEDIMENT OUTFLOW from the Downstream Boundary

GRAIN SIZE	LOAD (tons/day)	GRAIN SIZE	LOAD (tons/day)
VERY FINE SAND....	62.64	VERY FINE GRAVEL..	2.45
FINE SAND.....	29.37	FINE GRAVEL.....	0.00
MEDIUM SAND.....	18.40	MEDIUM GRAVEL.....	0.00
COARSE SAND.....	16.95	COARSE GRAVEL.....	0.00
VERY COARSE SAND..	6.08	VERY COARSE GRAVEL	0.00
		TOTAL =	135.90

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 0.212 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
1.560	-0.36	2792.96	2792.64	3.	82.
1.280	-1.66	2731.62	2731.34	3.	1601.
1.000	-0.92	2672.44	2672.08	3.	2622.
0.720	0.96	2614.15	2613.96	3.	1420.
0.440	0.75	2554.02	2553.75	3.	608.
0.160	0.86	2494.13	2493.86	3.	132.
0.070	0.05	2476.33	2476.05	3.	380.
0.000	0.35	2462.64	2462.35	3.	136.

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SUB-BASIN C4CC

ACCUMULATED TIME (yrs).... 0.001

FLOW DURATION (days)..... 0.003

UPSTREAM BOUNDARY CONDITIONS

Stream Segment # 2 / Section No. 1.240	DISCHARGE (cfs)	SEDIMENT LOAD (tons/day)	TEMPERATURE (deg F)
INFLOW	1.00	9.80	60.00

TABLE SA-1. TRAP EFFICIENCY ON STREAM SEGMENT # 2

SUB-BASIN C4CC

ACCUMULATED AC-FT ENTERING AND LEAVING THIS STREAM SEGMENT

TIME DAYS	ENTRY POINT *	SAND INFLOW	OUTFLOW	TRAP EFF *
0.21	1.240 *	0.03		*
TOTAL=	0.000 *	0.03	0.56	-20.31 *

TABLE SB-1: SEDIMENT LOAD PASSING THE BOUNDARIES OF STREAM SEGMENT # 2

SEDIMENT INFLOW at the Upstream Boundary:

GRAIN SIZE	LOAD (tons/day)	GRAIN SIZE	LOAD (tons/day)
VERY FINE SAND....	0.70	VERY FINE GRAVEL..	1.20
FINE SAND.....	0.50	FINE GRAVEL.....	1.90
MEDIUM SAND.....	0.60	MEDIUM GRAVEL.....	1.50
COARSE SAND.....	1.00	COARSE GRAVEL.....	1.10
VERY COARSE SAND..	0.90	VERY COARSE GRAVEL	0.40
		TOTAL =	9.80

SEDIMENT OUTFLOW from the Downstream Boundary

GRAIN SIZE	LOAD (tons/day)	GRAIN SIZE	LOAD (tons/day)
VERY FINE SAND....	3.86	VERY FINE GRAVEL..	0.00
FINE SAND.....	6.72	FINE GRAVEL.....	0.00
MEDIUM SAND.....	7.68	MEDIUM GRAVEL.....	0.00
COARSE SAND.....	3.27	COARSE GRAVEL.....	0.00
VERY COARSE SAND..	0.33	VERY COARSE GRAVEL	0.00
		TOTAL =	21.86

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 0.212 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
1.240	-5.39	2677.98	2677.61	1.	958.
0.950	0.77	2621.90	2621.77	1.	819.
0.660	0.85	2560.07	2559.85	1.	180.
0.370	0.34	2497.60	2497.34	1.	90.
0.080	0.27	2452.49	2452.27	1.	19.
0.000	0.47	2441.62	2441.47	1.	22.

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EAST C-1 DETENSION BASIN RETURN INTERVAL = 100 YEARS

ACCUMULATED TIME (yrs).... 0.001

FLOW DURATION (days)..... 0.003

UPSTREAM BOUNDARY CONDITIONS

Stream Segment # 1	DISCHARGE	SEDIMENT LOAD	TEMPERATURE

Section No. 3.380	(cfs)	(tons/day)	(deg F)
INFLOW	86.00	148.68	60.00

Upstream of SECTION NO. 0.900 is...

TRIBUTARY JUNCTION # 3	DISCHARGE (cfs)	SEDIMENT LOAD (tons/day)	TEMPERATURE (deg F)
MAINSTEM INFLOW	86.00	148.68	60.00
TRIBUTARY INFLOW	3.00	135.90	60.00
TOTAL	89.00	284.58	60.00

Upstream of SECTION NO. 0.800 is...

TRIBUTARY JUNCTION # 2	DISCHARGE (cfs)	SEDIMENT LOAD (tons/day)	TEMPERATURE (deg F)
MAINSTEM INFLOW	89.00	284.58	60.00
TRIBUTARY INFLOW	1.00	21.86	60.00
TOTAL	90.00	306.44	60.00

TABLE SA-1. TRAP EFFICIENCY ON STREAM SEGMENT # 1
EAST C-1 DETENSION BASIN RETURN INTERVAL = 100 YEARS
ACCUMULATED AC-FT ENTERING AND LEAVING THIS STREAM SEGMENT

TIME DAYS	ENTRY POINT	SAND INFLOW	SAND OUTFLOW	SAND TRAP EFF
0.21	3.380	0.10		
	0.900	0.93		
	0.800	0.56		
TOTAL=	0.100	1.58	4.70	-1.97

TABLE SB-1: SEDIMENT LOAD PASSING THE BOUNDARIES OF STREAM SEGMENT # 1

SEDIMENT INFLOW at the Upstream Boundary:

GRAIN SIZE	LOAD (tons/day)	GRAIN SIZE	LOAD (tons/day)
VERY FINE SAND....	10.62	VERY FINE GRAVEL..	18.21
FINE SAND.....	7.59	FINE GRAVEL.....	28.83
MEDIUM SAND.....	9.10	MEDIUM GRAVEL.....	22.76
COARSE SAND.....	15.17	COARSE GRAVEL.....	16.69
VERY COARSE SAND..	13.65	VERY COARSE GRAVEL	6.07
		TOTAL =	148.68

SEDIMENT OUTFLOW from the Downstream Boundary

GRAIN SIZE	LOAD (tons/day)	GRAIN SIZE	LOAD (tons/day)
VERY FINE SAND....	927.74	VERY FINE GRAVEL..	553.28
FINE SAND.....	688.21	FINE GRAVEL.....	614.20
MEDIUM SAND.....	661.68	MEDIUM GRAVEL.....	243.64
COARSE SAND.....	1180.35	COARSE GRAVEL.....	0.00
VERY COARSE SAND..	614.10	VERY COARSE GRAVEL	0.00
		TOTAL =	5483.20

TABLE SB-2: STATUS OF THE BED PROFILE AT TIME = 0.212 DAYS

SECTION NUMBER	BED CHANGE (ft)	WS ELEV (ft)	THALWEG (ft)	Q (cfs)	TRANSPORT RATE (tons/day) SAND
3.380	-1.62	2931.77	2931.38	86.	5968.
2.810	-0.01	2821.37	2820.99	86.	5830.
2.240	0.00	2709.39	2709.00	86.	5371.
1.670	-0.01	2597.37	2596.99	86.	4965.
1.100	0.25	2485.73	2485.25	86.	3816.
1.000	-0.04	2474.34	2473.96	86.	4430.
0.900	-1.10	2461.23	2460.90	89.	6484.
0.800	0.08	2440.50	2440.08	90.	5216.
0.600	0.15	2400.57	2400.15	90.	4467.
0.350	0.06	2360.49	2360.06	90.	3936.
0.100	1.92	2322.37	2321.92	90.	5483.

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STREAM SEGMENT # 3: SUB-BASIN C4CB

SUMMARY TABLE: MASS AND VOLUME OF SEDIMENT

SECTION	SEDIMENT THROUGH SECTION (tons) TOTAL	SAND	SILT	CLAY	SEDIMENT DEPOSITED IN REACH in cu. yds TOTAL	CUMULATIVE	SAND	SILT	CLAY
INFLOW	65.	65.	0.	0.	52.				
1.560	815.	815.	0.	0.	-597.	-597.	-597.	0.	0.
1.280	7764.	7764.	0.	0.	-5535.	-6132.	-5535.	0.	0.
1.000	11617.	11617.	0.	0.	-3069.	-9201.	-3069.	0.	0.
0.720	7584.	7584.	0.	0.	3213.	-5988.	3213.	0.	0.
0.440	4447.	4447.	0.	0.	2498.	-3490.	2498.	0.	0.
0.160	2093.	2093.	0.	0.	1875.	-1615.	1875.	0.	0.
0.070	2044.	2044.	0.	0.	39.	-1576.	39.	0.	0.
0.000	1886.	1886.	0.	0.	126.	-1450.	126.	0.	0.

TOTAL SEDIMENT - per grain size - THROUGH EACH CROSS SECTION (tons)

UPSTREAM INFLOW

VF SAND	5.	VC SAND	6.	C GRVL	7.
F SAND	3.	VF GRVL	8.	VC GRVL	3.
M SAND	4.	F GRVL	13.	0.	
C SAND	7.				

SECTION NO. 1.560

VF SAND	110.	VC SAND	81.	C GRVL	42.
F SAND	61.	VF GRVL	103.	VC GRVL	0.

M SAND	63.	F GRVL	155.	0.	
C SAND	96.				
SECTION NO.	1.280				
VF SAND	676.	VC SAND	699.	C GRVL	762.
F SAND	465.	VF GRVL	916.	VC GRVL	372.
M SAND	527.	F GRVL	1430.	0.	
C SAND	813.				
SECTION NO.	1.000				
VF SAND	994.	VC SAND	1038.	C GRVL	1146.
F SAND	694.	VF GRVL	1361.	VC GRVL	568.
M SAND	788.	F GRVL	2177.	0.	
C SAND	1212.				
SECTION NO.	0.720				
VF SAND	939.	VC SAND	679.	C GRVL	534.
F SAND	652.	VF GRVL	848.	VC GRVL	180.
M SAND	670.	F GRVL	1302.	0.	
C SAND	906.				
SECTION NO.	0.440				
VF SAND	911.	VC SAND	344.	C GRVL	150.
F SAND	597.	VF GRVL	377.	VC GRVL	21.
M SAND	535.	F GRVL	610.	0.	
C SAND	581.				
SECTION NO.	0.160				
VF SAND	845.	VC SAND	79.	C GRVL	2.
F SAND	470.	VF GRVL	73.	VC GRVL	0.
M SAND	293.	F GRVL	98.	0.	
C SAND	193.				
SECTION NO.	0.070				
VF SAND	850.	VC SAND	70.	C GRVL	6.
F SAND	467.	VF GRVL	65.	VC GRVL	0.
M SAND	282.	F GRVL	86.	0.	
C SAND	174.				
SECTION NO.	0.000				
VF SAND	845.	VC SAND	51.	C GRVL	3.
F SAND	458.	VF GRVL	48.	VC GRVL	0.
M SAND	261.	F GRVL	59.	0.	
C SAND	134.				

STREAM SEGMENT # 2: SUB-BASIN C4CC

SUMMARY TABLE: MASS AND VOLUME OF SEDIMENT

SECTION	SEDIMENT THROUGH SECTION (tons) TOTAL	SAND	SILT	CLAY	SEDIMENT DEPOSITED IN REACH in cu. yds TOTAL	CUMULATIVE	SAND	SILT	CLAY
INFLOW	53.	53.	0.	0.	42.				
1.240	7830.	7830.	0.	0.	-6194.	-6194.	-6194.	0.	0.
0.950	5613.	5613.	0.	0.	1766.	-4428.	1766.	0.	0.
0.660	3151.	3151.	0.	0.	1961.	-2468.	1961.	0.	0.
0.370	2096.	2096.	0.	0.	840.	-1628.	840.	0.	0.
0.080	1414.	1414.	0.	0.	543.	-1084.	543.	0.	0.
0.000	1131.	1131.	0.	0.	226.	-859.	226.	0.	0.

TOTAL SEDIMENT - per grain size - THROUGH EACH CROSS SECTION (tons)

UPSTREAM INFLOW					
VF SAND	4.	VC SAND	5.	C GRVL	6.
F SAND	3.	VF GRVL	6.	VC GRVL	2.
M SAND	3.	F GRVL	10.	0.	
C SAND	5.				
SECTION NO.	1.240				
VF SAND	559.	VC SAND	709.	C GRVL	850.
F SAND	400.	VF GRVL	939.	VC GRVL	455.
M SAND	478.	F GRVL	1483.	0.	
C SAND	792.				
SECTION NO.	0.950				
VF SAND	549.	VC SAND	522.	C GRVL	483.
F SAND	391.	VF GRVL	656.	VC GRVL	195.
M SAND	435.	F GRVL	999.	0.	
C SAND	647.				
SECTION NO.	0.660				
VF SAND	542.	VC SAND	267.	C GRVL	140.
F SAND	366.	VF GRVL	314.	VC GRVL	26.
M SAND	358.	F GRVL	442.	0.	
C SAND	423.				
SECTION NO.	0.370				
VF SAND	553.	VC SAND	135.	C GRVL	37.
F SAND	356.	VF GRVL	138.	VC GRVL	2.
M SAND	311.	F GRVL	190.	0.	
C SAND	274.				
SECTION NO.	0.080				
VF SAND	552.	VC SAND	51.	C GRVL	1.
F SAND	333.	VF GRVL	48.	VC GRVL	0.
M SAND	227.	F GRVL	54.	0.	
C SAND	128.				
SECTION NO.	0.000				
VF SAND	554.	VC SAND	21.	C GRVL	1.
F SAND	312.	VF GRVL	21.	VC GRVL	0.
M SAND	141.	F GRVL	22.	0.	
C SAND	49.				

STREAM SEGMENT # 1: EAST C-1 DETENSION BASIN RETURN INTERVAL = 100 YEARS

SUMMARY TABLE: MASS AND VOLUME OF SEDIMENT

SECTION	SEDIMENT THROUGH SECTION (tons) TOTAL	SAND	SILT	CLAY	SEDIMENT DEPOSITED IN REACH in cu. yds TOTAL	CUMULATIVE	SAND	SILT	CLAY
INFLOW	193.	193.	0.	0.	153.				
3.380	12041.	12041.	0.	0.	-9437.	-9437.	-9437.	0.	0.
2.810	12157.	12157.	0.	0.	-93.	-9530.	-93.	0.	0.
2.240	12088.	12088.	0.	0.	55.	-9475.	55.	0.	0.

1.670	12207.	12207.	0.	0.	-95.	-9569.	-95.	0.	0.
1.100	10063.	10063.	0.	0.	1708.	-7861.	1708.	0.	0.
1.000	10158.	10158.	0.	0.	-76.	-7938.	-76.	0.	0.
TRIB	1886.	1886.	0.	0.	1502.				
0.900	16640.	16640.	0.	0.	-3661.	-11598.	-3661.	0.	0.
TRIB	1131.	1131.	0.	0.	901.				
0.800	17408.	17408.	0.	0.	290.	-11309.	290.	0.	0.
0.600	16487.	16487.	0.	0.	733.	-10576.	733.	0.	0.
0.350	16070.	16070.	0.	0.	332.	-10243.	332.	0.	0.
0.100	9524.	9524.	0.	0.	5214.	-5029.	5214.	0.	0.

TOTAL SEDIMENT - per grain size - THROUGH EACH CROSS SECTION (tons)

UPSTREAM INFLOW

VF SAND	14.	VC SAND	18.	C GRVL	22.
F SAND	10.	VF GRVL	24.	VC GRVL	8.
M SAND	12.	F GRVL	37.	0.	
C SAND	20.				

SECTION NO. 3.380

VF SAND	1021.	VC SAND	1092.	C GRVL	1219.
F SAND	689.	VF GRVL	1432.	VC GRVL	571.
M SAND	770.	F GRVL	2270.	0.	
C SAND	1240.				

SECTION NO. 2.810

VF SAND	1107.	VC SAND	1161.	C GRVL	1108.
F SAND	750.	VF GRVL	1461.	VC GRVL	449.
M SAND	844.	F GRVL	2256.	0.	
C SAND	1350.				

SECTION NO. 2.240

VF SAND	1192.	VC SAND	1216.	C GRVL	981.
F SAND	811.	VF GRVL	1434.	VC GRVL	363.
M SAND	917.	F GRVL	2157.	0.	
C SAND	1465.				

SECTION NO. 1.670

VF SAND	1278.	VC SAND	1273.	C GRVL	909.
F SAND	872.	VF GRVL	1414.	VC GRVL	328.
M SAND	990.	F GRVL	2084.	0.	
C SAND	1587.				

SECTION NO. 1.100

VF SAND	1327.	VC SAND	1051.	C GRVL	559.
F SAND	907.	VF GRVL	1033.	VC GRVL	167.
M SAND	1012.	F GRVL	1460.	0.	
C SAND	1564.				

SECTION NO. 1.000

VF SAND	1342.	VC SAND	1056.	C GRVL	564.
F SAND	917.	VF GRVL	1038.	VC GRVL	171.
M SAND	1025.	F GRVL	1466.	0.	
C SAND	1585.				

TRIBUTARY INFLOW

VF SAND	845.	VC SAND	51.	C GRVL	3.
F SAND	458.	VF GRVL	48.	VC GRVL	0.
M SAND	261.	F GRVL	59.	0.	
C SAND	134.				

SECTION NO. 0.900

VF SAND	2638.	VC SAND	1504.	C GRVL	1010.
F SAND	1670.	VF GRVL	1610.	VC GRVL	357.
M SAND	1604.	F GRVL	2349.	0.	
C SAND	2236.				

TRIBUTARY INFLOW

VF SAND	554.	VC SAND	21.	C GRVL	1.
F SAND	312.	VF GRVL	21.	VC GRVL	0.
M SAND	141.	F GRVL	22.	0.	
C SAND	49.				

SECTION NO. 0.800

VF SAND	3220.	VC SAND	1459.	C GRVL	950.
F SAND	2002.	VF GRVL	1543.	VC GRVL	337.
M SAND	1770.	F GRVL	2235.	0.	
C SAND	2324.				

SECTION NO. 0.600

VF SAND	3256.	VC SAND	1331.	C GRVL	801.
F SAND	2028.	VF GRVL	1364.	VC GRVL	266.
M SAND	1798.	F GRVL	1937.	0.	
C SAND	2360.				

SECTION NO. 0.350

VF SAND	3296.	VC SAND	1260.	C GRVL	721.
F SAND	2056.	VF GRVL	1261.	VC GRVL	239.
M SAND	1832.	F GRVL	1767.	0.	
C SAND	2417.				

SECTION NO. 0.100

VF SAND	3286.	VC SAND	381.	C GRVL	79.
F SAND	1975.	VF GRVL	323.	VC GRVL	3.
M SAND	1589.	F GRVL	406.	0.	
C SAND	1251.				

$$END

0 DATA ERRORS DETECTED.

TOTAL NO. OF TIME STEPS READ = 61
TOTAL NO. OF WS PROFILES = 61
ITERATIONS IN EXNER EQ = 7625

COMPUTATIONS COMPLETED
RUN TIME = 0 HOURS, 0 MINUTES & 10.00 SECONDS

INLET SEDIMENT CONTROL STRUCTURE DESIGN

PRIMARY WASH (WITH OPENING APPROX. 950 FEET)

Client	WO No	Page No	of
Subject	Date	By	
	Checked	By	
Location	Revised	By	

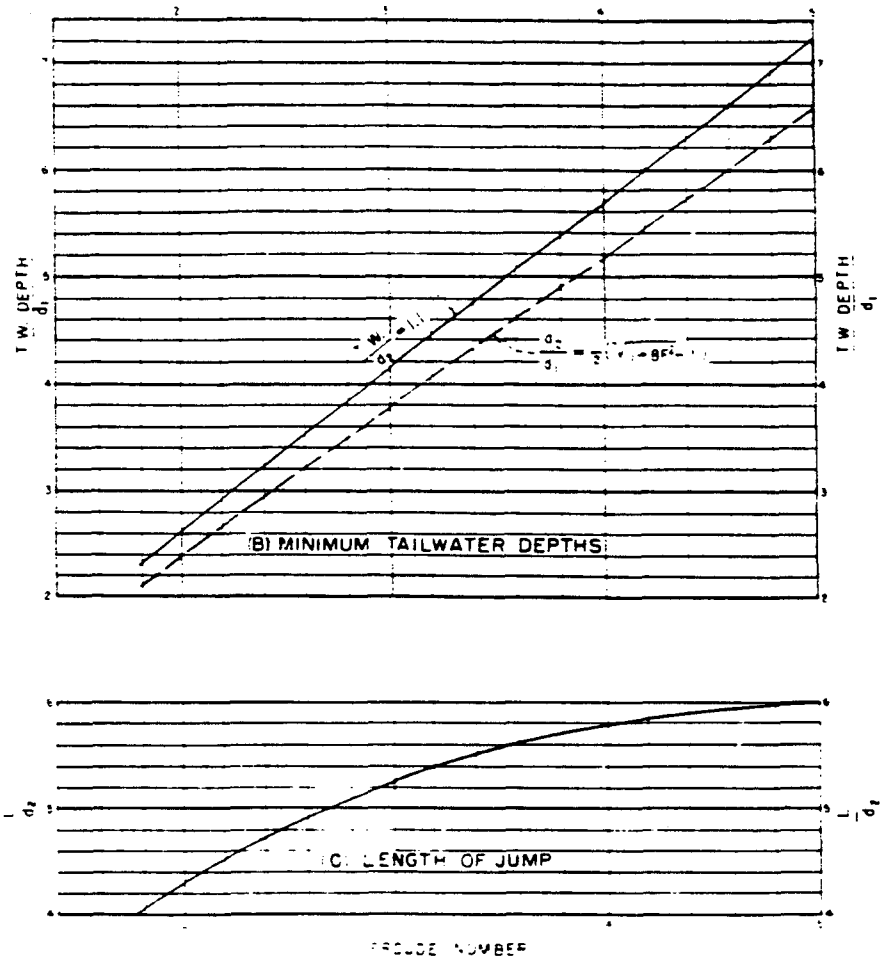


Figure 265. Stilling basin characteristics for Froude numbers between 2.5 and 4.5. 288—D—2425.

vtn nevada

CONSULTING ENGINEERS • PLANNERS • SURVEYORS

2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89102-5148
TEL (702) 873-7550 FAX: 362-2597

EAST C-1 DETENTION BASIN INLET DESIGN

DESIGN PARAMETERS:

Design Event : 1000 yr
DISCHARGE: 4824 cfs (from HEC-1 design model)
Manning's N : 0.024 (from "OPEN CHANNEL HYDRAULICS" P-109 by Ven Te Chow)
Inlet Channel Dimension :
Channel Width : 800 ft
Bottom Slope : 0.2 (5H to 1V)
Side Slope : 0.5 (2H to 1V)

Open Channel Calculation:

```
==========================================================================
            OPEN CHANNEL FLOW ANALYSIS:TRAPEZOIDAL CHANNEL
          Developed by Civil Eng. Dept, U of Colorado at Denver
        Metro Denver Cities/Counties and UD&FCD Pool Fund Study
==========================================================================
User=:VTN-nevada.....................................................
     ON DATE 01-17-1998  AT TIME 11:59:46

*** PROJECT TITLE: EAST C-1 DETENTION BASIN INLET DESIGN
    CHANNEL ROUGHNESS IS GIVEN

*** DESIGN FLOW RATE AND CHANNEL GEOMETRIES:

    FLOW RATE          (CFS)=   4824.00
    MANNING ROUGHNESS       =    0.0240
    CHANNEL SLOPE    (FT/FT)=    0.2000
    BOTTOM WIDTH      (FEET)=    800.00
    RIGHT SIDE SLOPE(FT/FT)=      2.00
    LEFT  SIDE SLOPE(FT/FT)=      2.00

*** NORMAL FLOW CONDITIONS:

    FLOW DEPTH        (FEET)=      0.40
    FLOW AREA       (SQ FT)=     320.31
    FLOW VELOCITY      (FPS)=      15.06
    WETTED PERIMETER  (FEET)=     801.79
    TOP WIDTH         (FEET)=     801.60
    FROUDE NUMBER           =      4.20
    SPECIFIC FORCE     (KLB)=     144.94
    SPECIFIC ENERGY   (FEET)=      3.92
    SEQUENT DEPTH       (FT)=      2.18
    ALTERNATE DEPTH     (FT)=      3.85
```

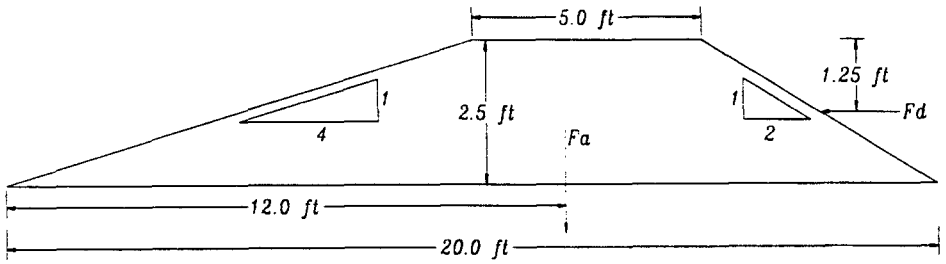
*** CRITICAL FLOW CONDITIONS:

DEPTH	(FEET) =	1.04
FLOW AREA	(SQ FT) =	834.52
FLOW VELOCITY	(FPS) =	5.78
WETTED PERIMETER	(FEET) =	804.65
MINIMUM SPECIFIC FORCE	(KLB) =	81.16
MINIMUM SPECIFIC ENERGY	(FT) =	1.5593
SLOPE	(FT/FT) =	0.0083

Based on the calculation provided :

Froude Number = 4.20
Required Tail Water Depth = 2.18 ft

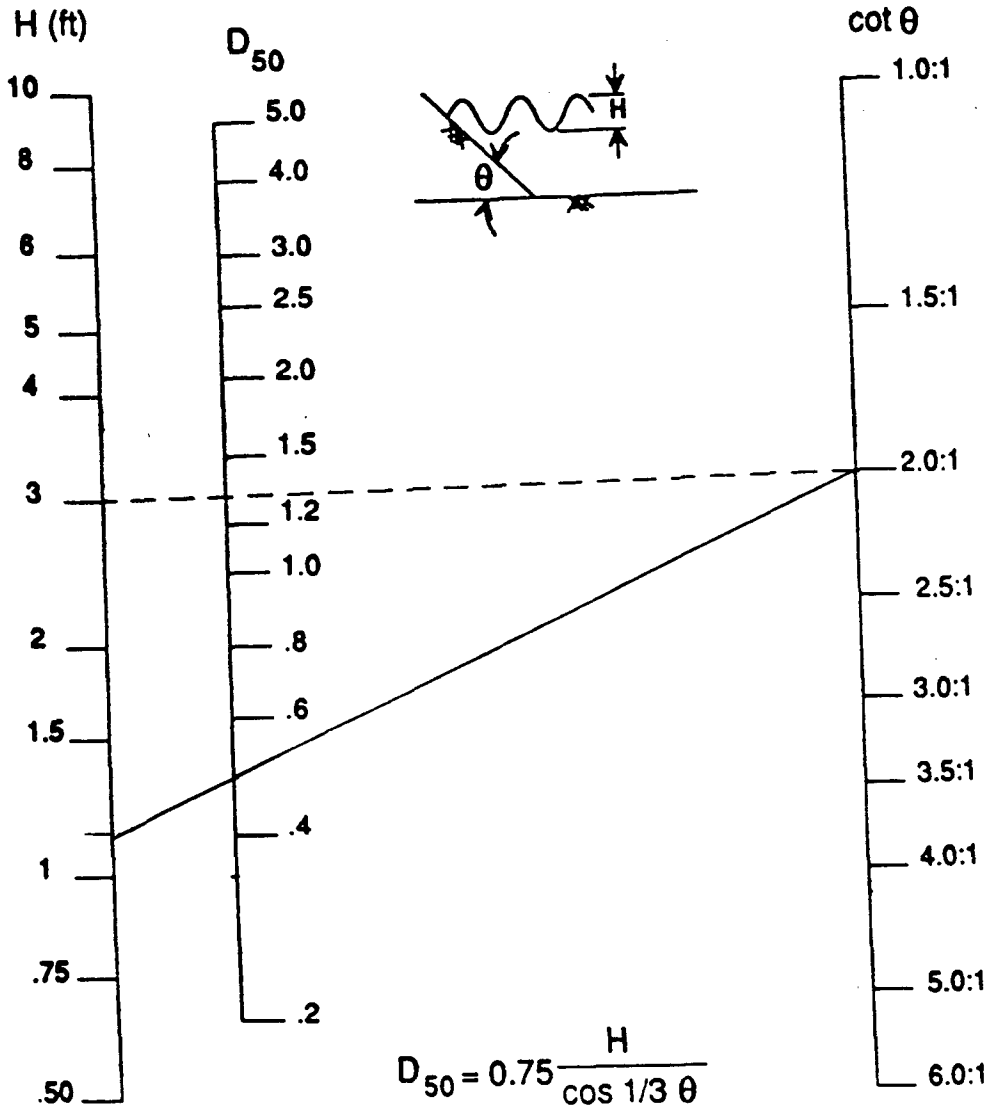
End Sill Dimension :



Where : $Fd = Cd*Af*\rho*Va^2/2$
$= 1.94*Af*Va^2/2$
$= 550$ lb/ft
$Fa = h*Fd/2Lc$
$= 0.97*(h/Lc)*Af*Va^2$
$= 114.6$ lb/ft

FA = Total force to GC
Fd = Drag force on roughness element
h = Height of roughness element
Lc = Distance from downstream edge of roughness element to centroid
Af = Frontal area of roughness element
Va = approach velocity acting on roughness element

Check:
Total Weight per foot of End Sill:
W = Areaxdensity
= 3437.5 lb/ft > Fa (Density = 110.0 pcf)
Friction force = W*Friction factor
= W*(1-sin ϕ)
= 1718.75 lb/ft > Fd (ϕ =30 drgree)



$$D_{50} = 0.75 \frac{H}{\cos 1/3\ \theta}$$

D_{50} = Median Riprap Size

H = Wave height

θ = Bank Angle with Horizontal

Example

Given:	Find:	Solution:
cot θ = 2:1 H = 3 ft.	D_{50}	D_{50} = 1.33 ft.

Chart 7. Hudson relationship for riprap size required to resist wave erosion

4.2 ROCK GRADATION

The gradation of stones in riprap revetment affects the riprap's resistance to erosion. The stone should be reasonably well graded throughout the riprap layer thickness. Specifications should provide for two limiting gradation curves, and the stone gradation (as determined from a field test sample) should lay within these limits. The gradation limits should not be so restrictive that production costs would be excessive. Table 2 presents suggested guidelines for establishing gradation limits. Table 3 presents six (6) suggested gradation classes based on AASHTO specifications. Form 3 (appendix C) can be used as an aid in selecting appropriate gradation limits.

It is recognized that the use of a four (4) point gradation as specified in table 2 might in some cases be too harsh a specification for some smaller quarries. If this is the case, the 85 percent specification can be dropped as is done in table 3. In most instances, a uniform gradation between D_{50} and D_{100} will result in an appropriate D_{85}.

Each load of riprap should be reasonably well graded from the smallest to the maximum size specified. Stones smaller than the specified 5 or 10 percent size should not be permitted in an amount exceeding 20 percent by weight of each load.

Table 2. Rock riprap gradation limits.

Stone Size Range* (ft)	Stone Weight Range (lb)	Percent of Gradation Smaller Than
1.5 D_{50} to 1.7 D_{50}	3.0 W_{50} to 5.0 W_{50}	100
1.2 D_{50} to 1.4 D_{50}	2.0 W_{50} to 2.75 W_{50}	85
1.0 D_{50} to 1.15 D_{50}	1.0 W_{50} to 1.5 W_{50}	50
0.4 D_{50} to 0.6 D_{50}	0.1 W_{50} to 0.2 W_{50}	15

EAST C-1 DETENTION BASIN INLET DESIGN

DESIGN PARAMETERS:

Design Event : 1000 yr
DISCHARGE: 4824 cfs (from HEC-1 design model)
Manning's N : 0.024 (from "OPEN CHANNEL HYDRAULICS" P-109 by Ven Te Chow)
Inlet Channel Dimension :
Channel Width : 800 ft
Bottom Slope : 0.2 (5H to 1V)
Side Slope : 0.5 (2H to 1V)

Open Channel Calculation:

```
==========================================================================
            OPEN CHANNEL FLOW ANALYSIS:TRAPEZOIDAL CHANNEL
          Developed by Civil Eng. Dept, U of Colorado at Denver
        Metro Denver Cities/Counties and UD&FCD Pool Fund Study
==========================================================================
User=:VTN-nevada.....................................................
     ON DATE 01-17-1998  AT TIME 11:59:46

*** PROJECT TITLE: EAST C-1 DETENTION BASIN INLET DESIGN
    CHANNEL ROUGHNESS IS GIVEN

*** DESIGN FLOW RATE AND CHANNEL GEOMETRIES:

    FLOW RATE          (CFS)=   4824.00
    MANNING ROUGHNESS       =    0.0240
    CHANNEL SLOPE    (FT/FT)=    0.2000
    BOTTOM WIDTH      (FEET)=    800.00
    RIGHT SIDE SLOPE(FT/FT)=      2.00
    LEFT  SIDE SLOPE(FT/FT)=      2.00

*** NORMAL FLOW CONDITIONS:

    FLOW DEPTH         (FEET)=      0.40
    FLOW AREA        (SQ FT)=     320.31
    FLOW VELOCITY       (FPS)=     15.06
    WETTED PERIMETER  (FEET)=     801.79
    TOP WIDTH          (FEET)=     801.60
    FROUDE NUMBER           =       4.20
    SPECIFIC FORCE      (KLB)=     144.94
    SPECIFIC ENERGY   (FEET)=       3.92
    SEQUENT DEPTH        (FT)=      2.18
    ALTERNATE DEPTH      (FT)=      3.85
```

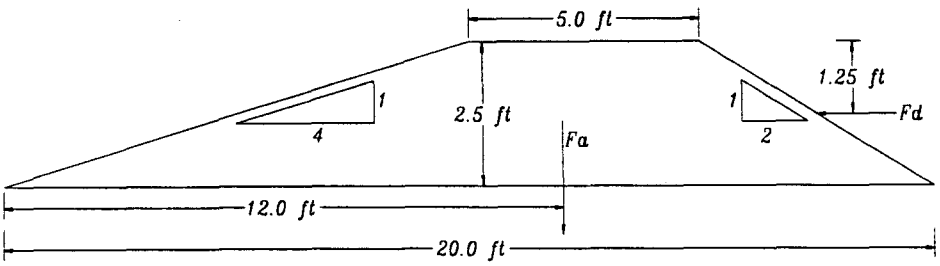
*** CRITICAL FLOW CONDITIONS:

DEPTH	(FEET) =	1.04
FLOW AREA	(SQ FT) =	834.52
FLOW VELOCITY	(FPS) =	5.78
WETTED PERIMETER	(FEET) =	804.65
MINIMUM SPECIFIC FORCE	(KLB) =	81.16
MINIMUM SPECIFIC ENERGY	(FT) =	1.5593
SLOPE	(FT/FT) =	0.0083

Based on the calculation provided :

Froude Number = 4.20
Required Tail Water Depth = 2.18 ft

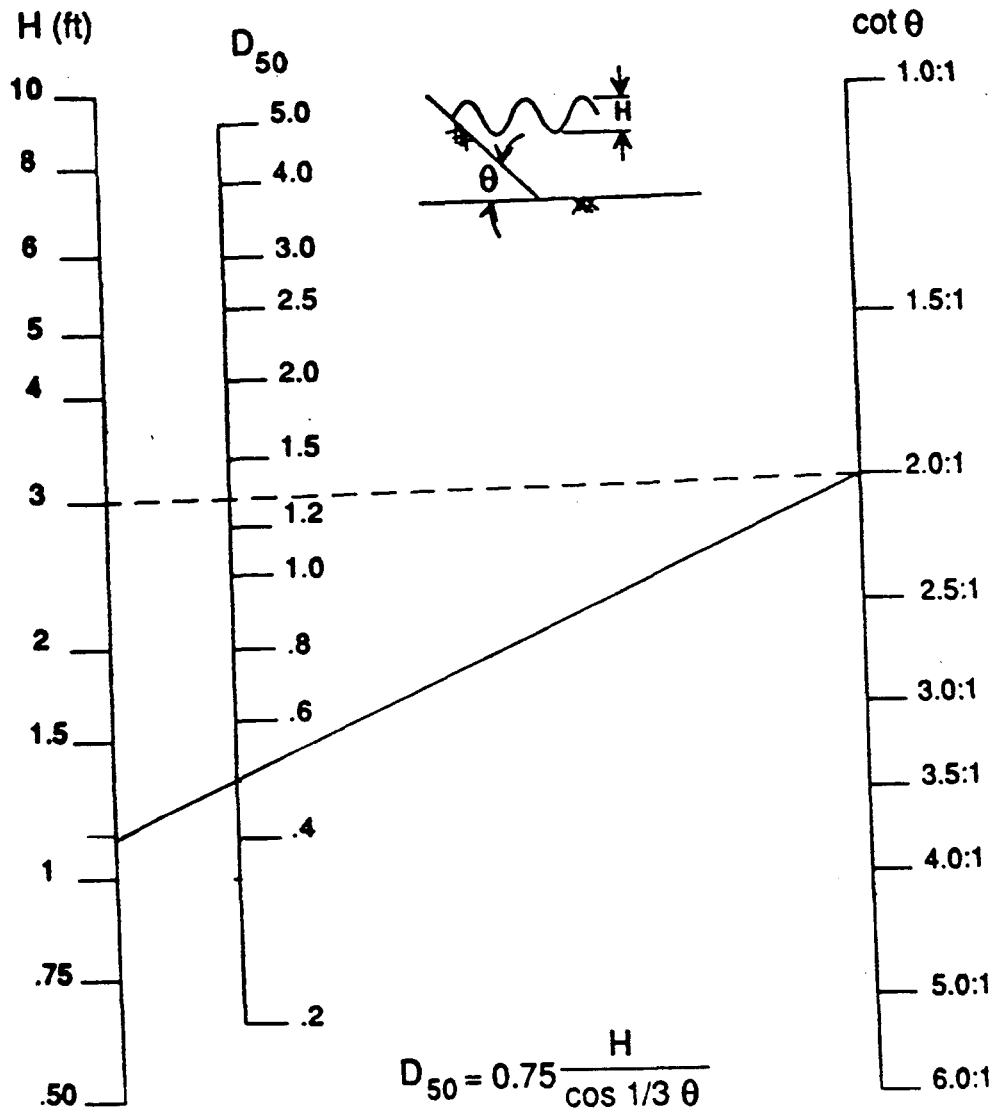
End Sill Dimension :



Where : $Fd = Cd*Af*\rho*Va^2/2$
$= 1.94*Af*Va^2/2$
$= 550$ lb/ft
$Fa = h*Fd/2Lc$
$= 0.97*(h/Lc)*Af*Va^2$
$= 114.6$ lb/ft

FA = Total force to GC
Fd = Drag force on roughness element
h = Height of roughness element
Lc = Distance from downstream edge of roughness element to centroid
Af = Frontal area of roughness element
Va = approach velocity acting on roughness element

Check:
Total Weight per foot of End Sill:
W = Areaxdensity
= 3437.5 lb/ft > Fa (Density = 110.0 pcf)
Friction force = W*Friction factor
= W*(1-sin ϕ)
= 1718.75 lb/ft > Fd (ϕ =30 drgree)



$$D_{50} = 0.75 \frac{H}{\cos 1/3\ \theta}$$

D_{50} = Median Riprap Size

H = Wave height

θ = Bank Angle with Horizontal

Example		
Given:	Find:	Solution:
cot θ = 2:1 H = 3 ft.	D_{50}	D_{50} = 1.33 ft.

Chart 7. Hudson relationship for riprap size required to resist wave erosion

4.2 ROCK GRADATION

The gradation of stones in riprap revetment affects the riprap's resistance to erosion. The stone should be reasonably well graded throughout the riprap layer thickness. Specifications should provide for two limiting gradation curves, and the stone gradation (as determined from a field test sample) should lay within these limits. The gradation limits should not be so restrictive that production costs would be excessive. Table 2 presents suggested guidelines for establishing gradation limits. Table 3 presents six (6) suggested gradation classes based on AASHTO specifications. Form 3 (appendix C) can be used as an aid in selecting appropriate gradation limits.

It is recognized that the use of a four (4) point gradation as specified in table 2 might in some cases be too harsh a specification for some smaller quarries. If this is the case, the 85 percent specification can be dropped as is done in table 3. In most instances, a uniform gradation between D_{50} and D_{100} will result in an appropriate D_{85}.

Each load of riprap should be reasonably well graded from the smallest to the maximum size specified. Stones smaller than the specified 5 or 10 percent size should not be permitted in an amount exceeding 20 percent by weight of each load.

Table 2. Rock riprap gradation limits.

Stone Size Range* (ft.)	Stone Weight Range (lb)	Percent of Gradation Smaller Than
1.5 D_{50} to 1.7 D_{50}	3.0 W_{50} to 5.0 W_{50}	100
1.2 D_{50} to 1.4 D_{50}	2.0 W_{50} to 2.75 W_{50}	85
1.0 D_{50} to 1.15 D_{50}	1.0 W_{50} to 1.5 W_{50}	50
0.4 D_{50} to 0.6 D_{50}	0.1 W_{50} to 0.2 W_{50}	15

EAST C-1 DETENTION BASIN INLET DESIGN

DESIGN PARAMETERS:

Design Event :	1000 yr	
DISCHARGE:	4824 cfs	(from HEC-1 design model)
Manning's N :	0.024	(from "OPEN CHANNEL HYDRAULICS" P-109 by Ven Te Chow)
Inlet Channel Dimension :		
Channel Width :	800 ft	
Bottom Slope :	0.2	(5H to 1V)
Side Slope :	0.5	(2H to 1V)

Open Channel Calculation:

==========

OPEN CHANNEL FLOW ANALYSIS:TRAPEZOIDAL CHANNEL
Developed by Civil Eng. Dept, U of Colorado at Denver
Metro Denver Cities/Counties and UD&FCD Pool Fund Study

==========

User=:VTN-nevada.....

ON DATE 01-17-1998 AT TIME 11:59:46

*** PROJECT TITLE: EAST C-1 DETENTION BASIN INLET DESIGN
CHANNEL ROUGHNESS IS GIVEN

*** DESIGN FLOW RATE AND CHANNEL GEOMETRIES:

FLOW RATE	(CFS) =	4824.00
MANNING ROUGHNESS	=	0.0240
CHANNEL SLOPE	(FT/FT) =	0.2000
BOTTOM WIDTH	(FEET) =	800.00
RIGHT SIDE SLOPE	(FT/FT) =	2.00
LEFT SIDE SLOPE	(FT/FT) =	2.00

*** NORMAL FLOW CONDITIONS:

FLOW DEPTH	(FEET) =	0.40
FLOW AREA	(SQ FT) =	320.31
FLOW VELOCITY	(FPS) =	15.06
WETTED PERIMETER	(FEET) =	801.79
TOP WIDTH	(FEET) =	801.60
FROUDE NUMBER	=	4.20
SPECIFIC FORCE	(KLB) =	144.94
SPECIFIC ENERGY	(FEET) =	3.92
SEQUENT DEPTH	(FT) =	2.18
ALTERNATE DEPTH	(FT) =	3.85

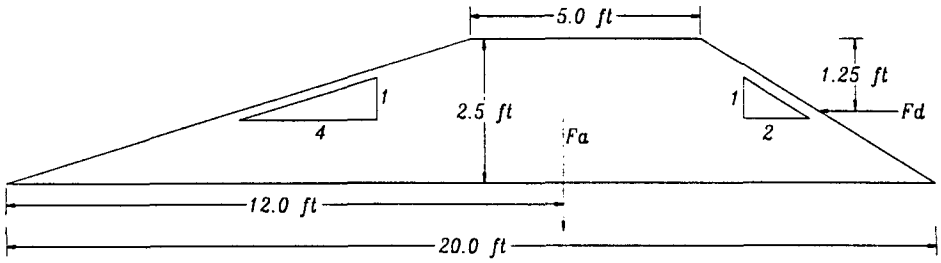
*** CRITICAL FLOW CONDITIONS:

DEPTH	(FEET) =	1.04
FLOW AREA	(SQ FT) =	834.52
FLOW VELOCITY	(FPS) =	5.78
WETTED PERIMETER	(FEET) =	804.65
MINIMUM SPECIFIC FORCE	(KLB) =	81.16
MINIMUM SPECIFIC ENERGY	(FT) =	1.5593
SLOPE	(FT/FT) =	0.0083

Based on the calculation provided :

Froude Number = 4.20
Required Tail Water Depth = 2.18 ft

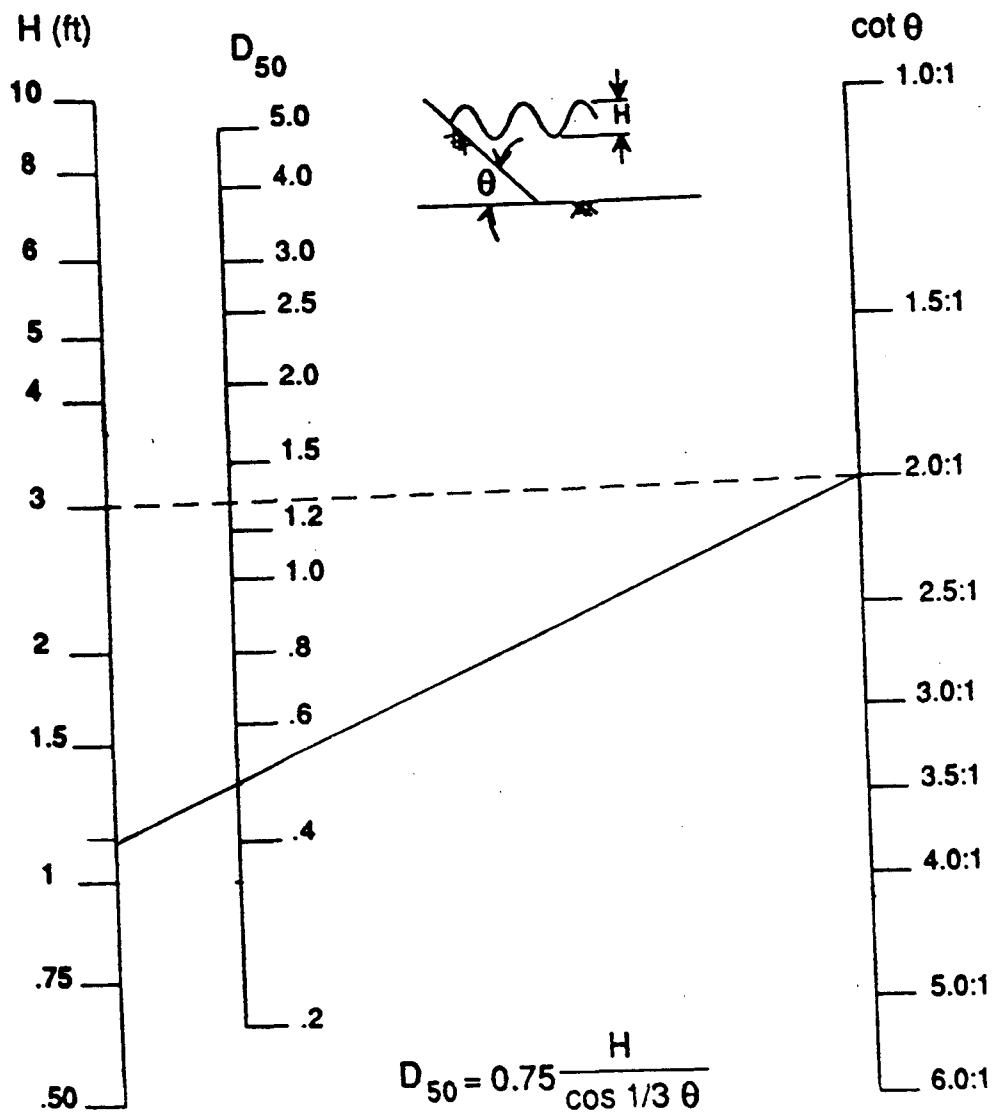
End Sill Dimension :



Where : $Fd = Cd*Af*\rho*Va^2/2$
$= 1.94*Af*Va^2/2$
$= 550$ lb/ft
$Fa = h*Fd/2Lc$
$= 0.97*(h/Lc)*Af*Va^2$
$= 114.6$ lb/ft

FA = Total force to GC
Fd = Drag force on roughness element
h = Height of roughness element
Lc = Distance from downstream edge of roughness element to centroid
Af = Frontal area of roughness element
Va = approach velocity acting on roughness element

Check:
Total Weight per foot of End Sill:
W = Areaxdensity
= 3437.5 lb/ft > Fa (Density = 110.0 pcf)
Friction force = W*Friction factor
= W*(1-sin ϕ)
= 1718.75 lb/ft > Fd (ϕ =30 drgree)



$$D_{50} = 0.75 \frac{H}{\cos 1/3\ \theta}$$

D_{50} = Median Riprap Size

H = Wave height

θ = Bank Angle with Horizontal

Example		
Given:	Find:	Solution:
cot θ = 2:1 H = 3 ft.	D_{50}	D_{50} = 1.33 ft.

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4.2 ROCK GRADATION

The gradation of stones in riprap revetment affects the riprap's resistance to erosion. The stone should be reasonably well graded throughout the riprap layer thickness. Specifications should provide for two limiting gradation curves, and the stone gradation (as determined from a field test sample) should lay within these limits. The gradation limits should not be so restrictive that production costs would be excessive. Table 2 presents suggested guidelines for establishing gradation limits. Table 3 presents six (6) suggested gradation classes based on AASHTO specifications. Form 3 (appendix C) can be used as an aid in selecting appropriate gradation limits.

It is recognized that the use of a four (4) point gradation as specified in table 2 might in some cases be too harsh a specification for some smaller quarries. If this is the case, the 85 percent specification can be dropped as is done in table 3. In most instances, a uniform gradation between D_{50} and D_{100} will result in an appropriate D_{85}.

Each load of riprap should be reasonably well graded from the smallest to the maximum size specified. Stones smaller than the specified 5 or 10 percent size should not be permitted in an amount exceeding 20 percent by weight of each load.

Table 2. Rock riprap gradation limits.

Stone Size Range* (ft.)	Stone Weight Range (lb)	Percent of Gradation Smaller Than
1.5 D_{50} to 1.7 D_{50}	3.0 W_{50} to 5.0 W_{50}	100
1.2 D_{50} to 1.4 D_{50}	2.0 W_{50} to 2.75 W_{50}	85
1.0 D_{50} to 1.15 D_{50}	1.0 W_{50} to 1.5 W_{50}	50
0.4 D_{50} to 0.6 D_{50}	0.1 W_{50} to 0.2 W_{50}	15

SECONDARY WASH (WITH OPENING APPROX. 160 FEET)

Design Summary of HEC-1 & HEC-2 Result

East C-1 Detention Basin: Inlet Design (North Wash)

Return Period	Design Discharge	Water Surface Sta. 1500	Water Surface Sta. 1600	Water Surface Sta. 1700	Water Surface Sta. 1800	Detention Basin Stage
Tr (yr)	Qp (cfs)	(ft)	(ft)	(ft)	(ft)	(ft)
5	369	2487.39	2485.38	2482.03	2479.10	2462.78
10	758	2488.02	2485.71	2482.41	2479.60	2476.94
25	1347	2488.78	2486.08	2482.81	2480.20	2476.95
50	1827	2489.33	2486.34	**2483.08**	2480.64	**2481.70**
100	2404	2489.82	2486.57	2483.31	2481.02	2485.33

Based on the output provided by HEC-1 and HEC-2 Models, the optimum location of the sediment control structure will be located at Station 1700. The inlet structure will be designed to force the inflow below this water surface elevation to jump in the stilling basin. The hydraulic jump for the inflow above this water surface elevation will be controlled by the stage in the detention basin.

```
==========================================================================
          OPEN CHANNEL FLOW ANALYSIS:TRAPEZOIDAL CHANNEL
        Developed by Civil Eng. Dept, U of Colorado at Denver
       Metro Denver Cities/Counties and UD&FCD Pool Fund Study
==========================================================================
User= :VTN-nevada.....................................................
     ON DATE 01-30-1998  AT TIME 08:12:17

*** PROJECT TITLE: EACT C-1 DETENTION BASIN SEDIMENT CONTROL DESIGN
    CHANNEL ROUGHNESS IS GIVEN

*** DESIGN FLOW RATE AND CHANNEL GEOMETRIES:

    FLOW RATE           (CFS) =   1872.00
    MANNING ROUGHNESS         =    0.0300
    CHANNEL SLOPE     (FT/FT) =    0.0300
    BOTTOM WIDTH       (FEET) =     90.00
    RIGHT SIDE SLOPE (FT/FT) =      5.00
    LEFT  SIDE SLOPE (FT/FT) =      5.00

*** NORMAL FLOW CONDITIONS:

    FLOW DEPTH         (FEET) =      1.67
    FLOW AREA        (SQ FT) =     163.82
    FLOW VELOCITY       (FPS) =     11.43
    WETTED PERIMETER   (FEET) =     107.00
    TOP WIDTH          (FEET) =     106.66
    FROUDE NUMBER             =      1.62
    SPECIFIC FORCE      (KLB) =     49.77
    SPECIFIC ENERGY    (FEET) =      3.69
    SEQUENT DEPTH        (FT) =      3.01
    ALTERNATE DEPTH      (FT) =      3.28

*** CRITICAL FLOW CONDITIONS:

    DEPTH                          (FEET) =      2.27
    FLOW AREA                     (SQ FT) =    230.24
    FLOW VELOCITY                   (FPS) =      8.13
    WETTED PERIMETER               (FEET) =    113.17
    MINIMUM SPECIFIC FORCE          (KLB) =     45.22
    MINIMUM SPECIFIC ENERGY          (FT) =    3.2981
    SLOPE                         (FT/FT) =    0.0104

    RECOMMENDATIONS ON FREEBOARD:
      FOR CONCRETE CHANNEL (2.0+0.025*VELOCITY*DEPTH^0.33) =      2.34 FEET
      FOR A MAJOR DRAINAGE CHANNEL (100-YR FLOOD) >= 1.0 FOOT
      FOR A MINOR DRAINAGE CHANNEL (2 OR 5-YR FLOOD) >=       0.50 FEET

    RECOMMENDATIONS FOR ERODABLE CHANNEL:
     (MINOR FLOOD) 2 <= FLOW VELOCITY <= 5 TO 7 FPS (MAJOR FLOOD)
      FROUDE NUMBER (TURBULENCE FACTOR)<= 0.80
```

HEC-1 MODEL OUTPUT

```
**********
*        *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)  *
*        SEPTEMBER 1990              *
*         VERSION 4.0                *
*                                    *
*  RUN DATE  01/30/1998  TIME  11:22:01  *
*                                    *
**********
```


```
**********
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*    DAVIS, CALIFORNIA 95616         *
*       (916) 756-1104               *
*                                    *
**********
```


```
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    INPUT FILE = ALT3.DAT
                2   ID    RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
                3   ID    100-YEAR 6-HR STORM (SDN#3)
                4   ID    VTN NEVADA, July 1997
                5   ID
                6   ID    WATERSHED MODEL TAKEN FROM COE HYDROLOGY
                7   ID    KINEMATIC SUBBASINS CONVERTED TO SCS
                8   ID    CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
                9   ID    SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT
               10   ID
*** FREE ***
               11   IT       5       0       0     300
               12   IN       5       0       0
               13   IO       5
                    * ******* USING 100 YEAR JR CARD  *******
                    *  JR    PREC 0.905 1.45
               14   JR    PREC    0.40    0.52    0.67    0.79   0.905
                    *  JR PREC 1.45
                    *  100-YEAR DARF=0.905, 1000-YEAR DARF=1.45
                    *
                    *  JR PREC 0.98 0.97 0.93 0.905
                    * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)
                    *

               15   KK    C4CA WEST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
               16   KM   RUNOFF FOR THE WEST SEDIMENT TRAP DESIGN
               17   BA    4.59
               18   PB    3.43
               19   PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
               20   PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
               21   PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
               22   PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
               23   PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
               24   PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
               25   PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
               26   PC    .998    .999   1.00
               27   LS   0.00    80.0
               28   UD  0.8929

               29   KK    C4CBMIDDLE TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
               30   KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
               31   BA    0.38
               32   PB    3.43
               33   LS    0.00    80.0
               34   UD    0.66

               35   KK    C4C1
               36   KM   COMBINE C4CA AND C4CB FOR INLET DESIGN PURPOSE
               37   HC       2
                    *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  38      KK    C4CCEAST TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
  39      KM   RUNOFF FOR THE EAST SEDIMENT TRAP DESIGN
  40      BA    0.35
  41      PB    3.43
  42      LS    0.00    80.0
  43      UD    0.49

  44      KK     C4C
  45      KM   COMBINE FLOW BEFORE DETENTION BASIN
  46      HC       2
          *  KO 1
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  47      KK DET_C4CEast Detention Basin
          *
  48      KM   100-YR DESIGN EVENT STORAGE AND PMF SPILLWAY, LEVEE
          *
  49      KM   Proposed detention basin d/s of subbasin C4C; storage capacity = 575.ac-ft;
  50      KM   assume a 48" diameter low-level outlet pipe;invert elevation 2447.0 ft
  51      RS       1    STOR      -1
  52      SV     0.0    1.77    9.98   24.08   44.42   70.24  141.57  148.43  204.67  272.23
  53      SV  361.84  475.86  539.26  607.34  680.90  759.74  844.74  935.37  1134.5  1358.9
  54      SE  2446.0  2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  55      SE  2486.0  2490.0  2492.0  2494.0  2496.0  2498.0  2500.0  2502.2  2506.0  2510.0
  56      SQ     0.0   24.59   37.30   46.66   54.44   61.24   67.35   72.96   78.16   83.04
  57      SQ   87.65   92.02   94.14   96.20   98.22  100.21  102.15  104.06  107.77  111.36
  58      SE  2446.0  2450.0  2454.0  2458.0  2462.0  2466.0  2470.0  2474.0  2478.0  2482.0
  59      SE  2486.0  2490.0  2492.0  2494.0  2496.0  2498.0  2500.0  2502.2  2506.0  2510.0
  60      KO       1
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  61      KK    RC4C
  62      KM   ROUTE DET_C4C outflow THRU C3B3
  63      KM   With 7-7' drop structures
  64      RK    3200   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  65      KK    C4CD TRIBUTARY AREA IN DISTRICT C AREA 4 SUBBASIN C
  66      KM   RUNOFF FROM C4CD
  67      BA    0.17
  68      PB    3.34
  69      LS    0.00      82
  70      UD    0.20

  71      KK     C4C
  72      KM   COMBINE DETENTION BASIN OUTFALL AND SUBBASIN C4CD
  73      HC       2

  74      KK   C3B3B  DISTRICT C AREA 3 SUBBASIN B3B
  75      KM   RUNOFF FROM C3B3B
  76      BA    0.56
  77      PB    3.36
  78      LS    0.00      82
  79      UD    0.42
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  80      KK   C3B3B
  81      KM   Combine RC4C & C3B3
  82      HC       2
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

  83      KK   R3B3B
  84      KM   ROUTE 3B3B
  85      KM   With 7-7' drop structures
  86      RK    3800   0.015   0.030       0    TRAP      50     3.0
          * FROM FACILITIES REPORT FOR THE C-1 CHANNEL, BY VTN NEV. (9/92)

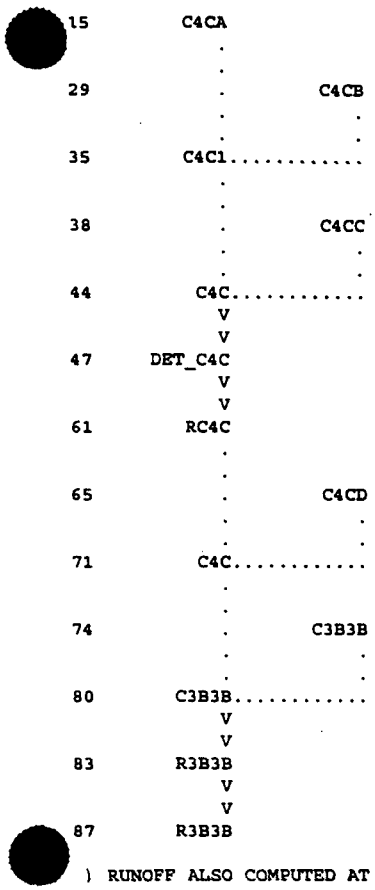
  87      KK   R3B3B
  88      KM   ROUTE R3B3B THRU C3B1
  89      RK    8250   0.015   0.030       0    TRAP      50     3.0
          *
  90      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*         SEPTEMBER 1990             *
*          VERSION 4.0               *
*                                    *
*  RUN DATE  01/30/1998  TIME  11:22:01*
*                                    *
**************************************
```


```
**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*         (916) 756-1104             *
*                                    *
**************************************
```


INPUT FILE = ALT3.DAT
RECOMMENDED DRAINAGE SYSTEM WITH FUTURE DEVELOPMENT
100-YEAR 6-HR STORM (SDN#3)
VTN NEVADA, July 1997

WATERSHED MODEL TAKEN FROM COE HYDROLOGY
KINEMATIC SUBBASINS CONVERTED TO SCS
CHANNEL ROUTING CHANGED TO REFLECT NEW EXISTING FACILITIES
SUBBASIN ROUTING CHANGED TO REFLECT NEW DEVELOPMENT

13 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	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2 0	ENDING DATE
NDTIME	0055	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 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
.40 .52 .67 .79 .90

*** ***

```
          **************
          *            *
47 KK     *  DET_C4C   *     East Detention Basin
          *            *
          **************
```

60 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

51 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

52 SV STORAGE	.0	1.8	10.0	24.1	44.4	70.2	141.6	148.4	204.7	272.2
	361.8	475.9	539.3	607.3	680.9	759.7	844.7	935.4	1134.5	1358.9
54 SE ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
	2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.20	2506.00	2510.00
56 SQ DISCHARGE	0.	25.	37.	47.	54.	61.	67.	73.	78.	83.
	88.	92.	94.	96.	98.	100.	102.	104.	108.	111.

58 SE	ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
		2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.20	2506.00	2510.00

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	1.77	9.98	24.08	44.42	70.24	141.57	148.43	204.67	272.23
OUTFLOW	.00	24.59	37.30	46.66	54.44	61.24	67.35	72.96	78.16	83.04
ELEVATION	2446.00	2450.00	2454.00	2458.00	2462.00	2466.00	2470.00	2474.00	2478.00	2482.00
STORAGE	361.84	475.86	539.26	607.34	680.90	759.74	844.74	935.37	1134.50	1358.90
OUTFLOW	87.65	92.02	94.14	96.20	98.22	100.21	102.15	104.06	107.77	111.36
ELEVATION	2486.00	2490.00	2492.00	2494.00	2496.00	2498.00	2500.00	2502.20	2506.00	2510.00

****

HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = .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	2446.0	1		0820	101	55.	44.8	2462.1	1		1640	201	39.	12.3	2454.7
1		0005	2	0.	.0	2446.0	1		0825	102	54.	44.5	2462.0	1		1645	202	39.	12.1	2454.6
1		0010	3	0.	.0	2446.0	1		0830	103	54.	44.1	2461.9	1		1650	203	39.	11.8	2454.5
1		0015	4	0.	.0	2446.0	1		0835	104	54.	43.8	2461.9	1		1655	204	38.	11.5	2454.4
1		0020	5	0.	.0	2446.0	1		0840	105	54.	43.4	2461.8	1		1700	205	38.	11.3	2454.4
1		0025	6	0.	.0	2446.0	1		0845	106	54.	43.0	2461.7	1		1705	206	38.	11.0	2454.3
1		0030	7	0.	.0	2446.0	1		0850	107	54.	42.7	2461.7	1		1710	207	38.	10.7	2454.2
1		0035	8	0.	.0	2446.0	1		0855	108	54.	42.3	2461.6	1		1715	208	38.	10.5	2454.1
1		0040	9	0.	.0	2446.0	1		0900	109	53.	41.9	2461.5	1		1720	209	37.	10.2	2454.1
1		0045	10	0.	.0	2446.0	1		0905	110	53.	41.6	2461.4	1		1725	210	37.	10.0	2454.0
1		0050	11	0.	.0	2446.0	1		0910	111	53.	41.2	2461.4	1		1730	211	37.	9.7	2453.9
1		0055	12	0.	.0	2446.0	1		0915	112	53.	40.9	2461.3	1		1735	212	36.	9.5	2453.7
1		0100	13	0.	.0	2446.0	1		0920	113	53.	40.5	2461.2	1		1740	213	36.	9.2	2453.6
1		0105	14	0.	.0	2446.0	1		0925	114	53.	40.1	2461.2	1		1745	214	36.	9.0	2453.5
1		0110	15	0.	.0	2446.0	1		0930	115	53.	39.8	2461.1	1		1750	215	35.	8.7	2453.4
1		0115	16	0.	.0	2446.0	1		0935	116	53.	39.4	2461.0	1		1755	216	35.	8.5	2453.3
1		0120	17	0.	.0	2446.0	1		0940	117	52.	39.1	2460.9	1		1800	217	35.	8.2	2453.1
1		0125	18	0.	.0	2446.0	1		0945	118	52.	38.7	2460.9	1		1805	218	34.	8.0	2453.0
1		0130	19	0.	.0	2446.0	1		0950	119	52.	38.3	2460.8	1		1810	219	34.	7.8	2452.9
		0135	20	0.	.0	2446.0	1		0955	120	52.	38.0	2460.7	1		1815	220	34.	7.5	2452.8
		0140	21	0.	.0	2446.0	1		1000	121	52.	37.6	2460.7	1		1820	221	33.	7.3	2452.7
		0145	22	0.	.0	2446.0	1		1005	122	52.	37.3	2460.6	1		1825	222	33.	7.1	2452.6
1		0150	23	0.	.0	2446.0	1		1010	123	52.	36.9	2460.5	1		1830	223	32.	6.8	2452.5
1		0155	24	0.	.0	2446.0	1		1015	124	51.	36.6	2460.5	1		1835	224	32.	6.6	2452.4
1		0200	25	0.	.0	2446.0	1		1020	125	51.	36.2	2460.4	1		1840	225	32.	6.4	2452.3
1		0205	26	0.	.0	2446.0	1		1025	126	51.	35.8	2460.3	1		1845	226	31.	6.2	2452.2
1		0210	27	0.	.0	2446.0	1		1030	127	51.	35.5	2460.2	1		1850	227	31.	6.0	2452.0
1		0215	28	0.	.0	2446.0	1		1035	128	51.	35.1	2460.2	1		1855	228	31.	5.8	2451.9
1		0220	29	0.	.0	2446.0	1		1040	129	51.	34.8	2460.1	1		1900	229	30.	5.5	2451.8
1		0225	30	0.	.0	2446.0	1		1045	130	51.	34.4	2460.0	1		1905	230	30.	5.3	2451.7
1		0230	31	0.	.0	2446.0	1		1050	131	50.	34.1	2460.0	1		1910	231	30.	5.1	2451.6
1		0235	32	0.	.0	2446.0	1		1055	132	50.	33.7	2459.9	1		1915	232	29.	4.9	2451.5
1		0240	33	0.	.0	2446.0	1		1100	133	50.	33.4	2459.8	1		1920	233	29.	4.7	2451.4
1		0245	34	0.	.0	2446.0	1		1105	134	50.	33.1	2459.8	1		1925	234	29.	4.5	2451.3
1		0250	35	0.	.0	2446.0	1		1110	135	50.	32.7	2459.7	1		1930	235	29.	4.3	2451.2
1		0255	36	0.	.0	2446.0	1		1115	136	50.	32.4	2459.6	1		1935	236	28.	4.1	2451.2
1		0300	37	0.	.0	2446.0	1		1120	137	50.	32.0	2459.6	1		1940	237	28.	3.9	2451.1
1		0305	38	0.	.0	2446.0	1		1125	138	50.	31.7	2459.5	1		1945	238	28.	3.7	2451.0
1		0310	39	0.	.0	2446.0	1		1130	139	49.	31.3	2459.4	1		1950	239	27.	3.6	2450.9
1		0315	40	0.	.0	2446.0	1		1135	140	49.	31.0	2459.4	1		1955	240	27.	3.4	2450.8
1		0320	41	0.	.0	2446.0	1		1140	141	49.	30.7	2459.3	1		2000	241	27.	3.2	2450.7
1		0325	42	0.	.0	2446.1	1		1145	142	49.	30.3	2459.2	1		2005	242	26.	3.0	2450.6
1		0330	43	2.	.1	2446.2	1		1150	143	49.	30.0	2459.2	1		2010	243	26.	2.8	2450.5
1		0335	44	4.	.3	2446.7	1		1155	144	49.	29.7	2459.1	1		2015	244	26.	2.6	2450.4
1		0340	45	9.	.6	2447.4	1		1200	145	49.	29.3	2459.0	1		2020	245	26.	2.5	2450.3
1		0345	46	16.	1.1	2448.6	1		1205	146	49.	29.0	2459.0	1		2025	246	25.	2.3	2450.3
1		0350	47	25.	1.9	2450.1	1		1210	147	48.	28.6	2458.9	1		2030	247	25.	2.1	2450.2
1		0355	48	26.	2.9	2450.6	1		1215	148	48.	28.3	2458.8	1		2035	248	25.	1.9	2450.1
1		0400	49	28.	4.3	2451.2	1		1220	149	48.	28.0	2458.8	1		2040	249	25.	1.8	2450.0
1		0405	50	31.	5.9	2452.0	1		1225	150	48.	27.7	2458.7	1		2045	250	22.	1.6	2449.6
1		0410	51	34.	7.8	2452.9	1		1230	151	48.	27.3	2458.6	1		2050	251	20.	1.5	2449.3
1		0415	52	37.	9.9	2454.0	1		1235	152	48.	27.0	2458.6	1		2055	252	18.	1.3	2449.0
1		0420	53	39.	12.1	2454.6	1		1240	153	48.	26.7	2458.5	1		2100	253	17.	1.2	2448.7
1		0425	54	40.	14.3	2455.2	1		1245	154	48.	26.3	2458.4	1		2105	254	15.	1.1	2448.5
1		0430	55	42.	16.6	2455.9	1		1250	155	47.	26.0	2458.4	1		2110	255	14.	1.0	2448.3
		0435	56	43.	18.8	2456.5	1		1255	156	47.	25.7	2458.3	1		2115	256	13.	.9	2448.0
		0440	57	45.	21.0	2457.1	1		1300	157	47.	25.4	2458.3	1		2120	257	11.	.8	2447.9
		0445	58	46.	23.1	2457.7	1		1305	158	47.	25.0	2458.2	1		2125	258	10.	.7	2447.7
1		0450	59	47.	25.2	2458.2	1		1310	159	47.	24.7	2458.1	1		2130	259	9.	.7	2447.5
1		0455	60	48.	27.2	2458.6	1		1315	160	47.	24.4	2458.1	1		2135	260	9.	.6	2447.4
1		0500	61	49.	29.1	2459.0	1		1320	161	47.	24.1	2458.0	1		2140	261	8.	.6	2447.3
1		0505	62	49.	31.0	2459.4	1		1325	162	46.	23.7	2457.9	1		2145	262	7.	.5	2447.2
1		0510	63	50.	32.8	2459.7	1		1330	163	46.	23.4	2457.8	1		2150	263	6.	.5	2447.0
1		0515	64	51.	34.5	2460.1	1		1335	164	46.	23.1	2457.7	1		2155	264	6.	.4	2447.0
1		0520	65	51.	36.3	2460.4	1		1340	165	46.	22.8	2457.6	1		2200	265	5.	.4	2446.9

1	0525	66	52.	37.9	2460.7	*	1	1345	166	46.	22.5	2457.5	*	1	2205	266	5.	.3	2446.8
1	0530	67	53.	39.5	2461.0	*	1	1350	167	45.	22.2	2457.5	*	1	2210	267	4.	.3	2446.7
1	0535	68	53.	40.9	2461.3	*	1	1355	168	45.	21.9	2457.4	*	1	2215	268	4.	.3	2446.6
1	0540	69	54.	42.3	2461.6	*	1	1400	169	45.	21.5	2457.3	*	1	2220	269	4.	.3	2446.6
1	0545	70	54.	43.5	2461.8	*	1	1405	170	45.	21.2	2457.2	*	1	2225	270	3.	.2	2446.5
1	0550	71	54.	44.6	2462.0	*	1	1410	171	45.	20.9	2457.1	*	1	2230	271	3.	.2	2446.5
1	0555	72	55.	45.6	2462.2	*	1	1415	172	44.	20.6	2457.0	*	1	2235	272	3.	.2	2446.4
	0600	73	55.	46.4	2462.3	*	1	1420	173	44.	20.3	2456.9	*	1	2240	273	2.	.2	2446.4
	0605	74	55.	47.1	2462.4	*	1	1425	174	44.	20.0	2456.8	*	1	2245	274	2.	.2	2446.4
	0610	75	55.	47.7	2462.5	*	1	1430	175	44.	19.7	2456.8	*	1	2250	275	2.	.1	2446.3
1	0615	76	55.	48.2	2462.6	*	1	1435	176	44.	19.4	2456.7	*	1	2255	276	2.	.1	2446.3
1	0620	77	56.	48.6	2462.6	*	1	1440	177	43.	19.1	2456.6	*	1	2300	277	2.	.1	2446.3
1	0625	78	56.	48.9	2462.7	*	1	1445	178	43.	18.8	2456.5	*	1	2305	278	2.	.1	2446.2
1	0630	79	56.	49.2	2462.7	*	1	1450	179	43.	18.5	2456.4	*	1	2310	279	1.	.1	2446.2
1	0635	80	56.	49.3	2462.8	*	1	1455	180	43.	18.2	2456.3	*	1	2315	280	1.	.1	2446.2
1	0640	81	56.	49.4	2462.8	*	1	1500	181	43.	17.9	2456.3	*	1	2320	281	1.	.1	2446.2
1	0645	82	56.	49.5	2462.8	*	1	1505	182	42.	17.6	2456.2	*	1	2325	282	1.	.1	2446.2
1	0650	83	56.	49.4	2462.8	*	1	1510	183	42.	17.3	2456.1	*	1	2330	283	1.	.1	2446.2
1	0655	84	56.	49.4	2462.8	*	1	1515	184	42.	17.1	2456.0	*	1	2335	284	1.	.1	2446.1
1	0700	85	56.	49.3	2462.8	*	1	1520	185	42.	16.8	2455.9	*	1	2340	285	1.	.1	2446.1
1	0705	86	56.	49.1	2462.7	*	1	1525	186	42.	16.5	2455.8	*	1	2345	286	1.	.1	2446.1
1	0710	87	56.	49.0	2462.7	*	1	1530	187	41.	16.2	2455.8	*	1	2350	287	1.	.0	2446.1
1	0715	88	56.	48.8	2462.7	*	1	1535	188	41.	15.9	2455.7	*	1	2355	288	1.	.0	2446.1
1	0720	89	56.	48.6	2462.6	*	1	1540	189	41.	15.6	2455.6	*	2	0000	289	1.	.0	2446.1
1	0725	90	55.	48.3	2462.6	*	1	1545	190	41.	15.3	2455.5	*	2	0005	290	0.	.0	2446.1
1	0730	91	55.	48.1	2462.6	*	1	1550	191	41.	15.1	2455.4	*	2	0010	291	0.	.0	2446.1
1	0735	92	55.	47.8	2462.5	*	1	1555	192	40.	14.8	2455.4	*	2	0015	292	0.	.0	2446.1
1	0740	93	55.	47.5	2462.5	*	1	1600	193	40.	14.5	2455.3	*	2	0020	293	0.	.0	2446.1
1	0745	94	55.	47.2	2462.4	*	1	1605	194	40.	14.2	2455.2	*	2	0025	294	0.	.0	2446.1
1	0750	95	55.	46.9	2462.4	*	1	1610	195	40.	13.9	2455.1	*	2	0030	295	0.	.0	2446.0
1	0755	96	55.	46.5	2462.3	*	1	1615	196	40.	13.7	2455.0	*	2	0035	296	0.	.0	2446.0
1	0800	97	55.	46.2	2462.3	*	1	1620	197	40.	13.4	2455.0	*	2	0040	297	0.	.0	2446.0
1	0805	98	55.	45.9	2462.2	*	1	1625	198	39.	13.1	2454.9	*	2	0045	298	0.	.0	2446.0
1	0810	99	55.	45.5	2462.2	*	1	1630	199	39.	12.9	2454.8	*	2	0050	299	0.	.0	2446.0
1	0815	100	55.	45.2	2462.1	*	1	1635	200	39.	12.6	2454.7	*	2	0055	300	0.	.0	2446.0
						*							*						

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 56.	6.75	54.	32.	31.	31.
		(INCHES) .094	.225	.225	.225
		(AC-FT) 27.	64.	64.	64.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
49.	6.75	43.	18.	17.	17.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2462.78	6.75	2461.57	2454.23	2453.93	2453.93

CUMULATIVE AREA = 5.32 SQ MI

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HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = .52

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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	2446.0	*	1		0820	101	64.	100.5	2467.7	*	1		1640	201	58.	58.2	2464.1
1		0005	2	0.	.0	2446.0	*	1		0825	102	64.	100.1	2467.7	*	1		1645	202	58.	57.8	2464.1
1		0010	3	0.	.0	2446.0	*	1		0830	103	64.	99.7	2467.7	*	1		1650	203	58.	57.4	2464.0
1		0015	4	0.	.0	2446.0	*	1		0835	104	64.	99.3	2467.6	*	1		1655	204	58.	57.1	2464.0
1		0020	5	0.	.0	2446.0	*	1		0840	105	64.	98.9	2467.6	*	1		1700	205	58.	56.7	2463.9
1		0025	6	0.	.0	2446.0	*	1		0845	106	64.	98.5	2467.6	*	1		1705	206	58.	56.3	2463.8
1		0030	7	0.	.0	2446.0	*	1		0850	107	64.	98.0	2467.6	*	1		1710	207	57.	55.9	2463.8
1		0035	8	0.	.0	2446.0	*	1		0855	108	64.	97.6	2467.5	*	1		1715	208	57.	55.5	2463.7
1		0040	9	0.	.0	2446.0	*	1		0900	109	64.	97.2	2467.5	*	1		1720	209	57.	55.1	2463.6
1		0045	10	0.	.0	2446.0	*	1		0905	110	64.	96.8	2467.5	*	1		1725	210	57.	54.7	2463.6
1		0050	11	0.	.0	2446.0	*	1		0910	111	63.	96.3	2467.5	*	1		1730	211	57.	54.3	2463.5
1		0055	12	0.	.0	2446.0	*	1		0915	112	63.	95.9	2467.4	*	1		1735	212	57.	53.9	2463.5
		0100	13	0.	.0	2446.0	*	1		0920	113	63.	95.5	2467.4	*	1		1740	213	57.	53.5	2463.4
		0105	14	0.	.0	2446.0	*	1		0925	114	63.	95.0	2467.4	*	1		1745	214	57.	53.1	2463.3
		0110	15	0.	.0	2446.0	*	1		0930	115	63.	94.6	2467.4	*	1		1750	215	57.	52.7	2463.3
1		0115	16	0.	.0	2446.0	*	1		0935	116	63.	94.2	2467.3	*	1		1755	216	57.	52.3	2463.2
1		0120	17	0.	.0	2446.0	*	1		0940	117	63.	93.7	2467.3	*	1		1800	217	56.	51.9	2463.2
1		0125	18	0.	.0	2446.0	*	1		0945	118	63.	93.3	2467.3	*	1		1805	218	56.	51.6	2463.1
1		0130	19	0.	.0	2446.0	*	1		0950	119	63.	92.9	2467.3	*	1		1810	219	56.	51.2	2463.0
1		0135	20	0.	.0	2446.0	*	1		0955	120	63.	92.4	2467.2	*	1		1815	220	56.	50.8	2463.0
1		0140	21	0.	.0	2446.0	*	1		1000	121	63.	92.0	2467.2	*	1		1820	221	56.	50.4	2462.9
1		0145	22	0.	.0	2446.0	*	1		1005	122	63.	91.6	2467.2	*	1		1825	222	56.	50.0	2462.9

1	0150	23	0.	.0	2446.0	*	1	1010	123	63.	91.1	2467.2	*	1	1830	223	56.	49.6	2462.8
1	0155	24	0.	.0	2446.0	*	1	1015	124	63.	90.7	2467.1	*	1	1835	224	56.	49.2	2462.7
1	0200	25	0.	.0	2446.0	*	1	1020	125	63.	90.3	2467.1	*	1	1840	225	56.	48.9	2462.7
1	0205	26	0.	.0	2446.0	*	1	1025	126	63.	89.8	2467.1	*	1	1845	226	56.	48.5	2462.6
1	0210	27	0.	.0	2446.0	*	1	1030	127	63.	89.4	2467.1	*	1	1850	227	55.	48.1	2462.6
1	0215	28	0.	.0	2446.0	*	1	1035	128	63.	89.0	2467.0	*	1	1855	228	55.	47.7	2462.5
1	0220	29	0.	.0	2446.0	*	1	1040	129	63.	88.5	2467.0	*	1	1900	229	55.	47.3	2462.5
	0225	30	0.	.0	2446.0	*	1	1045	130	63.	88.1	2467.0	*	1	1905	230	55.	46.9	2462.4
	0230	31	0.	.0	2446.0	*	1	1050	131	63.	87.7	2467.0	*	1	1910	231	55.	46.6	2462.3
	0235	32	0.	.0	2446.0	*	1	1055	132	63.	87.2	2467.0	*	1	1915	232	55.	46.2	2462.3
1	0240	33	0.	.0	2446.0	*	1	1100	133	63.	86.8	2466.9	*	1	1920	233	55.	45.8	2462.2
1	0245	34	0.	.0	2446.0	*	1	1105	134	63.	86.4	2466.9	*	1	1925	234	55.	45.4	2462.2
1	0250	35	0.	.0	2446.0	*	1	1110	135	63.	85.9	2466.9	*	1	1930	235	55.	45.1	2462.1
1	0255	36	0.	.0	2446.0	*	1	1115	136	63.	85.5	2466.9	*	1	1935	236	55.	44.7	2462.0
1	0300	37	0.	.0	2446.0	*	1	1120	137	63.	85.1	2466.8	*	1	1940	237	54.	44.3	2462.0
1	0305	38	0.	.0	2446.0	*	1	1125	138	62.	84.6	2466.8	*	1	1945	238	54.	43.9	2461.9
1	0310	39	0.	.0	2446.0	*	1	1130	139	62.	84.2	2466.8	*	1	1950	239	54.	43.6	2461.8
1	0315	40	0.	.0	2446.0	*	1	1135	140	62.	83.8	2466.8	*	1	1955	240	54.	43.2	2461.8
1	0320	41	1.	.1	2446.2	*	1	1140	141	62.	83.4	2466.7	*	1	2000	241	54.	42.8	2461.7
1	0325	42	3.	.2	2446.4	*	1	1145	142	62.	82.9	2466.7	*	1	2005	242	54.	42.4	2461.6
1	0330	43	7.	.5	2447.1	*	1	1150	143	62.	82.5	2466.7	*	1	2010	243	54.	42.1	2461.5
1	0335	44	14.	1.0	2448.3	*	1	1155	144	62.	82.1	2466.7	*	1	2015	244	53.	41.7	2461.5
1	0340	45	25.	1.9	2450.1	*	1	1200	145	62.	81.6	2466.6	*	1	2020	245	53.	41.3	2461.4
1	0345	46	27.	3.3	2450.8	*	1	1205	146	62.	81.2	2466.6	*	1	2025	246	53.	41.0	2461.3
1	0350	47	30.	5.3	2451.7	*	1	1210	147	62.	80.8	2466.6	*	1	2030	247	53.	40.6	2461.3
1	0355	48	34.	8.0	2453.0	*	1	1215	148	62.	80.4	2466.6	*	1	2035	248	53.	40.2	2461.2
1	0400	49	38.	11.3	2454.4	*	1	1220	149	62.	79.9	2466.5	*	1	2040	249	53.	39.9	2461.1
1	0405	50	41.	15.1	2455.5	*	1	1225	150	62.	79.5	2466.5	*	1	2045	250	53.	39.5	2461.0
1	0410	51	44.	19.5	2456.7	*	1	1230	151	62.	79.1	2466.5	*	1	2050	251	52.	39.2	2461.0
1	0415	52	47.	24.1	2458.0	*	1	1235	152	62.	78.6	2466.5	*	1	2055	252	52.	38.8	2460.9
1	0420	53	48.	28.9	2458.9	*	1	1240	153	62.	78.2	2466.4	*	1	2100	253	52.	38.4	2460.8
1	0425	54	50.	33.7	2459.9	*	1	1245	154	62.	77.8	2466.4	*	1	2105	254	52.	38.1	2460.8
1	0430	55	52.	38.6	2460.8	*	1	1250	155	62.	77.4	2466.4	*	1	2110	255	52.	37.7	2460.7
1	0435	56	54.	43.3	2461.8	*	1	1255	156	62.	76.9	2466.4	*	1	2115	256	52.	37.4	2460.6
1	0440	57	55.	47.9	2462.5	*	1	1300	157	62.	76.5	2466.4	*	1	2120	257	52.	37.0	2460.5
1	0445	58	56.	52.2	2463.2	*	1	1305	158	62.	76.1	2466.3	*	1	2125	258	51.	36.7	2460.5
1	0450	59	58.	56.4	2463.9	*	1	1310	159	62.	75.7	2466.3	*	1	2130	259	51.	36.3	2460.4
1	0455	60	59.	60.4	2464.5	*	1	1315	160	62.	75.2	2466.3	*	1	2135	260	51.	35.9	2460.3
1	0500	61	60.	64.2	2465.1	*	1	1320	161	62.	74.8	2466.3	*	1	2140	261	51.	35.6	2460.3
1	0505	62	61.	67.8	2465.6	*	1	1325	162	62.	74.4	2466.2	*	1	2145	262	51.	35.2	2460.2
1	0510	63	61.	71.3	2466.1	*	1	1330	163	62.	74.0	2466.2	*	1	2150	263	51.	34.9	2460.1
1	0515	64	62.	74.7	2466.3	*	1	1335	164	62.	73.5	2466.2	*	1	2155	264	51.	34.5	2460.1
1	0520	65	62.	78.0	2466.4	*	1	1340	165	61.	73.1	2466.2	*	1	2200	265	51.	34.2	2460.0
1	0525	66	62.	81.1	2466.6	*	1	1345	166	61.	72.7	2466.1	*	1	2205	266	50.	33.8	2459.9
	0530	67	62.	84.1	2466.8	*	1	1350	167	61.	72.3	2466.1	*	1	2210	267	50.	33.5	2459.9
	0535	68	63.	86.9	2466.9	*	1	1355	168	61.	71.8	2466.1	*	1	2215	268	50.	33.2	2459.8
1	0540	69	63.	89.4	2467.1	*	1	1400	169	61.	71.4	2466.1	*	1	2220	269	50.	32.8	2459.7
1	0545	70	63.	91.7	2467.2	*	1	1405	170	61.	71.0	2466.0	*	1	2225	270	50.	32.5	2459.6
1	0550	71	63.	93.9	2467.3	*	1	1410	171	61.	70.6	2466.0	*	1	2230	271	50.	32.1	2459.6
1	0555	72	63.	95.7	2467.4	*	1	1415	172	61.	70.2	2466.0	*	1	2235	272	50.	31.8	2459.5
1	0600	73	64.	97.4	2467.5	*	1	1420	173	61.	69.7	2465.9	*	1	2240	273	49.	31.4	2459.4
1	0605	74	64.	98.8	2467.6	*	1	1425	174	61.	69.3	2465.9	*	1	2245	274	49.	31.1	2459.4
1	0610	75	64.	100.1	2467.7	*	1	1430	175	61.	68.9	2465.8	*	1	2250	275	49.	30.8	2459.3
1	0615	76	64.	101.1	2467.7	*	1	1435	176	61.	68.5	2465.7	*	1	2255	276	49.	30.4	2459.2
1	0620	77	64.	102.0	2467.8	*	1	1440	177	61.	68.1	2465.7	*	1	2300	277	49.	30.1	2459.2
1	0625	78	64.	102.8	2467.8	*	1	1445	178	61.	67.6	2465.6	*	1	2305	278	49.	29.7	2459.1
1	0630	79	64.	103.4	2467.9	*	1	1450	179	60.	67.2	2465.5	*	1	2310	279	49.	29.4	2459.0
1	0635	80	64.	103.8	2467.9	*	1	1455	180	60.	66.8	2465.5	*	1	2315	280	49.	29.1	2459.0
1	0640	81	64.	104.2	2467.9	*	1	1500	181	60.	66.4	2465.4	*	1	2320	281	48.	28.7	2458.9
1	0645	82	64.	104.5	2467.9	*	1	1505	182	60.	66.0	2465.3	*	1	2325	282	48.	28.4	2458.9
1	0650	83	64.	104.7	2467.9	*	1	1510	183	60.	65.6	2465.3	*	1	2330	283	48.	28.1	2458.8
1	0655	84	64.	104.8	2467.9	*	1	1515	184	60.	65.2	2465.2	*	1	2335	284	48.	27.7	2458.7
1	0700	85	64.	104.8	2467.9	*	1	1520	185	60.	64.7	2465.1	*	1	2340	285	48.	27.4	2458.7
1	0705	86	64.	104.8	2467.9	*	1	1525	186	60.	64.3	2465.1	*	1	2345	286	48.	27.1	2458.6
1	0710	87	64.	104.7	2467.9	*	1	1530	187	60.	63.9	2465.0	*	1	2350	287	48.	26.8	2458.5
1	0715	88	64.	104.6	2467.9	*	1	1535	188	59.	63.5	2465.0	*	1	2355	288	48.	26.4	2458.5
1	0720	89	64.	104.4	2467.9	*	1	1540	189	59.	63.1	2464.9	*	2	0000	289	47.	26.1	2458.4
1	0725	90	64.	104.2	2467.9	*	1	1545	190	59.	62.7	2464.8	*	2	0005	290	47.	25.8	2458.3
1	0730	91	64.	104.0	2467.9	*	1	1550	191	59.	62.3	2464.8	*	2	0010	291	47.	25.4	2458.3
1	0735	92	64.	103.7	2467.9	*	1	1555	192	59.	61.9	2464.7	*	2	0015	292	47.	25.1	2458.2
1	0740	93	64.	103.4	2467.9	*	1	1600	193	59.	61.5	2464.6	*	2	0020	293	47.	24.8	2458.1
1	0745	94	64.	103.1	2467.8	*	1	1605	194	59.	61.1	2464.6	*	2	0025	294	47.	24.5	2458.1
1	0750	95	64.	102.8	2467.8	*	1	1610	195	59.	60.7	2464.5	*	2	0030	295	47.	24.2	2458.0
1	0755	96	64.	102.4	2467.8	*	1	1615	196	59.	60.3	2464.5	*	2	0035	296	46.	23.8	2457.9
1	0800	97	64.	102.1	2467.8	*	1	1620	197	59.	59.9	2464.4	*	2	0040	297	46.	23.5	2457.8
1	0805	98	64.	101.7	2467.8	*	1	1625	198	58.	59.5	2464.3	*	2	0045	298	46.	23.2	2457.7
1	0810	99	64.	101.3	2467.7	*	1	1630	199	58.	59.0	2464.3	*	2	0050	299	46.	22.9	2457.7
1	0815	100	64.	100.9	2467.7	*	1	1635	200	58.	58.6	2464.2	*	2	0055	300	46.	22.6	2457.6
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
64.	7.00		63.	51.	49.	49.
		(INCHES)	.111	.356	.356	.356
		(AC-FT)	31.	101.	101.	101.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE

+ (AC-FT)	(HR)	6-HR	24-HR	72-HR	24.92-HR
105.	7.00	96.	56.	54.	54.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2467.94	7.00	2467.47	2461.89	2461.31	2461.31

CUMULATIVE AREA = 5.32 SQ MI

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HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = .67

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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	2446.0	1		0820	101	76.	185.6	2476.6	1		1640	201	67.	135.6	2469.7
1		0005	2	0.	.0	2446.0	1		0825	102	76.	185.2	2476.6	1		1645	202	67.	135.2	2469.6
1		0010	3	0.	.0	2446.0	1		0830	103	76.	184.7	2476.6	1		1650	203	67.	134.7	2469.6
1		0015	4	0.	.0	2446.0	1		0835	104	76.	184.2	2476.5	1		1655	204	67.	134.2	2469.6
1		0020	5	0.	.0	2446.0	1		0840	105	76.	183.7	2476.5	1		1700	205	67.	133.8	2469.6
1		0025	6	0.	.0	2446.0	1		0845	106	76.	183.2	2476.5	1		1705	206	67.	133.3	2469.5
1		0030	7	0.	.0	2446.0	1		0850	107	76.	182.7	2476.4	1		1710	207	67.	132.9	2469.5
1		0035	8	0.	.0	2446.0	1		0855	108	76.	182.2	2476.4	1		1715	208	67.	132.4	2469.5
1		0040	9	0.	.0	2446.0	1		0900	109	76.	181.7	2476.4	1		1720	209	67.	132.0	2469.5
1		0045	10	0.	.0	2446.0	1		0905	110	76.	181.2	2476.3	1		1725	210	66.	131.5	2469.4
1		0050	11	0.	.0	2446.0	1		0910	111	76.	180.7	2476.3	1		1730	211	66.	131.0	2469.4
1		0055	12	0.	.0	2446.0	1		0915	112	76.	180.1	2476.3	1		1735	212	66.	130.6	2469.4
1		0100	13	0.	.0	2446.0	1		0920	113	76.	179.6	2476.2	1		1740	213	66.	130.1	2469.4
1		0105	14	0.	.0	2446.0	1		0925	114	76.	179.1	2476.2	1		1745	214	66.	129.7	2469.3
1		0110	15	0.	.0	2446.0	1		0930	115	76.	178.6	2476.1	1		1750	215	66.	129.2	2469.3
1		0115	16	0.	.0	2446.0	1		0935	116	76.	178.1	2476.1	1		1755	216	66.	128.8	2469.3
1		0120	17	0.	.0	2446.0	1		0940	117	76.	177.6	2476.1	1		1800	217	66.	128.3	2469.3
1		0125	18	0.	.0	2446.0	1		0945	118	76.	177.0	2476.0	1		1805	218	66.	127.8	2469.2
1		0130	19	0.	.0	2446.0	1		0950	119	76.	176.5	2476.0	1		1810	219	66.	127.4	2469.2
1		0135	20	0.	.0	2446.0	1		0955	120	76.	176.0	2476.0	1		1815	220	66.	126.9	2469.2
1		0140	21	0.	.0	2446.0	1		1000	121	75.	175.5	2475.9	1		1820	221	66.	126.5	2469.2
1		0145	22	0.	.0	2446.0	1		1005	122	75.	175.0	2475.9	1		1825	222	66.	126.0	2469.1
1		0150	23	0.	.0	2446.0	1		1010	123	75.	174.4	2475.8	1		1830	223	66.	125.6	2469.1
		0155	24	0.	.0	2446.0	1		1015	124	75.	173.9	2475.8	1		1835	224	66.	125.1	2469.1
		0200	25	0.	.0	2446.0	1		1020	125	75.	173.4	2475.8	1		1840	225	66.	124.7	2469.1
1		0205	26	0.	.0	2446.0	1		1025	126	75.	172.9	2475.7	1		1845	226	66.	124.2	2469.0
1		0210	27	0.	.0	2446.0	1		1030	127	75.	172.4	2475.7	1		1850	227	66.	123.7	2469.0
1		0215	28	0.	.0	2446.0	1		1035	128	75.	171.8	2475.7	1		1855	228	66.	123.3	2469.0
1		0220	29	0.	.0	2446.0	1		1040	129	75.	171.3	2475.6	1		1900	229	66.	122.8	2468.9
1		0225	30	0.	.0	2446.0	1		1045	130	75.	170.8	2475.6	1		1905	230	66.	122.4	2468.9
1		0230	31	0.	.0	2446.0	1		1050	131	75.	170.3	2475.6	1		1910	231	66.	121.9	2468.9
1		0235	32	0.	.0	2446.0	1		1055	132	75.	169.8	2475.5	1		1915	232	66.	121.5	2468.9
1		0240	33	0.	.0	2446.1	1		1100	133	75.	169.3	2475.5	1		1920	233	66.	121.0	2468.8
1		0245	34	1.	.1	2446.1	1		1105	134	75.	168.8	2475.4	1		1925	234	66.	120.6	2468.8
1		0250	35	1.	.1	2446.2	1		1110	135	75.	168.2	2475.4	1		1930	235	66.	120.1	2468.8
1		0255	36	2.	.1	2446.3	1		1115	136	75.	167.7	2475.4	1		1935	236	65.	119.7	2468.8
1		0300	37	3.	.2	2446.5	1		1120	137	75.	167.2	2475.3	1		1940	237	65.	119.2	2468.7
1		0305	38	4.	.3	2446.6	1		1125	138	75.	166.7	2475.3	1		1945	238	65.	118.8	2468.7
1		0310	39	6.	.4	2446.9	1		1130	139	75.	166.2	2475.3	1		1950	239	65.	118.3	2468.7
1		0315	40	8.	.6	2447.3	1		1135	140	75.	165.7	2475.2	1		1955	240	65.	117.9	2468.7
1		0320	41	11.	.8	2447.9	1		1140	141	75.	165.2	2475.2	1		2000	241	65.	117.4	2468.6
1		0325	42	18.	1.3	2448.9	1		1145	142	74.	164.6	2475.2	1		2005	242	65.	117.0	2468.6
1		0330	43	25.	2.1	2450.1	1		1150	143	74.	164.1	2475.1	1		2010	243	65.	116.5	2468.6
1		0335	44	27.	3.4	2450.8	1		1155	144	74.	163.6	2475.1	1		2015	244	65.	116.1	2468.6
1		0340	45	30.	5.6	2451.8	1		1200	145	74.	163.1	2475.0	1		2020	245	65.	115.6	2468.5
1		0345	46	35.	8.7	2453.4	1		1205	146	74.	162.6	2475.0	1		2025	246	65.	115.2	2468.5
1		0350	47	39.	12.9	2454.8	1		1210	147	74.	162.1	2475.0	1		2030	247	65.	114.7	2468.5
1		0355	48	43.	18.3	2456.3	1		1215	148	74.	161.6	2474.9	1		2035	248	65.	114.3	2468.5
1		0400	49	47.	24.7	2458.1	1		1220	149	74.	161.1	2474.9	1		2040	249	65.	113.8	2468.4
1		0405	50	50.	32.1	2459.6	1		1225	150	74.	160.5	2474.9	1		2045	250	65.	113.4	2468.4
1		0410	51	53.	40.2	2461.2	1		1230	151	74.	160.0	2474.8	1		2050	251	65.	112.9	2468.4
1		0415	52	56.	48.8	2462.7	1		1235	152	74.	159.5	2474.8	1		2055	252	65.	112.5	2468.4
1		0420	53	58.	57.6	2464.0	1		1240	153	74.	159.0	2474.8	1		2100	253	65.	112.1	2468.3
1		0425	54	60.	66.5	2465.4	1		1245	154	74.	158.5	2474.7	1		2105	254	65.	111.6	2468.3
1		0430	55	62.	75.2	2466.3	1		1250	155	74.	158.0	2474.7	1		2110	255	65.	111.2	2468.3
1		0435	56	62.	83.6	2466.8	1		1255	156	74.	157.5	2474.6	1		2115	256	65.	110.7	2468.3
1		0440	57	63.	91.7	2467.2	1		1300	157	74.	157.0	2474.6	1		2120	257	65.	110.3	2468.2
1		0445	58	64.	99.5	2467.6	1		1305	158	74.	156.5	2474.6	1		2125	258	65.	109.8	2468.2
1		0450	59	64.	106.8	2468.0	1		1310	159	74.	156.0	2474.5	1		2130	259	65.	109.4	2468.2
		0455	60	65.	113.7	2468.4	1		1315	160	74.	155.5	2474.5	1		2135	260	65.	108.9	2468.2
		0500	61	66.	120.3	2468.8	1		1320	161	74.	155.0	2474.5	1		2140	261	65.	108.5	2468.1
1		0505	62	66.	126.5	2469.2	1		1325	162	74.	154.4	2474.4	1		2145	262	64.	108.0	2468.1
1		0510	63	67.	132.5	2469.5	1		1330	163	73.	153.9	2474.4	1		2150	263	64.	107.6	2468.1
1		0515	64	67.	138.3	2469.8	1		1335	164	73.	153.4	2474.4	1		2155	264	64.	107.2	2468.1
1		0520	65	69.	143.8	2471.3	1		1340	165	73.	152.9	2474.3	1		2200	265	64.	106.7	2468.0
1		0525	66	73.	149.0	2474.0	1		1345	166	73.	152.4	2474.3	1		2205	266	64.	106.3	2468.0
1		0530	67	73.	154.0	2474.4	1		1350	167	73.	151.9	2474.2	1		2210	267	64.	105.8	2468.0
1		0535	68	74.	158.6	2474.7	1		1355	168	73.	151.4	2474.2	1		2215	268	64.	105.4	2468.0
1		0540	69	74.	162.8	2475.0	1		1400	169	73.	150.9	2474.2	1		2220	269	64.	104.9	2467.9

1	0545	70	75.	166.7	2475.3	*	1	1405	170	73.	150.4	2474.1	*	1	2225	270	64.	104.5	2467.9
1	0550	71	75.	170.2	2475.5	*	1	1410	171	73.	149.9	2474.1	*	1	2230	271	64.	104.1	2467.9
1	0555	72	75.	173.3	2475.8	*	1	1415	172	73.	149.4	2474.1	*	1	2235	272	64.	103.6	2467.9
1	0600	73	76.	176.1	2476.0	*	1	1420	173	73.	148.9	2474.0	*	1	2240	273	64.	103.2	2467.8
1	0605	74	76.	178.6	2476.1	*	1	1425	174	73.	148.4	2474.0	*	1	2245	274	64.	102.7	2467.8
1	0610	75	76.	180.7	2476.3	*	1	1430	175	73.	147.9	2473.7	*	1	2250	275	64.	102.3	2467.8
1	0615	76	76.	182.5	2476.4	*	1	1435	176	72.	147.4	2473.4	*	1	2255	276	64.	101.9	2467.8
	0620	77	76.	184.1	2476.5	*	1	1440	177	72.	146.9	2473.1	*	1	2300	277	64.	101.4	2467.7
	0625	78	76.	185.4	2476.6	*	1	1445	178	71.	146.4	2472.8	*	1	2305	278	64.	101.0	2467.7
	0630	79	76.	186.5	2476.7	*	1	1450	179	71.	145.9	2472.5	*	1	2310	279	64.	100.5	2467.7
1	0635	80	77.	187.4	2476.8	*	1	1455	180	71.	145.4	2472.3	*	1	2315	280	64.	100.1	2467.7
1	0640	81	77.	188.2	2476.8	*	1	1500	181	70.	144.9	2472.0	*	1	2320	281	64.	99.7	2467.6
1	0645	82	77.	188.8	2476.9	*	1	1505	182	70.	144.5	2471.7	*	1	2325	282	64.	99.2	2467.6
1	0650	83	77.	189.2	2476.9	*	1	1510	183	69.	144.0	2471.4	*	1	2330	283	64.	98.8	2467.6
1	0655	84	77.	189.6	2476.9	*	1	1515	184	69.	143.5	2471.1	*	1	2335	284	64.	98.3	2467.6
1	0700	85	77.	189.8	2476.9	*	1	1520	185	69.	143.0	2470.9	*	1	2340	285	64.	97.9	2467.6
1	0705	86	77.	189.9	2477.0	*	1	1525	186	68.	142.6	2470.6	*	1	2345	286	64.	97.5	2467.5
1	0710	87	77.	190.0	2477.0	*	1	1530	187	68.	142.1	2470.3	*	1	2350	287	64.	97.0	2467.5
1	0715	88	77.	189.9	2477.0	*	1	1535	188	67.	141.6	2470.0	*	1	2355	288	63.	96.6	2467.5
1	0720	89	77.	189.8	2476.9	*	1	1540	189	67.	141.2	2470.0	*	2	0000	289	63.	96.1	2467.5
1	0725	90	77.	189.7	2476.9	*	1	1545	190	67.	140.7	2470.0	*	2	0005	290	63.	95.7	2467.4
1	0730	91	77.	189.5	2476.9	*	1	1550	191	67.	140.2	2469.9	*	2	0010	291	63.	95.3	2467.4
1	0735	92	77.	189.2	2476.9	*	1	1555	192	67.	139.8	2469.9	*	2	0015	292	63.	94.8	2467.4
1	0740	93	77.	188.9	2476.9	*	1	1600	193	67.	139.3	2469.9	*	2	0020	293	63.	94.4	2467.4
1	0745	94	77.	188.6	2476.9	*	1	1605	194	67.	138.9	2469.8	*	2	0025	294	63.	94.0	2467.3
1	0750	95	77.	188.2	2476.8	*	1	1610	195	67.	138.4	2469.8	*	2	0030	295	63.	93.5	2467.3
1	0755	96	77.	187.8	2476.8	*	1	1615	196	67.	137.9	2469.8	*	2	0035	296	63.	93.1	2467.3
1	0800	97	77.	187.4	2476.8	*	1	1620	197	67.	137.5	2469.8	*	2	0040	297	63.	92.7	2467.3
1	0805	98	77.	187.0	2476.7	*	1	1625	198	67.	137.0	2469.7	*	2	0045	298	63.	92.2	2467.2
1	0810	99	76.	186.6	2476.7	*	1	1630	199	67.	136.5	2469.7	*	2	0050	299	63.	91.8	2467.2
1	0815	100	76.	186.1	2476.7	*	1	1635	200	67.	136.1	2469.7	*	2	0055	300	63.	91.4	2467.2
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 77.	7.17		76.	62.	59.	59.
		(INCHES)	.133	.430	.430	.430
		(AC-FT)	38.	122.	122.	122.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)				
190.	7.17	180.	122.	118.	118.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2476.95	7.17	2476.22	2468.58	2467.75	2467.75

CUMULATIVE AREA = 5.32 SQ MI

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HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = .79

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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	2446.0	*	1		0820	101	82.	263.1	2481.5	*	1		1640	201	78.	208.1	2478.2
1		0005	2	0.	.0	2446.0	*	1		0825	102	82.	262.6	2481.4	*	1		1645	202	78.	207.5	2478.2
1		0010	3	0.	.0	2446.0	*	1		0830	103	82.	262.0	2481.4	*	1		1650	203	78.	207.0	2478.1
1		0015	4	0.	.0	2446.0	*	1		0835	104	82.	261.5	2481.4	*	1		1655	204	78.	206.5	2478.1
1		0020	5	0.	.0	2446.0	*	1		0840	105	82.	261.0	2481.3	*	1		1700	205	78.	205.9	2478.1
1		0025	6	0.	.0	2446.0	*	1		0845	106	82.	260.5	2481.3	*	1		1705	206	78.	205.4	2478.0
1		0030	7	0.	.0	2446.0	*	1		0850	107	82.	259.9	2481.3	*	1		1710	207	78.	204.9	2478.0
1		0035	8	0.	.0	2446.0	*	1		0855	108	82.	259.4	2481.2	*	1		1715	208	78.	204.3	2478.0
1		0040	9	0.	.0	2446.0	*	1		0900	109	82.	258.9	2481.2	*	1		1720	209	78.	203.8	2477.9
1		0045	10	0.	.0	2446.0	*	1		0905	110	82.	258.3	2481.2	*	1		1725	210	78.	203.2	2477.9
1		0050	11	0.	.0	2446.0	*	1		0910	111	82.	257.8	2481.1	*	1		1730	211	78.	202.7	2477.9
1		0055	12	0.	.0	2446.0	*	1		0915	112	82.	257.2	2481.1	*	1		1735	212	78.	202.2	2477.8
1		0100	13	0.	.0	2446.0	*	1		0920	113	82.	256.6	2481.1	*	1		1740	213	78.	201.6	2477.8
1		0105	14	0.	.0	2446.0	*	1		0925	114	82.	256.1	2481.0	*	1		1745	214	78.	201.1	2477.7
1		0110	15	0.	.0	2446.0	*	1		0930	115	82.	255.5	2481.0	*	1		1750	215	78.	200.6	2477.7
1		0115	16	0.	.0	2446.0	*	1		0935	116	82.	255.0	2481.0	*	1		1755	216	78.	200.0	2477.7
		0120	17	0.	.0	2446.0	*	1		0940	117	82.	254.4	2480.9	*	1		1800	217	78.	199.5	2477.6
		0125	18	0.	.0	2446.0	*	1		0945	118	82.	253.8	2480.9	*	1		1805	218	78.	199.0	2477.6
1		0130	19	0.	.0	2446.0	*	1		0950	119	82.	253.3	2480.9	*	1		1810	219	78.	198.4	2477.6
1		0135	20	0.	.0	2446.0	*	1		0955	120	82.	252.7	2480.8	*	1		1815	220	78.	197.9	2477.5
1		0140	21	0.	.0	2446.0	*	1		1000	121	82.	252.2	2480.8	*	1		1820	221	77.	197.3	2477.5
1		0145	22	0.	.0	2446.0	*	1		1005	122	82.	251.6	2480.8	*	1		1825	222	77.	196.8	2477.4
1		0150	23	0.	.0	2446.0	*	1		1010	123	82.	251.0	2480.7	*	1		1830	223	77.	196.3	2477.4
1		0155	24	0.	.0	2446.0	*	1		1015	124	81.	250.5	2480.7	*	1		1835	224	77.	195.8	2477.4
1		0200	25	0.	.0	2446.0	*	1		1020	125	81.	249.9	2480.7	*	1		1840	225	77.	195.2	2477.3
1		0205	26	0.	.0	2446.0	*	1		1025	126	81.	249.4	2480.6	*	1		1845	226	77.	194.7	2477.3

1	0210	27	0.	.0	2446.0	*	1	1030	127	81.	248.8	2480.6	*	1	1850	227	77.	194.2	2477.3
1	0215	28	0.	.0	2446.1	*	1	1035	128	81.	248.2	2480.6	*	1	1855	228	77.	193.6	2477.2
1	0220	29	1.	.0	2446.1	*	1	1040	129	81.	247.7	2480.5	*	1	1900	229	77.	193.1	2477.2
1	0225	30	1.	.1	2446.2	*	1	1045	130	81.	247.1	2480.5	*	1	1905	230	77.	192.6	2477.1
1	0230	31	2.	.1	2446.3	*	1	1050	131	81.	246.6	2480.5	*	1	1910	231	77.	192.0	2477.1
1	0235	32	3.	.2	2446.4	*	1	1055	132	81.	246.0	2480.4	*	1	1915	232	77.	191.5	2477.1
1	0240	33	4.	.3	2446.7	*	1	1100	133	81.	245.4	2480.4	*	1	1920	233	77.	191.0	2477.0
	0245	34	6.	.4	2446.9	*	1	1105	134	81.	244.9	2480.4	*	1	1925	234	77.	190.4	2477.0
	0250	35	8.	.6	2447.3	*	1	1110	135	81.	244.3	2480.3	*	1	1930	235	77.	189.9	2477.0
	0255	36	11.	.8	2447.7	*	1	1115	136	81.	243.8	2480.3	*	1	1935	236	77.	189.4	2476.9
1	0300	37	14.	1.0	2448.2	*	1	1120	137	81.	243.2	2480.3	*	1	1940	237	77.	188.9	2476.9
1	0305	38	17.	1.2	2448.8	*	1	1125	138	81.	242.6	2480.2	*	1	1945	238	77.	188.3	2476.8
1	0310	39	21.	1.5	2449.5	*	1	1130	139	81.	242.1	2480.2	*	1	1950	239	77.	187.8	2476.8
1	0315	40	25.	1.9	2450.1	*	1	1135	140	81.	241.5	2480.2	*	1	1955	240	77.	187.3	2476.8
1	0320	41	26.	2.5	2450.3	*	1	1140	141	81.	241.0	2480.1	*	1	2000	241	77.	186.7	2476.7
1	0325	42	27.	3.4	2450.8	*	1	1145	142	81.	240.4	2480.1	*	1	2005	242	76.	186.2	2476.7
1	0330	43	29.	4.8	2451.5	*	1	1150	143	81.	239.9	2480.1	*	1	2010	243	76.	185.7	2476.7
1	0335	44	33.	7.1	2452.6	*	1	1155	144	81.	239.3	2480.1	*	1	2015	244	76.	185.2	2476.6
1	0340	45	38.	10.5	2454.2	*	1	1200	145	81.	238.8	2480.0	*	1	2020	245	76.	184.6	2476.6
1	0345	46	41.	15.3	2455.5	*	1	1205	146	81.	238.2	2480.0	*	1	2025	246	76.	184.1	2476.5
1	0350	47	45.	21.6	2457.3	*	1	1210	147	81.	237.6	2480.0	*	1	2030	247	76.	183.6	2476.5
1	0355	48	49.	29.5	2459.1	*	1	1215	148	81.	237.1	2479.9	*	1	2035	248	76.	183.1	2476.5
1	0400	49	52.	38.8	2460.9	*	1	1220	149	80.	236.5	2479.9	*	1	2040	249	76.	182.5	2476.4
1	0405	50	56.	49.4	2462.8	*	1	1225	150	80.	236.0	2479.9	*	1	2045	250	76.	182.0	2476.4
1	0410	51	59.	61.0	2464.6	*	1	1230	151	80.	235.4	2479.8	*	1	2050	251	76.	181.5	2476.4
1	0415	52	61.	73.1	2466.2	*	1	1235	152	80.	234.9	2479.8	*	1	2055	252	76.	181.0	2476.3
1	0420	53	63.	85.5	2466.9	*	1	1240	153	80.	234.3	2479.8	*	1	2100	253	76.	180.4	2476.3
1	0425	54	64.	97.9	2467.6	*	1	1245	154	80.	233.8	2479.7	*	1	2105	254	76.	179.9	2476.2
1	0430	55	65.	110.1	2468.2	*	1	1250	155	80.	233.2	2479.7	*	1	2110	255	76.	179.4	2476.2
1	0435	56	66.	121.8	2468.9	*	1	1255	156	80.	232.7	2479.7	*	1	2115	256	76.	178.9	2476.2
1	0440	57	67.	133.1	2469.5	*	1	1300	157	80.	232.1	2479.6	*	1	2120	257	76.	178.4	2476.1
1	0445	58	69.	143.7	2471.3	*	1	1305	158	80.	231.6	2479.6	*	1	2125	258	76.	177.8	2476.1
1	0450	59	73.	153.8	2474.4	*	1	1310	159	80.	231.0	2479.6	*	1	2130	259	76.	177.3	2476.1
1	0455	60	74.	163.2	2475.1	*	1	1315	160	80.	230.5	2479.5	*	1	2135	260	76.	176.8	2476.0
1	0500	61	75.	172.1	2475.7	*	1	1320	161	80.	229.9	2479.5	*	1	2140	261	76.	176.3	2476.0
1	0505	62	76.	180.6	2476.3	*	1	1325	162	80.	229.4	2479.5	*	1	2145	262	75.	175.8	2475.9
1	0510	63	77.	188.7	2476.9	*	1	1330	163	80.	228.8	2479.4	*	1	2150	263	75.	175.2	2475.9
1	0515	64	77.	196.5	2477.4	*	1	1335	164	80.	228.3	2479.4	*	1	2155	264	75.	174.7	2475.9
1	0520	65	78.	203.9	2477.9	*	1	1340	165	80.	227.7	2479.4	*	1	2200	265	75.	174.2	2475.8
1	0525	66	79.	210.9	2478.4	*	1	1345	166	80.	227.2	2479.3	*	1	2205	266	75.	173.7	2475.8
1	0530	67	79.	217.5	2478.8	*	1	1350	167	80.	226.6	2479.3	*	1	2210	267	75.	173.2	2475.8
1	0535	68	80.	223.7	2479.1	*	1	1355	168	80.	226.1	2479.3	*	1	2215	268	75.	172.6	2475.7
1	0540	69	80.	229.4	2479.5	*	1	1400	169	80.	225.5	2479.2	*	1	2220	269	75.	172.1	2475.7
1	0545	70	80.	234.6	2479.8	*	1	1405	170	80.	225.0	2479.2	*	1	2225	270	75.	171.6	2475.6
	0550	71	81.	239.3	2480.1	*	1	1410	171	80.	224.4	2479.2	*	1	2230	271	75.	171.1	2475.6
	0555	72	81.	243.6	2480.3	*	1	1415	172	80.	223.9	2479.1	*	1	2235	272	75.	170.6	2475.6
1	0600	73	81.	247.3	2480.5	*	1	1420	173	80.	223.3	2479.1	*	1	2240	273	75.	170.1	2475.5
1	0605	74	81.	250.6	2480.7	*	1	1425	174	79.	222.8	2479.1	*	1	2245	274	75.	169.5	2475.5
1	0610	75	82.	253.5	2480.9	*	1	1430	175	79.	222.2	2479.0	*	1	2250	275	75.	169.0	2475.5
1	0615	76	82.	256.0	2481.0	*	1	1435	176	79.	221.7	2479.0	*	1	2255	276	75.	168.5	2475.4
1	0620	77	82.	258.2	2481.2	*	1	1440	177	79.	221.1	2479.0	*	1	2300	277	75.	168.0	2475.4
1	0625	78	82.	260.0	2481.3	*	1	1445	178	79.	220.6	2478.9	*	1	2305	278	75.	167.5	2475.4
1	0630	79	82.	261.6	2481.4	*	1	1450	179	79.	220.0	2478.9	*	1	2310	279	75.	167.0	2475.3
1	0635	80	82.	262.9	2481.4	*	1	1455	180	79.	219.5	2478.9	*	1	2315	280	75.	166.4	2475.3
1	0640	81	82.	264.0	2481.5	*	1	1500	181	79.	218.9	2478.8	*	1	2320	281	75.	165.9	2475.2
1	0645	82	83.	264.9	2481.6	*	1	1505	182	79.	218.4	2478.8	*	1	2325	282	75.	165.4	2475.2
1	0650	83	83.	265.6	2481.6	*	1	1510	183	79.	217.9	2478.8	*	1	2330	283	74.	164.9	2475.2
1	0655	84	83.	266.2	2481.6	*	1	1515	184	79.	217.3	2478.7	*	1	2335	284	74.	164.4	2475.1
1	0700	85	83.	266.6	2481.7	*	1	1520	185	79.	216.8	2478.7	*	1	2340	285	74.	163.9	2475.1
1	0705	86	83.	266.9	2481.7	*	1	1525	186	79.	216.2	2478.7	*	1	2345	286	74.	163.4	2475.1
1	0710	87	83.	267.1	2481.7	*	1	1530	187	79.	215.7	2478.7	*	1	2350	287	74.	162.9	2475.0
1	0715	88	83.	267.1	2481.7	*	1	1535	188	79.	215.1	2478.6	*	1	2355	288	74.	162.3	2475.0
1	0720	89	83.	267.1	2481.7	*	1	1540	189	79.	214.6	2478.6	*	2	0000	289	74.	161.8	2475.0
1	0725	90	83.	267.0	2481.7	*	1	1545	190	79.	214.0	2478.6	*	2	0005	290	74.	161.3	2474.9
1	0730	91	83.	266.9	2481.7	*	1	1550	191	79.	213.5	2478.5	*	2	0010	291	74.	160.8	2474.9
1	0735	92	83.	266.6	2481.7	*	1	1555	192	79.	213.0	2478.5	*	2	0015	292	74.	160.3	2474.8
1	0740	93	83.	266.4	2481.7	*	1	1600	193	79.	212.4	2478.5	*	2	0020	293	74.	159.8	2474.8
1	0745	94	83.	266.1	2481.6	*	1	1605	194	79.	211.9	2478.4	*	2	0025	294	74.	159.3	2474.8
1	0750	95	83.	265.7	2481.6	*	1	1610	195	79.	211.3	2478.4	*	2	0030	295	74.	158.8	2474.7
1	0755	96	83.	265.3	2481.6	*	1	1615	196	79.	210.8	2478.4	*	2	0035	296	74.	158.3	2474.7
1	0800	97	83.	264.9	2481.6	*	1	1620	197	79.	210.3	2478.3	*	2	0040	297	74.	157.8	2474.7
1	0805	98	82.	264.5	2481.5	*	1	1625	198	79.	209.7	2478.3	*	2	0045	298	74.	157.3	2474.6
1	0810	99	82.	264.0	2481.5	*	1	1630	199	78.	209.2	2478.3	*	2	0050	299	74.	156.7	2474.6
1	0815	100	82.	263.5	2481.5	*	1	1635	200	78.	208.6	2478.2	*	2	0055	300	74.	156.2	2474.6
						*							*						

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
83.	7.25		82.	70.	67.	67.
		(INCHES)	.143	.486	.486	.486
		(AC-FT)	41.	138.	138.	138.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)				
267.	7.25	256.	184.	177.	177.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	24.92-HR
2481.70	7.25	2481.04	2474.25	2473.21	2473.21

CUMULATIVE AREA = 5.32 SQ MI

HYDROGRAPH AT STATION DET_C4C
PLAN 1, RATIO = .90

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	2446.0	1		0820	101	87.	343.1	2485.2	1		1640	201	84.	284.9	2482.6
1		0005	2	0.	.0	2446.0	1		0825	102	87.	342.5	2485.1	1		1645	202	84.	284.3	2482.5
1		0010	3	0.	.0	2446.0	1		0830	103	87.	342.0	2485.1	1		1650	203	84.	283.7	2482.5
1		0015	4	0.	.0	2446.0	1		0835	104	87.	341.5	2485.1	1		1655	204	84.	283.1	2482.5
1		0020	5	0.	.0	2446.0	1		0840	105	87.	340.9	2485.1	1		1700	205	84.	282.6	2482.5
1		0025	6	0.	.0	2446.0	1		0845	106	87.	340.4	2485.0	1		1705	206	84.	282.0	2482.4
1		0030	7	0.	.0	2446.0	1		0850	107	87.	339.8	2485.0	1		1710	207	84.	281.4	2482.4
1		0035	8	0.	.0	2446.0	1		0855	108	86.	339.3	2485.0	1		1715	208	83.	280.8	2482.4
1		0040	9	0.	.0	2446.0	1		0900	109	86.	338.7	2485.0	1		1720	209	83.	280.3	2482.4
1		0045	10	0.	.0	2446.0	1		0905	110	86.	338.1	2484.9	1		1725	210	83.	279.7	2482.3
1		0050	11	0.	.0	2446.0	1		0910	111	86.	337.5	2484.9	1		1730	211	83.	279.1	2482.3
1		0055	12	0.	.0	2446.0	1		0915	112	86.	336.9	2484.9	1		1735	212	83.	278.5	2482.3
1		0100	13	0.	.0	2446.0	1		0920	113	86.	336.4	2484.9	1		1740	213	83.	278.0	2482.3
1		0105	14	0.	.0	2446.0	1		0925	114	86.	335.8	2484.8	1		1745	214	83.	277.4	2482.2
1		0110	15	0.	.0	2446.0	1		0930	115	86.	335.2	2484.8	1		1750	215	83.	276.8	2482.2
1		0115	16	0.	.0	2446.0	1		0935	116	86.	334.6	2484.8	1		1755	216	83.	276.2	2482.2
1		0120	17	0.	.0	2446.0	1		0940	117	86.	334.0	2484.8	1		1800	217	83.	275.7	2482.2
1		0125	18	0.	.0	2446.0	1		0945	118	86.	333.4	2484.7	1		1805	218	83.	275.1	2482.1
1		0130	19	0.	.0	2446.0	1		0950	119	86.	332.8	2484.7	1		1810	219	83.	274.5	2482.1
1		0135	20	0.	.0	2446.0	1		0955	120	86.	332.2	2484.7	1		1815	220	83.	274.0	2482.1
1		0140	21	0.	.0	2446.0	1		1000	121	86.	331.6	2484.7	1		1820	221	83.	273.4	2482.1
1		0145	22	0.	.0	2446.0	1		1005	122	86.	331.0	2484.6	1		1825	222	83.	272.8	2482.0
1		0150	23	0.	.0	2446.1	1		1010	123	86.	330.4	2484.6	1		1830	223	83.	272.2	2482.0
1		0155	24	1.	.1	2446.1	1		1015	124	86.	329.9	2484.6	1		1835	224	83.	271.7	2482.0
1		0200	25	1.	.1	2446.2	1		1020	125	86.	329.3	2484.5	1		1840	225	83.	271.1	2481.9
1		0205	26	2.	.1	2446.3	1		1025	126	86.	328.7	2484.5	1		1845	226	83.	270.5	2481.9
1		0210	27	3.	.2	2446.4	1		1030	127	86.	328.1	2484.5	1		1850	227	83.	269.9	2481.9
		0215	28	4.	.3	2446.6	1		1035	128	86.	327.5	2484.5	1		1855	228	83.	269.4	2481.8
		0220	29	5.	.4	2446.8	1		1040	129	86.	326.9	2484.4	1		1900	229	83.	268.8	2481.8
1		0225	30	7.	.5	2447.1	1		1045	130	86.	326.3	2484.4	1		1905	230	83.	268.2	2481.8
1		0230	31	9.	.6	2447.4	1		1050	131	86.	325.7	2484.4	1		1910	231	83.	267.7	2481.7
1		0235	32	11.	.8	2447.8	1		1055	132	86.	325.1	2484.4	1		1915	232	83.	267.1	2481.7
1		0240	33	14.	1.0	2448.3	1		1100	133	86.	324.5	2484.3	1		1920	233	83.	266.5	2481.7
1		0245	34	18.	1.3	2449.0	1		1105	134	86.	323.9	2484.3	1		1925	234	83.	266.0	2481.6
1		0250	35	23.	1.6	2449.7	1		1110	135	86.	323.4	2484.3	1		1930	235	83.	265.4	2481.6
1		0255	36	25.	2.0	2450.1	1		1115	136	86.	322.8	2484.3	1		1935	236	83.	264.8	2481.6
1		0300	37	26.	2.5	2450.3	1		1120	137	86.	322.2	2484.2	1		1940	237	82.	264.3	2481.5
1		0305	38	26.	3.0	2450.6	1		1125	138	86.	321.6	2484.2	1		1945	238	82.	263.7	2481.5
1		0310	39	27.	3.6	2450.9	1		1130	139	86.	321.0	2484.2	1		1950	239	82.	263.1	2481.5
1		0315	40	29.	4.4	2451.3	1		1135	140	86.	320.4	2484.2	1		1955	240	82.	262.6	2481.4
1		0320	41	30.	5.4	2451.8	1		1140	141	85.	319.8	2484.1	1		2000	241	82.	262.0	2481.4
1		0325	42	32.	6.8	2452.5	1		1145	142	85.	319.2	2484.1	1		2005	242	82.	261.4	2481.4
1		0330	43	36.	9.0	2453.5	1		1150	143	85.	318.6	2484.1	1		2010	243	82.	260.9	2481.3
1		0335	44	39.	12.3	2454.7	1		1155	144	85.	318.1	2484.0	1		2015	244	82.	260.3	2481.3
1		0340	45	42.	17.1	2456.0	1		1200	145	85.	317.5	2484.0	1		2020	245	82.	259.7	2481.3
1		0345	46	46.	23.6	2457.9	1		1205	146	85.	316.9	2484.0	1		2025	246	82.	259.2	2481.2
1		0350	47	50.	32.1	2459.6	1		1210	147	85.	316.3	2484.0	1		2030	247	82.	258.6	2481.2
1		0355	48	54.	42.6	2461.6	1		1215	148	85.	315.7	2483.9	1		2035	248	82.	258.0	2481.2
1		0400	49	57.	54.9	2463.6	1		1220	149	85.	315.1	2483.9	1		2040	249	82.	257.5	2481.1
1		0405	50	61.	68.8	2465.8	1		1225	150	85.	314.5	2483.9	1		2045	250	82.	256.9	2481.1
1		0410	51	62.	83.8	2466.8	1		1230	151	85.	313.9	2483.9	1		2050	251	82.	256.3	2481.1
1		0415	52	64.	99.6	2467.6	1		1235	152	85.	313.4	2483.8	1		2055	252	82.	255.8	2481.0
1		0420	53	65.	115.6	2468.5	1		1240	153	85.	312.8	2483.8	1		2100	253	82.	255.2	2481.0
1		0425	54	66.	131.6	2469.4	1		1245	154	85.	312.2	2483.8	1		2105	254	82.	254.6	2481.0
1		0430	55	72.	147.3	2473.3	1		1250	155	85.	311.6	2483.8	1		2110	255	82.	254.1	2480.9
1		0435	56	74.	162.4	2475.0	1		1255	156	85.	311.0	2483.7	1		2115	256	82.	253.5	2480.9
1		0440	57	76.	176.7	2476.0	1		1300	157	85.	310.4	2483.7	1		2120	257	82.	253.0	2480.9
1		0445	58	77.	190.3	2477.0	1		1305	158	85.	309.8	2483.7	1		2125	258	82.	252.4	2480.8
1		0450	59	78.	203.1	2477.9	1		1310	159	85.	309.3	2483.7	1		2130	259	82.	251.8	2480.8
1		0455	60	79.	215.1	2478.6	1		1315	160	85.	308.7	2483.6	1		2135	260	82.	251.3	2480.8
1		0500	61	80.	226.4	2479.3	1		1320	161	85.	308.1	2483.6	1		2140	261	81.	250.7	2480.7
1		0505	62	81.	237.1	2479.9	1		1325	162	85.	307.5	2483.6	1		2145	262	81.	250.1	2480.7
1		0510	63	81.	247.3	2480.5	1		1330	163	85.	306.9	2483.5	1		2150	263	81.	249.6	2480.7
		0515	64	82.	257.1	2481.1	1		1335	164	85.	306.3	2483.5	1		2155	264	81.	249.0	2480.6
		0520	65	83.	266.4	2481.7	1		1340	165	85.	305.7	2483.5	1		2200	265	81.	248.5	2480.6
1		0525	66	83.	275.2	2482.1	1		1345	166	85.	305.2	2483.5	1		2205	266	81.	247.9	2480.6
1		0530	67	84.	283.5	2482.5	1		1350	167	85.	304.6	2483.4	1		2210	267	81.	247.3	2480.5
1		0535	68	84.	291.2	2482.8	1		1355	168	85.	304.0	2483.4	1		2215	268	81.	246.8	2480.5
1		0540	69	84.	298.4	2483.2	1		1400	169	85.	303.4	2483.4	1		2220	269	81.	246.2	2480.5
1		0545	70	85.	304.9	2483.5	1		1405	170	85.	302.8	2483.4	1		2225	270	81.	245.7	2480.4
1		0550	71	85.	310.9	2483.7	1		1410	171	85.	302.2	2483.3	1		2230	271	81.	245.1	2480.4
1		0555	72	85.	316.2	2484.0	1		1415	172	85.	301.7	2483.3	1		2235	272	81.	244.5	2480.4
1		0600	73	86.	320.9	2484.2	1		1420	173	85.	301.1	2483.3	1		2240	273	81.	244.0	2480.3

1	0605	74	86.	325.1	2484.4	*	1	1425	174	84.	300.5	2483.3	*	1	2245	274	81.	243.4	2480.3
1	0610	75	86.	328.7	2484.5	*	1	1430	175	84.	299.9	2483.2	*	1	2250	275	81.	242.9	2480.3
1	0615	76	86.	331.9	2484.7	*	1	1435	176	84.	299.3	2483.2	*	1	2255	276	81.	242.3	2480.2
1	0620	77	86.	334.7	2484.8	*	1	1440	177	84.	298.8	2483.2	*	1	2300	277	81.	241.8	2480.2
1	0625	78	86.	337.0	2484.9	*	1	1445	178	84.	298.2	2483.2	*	1	2305	278	81.	241.2	2480.2
1	0630	79	86.	339.1	2485.0	*	1	1450	179	84.	297.6	2483.1	*	1	2310	279	81.	240.6	2480.1
1	0635	80	87.	340.8	2485.1	*	1	1455	180	84.	297.0	2483.1	*	1	2315	280	81.	240.1	2480.1
	0640	81	87.	342.3	2485.1	*	1	1500	181	84.	296.4	2483.1	*	1	2320	281	81.	239.5	2480.1
	0645	82	87.	343.5	2485.2	*	1	1505	182	84.	295.9	2483.1	*	1	2325	282	81.	239.0	2480.0
	0650	83	87.	344.4	2485.2	*	1	1510	183	84.	295.3	2483.0	*	1	2330	283	81.	238.4	2480.0
1	0655	84	87.	345.2	2485.3	*	1	1515	184	84.	294.7	2483.0	*	1	2335	284	81.	237.9	2480.0
1	0700	85	87.	345.8	2485.3	*	1	1520	185	84.	294.1	2483.0	*	1	2340	285	81.	237.3	2479.9
1	0705	86	87.	346.3	2485.3	*	1	1525	186	84.	293.5	2483.0	*	1	2345	286	80.	236.8	2479.9
1	0710	87	87.	346.6	2485.3	*	1	1530	187	84.	293.0	2482.9	*	1	2350	287	80.	236.2	2479.9
1	0715	88	87.	346.8	2485.3	*	1	1535	188	84.	292.4	2482.9	*	1	2355	288	80.	235.7	2479.8
1	0720	89	87.	346.8	2485.3	*	1	1540	189	84.	291.8	2482.9	*	2	0000	289	80.	235.1	2479.8
1	0725	90	87.	346.8	2485.3	*	1	1545	190	84.	291.2	2482.8	*	2	0005	290	80.	234.5	2479.8
1	0730	91	87.	346.7	2485.3	*	1	1550	191	84.	290.6	2482.8	*	2	0010	291	80.	234.0	2479.7
1	0735	92	87.	346.6	2485.3	*	1	1555	192	84.	290.1	2482.8	*	2	0015	292	80.	233.4	2479.7
1	0740	93	87.	346.3	2485.3	*	1	1600	193	84.	289.5	2482.8	*	2	0020	293	80.	232.9	2479.7
1	0745	94	87.	346.1	2485.3	*	1	1605	194	84.	288.9	2482.7	*	2	0025	294	80.	232.3	2479.6
1	0750	95	87.	345.7	2485.3	*	1	1610	195	84.	288.3	2482.7	*	2	0030	295	80.	231.8	2479.6
1	0755	96	87.	345.4	2485.3	*	1	1615	196	84.	287.7	2482.7	*	2	0035	296	80.	231.2	2479.6
1	0800	97	87.	344.9	2485.2	*	1	1620	197	84.	287.2	2482.7	*	2	0040	297	80.	230.7	2479.5
1	0805	98	87.	344.5	2485.2	*	1	1625	198	84.	286.6	2482.6	*	2	0045	298	80.	230.1	2479.5
1	0810	99	87.	344.0	2485.2	*	1	1630	199	84.	286.0	2482.6	*	2	0050	299	80.	229.6	2479.5
1	0815	100	87.	343.6	2485.2	*	1	1635	200	84.	285.4	2482.6	*	2	0055	300	80.	229.0	2479.4
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 87.	7.33		86.	75.	72.	72.
		(INCHES)	.151	.521	.521	.521
		(AC-FT)	43.	148.	148.	148.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)					
347.	7.33		335.	249.	240.	240.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)					
2485.33	7.33		2484.80	2478.05	2476.87	2476.87

CUMULATIVE AREA = 5.32 SQ MI

*** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION= 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

ATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5
					.40	.52	.67	.79	.90
HYDROGRAPH AT									
+	C4CA	4.59	1	FLOW	320.	653.	1163.	1614.	2070.
				TIME	4.50	4.50	4.42	4.42	4.42
HYDROGRAPH AT									
+	C4CB	.38	1	FLOW	32.	67.	119.	164.	211.
				TIME	4.25	4.17	4.17	4.17	4.17
2 COMBINED AT									
+	C4C1	4.97	1	FLOW	348.	712.	1265.	1753.	2254.
				TIME	4.50	4.42	4.42	4.33	4.33
HYDROGRAPH AT									
+	C4CC	.35	1	FLOW	36.	74.	132.	182.	233.
				TIME	4.00	4.00	4.00	4.00	3.92
2 COMBINED AT									
+	C4C	5.32	1	FLOW	369.	758.	1347.	1872.	2404.
				TIME	4.50	4.42	4.33	4.33	4.33
ROUTED TO									
+	DET_C4C	5.32	1	FLOW	56.	64.	77.	83.	87.
				TIME	6.75	7.00	7.17	7.25	7.33
				** PEAK STAGES IN FEET **					
			1	STAGE	2462.78	2467.94	2476.95	2481.70	2485.33
				TIME	6.75	7.00	7.17	7.25	7.33
ROUTED TO									
+	RC4C	5.32	1	FLOW	56.	64.	77.	83.	87.
				TIME	6.92	7.08	7.25	7.33	7.42
YDROGRAPH AT									
	C4CD	.17	1	FLOW	32.	62.	105.	142.	179.
				TIME	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT									
+	C4C	5.49	1	FLOW	58.	76.	127.	172.	216.
				TIME	5.00	4.92	3.67	3.67	3.67
HYDROGRAPH AT									
+	C3B3B	.56	1	FLOW	76.	148.	251.	340.	430.
				TIME	3.92	3.92	3.92	3.92	3.83
2 COMBINED AT									
+	C3B3B	6.05	1	FLOW	110.	211.	355.	478.	599.
				TIME	4.00	3.92	3.83	3.83	3.83
ROUTED TO									
+	R3B3B	6.05	1	FLOW	109.	209.	354.	475.	596.
				TIME	4.17	4.00	3.92	3.92	3.83
ROUTED TO									
+	R3B3B	6.05	1	FLOW	107.	206.	350.	469.	595.
				TIME	4.42	4.25	4.08	4.00	4.00

*** NORMAL END OF HEC-1 ***

HEC-2 MODEL OUTPUT

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*******************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.0;  February 1991        *
*                                         *
*  RUN DATE    29JAN98    TIME   14:28:10  *
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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 29JAN98 14:28:10

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**********************************
 -2 WATER SURFACE PROFILES

 Version  4.6.0;  February 1991
**********************************

T1   EAST C-1 DETENTION BASIN NORTH WASH
T2   SEDIMENT CONTROL STUDY ( MULTIPLE FREQUENCY ANALYSIS )
T3   VTN MODEL ( SUPERCRITICAL )

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                   1       0.03                                  2501.5

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1                   -1                                      -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150       200


NC     .024      .024       .03        .1        .3
QT        5       369       758      1347      1872      2404

X1     1000        10       315       410       100       100       100
GR     2526       100      2518       150      2510       250      2510       285    2500.7       315
GR   2500.5       350      2503       410      2513       450      2520       530    2522.8       590


X1     1100        12       385       450        90       110       100
GR     2526       100      2518       150      2512       215      2510       250      2506       320
GR     2502       335      2505       370    2497.5       385      2498       420      2501       450
GR     2510       470      2526       515


X1     1200        11       370       430        90       110       100
GR     2524       100      2504       280      2504       300      2502       320      2502       340
GR     2496       370    2494.7       390    2494.7       410      2504       430      2505       440
GR     2524       520


X1     1300        10       330       370        70       130       100
GR     2514       100    2507.5       200      2499       280      2497       315      2495       330
GR     2492       340      2492       360      2494       370      2510       400      2514       420
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X1	1400	10	270	340	110	95	100			
GR	2510	100	2504	165	2504	180	2501	235	2497	270
	2490	295	2489	315	2498	325	2500	340	2510	380
X1	1500	11	290	350	110	90	100			
GR	2510	100	2502	140	2498	180	2497	250	2494	290
GR	2486	315	2486	330	2487	340	2490	350	2500	410
GR	2510	480								
X1	1600	11	305	370	110	90	100			
GR	2508	100	2501	140	2497	190	2494	260	2485	305
GR	2484	350	2485	370	2489	390	2490	410	2502	500
GR	2508	530								
X1	1700	10	310	400	120	80	100			
GR	2509	100	2500	150	2490	230	2490	270	2482	310
GR	2481	350	2482	400	2488	430	2501	505	2509	560
X1	1800	11	360	430	90	110	100			
GR	2498	100	2498	180	2484	320	2485	360	2478	390
GR	2478	430	2480	450	2484	460	2493	510	2493	560
GR	2498	580								
X1	1900	12	390	460	70	130	100			
GR	2496	100	2493	165	2489	200	2491	240	2488	290
GR	2481	330	2483	370	2476	390	2476	460	2486	500
GR	2493	540	2496	800						
X1	2000	11	350	415	120	80	100			
GR	2496	100	2492	200	2490	235	2485	270	2479	305
GR	2480	325	2474	350	2473	400	2476	415	2482	450
GR	2496	530								
	2100	12	260	365	100	100	100			
GR	2496	100	2482	180	2482	190	2476	220	2476	240
GR	2471	260	2474	270	2471	290	2471	365	2480	390
GR	2488	440	2496	480						
X1	2200	10	250	335	100	100	100			
GR	2496	100	2469	250	2469	290	2468	300	2468	335
GR	2472	350	2476	370	2478	370	2494	460	2496	480

X1	2300	9	250	320	100	100	100			
GR	2494	100	2473	205	2466	250	2463	280	2463	320
	2477	380	2481	400	2486	440	2494	480		
X1	2400	11	240	320	100	100	100			
GR	2496	100	2469	200	2464	220	2457	240	2457	320
GR	2464	340	2473	370	2481	430	2481	440	2486	460
GR	2496	520								
X1	2500	10	220	290	100	100	100			
GR	2496	100	2466	180	2462	200	2454	220	2454	290
GR	2466	320	2474	390	2471	405	2480	440	2496	530
X1	2600	8	210	280	100	100	100			
GR	2496	100	2451	210	2451	280	2460	300	2460	302
GR	2468	350	2488	520	2494	560				
X1	2700	7	210	280	100	100	100			
GR	2496	100	2448	210	2448	280	2462	300	2478	450
GR	2479	470	2496	540						

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300

*SECNO 1000.000

1000.000	1.09	2501.59	2501.83	2501.50	2502.43	.84	.00	.00	2500.70
369.0	7.7	361.3	.0	1.3	48.9	.0	.0	.0	2503.00
.00	6.06	7.38	.00	.024	.030	.000	.000	2500.50	312.13
.029938	0.	0.	0.	0	11	5	.00	64.04	376.17

*SECNO 1100.000

1100.000	1.46	2498.96	2499.17	.00	2499.85	.90	2.57	.01	2497.50
369.0	14.6	354.4	.0	2.1	46.5	.0	.1	.1	2501.00
.00	6.93	7.62	.00	.024	.030	.000	.000	2497.50	382.10
.022331	100.	100.	100.	4	14	0	.00	47.40	429.50

*SECNO 1200.000

1200.000	1.33	2496.03	2496.38	.00	2497.20	1.17	2.62	.03	2496.00
369.0	.0	369.0	.0	.0	42.5	.0	.2	.2	2504.00
.01	.11	8.68	.00	.024	.030	.000	.000	2494.70	369.80
.031412	90.	100.	110.	5	8	0	.00	43.08	412.88

*SECNO 1300.000

1300.000	1.66	2493.66	2493.91	.00	2494.72	1.06	2.45	.03	2495.00
369.0	.0	369.0	.0	.0	44.6	.0	.3	.3	2494.00
.01	.00	8.27	.00	.000	.030	.000	.000	2492.00	334.48
.019602	90.	100.	110.	4	11	0	.00	33.81	368.29

*SECNO 1400.000

00.000	2.19	2491.19	2491.55	.00	2492.57	1.38	2.12	.03	2497.00
369.0	.0	369.0	.0	.0	39.1	.0	.4	.4	2500.00
.01	.00	9.44	.00	.000	.030	.000	.000	2489.00	290.73
.022945	70.	100.	130.	5	14	0	.00	26.70	317.44

*SECNO 1500.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 = 1.43

1500.000	1.39	2487.39	2487.99	.00	2489.34	1.95	3.18	.06	2494.00
369.0	.0	369.0	.0	.0	33.0	.0	.5	.5	2490.00
.02	.00	11.20	.00	.000	.030	.000	.000	2486.00	310.66
.047016	110.	100.	95.	6	11	0	.00	30.63	341.29

*SECNO 1600.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

1600.000	1.38	2485.38	2485.50	.00	2486.02	.64	2.93	.39	2485.00
369.0	1.0	366.9	1.0	.4	57.2	.4	.6	.6	2485.00
.02	2.85	6.42	2.85	.024	.030	.024	.000	2484.00	303.10
.019951	110.	100.	90.	4	8	0	.00	68.79	371.90

*SECNO 1700.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.63

1700.000	1.03	2482.03	2482.30	.00	2482.92	.89	3.07	.03	2482.00
369.0	.0	369.0	.0	.0	48.7	.0	.7	.8	2482.00
.02	.14	7.58	.14	.024	.030	.024	.000	2481.00	309.79
.053116	110.	100.	90.	5	11	0	.00	90.41	400.21

NO 1800.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .61

1800.000	1.10	2479.10	2479.28	.00	2479.87	.77	3.01	.04	2485.00
369.0	.0	333.6	35.4	.0	46.7	6.1	.8	.9	2478.00
.03	.00	7.14	5.82	.000	.030	.024	.000	2478.00	385.27
.019700	120.	100.	80.	4	11	0	.00	55.75	441.03

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 1900.000

1900.000	.74	2476.74	2476.93	.00	2477.48	.74	2.39	.01	2476.00
369.0	4.1	359.0	5.9	.8	51.9	1.1	1.0	1.1	2476.00
.03	5.25	6.92	5.34	.024	.030	.024	.000	2476.00	387.88
.029157	90.	100.	110.	5	11	0	.00	75.08	462.96

*SECNO 2000.000

2000.000	1.51	2474.51	2474.62	.00	2475.18	.67	2.28	.02	2474.00
369.0	1.8	367.2	.0	.5	56.0	.0	1.1	1.2	2476.00
.04	3.29	6.56	.00	.024	.030	.000	.000	2473.00	347.89
.018263	70.	100.	130.	3	17	0	.00	59.64	407.53

*SECNO 2100.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.55

2100.000	.63	2471.63	2471.88	.00	2472.46	.84	2.70	.02	2471.00
369.0	4.6	361.3	3.1	.8	49.0	.5	1.2	1.4	2471.00
.04	5.85	7.38	5.73	.024	.030	.024	.000	2471.00	257.49
.043694	120.	100.	80.	6	11	0	.00	85.51	366.74

*SECNO 2200.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

2200.000	1.28	2469.28	2469.33	.00	2469.74	.46	2.61	.11	2469.00
369.0	.5	350.0	18.5	.2	64.5	3.1	1.3	1.6	2468.00
.04	2.22	5.42	5.94	.024	.030	.024	.000	2468.00	248.40
017326	100.	100.	100.	2	17	0	.00	91.44	339.83

*SECNO 2300.000

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 = 2.56

2300.000	.67	2463.67	2464.27	.00	2465.97	2.30	3.58	.18	2466.00
369.0	.0	359.2	9.8	.0	29.4	1.0	1.5	1.8	2463.00
.05	.00	12.24	9.96	.000	.030	.024	.000	2463.00	273.23
.113613	100.	100.	100.	5	5	0	.00	49.67	322.90

*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

2400.000	.60	2457.60	2457.86	.00	2458.50	.90	7.05	.42	2457.00
369.0	2.9	363.2	2.9	.5	47.4	.5	1.5	1.9	2457.00
.05	5.80	7.66	5.80	.024	.030	.024	.000	2457.00	238.31
.048007	100.	100.	100.	6	11	0	.00	83.39	321.69

*SECNO 2500.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

2500.000	.83	2454.83	2454.94	.00	2455.42	.60	2.98	.09	2454.00
369.0	4.0	361.0	4.0	.9	58.0	.9	1.7	2.1	2454.00
.06	4.67	6.23	4.67	.024	.030	.024	.000	2454.00	217.93
.020325	100.	100.	100.	4	14	0	.00	74.14	292.07

*SECNO 2600.000

? WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

2600.000	.67	2451.67	2451.94	.00	2452.59	.92	2.80	.03	2451.00
369.0	3.2	362.9	2.9	.6	47.1	.5	1.8	2.3	2451.00
.06	5.77	7.71	5.71	.024	.030	.024	.000	2451.00	208.36
.041148	100.	100.	100.	6	8	0	.00	73.14	281.49

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 2700.000

2700.000	.80	2448.80	2448.94	.00	2449.46	.66	3.05	.08	2448.00
369.0	3.5	363.4	2.0	.7	55.7	.5	1.9	2.4	2448.00
.06	4.85	6.53	4.50	.024	.030	.024	.000	2448.00	208.18
.023565	100.	100.	100.	4	11	0	.00	72.96	281.14

T1 EAST C-1 DETENTION BASIN NORTH WASH
T2 SEDIMENT CONTROL STUDY (MULTIPLE FREQUENCY ANALYSIS)
T3 VTN MODEL (SUPERCRITICAL)

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3		1	0.03				2502.0	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2		-1				-1			

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300

*SECNO 1000.000

1000.000	1.56	2502.06	2502.45	2502.00	2503.35	1.30	.00	.00	2500.70
758.0	23.8	734.2	.0	3.0	80.0	.0	.0	.0	2503.00
.00	8.03	9.17	.00	.024	.030	.000	.000	2500.50	310.62
.029987	0.	0.	0.	0	11	5	.00	76.73	387.35

*SECNO 1100.000

1100.000	2.09	2499.59	2499.94	.00	2500.92	1.33	2.43	.00	2497.50
758.0	37.2	720.8	.0	4.4	77.7	.0	.2	.2	2501.00
.00	8.42	9.28	.00	.024	.030	.000	.000	2497.50	380.80
.020099	100.	100.	100.	5	14	0	.00	55.22	436.02

*SECNO 1200.000

3301 HV CHANGED MORE THAN HVINS

1200.000	1.93	2496.63	2497.19	.00	2498.51	1.88	2.36	.06	2496.00
758.0	4.7	753.3	.0	1.0	68.3	.0	.4	.3	2504.00
.01	4.75	11.03	.00	.024	.030	.000	.000	2494.70	366.84
.028149	90.	100.	110.	5	11	0	.00	47.31	414.15

*SECNO 1300.000

1300.000	2.41	2494.41	2494.85	.00	2496.13	1.72	2.34	.05	2495.00
758.0	.0	757.6	.4	.0	71.9	.2	.5	.4	2494.00
.01	.00	10.53	2.77	.000	.030	.024	.000	2492.00	331.97
.019692	90.	100.	110.	5	14	0	.00	38.80	370.77

*SECNO 1400.000

1400.000	3.17	2492.17	2492.68	.00	2494.13	1.96	1.97	.02	2497.00
758.0	.0	758.0	.0	.0	67.5	.0	.7	.4	2500.00
.01	.00	11.24	.00	.000	.030	.000	.000	2489.00	287.24
.019687	70.	100.	130.	6	14	0	.00	31.28	318.52

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 1500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.54

1500.000	2.02	2488.02	2488.97	.00	2491.13	3.10	2.89	.11	2494.00
758.0	.0	758.0	.0	.0	53.6	.0	.8	.5	2490.00
.01	.00	14.14	.00	.000	.030	.000	.000	2486.00	308.69
.046545	110.	100.	95.	6	11	0	.00	34.71	343.40

*SECNO 1600.000

3301 HV CHANGED MORE THAN HVINS

1600.000	1.71	2485.71	2486.10	.00	2487.07	1.36	3.54	.52	2485.00
758.0	6.6	744.8	6.6	1.3	79.2	1.3	1.0	.6	2485.00
.02	5.14	9.41	5.14	.024	.030	.024	.000	2484.00	301.41
.027765	110.	100.	90.	5	8	0	.00	72.18	373.59

*SECNO 1700.000

1700.000	1.41	2482.41	2482.79	.00	2483.74	1.33	3.32	.01	2482.00
758.0	1.7	754.6	1.7	.4	81.3	.4	1.2	.8	2482.00
.02	4.21	9.29	4.21	.024	.030	.024	.000	2481.00	307.99
.040295	110.	100.	90.	6	8	0	.00	94.03	402.01

*SECNO 1800.000

1800.000	1.60	2479.60	2479.99	.00	2480.92	1.32	2.82	.00	2485.00
758.0	.0	657.3	100.7	.0	69.8	12.9	1.4	1.0	2478.00
.02	.00	9.41	7.79	.000	.030	.024	.000	2478.00	383.11
.021330	120.	100.	80.	5	11	0	.00	62.97	446.08

*SECNO 1900.000

1900.000	1.13	2477.13	2477.49	.00	2478.42	1.28	2.49	.01	2476.00
758.0	12.7	727.1	18.2	1.8	79.3	2.6	1.5	1.2	2476.00
.02	6.95	9.17	7.08	.024	.030	.024	.000	2476.00	386.76
.029039	90.	100.	110.	6	11	0	.00	77.77	464.53

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 2000.000

2000.000	2.06	2475.06	2475.28	.00	2476.15	1.09	2.21	.06	2474.00
758.0	12.3	745.7	.0	2.3	88.5	.0	1.7	1.3	2476.00
.03	5.25	8.42	.00	.024	.030	.000	.000	2473.00	345.59
.017405	70.	100.	130.	4	17	0	.00	64.71	410.29

*SECNO 2100.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.64

2100.000	.94	2471.94	2472.39	.00	2473.42	1.49	2.69	.04	2471.00
758.0	13.9	734.7	9.4	1.8	74.7	1.2	1.9	1.5	2471.00
.03	7.90	9.84	7.74	.024	.030	.024	.000	2471.00	256.25
.046554	120.	100.	80.	6	14	0	.00	90.73	367.60

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .62

2200.000	1.68	2469.68	2469.83	.00	2470.50	.82	2.72	.20	2469.00
758.0	5.2	714.5	38.3	1.3	98.2	5.3	2.1	1.7	2468.00
.03	4.00	7.28	7.21	.024	.030	.024	.000	2468.00	246.20
.017830	100.	100.	100.	4	14	0	.00	95.12	341.32

*SECNO 2300.000

HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.06

2300.000	1.15	2464.15	2464.98	.00	2467.06	2.91	3.23	.21	2466.00
758.0	.0	725.3	32.7	.0	52.6	2.8	2.3	1.9	2463.00
.04	.00	13.78	11.55	.000	.030	.024	.000	2463.00	268.50
.075352	100.	100.	100.	6	8	0	.00	56.43	324.93

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 2400.000

3301 HV CHANGED MORE THAN HVINS

2400.000	.83	2457.83	2458.38	.00	2459.75	1.92	7.01	.30	2457.00
758.0	8.3	741.4	8.3	1.0	66.3	1.0	2.5	2.1	2457.00
.04	8.47	11.18	8.47	.024	.030	.024	.000	2457.00	237.63
.065439	100.	100.	100.	6	11	0	.00	84.74	322.37

*SECNO 2500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .53

2500.000	1.30	2455.30	2455.51	.00	2456.30	1.00	3.18	.28	2454.00
758.0	12.7	732.6	12.7	2.1	90.8	2.1	2.7	2.3	2454.00
.04	6.04	8.06	6.04	.024	.030	.024	.000	2454.00	216.76
.018730	100.	100.	100.	4	14	0	.00	76.49	293.24

*SECNO 2600.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.45

2600.000	1.04	2452.04	2452.52	.00	2453.61	1.57	2.62	.06	2451.00
758.0	10.1	738.9	9.1	1.3	73.0	1.2	2.9	2.4	2451.00
.05	7.56	10.12	7.49	.024	.030	.024	.000	2451.00	207.45
.039406	100.	100.	100.	6	8	0	.00	74.87	282.32

*SECNO 2700.000

2700.000	1.19	2449.19	2449.52	.00	2450.40	1.20	3.11	.11	2448.00
758.0	10.8	741.0	6.2	1.6	83.7	1.0	3.0	2.6	2448.00
.05	6.57	8.85	6.10	.024	.030	.024	.000	2448.00	207.26
.025128	100.	100.	100.	5	11	0	.00	74.45	281.71

T1 EAST C-1 DETENTION BASIN NORTH WASH
T2 SEDIMENT CONTROL STUDY (MULTIPLE FREQUENCY ANALYSIS)
T3 VTN MODEL (SUPERCRITICAL)

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		4		1	0.03				2502.5	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3		-1				-1			

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300

*SECNO 1000.000

1000.000	2.06	2502.56	2503.10	2502.50	2504.36	1.80	.00	.00	2500.70
1347.0	55.3	1291.7	.0	5.6	119.5	.0	.0	.0	2503.00
.00	9.91	10.81	.00	.024	.030	.000	.000	2500.50	309.00
.029998	0.	0.	0.	0	11	5	.00	90.43	399.43

*SECNO 1100.000

1100.000	2.87	2500.37	2500.81	.00	2502.08	1.71	2.25	.03	2497.50
1347.0	80.2	1266.8	.0	8.3	120.2	.0	.3	.2	2501.00
.00	9.69	10.54	.00	.024	.030	.000	.000	2497.50	379.25
.017501	100.	100.	100.	5	14	0	.00	64.52	443.76

*SECNO 1200.000

3301 HV CHANGED MORE THAN HVINS

1200.000	2.65	2497.35	2498.14	.00	2499.95	2.59	2.05	.09	2496.00
1347.0	33.9	1313.1	.0	4.6	100.8	.0	.6	.3	2504.00
.00	7.39	13.03	.00	.024	.030	.000	.000	2494.70	363.23
.024572	90.	100.	110.	6	11	0	.00	52.48	415.71

*SECNO 1300.000

1300.000	3.24	2495.24	2495.97	.00	2497.78	2.54	2.15	.02	2495.00
1347.0	.4	1338.4	8.1	.2	104.4	1.4	.8	.4	2494.00
.01	2.03	12.82	5.70	.024	.030	.024	.000	2492.00	328.24
.019053	90.	100.	110.	7	14	0	.00	44.07	372.31

*SECNO 1400.000

1400.000	4.23	2493.23	2493.93	.00	2495.88	2.65	1.88	.01	2497.00
1347.0	.0	1347.0	.0	.0	103.1	.0	1.0	.5	2500.00
.01	.00	13.07	.00	.000	.030	.000	.000	2489.00	283.47
.018602	70.	100.	130.	7	14	0	.00	36.22	319.70

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 1500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.53

1500.000	2.78	2488.78	2490.09	.00	2493.01	4.23	2.72	.16	2494.00
1347.0	.0	1347.0	.0	.0	81.6	.0	1.3	.6	2490.00
.01	.00	16.50	.00	.000	.030	.000	.000	2486.00	306.33
.043347	110.	100.	95.	6	8	0	.00	39.58	345.91

*SECNO 1600.000

3301 HV CHANGED MORE THAN HVINS

1600.000	2.08	2486.08	2486.84	.00	2488.54	2.46	3.94	.53	2485.00
1347.0	22.2	1302.7	22.2	2.9	102.4	2.9	1.5	.7	2485.00
.01	7.67	12.72	7.67	.024	.030	.024	.000	2484.00	299.62
.036003	110.	100.	90.	5	5	0	.00	75.75	375.38

*SECNO 1700.000

3301 HV CHANGED MORE THAN HVINS

1700.000	1.81	2482.81	2483.40	.00	2484.77	1.95	3.62	.15	2482.00
1347.0	10.3	1326.3	10.3	1.6	117.6	1.6	1.7	.9	2482.00
.02	6.36	11.28	6.36	.024	.030	.024	.000	2481.00	305.97
.036305	110.	100.	90.	6	8	0	.00	98.07	404.03

*SECNO 1800.000

900.000	2.20	2480.20	2480.72	.00	2482.10	1.90	2.65	.02	2485.00
1347.0	.0	1106.8	240.2	.0	98.1	24.0	2.0	1.1	2478.00
.02	.00	11.28	10.03	.000	.030	.024	.000	2478.00	380.59
.020901	120.	100.	80.	6	14	0	.00	69.90	450.49

*SECNO 1900.000

1900.000	1.57	2477.57	2478.17	.00	2479.59	2.02	2.49	.01	2476.00
1347.0	31.0	1271.9	44.2	3.5	110.2	5.0	2.3	1.3	2476.00
.02	8.74	11.54	8.90	.024	.030	.024	.000	2476.00	385.50
.029618	90.	100.	110.	5	5	0	.00	80.80	466.30

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 2000.000

2000.000	2.70	2475.70	2476.06	.00	2477.29	1.59	2.18	.13	2474.00
1347.0	42.2	1304.8	.0	6.0	127.9	.0	2.6	1.5	2476.00
.02	7.05	10.20	.00	.024	.030	.000	.000	2473.00	342.94
.016752	70.	100.	130.	4	17	0	.00	70.54	413.48

*SECNO 2100.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.68

2100.000	1.30	2472.30	2472.99	.00	2474.57	2.27	2.65	.07	2471.00
1347.0	33.5	1290.7	22.8	3.4	106.0	2.3	2.9	1.7	2471.00
.03	9.92	12.18	9.71	.024	.030	.024	.000	2471.00	254.80
.047422	120.	100.	80.	6	15	0	.00	96.81	368.61

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

2200.000	2.12	2470.12	2470.43	.00	2471.44	1.32	2.85	.29	2469.00
1347.0	19.9	1254.3	72.9	3.5	134.9	8.4	3.2	1.9	2468.00
.03	5.73	9.30	8.67	.024	.030	.024	.000	2468.00	243.79
.019029	100.	100.	100.	5	17	0	.00	99.14	342.94

*SECNO 2300.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.71

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
2300.000	1.73	2464.73	2465.75	.00	2468.19	3.47	3.03	.21	2466.00
1347.0	.0	1264.0	83.0	.0	83.9	6.4	3.4	2.1	2463.00
.03	.00	15.06	13.00	.000	.030	.024	.000	2463.00	262.74
.055607	100.	100.	100.	7	11	0	.00	64.66	327.40

*SECNO 2400.000

2400.000	1.09	2458.09	2459.02	.00	2461.53	3.43	6.65	.01	2457.00
1347.0	19.3	1308.3	19.3	1.7	87.4	1.7	3.6	2.2	2457.00
.03	11.34	14.96	11.34	.024	.030	.024	.000	2457.00	236.88
.081037	100.	100.	100.	6	8	0	.00	86.25	323.12

*SECNO 2500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .50

2500.000	1.77	2455.77	2456.20	.00	2457.40	1.62	3.59	.54	2454.00
1347.0	30.6	1285.8	30.6	4.0	124.6	4.0	3.9	2.4	2454.00
.03	7.74	10.32	7.74	.024	.030	.024	.000	2454.00	215.55
.020144	100.	100.	100.	5	14	0	.00	78.90	294.45

*SECNO 2600.000

3301 HV CHANGED MORE THAN HVINS

2600.000	1.53	2452.53	2453.20	.00	2454.77	2.24	2.57	.06	2451.00
1347.0	26.0	1297.7	23.4	2.9	107.2	2.6	4.2	2.6	2451.00
.04	9.05	12.10	8.96	.024	.030	.024	.000	2451.00	206.26
.033792	100.	100.	100.	6	11	0	.00	77.15	283.40

*SECNO 2700.000

2700.000	1.63	2449.63	2450.21	.00	2451.64	2.01	3.06	.07	2448.00
1347.0	25.9	1306.1	15.0	3.0	114.1	1.9	4.4	2.8	2448.00
.04	8.51	11.45	7.89	.024	.030	.024	.000	2448.00	206.26
.027847	100.	100.	100.	6	11	0	.00	76.06	282.33

T1 EAST C-1 DETENTION BASIN NORTH WASH
T2 SEDIMENT CONTROL STUDY (MULTIPLE FREQUENCY ANALYSIS)
T3 VTN MODEL (SUPERCRITICAL)

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		5		1	0.03				2502.9	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	4		-1				-1			

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300

*SECNO 1000.000

1000.000	2.40	2502.90	2503.54	2502.90	2505.10	2.20	.00	.00	2500.70
1872.0	87.4	1784.6	.0	7.8	149.6	.0	.0	.0	2503.00
.00	11.20	11.93	.00	.024	.030	.000	.000	2500.50	307.90
.030608	0.	0.	0.	0	10	0	.00	99.69	407.60

*SECNO 1100.000

1100.000	3.47	2500.97	2501.37	.00	2502.88	1.91	2.13	.08	2497.50
1872.0	124.7	1747.3	.0	12.0	156.6	.0	.4	.2	2501.00
.00	10.37	11.15	.00	.024	.030	.000	.000	2497.50	378.06
.015638	100.	100.	100.	4	14	0	.00	71.61	449.68

*SECNO 1200.000

3301 HV CHANGED MORE THAN HVINS

1200.000	3.21	2497.91	2498.83	.00	2500.94	3.03	1.84	.11	2496.00
1872.0	80.8	1791.2	.0	9.1	126.6	.0	.7	.3	2504.00
.00	8.83	14.15	.00	.024	.030	.000	.000	2494.70	360.43
.022162	90.	100.	110.	6	11	0	.00	56.48	416.91

*SECNO 1300.000

1300.000	3.83	2495.83	2496.81	.00	2498.95	3.11	1.98	.01	2495.00
1872.0	12.3	1836.7	22.9	2.7	128.7	3.2	1.0	.5	2494.00
.01	4.62	14.27	7.20	.024	.030	.024	.000	2492.00	323.68
.017838	90.	100.	110.	5	11	0	.00	49.78	373.46

*SECNO 1400.000

1400.000	4.96	2493.96	2494.83	.00	2497.13	3.17	1.81	.01	2497.00
1872.0	.0	1872.0	.0	.0	131.0	.0	1.3	.6	2500.00
.01	.00	14.29	.00	.000	.030	.000	.000	2489.00	280.84
.018328	70.	100.	130.	9	14	0	.00	39.67	320.52

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 1500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.50

1500.000	3.33	2489.33	2490.85	.00	2494.31	4.98	2.64	.18	2494.00
1872.0	.0	1872.0	.0	.0	104.5	.0	1.6	.7	2490.00
.01	.00	17.91	.00	.000	.030	.000	.000	2486.00	304.60
.041306	110.	100.	95.	6	5	0	.00	43.16	347.76

*SECNO 1600.000

3301 HV CHANGED MORE THAN HVINS

1600.000	2.34	2486.34	2487.37	.00	2489.73	3.39	4.10	.48	2485.00
1872.0	42.0	1788.0	42.0	4.5	119.3	4.5	1.9	.8	2485.00
.01	9.43	14.99	9.43	.024	.030	.024	.000	2484.00	298.32
.040781	110.	100.	90.	6	5	0	.00	78.35	376.68

*SECNO 1700.000

3301 HV CHANGED MORE THAN HVINS

1700.000	2.08	2483.08	2483.84	.00	2485.61	2.53	3.87	.26	2482.00
1872.0	22.5	1826.9	22.5	2.9	142.1	2.9	2.2	1.0	2482.00
.01	7.75	12.86	7.75	.024	.030	.024	.000	2481.00	304.61
.036694	110.	100.	90.	5	11	0	.00	100.78	405.39

*SECNO 1800.000

1800.000	2.64	2480.64	2481.28	.00	2482.96	2.32	2.59	.06	2485.00
1872.0	.0	1475.9	396.1	.0	120.1	33.1	2.5	1.2	2478.00
.02	.00	12.29	11.95	.000	.030	.024	.000	2478.00	378.72
.019943	120.	100.	80.	6	14	0	.00	72.86	451.58

*SECNO 1900.000

1900.000	1.89	2477.89	2478.70	.00	2480.49	2.60	2.44	.03	2476.00
1872.0	51.4	1747.3	73.3	5.2	133.2	7.2	2.9	1.4	2476.00
.02	9.94	13.11	10.12	.024	.030	.024	.000	2476.00	384.56
.029716	90.	100.	110.	5	5	0	.00	83.05	467.61

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

*SECNO 2000.000

3301 HV CHANGED MORE THAN HVINS

2000.000	3.14	2476.14	2476.63	.00	2478.14	2.00	2.18	.18	2474.00
1872.0	78.1	1793.9	.0	9.5	156.4	.1	3.2	1.6	2476.00
.02	8.22	11.47	.08	.024	.030	.024	.000	2473.00	341.10
.016744	70.	100.	130.	5	17	0	.00	74.70	415.80

*SECNO 2100.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.67

2100.000	1.58	2472.58	2473.43	.00	2475.42	2.84	2.64	.08	2471.00
1872.0	55.6	1778.6	37.8	5.0	130.5	3.4	3.6	1.8	2471.00
.02	11.20	13.63	10.97	.024	.030	.024	.000	2471.00	253.70
.046854	120.	100.	80.	6	15	0	.00	101.42	369.37

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .65

2200.000	2.42	2470.42	2470.90	.00	2472.16	1.74	2.93	.33	2469.00
1872.0	38.9	1726.0	107.1	5.6	161.0	11.0	3.9	2.0	2468.00
.03	6.91	10.72	9.73	.024	.030	.024	.000	2468.00	242.09
.019991	100.	100.	100.	5	14	0	.00	102.00	344.09

*SECNO 2300.000

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 = 1.55

2300.000	2.15	2465.15	2466.29	.00	2469.00	3.85	2.95	.21	2466.00
1872.0	.0	1733.4	138.6	.0	109.2	9.9	4.3	2.2	2463.00
.03	.00	15.88	13.98	.000	.030	.024	.000	2463.00	258.49
.047931	100.	100.	100.	7	11	0	.00	70.73	329.22

*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

2400.000	1.32	2458.32	2459.50	.00	2462.79	4.46	6.15	.06	2457.00
1872.0	32.3	1807.3	32.3	2.5	105.8	2.5	4.6	2.4	2457.00
.03	12.94	17.08	12.94	.024	.030	.024	.000	2457.00	236.22
.081875	100.	100.	100.	6	8	0	.00	87.56	323.78

*SECNO 2500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .52

2500.000	2.11	2456.11	2456.73	.00	2458.30	2.20	3.80	.68	2454.00
1872.0	49.9	1772.2	49.9	5.5	147.3	5.5	4.9	2.6	2454.00
.03	9.02	12.03	9.02	.024	.030	.024	.000	2454.00	214.74
.021887	100.	100.	100.	6	14	0	.00	80.52	295.26

*SECNO 2600.000

HV CHANGED MORE THAN HVINS

2600.000	1.90	2452.90	2453.72	.00	2455.65	2.75	2.60	.06	2451.00
1872.0	44.4	1787.7	39.9	4.4	133.0	4.0	5.2	2.8	2451.00
.03	10.05	13.44	9.95	.024	.030	.024	.000	2451.00	205.36
.031296	100.	100.	100.	6	11	0	.00	78.87	284.22

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 2700.000

2700.000	1.95	2449.95	2450.74	.00	2452.61	2.66	3.02	.03	2448.00
1872.0	42.8	1804.4	24.8	4.4	136.7	2.7	5.5	2.9	2448.00
.04	9.81	13.20	9.10	.024	.030	.024	.000	2448.00	205.53
.029113	100.	100.	100.	5	11	0	.00	77.26	282.79

T1 EAST C-1 DETENTION BASIN NORTH WASH
T2 SEDIMENT CONTROL STUDY (MULTIPLE FREQUENCY ANALYSIS)
T3 VTN MODEL (SUPERCRITICAL)

	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		6		1	0.03				2503.1	

	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
J2	5		-1				-1			

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 5

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300

*SECNO 1000.000

1000.000	2.68	2503.18	2503.95	2503.10	2505.78	2.60	.00	.00	2500.70
2404.0	119.3	2284.7	.0	9.9	175.8	.1	.0	.0	2503.00
.00	12.06	13.00	.11	.024	.030	.024	.000	2500.50	307.01
.030324	0.	0.	0.	0	11	4	.00	103.70	410.71

*SECNO 1100.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

1100.000	3.93	2501.43	2501.88	.00	2503.64	2.21	2.02	.12	2497.50
2404.0	166.9	2236.6	.5	15.4	186.4	.2	.4	.2	2501.00
.00	10.83	12.00	2.50	.024	.030	.024	.000	2497.50	377.15
.014436	100.	100.	100.	4	14	0	.00	73.80	450.95

*SECNO 1200.000

3301 HV CHANGED MORE THAN HVINS

1200.000	3.70	2498.40	2499.44	.00	2501.81	3.41	1.71	.12	2496.00
2404.0	143.7	2260.3	.0	14.4	149.9	.0	.9	.4	2504.00
.00	9.96	15.08	.00	.024	.030	.000	.000	2494.70	357.98
.020779	90.	100.	110.	6	11	0	.00	59.98	417.96

*SECNO 1300.000

1300.000	4.39	2496.39	2497.59	.00	2499.94	3.56	1.85	.01	2495.00
2404.0	45.5	2314.0	44.6	7.3	150.7	5.4	1.2	.5	2494.00
.01	6.26	15.36	8.31	.024	.030	.024	.000	2492.00	319.56
.016746	90.	100.	110.	6	11	0	.00	54.93	374.49

*SECNO 1400.000

1400.000	5.62	2494.62	2495.61	.00	2498.21	3.59	1.73	.00	2497.00
2404.0	.0	2404.0	.0	.0	158.2	.0	1.6	.6	2500.00
.01	.00	15.20	.00	.000	.030	.000	.000	2489.00	278.49
.017912	70.	100.	130.	10	14	0	.00	42.76	321.25

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 1500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.49

1500.000	3.82	2489.82	2491.59	.00	2495.44	5.62	2.57	.20	2494.00
2404.0	.0	2404.0	.0	.0	126.4	.0	1.9	.7	2490.00
.01	.00	19.02	.00	.000	.030	.000	.000	2486.00	303.07
.039827	110.	100.	95.	6	5	0	.00	46.32	349.39

*SECNO 1600.000

3301 HV CHANGED MORE THAN HVINS

1600.000	2.57	2486.57	2487.84	.00	2490.85	4.28	4.19	.40	2485.00
2404.0	67.1	2269.8	67.1	6.1	134.4	6.1	2.2	.8	2485.00
.01	10.91	16.88	10.91	.024	.030	.024	.000	2484.00	297.16
.044112	110.	100.	90.	7	5	0	.00	80.68	377.84

*SECNO 1700.000

3301 HV CHANGED MORE THAN HVINS

1700.000	2.31	2483.31	2484.25	.00	2486.42	3.11	4.08	.35	2482.00
2404.0	38.4	2327.3	38.4	4.3	162.8	4.3	2.6	1.1	2482.00
.01	8.96	14.30	8.96	.024	.030	.024	.000	2481.00	303.46
.037805	110.	100.	90.	6	11	0	.00	103.09	406.54

*SECNO 1800.000

00.000	3.02	2481.02	2481.79	.00	2483.73	2.71	2.57	.12	2485.00
2404.0	.0	1843.5	560.5	.0	140.3	41.7	3.0	1.3	2478.00
.02	.00	13.14	13.45	.000	.030	.024	.000	2478.00	377.06
.019372	120.	100.	80.	7	14	0	.00	75.48	452.55

*SECNO 1900.000

1900.000	2.21	2478.21	2479.15	.00	2481.31	3.10	2.38	.04	2476.00
2404.0	75.8	2220.1	108.1	7.0	154.6	9.8	3.4	1.4	2476.00
.02	10.88	14.36	11.08	.024	.030	.024	.000	2476.00	383.69
.029212	90.	100.	110.	6	8	0	.00	85.15	468.83

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 2000.000

3301 HV CHANGED MORE THAN HVINS

2000.000	3.50	2476.50	2477.15	.00	2478.94	2.44	2.17	.20	2474.00
2404.0	119.5	2282.2	2.3	13.0	180.0	.7	3.8	1.6	2476.00
.02	9.18	12.68	3.17	.024	.030	.024	.000	2473.00	339.59
.016968	70.	100.	130.	6	17	0	.00	78.33	417.91

*SECNO 2100.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.66

2100.000	1.82	2472.82	2473.83	.00	2476.18	3.37	2.66	.09	2471.00
2404.0	81.1	2267.7	55.2	6.6	152.6	4.6	4.2	1.8	2471.00
.02	12.31	14.86	12.07	.024	.030	.024	.000	2471.00	252.74
.046880	120.	100.	80.	7	15	0	.00	105.45	370.04

*SECNO 2200.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .66

2200.000	2.70	2470.70	2471.31	.00	2472.84	2.14	2.97	.37	2469.00
2404.0	63.3	2195.8	144.9	8.0	184.6	13.7	4.7	2.1	2468.00
.02	7.88	11.90	10.59	.024	.030	.024	.000	2468.00	240.55
.020527	100.	100.	100.	6	14	0	.00	104.58	345.13

*SECNO 2300.000

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 = 1.46

2300.000	2.53	2465.53	2466.78	.00	2469.74	4.21	2.89	.21	2466.00
2404.0	.0	2201.9	202.1	.0	132.6	13.6	5.1	2.3	2463.00
.03	.00	16.61	14.85	.000	.030	.024	.000	2463.00	254.80
.043764	100.	100.	100.	6	11	0	.00	76.00	330.80

*SECNO 2400.000

3301 HV CHANGED MORE THAN HVINS

2400.000	1.54	2458.54	2459.94	.00	2463.86	5.32	5.77	.11	2457.00
2404.0	48.2	2307.5	48.2	3.4	123.6	3.4	5.4	2.5	2457.00
.03	14.14	18.66	14.14	.024	.030	.024	.000	2457.00	235.58
.079460	100.	100.	100.	6	8	0	.00	88.83	324.42

*SECNO 2500.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .54

2500.000	2.39	2456.39	2457.19	.00	2459.16	2.77	3.94	.76	2454.00
2404.0	72.1	2259.8	72.1	7.1	166.9	7.1	5.8	2.7	2454.00
.03	10.15	13.54	10.15	.024	.030	.024	.000	2454.00	214.04
.023457	100.	100.	100.	6	17	0	.00	81.92	295.96

*SECNO 2600.000

2600.000	2.23	2453.23	2454.20	.00	2456.47	3.24	2.64	.05	2451.00
2404.0	66.2	2278.2	59.6	6.1	155.8	5.5	6.2	2.9	2451.00
.03	10.93	14.62	10.83	.024	.030	.024	.000	2451.00	204.56
.029982	100.	100.	100.	6	11	0	.00	80.39	284.95

*SECNO 2700.000

2700.000	2.27	2450.27	2451.23	.00	2453.50	3.24	2.96	.00	2448.00
2404.0	63.2	2304.2	36.6	5.8	158.0	3.6	6.5	3.0	2448.00
.03	10.84	14.59	10.06	.024	.030	.024	.000	2448.00	204.83
.029298	100.	100.	100.	6	11	0	.00	78.40	283.22

THIS RUN EXECUTED 29JAN98 14:28:12

****
-2 WATER SURFACE PROFILES

Version 4.6.0; February 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

MODEL (SUPERCRITICAL)

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	1000.000	.00	.00	.00	2500.50	369.00	2501.59	2501.83	2502.43	299.38	7.38	50.21	21.33
	1000.000	.00	.00	.00	2500.50	758.00	2502.06	2502.45	2503.35	299.87	9.17	83.01	43.77
	1000.000	.00	.00	.00	2500.50	1347.00	2502.56	2503.10	2504.36	299.98	10.81	125.07	77.77
	1000.000	.00	.00	.00	2500.50	1872.00	2502.90	2503.54	2505.10	306.08	11.93	157.42	107.00
	1000.000	.00	.00	.00	2500.50	2404.00	2503.18	2503.95	2505.78	303.24	13.00	185.75	138.05
	1100.000	100.00	.00	.00	2497.50	369.00	2498.96	2499.17	2499.85	223.31	7.62	48.62	24.69
	1100.000	100.00	.00	.00	2497.50	758.00	2499.59	2499.94	2500.92	200.99	9.28	82.07	53.47
	1100.000	100.00	.00	.00	2497.50	1347.00	2500.37	2500.81	2502.08	175.01	10.54	128.44	101.82
	1100.000	100.00	.00	.00	2497.50	1872.00	2500.97	2501.37	2502.88	156.38	11.15	168.67	149.70
*	1100.000	100.00	.00	.00	2497.50	2404.00	2501.43	2501.88	2503.64	144.36	12.00	202.06	200.08
	1200.000	100.00	.00	.00	2494.70	369.00	2496.03	2496.38	2497.20	314.12	8.68	42.51	20.82
	1200.000	100.00	.00	.00	2494.70	758.00	2496.63	2497.19	2498.51	281.49	11.03	69.26	45.18
	1200.000	100.00	.00	.00	2494.70	1347.00	2497.35	2498.14	2499.95	245.72	13.03	105.34	85.93
	1200.000	100.00	.00	.00	2494.70	1872.00	2497.91	2498.83	2500.94	221.62	14.15	135.78	125.75
	1200.000	100.00	.00	.00	2494.70	2404.00	2498.40	2499.44	2501.81	207.79	15.08	164.31	166.77
	1300.000	100.00	.00	.00	2492.00	369.00	2493.66	2493.91	2494.72	196.02	8.27	44.60	26.36
	1300.000	100.00	.00	.00	2492.00	758.00	2494.41	2494.85	2496.13	196.92	10.53	72.10	54.02
	1300.000	100.00	.00	.00	2492.00	1347.00	2495.24	2495.97	2497.78	190.53	12.82	106.01	97.59
	1300.000	100.00	.00	.00	2492.00	1872.00	2495.83	2496.81	2498.95	178.38	14.27	134.57	140.16
	1300.000	100.00	.00	.00	2492.00	2404.00	2496.39	2497.59	2499.94	167.46	15.36	163.32	185.77
	1400.000	100.00	.00	.00	2489.00	369.00	2491.19	2491.55	2492.57	229.45	9.44	39.11	24.36
	1400.000	100.00	.00	.00	2489.00	758.00	2492.17	2492.68	2494.13	196.87	11.24	67.47	54.02
	1400.000	100.00	.00	.00	2489.00	1347.00	2493.23	2493.93	2495.88	186.02	13.07	103.07	98.76
	1400.000	100.00	.00	.00	2489.00	1872.00	2493.96	2494.83	2497.13	183.28	14.29	131.04	138.28
	1400.000	100.00	.00	.00	2489.00	2404.00	2494.62	2495.61	2498.21	179.12	15.20	158.18	179.62

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1500.000	100.00	.00	.00	2486.00	369.00	2487.39	2487.99	2489.34	470.16	11.20	32.95	17.02
	1500.000	100.00	.00	.00	2486.00	758.00	2488.02	2488.97	2491.13	465.45	14.14	53.61	35.13
	1500.000	100.00	.00	.00	2486.00	1347.00	2488.78	2490.09	2493.01	433.47	16.50	81.63	64.70
	1500.000	100.00	.00	.00	2486.00	1872.00	2489.33	2490.85	2494.31	413.06	17.91	104.54	92.11
*	1500.000	100.00	.00	.00	2486.00	2404.00	2489.82	2491.59	2495.44	398.27	19.02	126.41	120.46
*	1600.000	100.00	.00	.00	2484.00	369.00	2485.38	2485.50	2486.02	199.51	6.42	57.88	26.12
	1600.000	100.00	.00	.00	2484.00	758.00	2485.71	2486.10	2487.07	277.65	9.41	81.73	45.49
	1600.000	100.00	.00	.00	2484.00	1347.00	2486.08	2486.84	2488.54	360.03	12.72	108.19	70.99
	1600.000	100.00	.00	.00	2484.00	1872.00	2486.34	2487.37	2489.73	407.81	14.99	128.20	92.70
	1600.000	100.00	.00	.00	2484.00	2404.00	2486.57	2487.84	2490.85	441.12	16.88	146.74	114.46
*	1700.000	100.00	.00	.00	2481.00	369.00	2482.03	2482.30	2482.92	531.16	7.58	48.70	16.01
	1700.000	100.00	.00	.00	2481.00	758.00	2482.41	2482.79	2483.74	402.95	9.29	82.07	37.76
	1700.000	100.00	.00	.00	2481.00	1347.00	2482.81	2483.40	2484.77	363.05	11.28	120.85	70.69
	1700.000	100.00	.00	.00	2481.00	1872.00	2483.08	2483.84	2485.61	366.94	12.86	147.87	97.73
	1700.000	100.00	.00	.00	2481.00	2404.00	2483.31	2484.25	2486.42	378.05	14.30	171.36	123.64
*	1800.000	100.00	.00	.00	2478.00	369.00	2479.10	2479.28	2479.87	197.00	7.14	52.78	26.29
	1800.000	100.00	.00	.00	2478.00	758.00	2479.60	2479.99	2480.92	213.30	9.41	82.77	51.90
	1800.000	100.00	.00	.00	2478.00	1347.00	2480.20	2480.72	2482.10	209.01	11.28	122.09	93.17
	1800.000	100.00	.00	.00	2478.00	1872.00	2480.64	2481.28	2482.96	199.43	12.29	153.23	132.56
	1800.000	100.00	.00	.00	2478.00	2404.00	2481.02	2481.79	2483.73	193.72	13.14	181.92	172.72
	1900.000	100.00	.00	.00	2476.00	369.00	2476.74	2476.93	2477.48	291.57	6.92	53.73	21.61
	1900.000	100.00	.00	.00	2476.00	758.00	2477.13	2477.49	2478.42	290.39	9.17	83.68	44.48
	1900.000	100.00	.00	.00	2476.00	1347.00	2477.57	2478.17	2479.59	296.18	11.54	118.73	78.27
	1900.000	100.00	.00	.00	2476.00	1872.00	2477.89	2478.70	2480.49	297.16	13.11	145.65	108.59
	1900.000	100.00	.00	.00	2476.00	2404.00	2478.21	2479.15	2481.31	292.12	14.36	171.34	140.65
	2000.000	100.00	.00	.00	2473.00	369.00	2474.51	2474.62	2475.18	182.63	6.56	56.51	27.30
	2000.000	100.00	.00	.00	2473.00	758.00	2475.06	2475.28	2476.15	174.05	8.42	90.87	57.46
	2000.000	100.00	.00	.00	2473.00	1347.00	2475.70	2476.06	2477.29	167.52	10.20	133.92	104.07
	2000.000	100.00	.00	.00	2473.00	1872.00	2476.14	2476.63	2478.14	167.44	11.47	165.93	144.67
	2000.000	100.00	.00	.00	2473.00	2404.00	2476.50	2477.15	2478.94	169.68	12.68	193.69	184.55
*	2100.000	100.00	.00	.00	2471.00	369.00	2471.63	2471.88	2472.46	436.94	7.38	50.30	17.65
*	2100.000	100.00	.00	.00	2471.00	758.00	2471.94	2472.39	2473.42	465.54	9.84	77.66	35.13
	2100.000	100.00	.00	.00	2471.00	1347.00	2472.30	2472.99	2474.57	474.22	12.18	111.68	61.86
	2100.000	100.00	.00	.00	2471.00	1872.00	2472.58	2473.43	2475.42	468.54	13.63	138.93	86.48
*	2100.000	100.00	.00	.00	2471.00	2404.00	2472.82	2473.83	2476.18	468.80	14.86	163.75	111.03
*	2200.000	100.00	.00	.00	2468.00	369.00	2469.28	2469.33	2469.74	173.26	5.42	67.87	28.03
*	2200.000	100.00	.00	.00	2468.00	758.00	2469.68	2469.83	2470.50	178.30	7.28	104.79	56.77
*	2200.000	100.00	.00	.00	2468.00	1347.00	2470.12	2470.43	2471.44	190.29	9.30	146.81	97.65
*	2200.000	100.00	.00	.00	2468.00	1872.00	2470.42	2470.90	2472.16	199.91	10.72	177.67	132.40
*	2200.000	100.00	.00	.00	2468.00	2404.00	2470.70	2471.31	2472.84	205.27	11.90	206.29	167.79

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2300.000	100.00	.00	.00	2463.00	369.00	2463.67	2464.27	2465.97	1136.13	12.24	30.34	10.95
	2300.000	100.00	.00	.00	2463.00	758.00	2464.15	2464.98	2467.06	753.52	13.78	55.45	27.61
	2300.000	100.00	.00	.00	2463.00	1347.00	2464.73	2465.75	2468.19	556.07	15.06	90.32	57.12
	2300.000	100.00	.00	.00	2463.00	1872.00	2465.15	2466.29	2469.00	479.31	15.88	119.08	85.51
*	2300.000	100.00	.00	.00	2463.00	2404.00	2465.53	2466.78	2469.74	437.64	16.61	146.18	114.92
*	2400.000	100.00	.00	.00	2457.00	369.00	2457.60	2457.86	2458.50	480.07	7.66	48.43	16.84
	2400.000	100.00	.00	.00	2457.00	758.00	2457.83	2458.38	2459.75	654.39	11.18	68.27	29.63
	2400.000	100.00	.00	.00	2457.00	1347.00	2458.09	2459.02	2461.53	810.37	14.96	90.85	47.32
	2400.000	100.00	.00	.00	2457.00	1872.00	2458.32	2459.50	2462.79	818.75	17.08	110.82	65.42
	2400.000	100.00	.00	.00	2457.00	2404.00	2458.54	2459.94	2463.86	794.60	18.66	130.46	85.28
*	2500.000	100.00	.00	.00	2454.00	369.00	2454.83	2454.94	2455.42	203.25	6.23	59.68	25.88
*	2500.000	100.00	.00	.00	2454.00	758.00	2455.30	2455.51	2456.30	187.30	8.06	95.04	55.39
*	2500.000	100.00	.00	.00	2454.00	1347.00	2455.77	2456.20	2457.40	201.44	10.32	132.47	94.91
*	2500.000	100.00	.00	.00	2454.00	1872.00	2456.11	2456.73	2458.30	218.87	12.03	158.35	126.53
*	2500.000	100.00	.00	.00	2454.00	2404.00	2456.39	2457.19	2459.16	234.57	13.54	181.11	156.96
*	2600.000	100.00	.00	.00	2451.00	369.00	2451.67	2451.94	2452.59	411.48	7.71	48.12	18.19
*	2600.000	100.00	.00	.00	2451.00	758.00	2452.04	2452.52	2453.61	394.06	10.12	75.58	38.18
	2600.000	100.00	.00	.00	2451.00	1347.00	2452.53	2453.20	2454.77	337.92	12.10	112.72	73.28
	2600.000	100.00	.00	.00	2451.00	1872.00	2452.90	2453.72	2455.65	312.96	13.44	141.42	105.82
	2600.000	100.00	.00	.00	2451.00	2404.00	2453.23	2454.20	2456.47	299.82	14.62	167.37	138.84
	2700.000	100.00	.00	.00	2448.00	369.00	2448.80	2448.94	2449.46	235.65	6.53	56.86	24.04
	2700.000	100.00	.00	.00	2448.00	758.00	2449.19	2449.52	2450.40	251.28	8.85	86.40	47.82
	2700.000	100.00	.00	.00	2448.00	1347.00	2449.63	2450.21	2451.64	278.47	11.45	119.03	80.72
	2700.000	100.00	.00	.00	2448.00	1872.00	2449.95	2450.74	2452.61	291.13	13.20	143.76	109.71
	2700.000	100.00	.00	.00	2448.00	2404.00	2450.27	2451.23	2453.50	292.98	14.59	167.43	140.45

MODEL (SUPERCRITICAL)

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	1000.000	369.00	2501.59	.00	.00	.09	64.04	.00
	1000.000	758.00	2502.06	.47	.00	.06	76.73	.00
	1000.000	1347.00	2502.56	.50	.00	.06	90.43	.00
	1000.000	1872.00	2502.90	.34	.00	.00	99.69	.00
	1000.000	2404.00	2503.18	.28	.00	.08	103.70	.00
	1100.000	369.00	2498.96	.00	-2.63	.00	47.40	100.00
	1100.000	758.00	2499.59	.63	-2.46	.00	55.22	100.00
	1100.000	1347.00	2500.37	.78	-2.19	.00	64.52	100.00
	1100.000	1872.00	2500.97	.60	-1.93	.00	71.61	100.00
*	1100.000	2404.00	2501.43	.46	-1.74	.00	73.80	100.00
	1200.000	369.00	2496.03	.00	-2.93	.00	43.08	100.00
	1200.000	758.00	2496.63	.60	-2.97	.00	47.31	100.00
	1200.000	1347.00	2497.35	.73	-3.02	.00	52.48	100.00
	1200.000	1872.00	2497.91	.56	-3.06	.00	56.48	100.00
	1200.000	2404.00	2498.40	.49	-3.03	.00	59.98	100.00
	1300.000	369.00	2493.66	.00	-2.37	.00	33.81	100.00
	1300.000	758.00	2494.41	.75	-2.22	.00	38.80	100.00
	1300.000	1347.00	2495.24	.83	-2.12	.00	44.07	100.00
	1300.000	1872.00	2495.83	.60	-2.08	.00	49.78	100.00
	1300.000	2404.00	2496.39	.55	-2.01	.00	54.93	100.00
	1400.000	369.00	2491.19	.00	-2.47	.00	26.70	100.00
	1400.000	758.00	2492.17	.98	-2.23	.00	31.28	100.00
	1400.000	1347.00	2493.23	1.06	-2.01	.00	36.22	100.00
	1400.000	1872.00	2493.96	.73	-1.87	.00	39.67	100.00
	1400.000	2404.00	2494.62	.66	-1.76	.00	42.76	100.00
*	1500.000	369.00	2487.39	.00	-3.80	.00	30.63	100.00
*	1500.000	758.00	2488.02	.63	-4.15	.00	34.71	100.00
*	1500.000	1347.00	2488.78	.76	-4.45	.00	39.58	100.00
	1500.000	1872.00	2489.33	.55	-4.63	.00	43.16	100.00
	1500.000	2404.00	2489.82	.49	-4.80	.00	46.32	100.00
*	1600.000	369.00	2485.38	.00	-2.01	.00	68.79	100.00
	1600.000	758.00	2485.71	.33	-2.31	.00	72.18	100.00
	1600.000	1347.00	2486.08	.37	-2.70	.00	75.75	100.00
	1600.000	1872.00	2486.34	.26	-2.99	.00	78.35	100.00
	1600.000	2404.00	2486.57	.23	-3.26	.00	80.68	100.00
*	1700.000	369.00	2482.03	.00	-3.35	.00	90.41	100.00
	1700.000	758.00	2482.41	.38	-3.30	.00	94.03	100.00
	1700.000	1347.00	2482.81	.40	-3.26	.00	98.07	100.00
	1700.000	1872.00	2483.08	.26	-3.26	.00	100.78	100.00
	1700.000	2404.00	2483.31	.23	-3.26	.00	103.09	100.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1800.000	369.00	2479.10	.00	-2.93	.00	55.75	100.00
	1800.000	758.00	2479.60	.50	-2.81	.00	62.97	100.00
	800.000	1347.00	2480.20	.60	-2.62	.00	69.90	100.00
	1800.000	1872.00	2480.64	.44	-2.44	.00	72.86	100.00
	1800.000	2404.00	2481.02	.38	-2.29	.00	75.48	100.00
	1900.000	369.00	2476.74	.00	-2.36	.00	75.08	100.00
	1900.000	758.00	2477.13	.39	-2.47	.00	77.77	100.00
	1900.000	1347.00	2477.57	.44	-2.62	.00	80.80	100.00
	1900.000	1872.00	2477.89	.32	-2.74	.00	83.05	100.00
	1900.000	2404.00	2478.21	.31	-2.81	.00	85.15	100.00
	2000.000	369.00	2474.51	.00	-2.23	.00	59.64	100.00
	2000.000	758.00	2475.06	.55	-2.07	.00	64.71	100.00
	2000.000	1347.00	2475.70	.64	-1.87	.00	70.54	100.00
	2000.000	1872.00	2476.14	.44	-1.76	.00	74.70	100.00
	2000.000	2404.00	2476.50	.36	-1.71	.00	78.33	100.00
*	2100.000	369.00	2471.63	.00	-2.89	.00	85.51	100.00
*	2100.000	758.00	2471.94	.31	-3.12	.00	90.73	100.00
*	2100.000	1347.00	2472.30	.36	-3.40	.00	96.81	100.00
*	2100.000	1872.00	2472.58	.28	-3.55	.00	101.42	100.00
*	2100.000	2404.00	2472.82	.23	-3.68	.00	105.45	100.00
*	2200.000	369.00	2469.28	.00	-2.35	.00	91.44	100.00
*	2200.000	758.00	2469.68	.40	-2.25	.00	95.12	100.00
*	2200.000	1347.00	2470.12	.43	-2.19	.00	99.14	100.00
*	2200.000	1872.00	2470.42	.30	-2.16	.00	102.00	100.00
*	2200.000	2404.00	2470.70	.28	-2.11	.00	104.58	100.00
*	2300.000	369.00	2463.67	.00	-5.61	.00	49.67	100.00
*	2300.000	758.00	2464.15	.48	-5.53	.00	56.43	100.00
*	2300.000	1347.00	2464.73	.57	-5.39	.00	64.66	100.00
*	2300.000	1872.00	2465.15	.43	-5.27	.00	70.73	100.00
*	2300.000	2404.00	2465.53	.38	-5.17	.00	76.00	100.00
*	2400.000	369.00	2457.60	.00	-6.07	.00	83.39	100.00
	2400.000	758.00	2457.83	.24	-6.32	.00	84.74	100.00
	2400.000	1347.00	2458.09	.26	-6.63	.00	86.25	100.00
	400.000	1872.00	2458.32	.23	-6.83	.00	87.56	100.00
	2400.000	2404.00	2458.54	.22	-6.98	.00	88.83	100.00
*	2500.000	369.00	2454.83	.00	-2.77	.00	74.14	100.00
*	2500.000	758.00	2455.30	.47	-2.53	.00	76.49	100.00
*	2500.000	1347.00	2455.77	.47	-2.32	.00	78.90	100.00
*	2500.000	1872.00	2456.11	.33	-2.22	.00	80.52	100.00
*	2500.000	2404.00	2456.39	.28	-2.16	.00	81.92	100.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2600.000	369.00	2451.67	.00	-3.16	.00	73.14	100.00
	2600.000	758.00	2452.04	.37	-3.26	.00	74.87	100.00
	2600.000	1347.00	2452.53	.49	-3.24	.00	77.15	100.00
	2600.000	1872.00	2452.90	.37	-3.21	.00	78.87	100.00
	2600.000	2404.00	2453.23	.33	-3.16	.00	80.39	100.00
	2700.000	369.00	2448.80	.00	-2.87	.00	72.96	100.00
	2700.000	758.00	2449.19	.39	-2.85	.00	74.45	100.00
	2700.000	1347.00	2449.63	.44	-2.90	.00	76.06	100.00
	2700.000	1872.00	2449.95	.31	-2.95	.00	77.26	100.00
	2700.000	2404.00	2450.27	.32	-2.96	.00	78.40	100.00

FLOODWAY DATA, MODEL (SUPERCRITICAL)
TILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1000.000	77.	83.	9.1	2502.1	2501.6	.5
1100.000	55.	82.	9.2	2499.6	2499.0	.6
1200.000	47.	69.	10.9	2496.6	2496.0	.6
1300.000	39.	72.	10.5	2494.4	2493.7	.7
1400.000	31.	67.	11.2	2492.2	2491.2	1.0
1500.000	35.	54.	14.1	2488.0	2487.4	.6
1600.000	72.	82.	9.3	2485.7	2485.4	.3
1700.000	94.	82.	9.2	2482.4	2482.0	.4
1800.000	63.	83.	9.2	2479.6	2479.1	.5
1900.000	78.	84.	9.1	2477.1	2476.7	.4
2000.000	65.	91.	8.3	2475.0	2474.5	.5
2100.000	111.	78.	9.8	2471.9	2471.6	.3
2200.000	95.	105.	7.2	2469.7	2469.3	.4
2300.000	56.	55.	13.7	2464.2	2463.7	.5
2400.000	85.	68.	11.1	2457.8	2457.6	.2
2500.000	76.	95.	8.0	2455.3	2454.8	.5
2600.000	75.	76.	10.0	2452.1	2451.7	.4
2700.000	74.	86.	8.8	2449.2	2448.8	.4

FLOODWAY DATA, MODEL (SUPERCRITICAL)
ILE NO. 3

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1000.000	90.	125.	10.8	2502.6	2501.6	1.0
1100.000	65.	128.	10.5	2500.4	2499.0	1.4
1200.000	52.	105.	12.8	2497.4	2496.0	1.4
1300.000	44.	106.	12.7	2495.2	2493.7	1.5
1400.000	36.	103.	13.1	2493.2	2491.2	2.0
1500.000	40.	82.	16.5	2488.8	2487.4	1.4
1600.000	76.	108.	12.5	2486.1	2485.4	.7
1700.000	98.	121.	11.1	2482.8	2482.0	.8
1800.000	70.	122.	11.0	2480.2	2479.1	1.1
1900.000	81.	119.	11.3	2477.6	2476.7	.9
2000.000	71.	134.	10.1	2475.7	2474.5	1.2
2100.000	114.	112.	12.1	2472.3	2471.6	.7
2200.000	99.	147.	9.2	2470.1	2469.3	.8
2300.000	65.	90.	14.9	2464.7	2463.7	1.0
2400.000	86.	91.	14.8	2458.1	2457.6	.5
2500.000	79.	132.	10.2	2455.8	2454.8	1.0
2600.000	77.	113.	12.0	2452.5	2451.7	.8
2700.000	76.	119.	11.3	2449.6	2448.8	.8

FLOODWAY DATA, MODEL (SUPERCRITICAL)
FILE NO. 4

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1000.000	100.	157.	11.9	2502.9	2501.6	1.3
1100.000	72.	169.	11.1	2501.0	2499.0	2.0
1200.000	56.	136.	13.8	2497.9	2496.0	1.9
1300.000	50.	135.	13.9	2495.8	2493.7	2.1
1400.000	40.	131.	14.3	2494.0	2491.2	2.8
1500.000	43.	105.	17.9	2489.3	2487.4	1.9
1600.000	78.	128.	14.6	2486.3	2485.4	.9
1700.000	101.	148.	12.7	2483.1	2482.0	1.1
1800.000	73.	153.	12.2	2480.6	2479.1	1.5
1900.000	83.	146.	12.9	2477.9	2476.7	1.2
2000.000	75.	166.	11.3	2476.1	2474.5	1.6
2100.000	116.	139.	13.5	2472.6	2471.6	1.0
2200.000	102.	178.	10.5	2470.4	2469.3	1.1
2300.000	71.	119.	15.7	2465.2	2463.7	1.5
2400.000	88.	111.	16.9	2458.3	2457.6	.7
2500.000	81.	158.	11.8	2456.1	2454.8	1.3
2600.000	79.	141.	13.2	2452.9	2451.7	1.2
2700.000	77.	144.	13.0	2449.9	2448.8	1.1

FLOODWAY DATA, MODEL (SUPERCRITICAL)
FILE NO. 5

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1000.000	104.	186.	12.9	2503.2	2501.6	1.6
1100.000	74.	202.	11.9	2501.4	2499.0	2.4
1200.000	60.	164.	14.6	2498.4	2496.0	2.4
1300.000	55.	163.	14.7	2496.4	2493.7	2.7
1400.000	43.	158.	15.2	2494.6	2491.2	3.4
1500.000	46.	126.	19.0	2489.8	2487.4	2.4
1600.000	81.	147.	16.4	2486.6	2485.4	1.2
1700.000	103.	171.	14.0	2483.3	2482.0	1.3
1800.000	75.	182.	13.2	2481.0	2479.1	1.9
1900.000	85.	171.	14.0	2478.2	2476.7	1.5
2000.000	78.	194.	12.4	2476.5	2474.5	2.0
2100.000	117.	164.	14.7	2472.8	2471.6	1.2
2200.000	105.	206.	11.7	2470.7	2469.3	1.4
2300.000	76.	146.	16.4	2465.5	2463.7	1.8
2400.000	89.	130.	18.4	2458.5	2457.6	.9
2500.000	82.	181.	13.3	2456.4	2454.8	1.6
2600.000	80.	167.	14.4	2453.2	2451.7	1.5
2700.000	78.	167.	14.4	2450.3	2448.8	1.5

SECTION 10

GEOTECNICAL REOPORT

BY - KLEINFELDER

GEOTECHNICAL DESIGN REPORT
SOUTHERN NEVADA WATER AUTHORITY
EAST C-1 DETENTION BASIN
CLARK COUNTY, NEVADA
31-110021-001

April 15, 1998

Prepared for:

Mr. Ken Gilbreth, P.E.
VTN Nevada
2727 South Rainbow Boulevard
Las Vegas, Nevada 89102-5148

Julie A. Halligan
Project Professional

Andrew E. Bowman, P.E.
Geotechnical Department Manager

Ann L. Backstrom, P.E.
Senior Engineer

4-15-98

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APPENDIX A

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APPENDIX B

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Slope Stability Calculations

1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical investigation for the Southern Nevada Water Authority (SNWA) East C-1 Detention Basin. This work has been performed for VTN Nevada. The results of our seepage and slope stability analyses are presented in this report, along with our recommendations for site grading, structural fill and foundation design for structures.

Information regarding the surface and subsurface soil conditions at the proposed project site, including results of 32 auger borings, three core borings and laboratory test results are presented in our Geotechnical Data Report, dated December 23, 1997, Kleinfelder Project No. 31-110021-001.

The recommendations contained in this report are subject to the limitations presented herein. Attention is directed to the 'Limitations" section of this report.

1.2 PROJECT DESCRIPTION

The project is located at the western edge of the River Mountains to the north and east of the River Mountains Water Treatment Facility in Sections 14, 23, and 24, T22S, R63E. The principle project components consist of an embankment, spillway, and levee. A site plan is presented on Figures 1A, 1B and 1C.

The embankment will be constructed from materials borrowed from the detention basin area. The embankment will have a curved, roughly north-south trending crest at elevation 2510 with a total crest length of approximately 975 feet. A slope of 4:1 (horizontal:vertical) for a total height of approximately 63 feet is proposed for the upstream face. Soil-cement reinforcement is proposed for erosion protection of the upstream face. The downstream face will have a total height of approximately 75 feet and a proposed slope of 3:1 (horizontal:vertical).

It is our understanding that the embankment and detention basin are being designed for the 1000 year flood event. This event would result in a water surface elevation of 2500 within the basin. The basin will have a low level outlet at the base of the upstream side of the embankment at an elevation of approximately 2445. The low level flow will enter the outlet through a concrete box structure at the base of the upstream slope, pass beneath the embankment through either reinforced concrete or steel pipe, and exit as surface flow from a concrete box structure at the base of the downstream slope.

The spillway will be located approximately 600 feet northeast of the north abutment. Spillway flows will be directed northwest into a small drainage which is parallel to and approximately 1500 feet to the north of the main drainage spanned by the embankment. The spillway will have an apron elevation of 2495, crest elevation of 2500, and will be constructed of cast-in-place concrete. Rock cuts of up to approximately 65 feet will be required in the spillway area. Permanent cut slopes of 2:1 (horizontal:vertical) up to 50 feet in height are proposed for the spillway side slopes.

The proposed levee will be approximately 4300 feet in length and follow an alignment west of and approximately parallel to the River Mountain range front. The levee will be approximately 5 feet high with side slopes ranging between 4:1 and 7:1 (horizontal:vertical). A broad, shallow channel approximately 50 feet in width will be excavated adjacent to the levee. The invert of the channel will be approximately 5 feet below the crest of the levee.

2.0 SUMMARY OF SITE CONDITIONS

The proposed embankment spans a major drainage of the River Mountains. The drainage at the location of the embankment consists of an alluvial filled channel ranging between approximately 100 and 200 feet in width flanked by slopes underlain by volcanic bedrock. The slopes underlying the south abutment of the proposed embankment are composed of dacite breccia. The dacite breccia is hard, strong and relatively unweathered, forming resistant slopes locally as steep as 1:1 (horizontal:vertical) in the area of the south abutment. The north abutment area is underlain by slopes of 4:1 and flatter (horizontal:vertical) underlain predominantly by dacite flows. Surface exposures of the dacite flows in the north abutment area are typically moderately weathered, moderately hard, and moderately strong to strong.

Dacite tuff with lesser amounts of interlayered dacite breccia are the primary rock types encountered in the spillway area. The results of core borings in this area indicate that the dacite tuff is predominately relatively unweathered and moderately strong with up to approximately 20 percent moderately to highly weathered, weak zones typically occurring in layers 1 to 4 feet thick.

The detention basin area is underlain by volcanic and sedimentary bedrock with a veneer of Quaternary sand and gravel alluvium deposits. The volcanic bedrock consists primarily of dacite breccia and flows. The sedimentary bedrock consists of interlayered, well-bedded conglomerate and sandstone deposits which are typically moderately to well cemented with calcium carbonate. The volcanic and sedimentary bedrock is present within approximately 5 feet of the surface in the northern approximately one-half of the detention basin area. The southern approximately one-half of the basin is occupied by a broad wash with alluvial deposits up to on the order of 20 feet thick.

The alluvial soils consist of interlayered gravelly sand and sandy gravel with typically small amounts of silt. Laboratory test results indicate that the majority of the on-site soils consist of 30 to 70 percent sand with 20 to 60 percent gravel and typically 5 to 20 percent silt distributed throughout. Blow counts during sampling indicate that the majority of the on-site soils are dense to very dense in consistency. Partially cemented soils were encountered at several locations and at varied depths on the site.

The alluvial soils in the vicinity of the levee also consist primarily of sand with varying amounts of gravel, typically small amounts of silt and zones of partial cementation.

3.0 GEOLOGIC HAZARDS

3.1 FAULTING AND SEISMICITY

The site is located in the southeastern portion of the River Mountains, a low, rugged range of volcanic rock which separates the Las Vegas Valley and Lake Mead. The site is mapped on the Geologic Map of the Henderson Quadrangle (Bell and Smith, 1980). The results of more detailed mapping performed by Kleinfelder, Inc., as part of this project are presented on Figure 2.

Northwest trending bedrock faults have been mapped both through the spillway area and the proposed embankment area on the published Nevada Bureau of Mines and Geology Quadrangle map (Bell and Smith, 1980). Traces of the bedrock faults were located during the geological mapping performed at the site. The fault traces observed in these areas were up to approximately two feet in width and appeared to be brecciated and re-cemented with calcium carbonate. Isolated areas of bleached, altered dacite in the vicinity of the fault traces were also observed at the base of the slope on the north side of the embankment area. Based upon our review of published literature, the estimated age of faulting in the vicinity of the site is greater than 10,000 years (Bell and Smith, 1980; Siddharthan and Others, 1993).

A probabilistic seismic risk analysis was performed to obtain a peak horizontal ground acceleration for use in our slope stability analysis for the proposed embankments. The results of the seismic hazards analysis are presented in Appendix A.

3.2 SUBSIDENCE

Regional and localized subsidence has impacted many sites within the Las Vegas Valley. This geologic hazard occurs primarily in areas underlain by fine-grained sediments impacted by groundwater withdrawal. Saturated sand and gravel soils are anticipated to be present at great depth below the site. However, we do not anticipate that subsidence will occur in the event that these materials are dewatered in the future.

4.0 SEEPAGE ANALYSIS

4.1 GENERAL

As previously discussed, the proposed embankment will be constructed from the native sand and gravel soils borrowed from the basin area. Waterside and landside slopes of 4:1 and 3:1 (horzontal:vertical), respectively, are proposed.

SEEP/W was used to model seepage through the design embankment Two generalized embankment sections were selected for analysis. The approximate location of the generalized sections are shown on Figure 1A. Case I models the portions of the embankment where fill soils lie directly on the bedrock. For Case II, the embankment fill soils lie on the native soils overlying bedrock at an average depth of approximately 40 feet. The embankment sections modeled in both Cases I and II include a schematic blanket drain system; Case II also includes a cut-off trench of recompacted native soils below the crest of the embankment. Design recommendations for the cut-off trench and gravel blanket drain are presented in Sections 6.3.2 and 6.3.3, respectively.

4.2 PERMEABILITY VALUES

A permeability value of 1×10^{-1} cm/sec was selected for the undisturbed native soils below the embankment in our seepage analyses. This value was selected based upon a correlation by Hazen published in Freeze and Cherry (1979) which relates permeability to the d_{10} value determined in grain size analyses. The Hazen relationship was applied to the d_{10} values obtained from sieve analyses performed on soils sampled at the East C-1 detention basin site and presented in our previously referenced data report. A mean value of approximately 1×10^{-2} cm/sec was obtained. The 1×10^{-1} cm/sec value selected represents the mean plus two standard deviations value resulting from this analysis.

A permeability of 1×10^{-2} cm/sec was utilized for the recompacted native soil of the embankment and cut-off trench based upon laboratory permeability test results performed on the native soils compacted to 90 percent of ASTM D-1557. A permeability of 1×10^{-3} cm/sec was selected for the volcanic bedrock based upon published typical permeability values for weathered volcanic flow rocks, similar to those encountered beneath the embankment (Freeze and Cherry, 1979). Finally, a permeability of 1×10^{0} cm/sec for the drainage blanket was utilized in our analysis, based upon published typical values for coarse, granular soils (Fetter, 1980).

4.3 RESULTS OF ANALYSIS

Basin inflow and outflow data in the form of water level elevations versus time was provided verbally by VTN Nevada for our analysis. It is our understanding that the water reaches a maximum stage of el. 2500 during the design flood event approximately 6 hours after reaching the toe of the waterside slope. This results in a maximum water height of 55 feet. The basin drains to the pre-inundation level in 90 hours after reaching the maximum water level.

The results of our seepage analysis are presented in Appendix B. Plots of the seepage front versus time in one hour intervals during filling are presented on Plates B-1 and B-2 for Cases I and II, respectively. Plots of the seepage front versus time in 10 hour intervals during draining of the basin are presented on Plates B-3 and B-4 for Case I and Plates B-5 and B-6 for Case II. As shown on Plates B-1 through B-6, the results of our analysis indicate that the seepage front does not reach the face of the downstream slope.

5.0 SLOPE STABILITY ANALYSIS

Based upon the review of our field investigation and laboratory test results presented in our geotechnical data report, an internal friction angle of 38 degrees along with a cohesion of 100 psf was used for the embankment fill soils in our stability analyses. It is our opinion that this value would be representative of the native, predominantly sand and gravel soils compacted to a minimum of 95 percent of ASTM D-1557 in both the wet and dry states. A Lower Level Event (LLE) seismic peak ground acceleration of 0.22g was obtained in our seismic hazards analysis for the site and was used for the seismic case in the slope stability analysis.

Slope stability analysis was performed using the computer program XSTABL, Version 5.202, by Interactive Software Designs, Inc. XSTABL utilizes the Bishops Simplified Method of Slices. A minimum factor of safety for the end of construction loading condition was calculated. Our analysis also includes a factor of safety calculation for the waterside slope with the anticipated maximum saturation during transient seepage using the phreatic surface obtained during our seepage analysis. Our seepage analysis indicates that the intersection of the phreatic surface with the waterside slope face closely follows the falling water surface during basin emptying. The slope stability was calculated for the rapid drawdown condition using the phreatic surface corresponding to approximately t = 55 hours. A summary of the calculated factors of safety are presented in the following table.

LOADING CONDITION	CALCULATED MINIMUM FACTOR OF SAFETY	
	STATIC	SEISMIC
End of Construction (dry) (3:1 slope)	2.6	1.3
End of Construction (dry) (4:1 slope)	3.3	1.4
Transient Seepage (maximum saturation)	3.2	1.1
Rapid Drawdown	3.0	1.0

Based on our analysis, the calculated factors of safety meet or exceed minimum standards developed by the State of Nevada Division of Water Resources and presented in the 1995 publication Laws and Permitting Information Pertaining to Dams. A drawing showing the soil parameters used in the slope stability analysis is presented on Plate C-1 in Appendix C. Critical circle drawings for each of the

above cases are presented on Plates C-2 through C-9 in Appendix C. The calculations from the XSTABL analysis are presented in Appendix D of this report.

6.0 ADDITIONAL ANALYSES AND RECOMMENDATIONS

6.1 GENERAL

The results of our field exploration and laboratory testing indicate that the alluvial soils are relatively consistent across the site and are composed of interlayered, dense to very dense sands and gravels with typically small concentrations of silt and interbedded zones of partial cementation. The native soils, minus organics, debris or other deleterious materials, should also be suitable for use as structural fill for embankment construction and backfill behind proposed structures, provided moisture contents are adjusted to at or near optimum, and fill materials are processed to remove oversized materials. Recommendations regarding the geotechnical aspects of project design and construction specifications are presented in the following sections.

6.2 SITE PREPARATION AND GRADING

6.2.1 General

Prior to general site grading, all vegetation, debris or other deleterious materials should be stripped and disposed of outside the proposed construction limits. Following stripping, the embankment spillway and levee areas should be excavated to design subgrade. Soft, loose or yielding soils or highly weathered bedrock encountered should be removed to expose firm, undisturbed subgrade soils or competent bedrock materials. The exposed subgrade to support foundations or structural fill should then be scarified to a minimum depth of six inches, moisture conditioned to at or within 2 percent of the optimum moisture content, and compacted to the requirements of structural fill. Where competent bedrock is exposed, scarification and recompaction will not be required. A representative of the Geotechnical Engineer should observe the foundation excavations and subgrades of overexcavated areas prior to placement of structural fill.

6.2.2 Temporary Excavations in Soil

Based on observations made during drilling, temporary excavations performed in the on-site soils are not expected to stand vertically during construction without sluffing or caving. The on-site soils will require temporary shoring, or sloping of the side walls. Temporary excavations to depths of five feet in soil may be unshored provided they are sloped back at a ratio no steeper than 1:1 (horizontal to vertical). Excavations greater than five feet in depth within the on-site, non-cemented soils should be shored, or if unshored, should be laid back to a slope no steeper than

1.5:1 (horizontal:vertical). Slopes may need to be flattened further based on conditions encountered during construction.

Trenching and shoring operations should be conducted in accordance with Sections 1926.650 through .653 of the State of Nevada Occupational Safety and Health Standards of Construction Industry. Traffic should be routed back and materials which are stockpiled should be placed back from the top of the excavation a horizontal distance equal to the depth of the excavation.

6.2.3 Rock Excavation

Rock excavation will be required in several areas of the site. Rock cuts of up to 65 feet will be required to bring the spillway area to grade. Rock excavations will also be required in other areas, such as for bench construction where the embankment fill is placed against rock slopes and in localized areas for placement of the gravel blanket drain.

6.2.4 Permanent Slopes

Permanent cut slopes up to 30 feet in height within the native sand and gravel deposits as well as fill slopes up to 30 feet in height which are constructed of the native soils prepared as structural fill should be graded to a maximum slope of 2:1 (horizontal:vertical). Surface raveling and general degradation due to weathering and erosion of unprotected, permanent slopes constructed in the native sand and gravel deposits should be anticipated.

In order to facilitate drainage of surface flows and help control erosion, we recommend that a terrace be constructed near mid-height of unprotected slopes greater than 30 feet in height. This terrace should be at least 8 feet in width, graded to slope into the hill at a gradient of 10 percent, and graded to drain to each end of the terrace at a gradient of at least 2 percent.

Permanent cut slopes in the volcanic bedrock of the spillway area should be constructed at a minimum inclination of 1:1 (horizontal:vertical). A Geotechnical Engineer should examine the site several times during the work to observe the permanent rock slopes for consistency with the low-maintenance character assumed in the design and to provide recommendations. Areas of potential slope instability should be removed by overexcavation.

6.2.5 Structural Fill - General

All structural fill soils should be free of vegetation and debris and contain no rocks or clumps larger than three inches nominal diameter. In addition, all structural fill soils should consist of predominantly granular, low to non-expansive (expansion potential less than four percent under 60 psf surcharge), low solubility (solubility less than three percent) and non salt-laden (sodium sulfate less than 0.2 percent) soils.

Laboratory test results indicate that the native soils are granular and non-expansive. Neither gypsum, a soluble mineral, nor significant accumulations of salt or sulfates were noted in the on-site soils during our field investigation. We therefore anticipate that the on-site soils will be suitable for use as structural fill with processing to remove oversized materials.

All imported fill material should meet the above requirements and should be sampled and tested prior to importation to the site.

Structural fill should be placed in six to eight-inch thick loose lifts, moisture conditioned to at or within 2 percent of the optimum moisture content for granular soils, and compacted to at least 90 percent of maximum dry density as determined by ASTM D-1557. Fills greater than 3 feet in depth in areas of the proposed outlet drop and outlet structures should be compacted to a minimum of 95 percent of maximum dry density.

Where structural fill will be placed on original grades that slope at an inclination of 5:1 (horizontal:vertical) or steeper, benches should be cut into the natural slope as the filling operations proceed. Each bench should consist of a level terrace cut at least five feet in width into the existing slope, with a maximum vertical spacing of four feet between terraces. In areas where rock slopes are locally steeper than 1.25:1 (horizontal:vertical), the vertical spacing between benches may be locally increased as required to avoid unnecessary overexcavation of rock.

6.3 EMBANKMENT

6.3.1 Structural Fill for Embankment Construction

As previously described, the native sand and gravel soils borrowed from the basin area will be used to construct the embankment. All structural fill materials for embankment construction should meet the requirements for structural fill presented in Section 6.2.5. Fill for the embankment should be placed in six to eight inch thick loose lifts, and brought to within 2 percent of the optimum moisture content, and

compacted to a minimum of 95 percent of maximum dry density as determined by ASTM D-1557.

6.3.2 Cut-Off Trench

We recommend that a cut-off trench be constructed below the embankment to reduce the potential for piping in the alluvial channel sediments underlying the embankment. The cut-off trench should be located below the crest of the embankment and extend to bedrock or to a depth of 40 feet. The excavation for the cut-off trench should have a minimum width of eight feet at the base, with side slopes no steeper than 1.5:1 (horizontal:vertical). The cut-off trench should be backfilled with structural fill prepared according to the recommendations presented for the embankment fill Section 6.3.1.

As an alternative to overexcavation and replacement with recompacted structural fill, the cut-off trench may be backfilled with a controlled low strength material (CLSM). If this alternative is selected, the cut-off trench should be a minimum of 4 feet in width and extend to bedrock or a depth of 40 feet.

6.3.3 Controlled Low Strength Material Backfill

CLSM refers to a fluid mixture of Portland cement, water, and fine aggregate or flyash or both. The aggregate may consist of commercially prepared aggregate or material selected from the excavation or a combination thereof which is free from organic material and other deleterious substances.

We recommend that aggregate used to batch CLSM materials have a maximum particle size of 3 inches, maximum of 15 percent passing the No. 200 sieve, a liquid limit of less than 35, and maximum plasticity index according to the following Clark County Uniform Standard Specification for aggregate base materials:

PERCENT PASSING NO. 200 SIEVE	PLASTICITY INDEX PERCENT MAXIMUM
0.1 to 3.0	15
3.1 to 4.0	12
4.1 to 5.0	9
5.1 to 8.0	6
8.1 to 11.0	4
11.1 to 15.0	3

Additionally, the soluble sulfate content of the aggregate should not exceed 0.3 percent by dry weight of the soil. The resulting CLSM should be a non-segregating, free-flowing, low shrink slurry with a minimum unconfined compressive strength of 100 psi at 7 days.

Based upon the results of our investigation, the majority of the on-site soils are anticipated to be suitable for use in the CLSM after screening of oversized materials.

6.3.4 Gravel Blanket Drain

In order to control seepage within the embankment, we recommend that the embankment be designed with a gravel blanket drain. The gravel blanket drain should be a minimum of six feet thick and should extend from the landside toe to the centerline of the crest.

We recommend that the blanket drain material conform to the following gradation:

SIEVE SIZE	PERCENT PASSING BY DRY WEIGHT
1.5 inches	15 - 100
No. 4	0-15

The above criteria were developed using filter and drain criteria developed by the United States Bureau of Reclamation and presented in Dunn, Anderson and Kiefer (1980). Materials conforming to this specification will meet the aforementioned drainage and filter criteria for approximately 95 percent of the native soils tested. Based upon a review our gradations, we anticipate that a processing ratio in the range of two to three will be required to manufacture the drainage blanket material from the on-site soils. For example, a processing ratio of two would mean that 2,000 cubic yards of processed native soils would yield approximately 1,000 cubic yards of materials suitable for the drainage blanket.

It does not appear that the gradations of the on-site soils differ significantly between the basin proper and the drainage leading to the spillway. However, the majority of our data was obtained in the detention basin proper. We therefore recommend that this area be specified as the borrow area for the drainage blanket material.

6.4 FOUNDATIONS

6.4.1 Bearing Capacity

Foundation design recommendations are required for the proposed spillway structure as well as for the proposed inlet and outlet structures at the base of the embankment. Footing loads for the above structures are anticipated to be 3000 psf or less. The proposed spillway will bear on volcanic bedrock and may be designed for an allowable bearing pressure of 5000 pounds per square foot for footings a minimum of twelve inches in width.

Spread foundations bearing on undisturbed native soils or properly compacted structural fill may be designed for a maximum net allowable bearing pressure according to the following equation:

$$q_{all} = 1{,}300\ (D) + 1{,}000\ (B),\ \text{not to exceed } 8{,}000\ \text{psf}.$$

where q_{all} = Allowable bearing capacity, psf
D = Depth of embedment, feet; minimum D = 1 foot
B = Footing width, feet; minimum B = 1 foot

In no case should foundations for the proposed structures be supported on a combination of bedrock and native soils. If both bedrock and native soils are exposed in foundation excavations for any single structure, either the foundation excavation should be extended to bedrock in all areas, or the native soils should be overexcavated a minimum of two feet and backfilled with properly prepared structural fill. In areas where the native soils are overexcavated to bedrock, the resulting overexcavated area may be backfilled with lean concrete having a minimum strength of 1000 psi.

For seismic or dynamic load analyses, the bearing capacity for the above-referenced foundation conditions may be increased by one-third. Settlement of foundations bearing completely on the volcanic bedrock are anticipated to be one quarter inch or less. Settlement of foundations designed according to the above recommendations which bear on the native soils or properly prepared structural fill should be one inch or less. Differential settlements should be one-half the total settlement or less.

Reinforced mat foundations bearing on properly compacted structural fill may be designed using a coefficient of subgrade reaction (K) of 200 tons per cubic foot. Total settlements under mat foundations bearing on properly prepared structural fill

with spread loads of 3,000 psf or less are anticipated to be three-quarters of an inch or less. Differential settlements are anticipated to be half the total settlement, or less.

6.4.2 Resistance to Lateral Loads

Horizontal loads acting on foundations cast against undisturbed native soil or properly placed and compacted fill will be resisted by friction acting along the base of the footing and by passive earth pressures against the loaded side of the footing. If design makes use of passive earth pressure against backfill, it is important that a representative of the Geotechnical Engineer be present to monitor and test backfill placement and compaction. The friction acting along the base of the foundations bearing on suitable foundation soils or volcanic bedrock may be computed using an allowable coefficient of friction equal to 0.40 with the normal dead load. An ultimate lateral passive earth pressure may be computed using an equivalent fluid weighing 450 pounds per cubic foot (pcf) for the sides of foundations cast against undisturbed soil or properly placed and compacted backfill. An equivalent fluid density of 600 pcf may be used in ultimate passive pressure calculations for footings embedded into competent bedrock. Passive pressure in the upper one foot should be neglected unless confined by a concrete slab-on-grade or pavement. It is recommended that a minimum factor of safety of 1.5 be used with the above values for sustained loading.

6.5 BELOW GRADE WALLS

Cantilevered retaining walls which are not restrained at the top and with level backfill should be designed to resist backfill soil pressures in the active (K_a) lateral earth pressure state. Active earth pressures may be used for wall design where lateral movements of on the order of 0.001 (H) are possible at the top of the wall (where H is equal to the height of the wall). For design purposes, a backfill soil pressure equivalent to that developed by a fluid with a density of 35 pcf would be appropriate for properly compacted granular backfill. Thirty percent of any uniform area surcharge loading should be applied uniformly over the entire height of cantilevered walls. In addition to soil backfill loads and surcharge loads, cantilevered walls should be designed for an incremental dynamic earth pressure equal to 5H in pounds per square foot. The incremental dynamic pressure should be applied uniformly over the wall height, H, where H is in feet.

Walls which are restrained against movement at the top should be designed for the at-rest (K_o) lateral earth pressure state. A lateral earth pressure design value equivalent to that developed by a fluid with a density of 55 pounds per cubic foot (pcf) would be appropriate for granular backfill assuming a level backfill condition.

All lateral earth pressures presented in this report are provided for backfill materials which have been prepared as structural fill according to the recommendations of Section 6.2.5. In addition to soil pressures due to backfill, forty-five percent of any uniform area surcharge loading, including backfill above the above the top of the wall and loads from stored equipment, should be applied uniformly over the entire height of restrained walls. Application of incremental dynamic loads are not required for design of restrained walls.

Based upon the results of our field exploration and laboratory testing, it is our opinion that the native sand and gravel soils at the site are suitable for use as backfill behind below-grade walls.

The above-recommended earth pressures do not include lateral pressures caused by hydrostatic water that may accumulate behind the walls due to surface water infiltration or seepage in the embankment. Provisions for site and wall drainage intended to limit hydrostatic build-up behind walls are presented in Section 6.8. As an alternative, below grade walls may be designed for hydrostatic pressures in addition to soil pressures. Equivalent fluid densities of 82 and 92 pcf may be utilized for saturated granular backfills in the active and at-rest cases, respectively.

During backfill placement adjacent to below grade walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater. Within this zone, only hand operated equipment ("wackers", vibratory plates, or pneumatic compactors) should be used to compact backfill soils.

6.6 PIPELINES

6.6.1 Subgrade Preparation

It is our understanding that low level outlet flows will be carried in 48-inch-diameter reinforced concrete or steel pipe which will pass beneath the embankment. The native soil deposits were noted during our field investigation to be medium dense to very dense and should provide suitable support for the proposed pipe. Although not anticipated, soft, loose, or otherwise yielding soils encountered in the subgrade for the proposed pipe should be overexcavated to a minimum depth of 18 inches beneath the bottom of the pipe zone. The overexcavated areas should be backfilled with properly placed and compacted structural fill meeting the requirements presented in Section 6.2.5.

6.6.2 Pipe Zone Backfill

The pipe zone, as referred to in the following paragraphs, is the full width of the trench excavation from an elevation of six inches below the bottom surface of the pipe to the elevation of 12 inches above the top surface of the pipe.

The pipe zone should be backfilled with Type II aggregate base backfill material meeting the gradation, plasticity, and soluble sulfate content requirements in Sections 208 and 704 of the Clark County Uniform Standard Specifications. Backfill material placed within the pipe zone should be placed in lifts not exceeding eight inches loose thickness and compacted to a minimum of 90 percent of maximum dry density at or within two percent of the optimum moisture content as determined by ASTM D-1557. The backfill should be manually placed and hand compacted under the pipe haunches to provide uniform pipe support below the spring line. Pipe zone material above the spring line may be compacted with hand operated power equipment. We do not recommend placement and compaction of pipe zone backfill using jetting procedures. Care should be taken to not disturb or damage the pipe when using mechanical compaction equipment.

6.6.3 Modulus of Soil Reaction Values

The following table summarizes the recommended modulus of soil reaction values, E', for use in pipeline design. The following values are applicable to compacted Type II backfill, compacted fill constructed from the native soils, and the undisturbed native soil deposits encountered in the embankment area.

FINAL EMBEDMENT DEPTH (feet) AT SPRINGLINE	MODULUS OF SOIL REACTION, E' (psi)
15 to 20	2000
21	2100
22	2200
23	2300
24	2400
25 or greater	2500

6.7 SOIL CEMENT

It is our understanding that soil cement will be used to provide erosion protection to the upstream slope face of the embankment. In addition, it is also our understanding that the soil cement will be made from the material remaining after fabrication of the drainage blanket. The remaining material after processing for the

drainage blanket will consist of material passing the No. 4 sieve. Approximately 80 percent of the minus No. 4 material tested has overall fines contents in the range of 5 to 16 percent. Twenty percent has fines content in the range of 20 to 40 percent. Our gradations indicate that the majority of the on-site soils are of low plasticity. Based upon preliminary quantities provided by you, we anticipate that the material left over from manufacture of the drainage blanket will be more than the amount required to batch the soil cement.

The on-site soils are suitable for use in soil-cement mixtures. The primary requirement for producing soil-cement with satisfactory characteristics and serviceability is that an adequate quantity of Portland Cement be incorporated with the soil. Typical cement contents for soil types such as those encountered during our investigation are in the range of 5 to 9 percent by weight. Secondary requirements are that the proper amount of water be mixed uniformly within the soil-cement mixture and that the soil-cement mixture be compacted to the proper density before the cement hydrates. These requirements can be determined by laboratory tests and controlled with testing and observation during construction.

6.8 MOISTURE PROTECTION

Long term performance of foundations, concrete slabs-on-grade and walls for inlet and outlet structures will require that the subgrade soils and backfill be protected against excessive water infiltration and/or saturation. Positive drainage should be established away from foundations, concrete slabs-on-grade and below-grade walls. A slope of two percent is desirable for drainage features. Drainage systems should be placed behind all below-grade walls. A typical drainage scheme should consist of perforated pipe, surrounded by at least a 12-inch-wide blanket of gravel, placed at the base of the wall. The gravel pack should extend upward at least two thirds of the wall height, and should be wrapped in filter fabric to prevent migration of fines into the gravel. A filter fabric such as Mirafi 140N or equivalent would be suitable for use. This gravel blanket and perforated pipe should drain to a suitable discharge point, such as a sump. All discharge points should be located well away from the foundations.

7.0 CLOSURE

7.1 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory tests, and our understanding of the proposed design. The subsurface data used in the preparation of this report was obtained from the 35 borings drilled and cored during the field investigations. It is anticipated that variations in the soil conditions exist between the points explored. The nature and extent of variations will not be evident until construction occurs. If conditions are encountered at the site which are different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed design changes from that described in this report, our firm should also be notified. This report was prepared in accordance with generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made.

This report may be used only by VTN Nevada and SNWA and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on- and off-site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

The Application for Authorization to use the Seismic Risk Analysis prepared for this report is included in Appendix A. This application is provided as a means for obtaining permission for use of this report for other purposes other than those described herein.

7.2 ADDITIONAL SERVICES

The recommendations provided in this report are based on the assumption that an adequate program of tests and observations by geotechnical professionals will be performed during the construction to verify compliance with these recommendations. These tests and observations should include, but not necessarily be limited to, the following:

- Observations and testing during the preparation and earthwork.
- Observation of foundation excavation.
- Consultation as may be required during construction.

We also recommend that project plans and specifications be reviewed by Kleinfelder, Inc. for compatibility with the conclusions and recommendations of this report.

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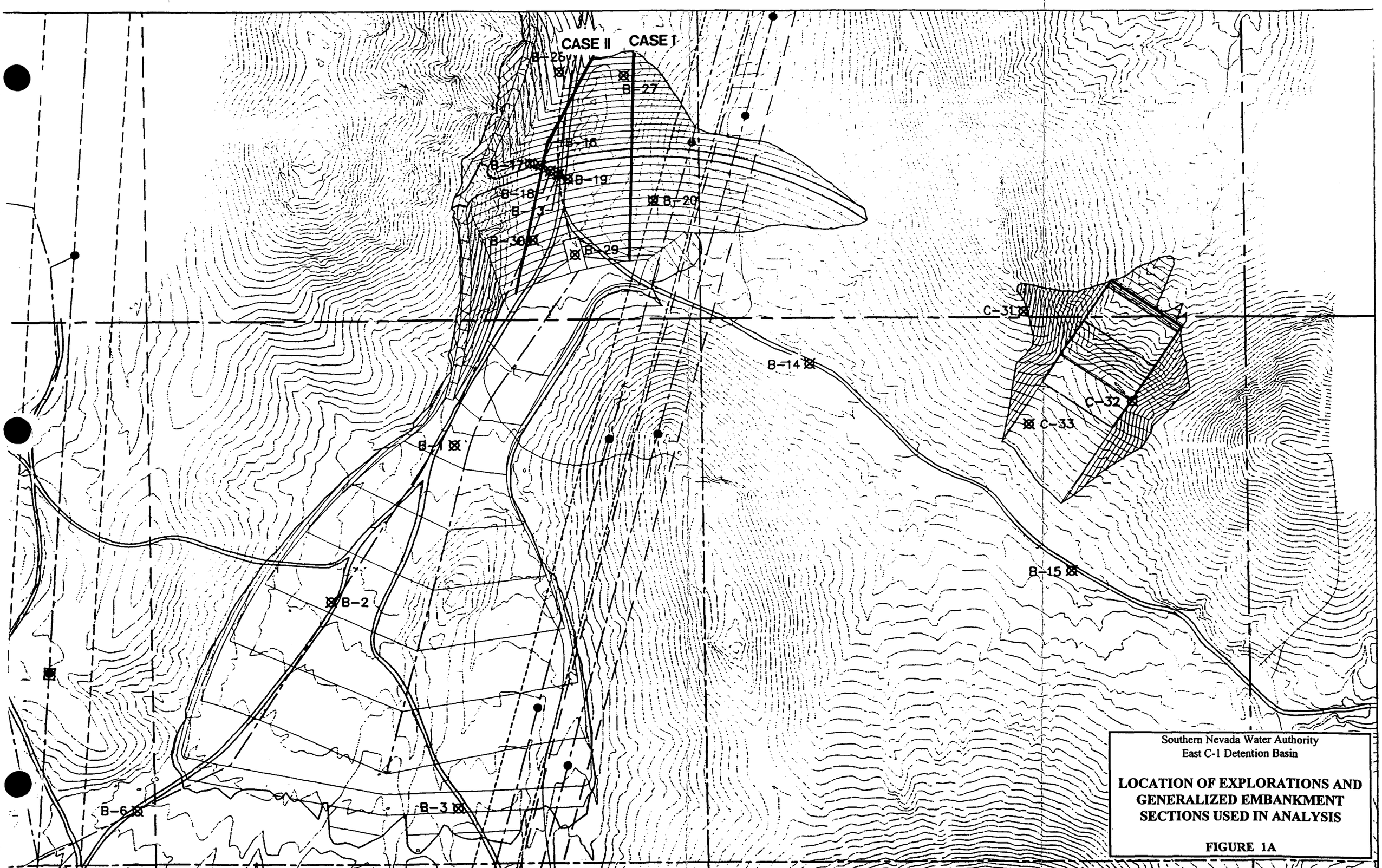
FIGURES



Southern Nevada Water Authority
East C-1 Detention Basin

LOCATION OF EXPLORATIONS AND GENERALIZED EMBANKMENT SECTIONS USED IN ANALYSIS

FIGURE 1A

B-26

B-25

B-24

B-23

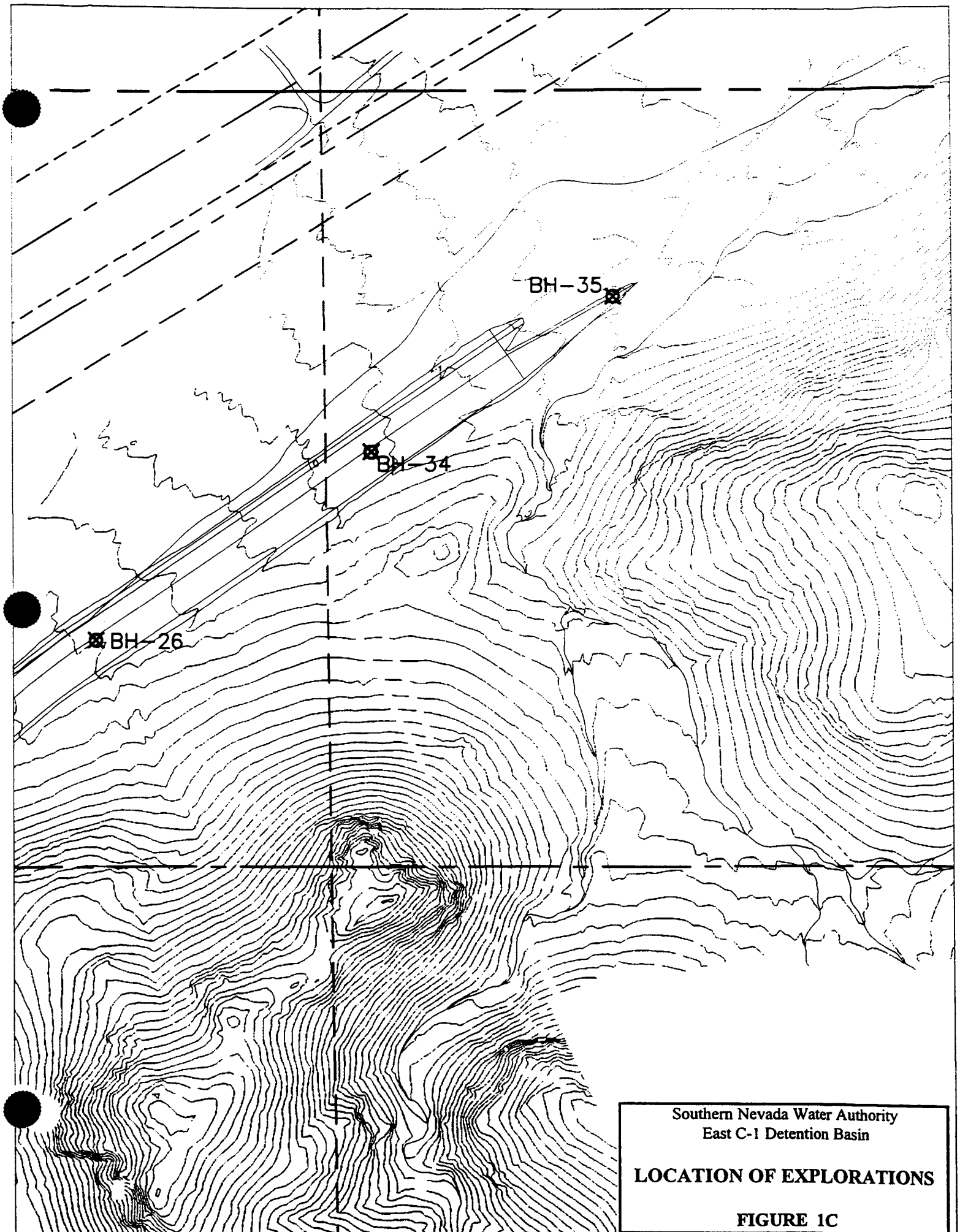
B-22

B-21

Southern Nevada Water Authority
East C-1 Detention Basin

LOCATION OF EXPLORATIONS

FIGURE 1B



Southern Nevada Water Authority
East C-1 Detention Basin

LOCATION OF EXPLORATIONS

FIGURE 1C

LEGEND

Qa	Quarterary alluvium: sand and gravel with cobbles and silt	Tdbr	Tertiary dacite breccia: mottled purple-gray to red-gray, with oxidized dark red-brown to black coating on weathered surfaces, slightly weathered to fresh, strong to very strong
Tf	Tertiary fanglomerate: moderately to well-bedded conglomerate and sandstone with silt; moderately to well-cemented with calcium carbonate		
Tdf	Tertiary dacite flow: gray, slightly weathered to fresh, strong	Tdt	Tertiary dacite tuff: light gray to green-gray, moderately weathered, weak to moderately strong
(1)	0'-2' of talus over bedrock	45	Strike and dip of sedimentary beds or volcanic layers
(2)	0'-4' of talus or alluvium over bedrock	45	Strike and dip of joints
	Approximate location of fault; arrow indicates direction and amount of dip	⊠	Boring location
	Approximate location of geologic contact	●	Power poles

N
Scale: 1" = 200'

B-28 B-27 B-17 B-16 B-19 B-18 B-13 B-20 B-30 B-29 B-14 B-1 B-2 B-6 B-3 B-15 C-31 C-32 C-33

Tdbr Tdf Tdt Qa Tf

N25E 90° N35W 80NE N75E 20SE N45E 80W 70-90 SW N35W 10NE N45E 45SE N40W 90° N40W 90° N40W 90°

KLEINFELDER	Southern Nevada Water Authority East C-1 Detention Basin GEOLOGIC MAP OF EMBANKMENT AND DETENTION BASIN AREAS	FIGURE 2
Project No. 31-110021-001		

APPENDIX A

SEISMIC RISK ANALYSIS
EAST C-1 DETENTION BASIN
HENDERSON, NEVADA

I INTRODUCTION

This report presents the results of our site specific earthquake ground motion study for the proposed East C-1 Detention Basin in Henderson, Nevada.

The purpose of this study was to develop site specific peak ground accelerations for dynamic slope stability analyses. Specifically, the scope of services included:

- Perform probabilistic seismic risk analysis to evaluate two levels of design ground motion: a Lower Level Event (LLE) with 10 percent probability of exceedance in a 50 year period (return period of 475 years) and an Upper Level Event (ULE) with 10 percent probability of exceedance in a 100 year period (return period of 975 years).

- Estimate peak horizontal design accelerations for the rock condition at the site for the two levels of design earthquakes described above.

II GEOLOGY

The study area is located in the southwestern River Mountains on the east side of the Las Vegas Valley. At this site the sediments appear to consist primarily of sand and gravel deposits with varying amounts of silt overlying volcanic bedrock. Based on our knowledge of the general site area, we anticipate that the approximate groundwater elevation is greater than 100 feet below the existing ground surface.

III SEISMICITY

A. Seismic History

The Las Vegas Valley is located in seismic zone 2-B as categorized by Uniform Building Code. Zone 2-B represents a low to moderately active seismic area. A few moderate earthquakes have occurred within this region in the past years. Some of the significant events include M6 (1916) earthquake apparently associated with Death Valley Fault system located southwest of the valley

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(Siddharthan et. al., 1993), M7+ events of March 6 and March 22, 1966 located in the north of the site, and several M5 earthquakes between 1936 and 1952 near Boulder City in the Hoover Dam/Lake Mead area which were triggered partly because of filling of Lake Mead (Rogers and Lee, 1976; Carter 1945, 1970).

To search for historical earthquakes in the region, we have used the earthquake data base which contains in excess of 5,000 seismic events and covers the period from 1800 through December 1997. The earthquake data base is principally comprised of an earthquake catalog from the Seismological Laboratory at University of Nevada, Reno (UNRSL) and a composite catalog by Council of the National Seismic System (CNSS). The UNRSL catalog is a merger of the Latest Western Great Basin Seismic Network Catalog (containing all the events since 1990 for Eastern California and Western Nevada catalogued by UNRSL) and California-Nevada Combined Catalog (containing events from 1800 to April 1993 catalogued by California Institute of Technology for Southern California and by University of Nevada, Reno for Western and Southern Great Basin). The CNSS catalog is a world-wide earthquake catalog which is created by merging the master earthquake catalogs from contributing CNSS member networks and then removing duplicate events, or non-unique solutions from the same event. The CNSS network includes Northern and Southern California Seismic Networks, Pacific Northwest Seismic Network, University of Nevada, Reno Seismic Network, University of Utah Seismographic Stations and US National Earthquake Information Service. Based on the results of our search, epicenters of earthquakes with magnitude M≥4 over a period of 1800 to December 1997 within 150 km of the site are shown on Plate A1.

B. Faults and Fault Activity

The faults surrounding the Las Vegas region are also shown on Plate 1. The faults most critical to the evaluation of seismic risk at the site are the Frenchman Mountain fault, the Eldorado Valley fault, the Las Vegas Shear zone, the Black Hills fault, the Eastern Las Vegas fault, the Western Las Vegas fault, the California Wash fault, the Dry Lake Range fault, the Elko fault, and the Eglington fault. The nearest fault to the site is the Frenchman Mountain fault, approximately 0.3 km to the west. The nearest distances from these faults to the site are listed in Table 1. Based on new geologic evidence, all of these faults are considered tectonic and a seismic potential has been assigned to them (Siddharthan et al., 1993).

The information on these fault zones affecting the seismicity of Las Vegas Region is summarized in Table 1. The Moment Magnitude (Mw) scale has been used for representation of the magnitude because most of the ground motion attenuation laws are based on moment magnitude. The fault parameters listed in Table 1 are based on the studies by Bell (1981), Stewart and Carlson (1977), Siddharthan et. al. (1993) and Wyman et. al. (1993).

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Table 1: Significant Faults in the Region and their Parameters

Fault Name	Fault Length (km)	Closest Distance (km)	Maximum Magnitude*	a	b
Frenchman Mountain	35	1.4	7.2	2.41	0.90
Black Hills	32	6.5	7.3	2.49	0.90
Eastern Las Vegas	15	11.4	7.0	1.20	0.90
Eldorado Valley	30	13.7	7.3	2.41	0.90
Las Vegas Shear Zone	85	19.9	7.2	2.48	0.90
Western Las Vegas	18	24.3	7 .0	1.76	0.90
California Wash	30	25.9	7.3	1.42	0.90
Dry Lake Range	20	30.2	7.0	1.15	0.90
Eglington	12	32.6	6.9	2.21	0.90
Lime Ridge	30	51.7	7.1	1.21	0.90
Arrow Canyon Range	60	52.3	7.3	1.81	0.98
Southwestern Sheep Range	45	56.0	7.2	1.71	0.98
Stateline	30	63.6	7.3	2.62	0.90
Wheeler Ridge	48	69.6	7.3	1.39	0.90
Eastern Sheep Range	50	70.8	7.3	1.81	0.98
Black Ridge	30	74.7	7.2	1.66	0.98
Virgin Mountain	75	76.7	7.5	2.95	0.90

* Moment Magnitude (Mw)

The "a" and "b" value listed in this table is a measure of the frequency of occurrence of earthquakes of various magnitudes. The general form of this recurrence model is based on the Gutenberg-Richter (Gutenberg-Richter, 1956) exponential frequency-magnitude relationship:

$$\log N(M) = a - bM$$

where N(M) is the cumulative number of earthquakes of magnitude "M" or greater per year, and "a" and "b" are constants based on recurrence analysis.

IV SITE CHARACTERIZATION

In developing site specific seismic design criteria, the characteristics of the soils underlying the site are an important input for evaluation of the site response at a given site.

Based on the results of our field investigation performed at this site, the site is underlain by dense alluvial soils overlying bedrock. The bedrock mainly consists of dacite with high quality rock at one side of the site to moderate quality on the other. The alluvium at the proposed site mainly consist of interbedded layers of sand, sandy gravel, clayey sand and silty sand. The sand and

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gravelly soils are generally dense to very dense in consistency. The depth of alluvium varies at the site from about 20 to 50 feet with an average of about 15 to 20 feet. Based on this, the proposed site can be classified in between site profile type S_B and S_C according to new NEHRP site categories and soil amplification factors as presented in Table 16-J of 1997 UBC (Rinne, 1994, Martin and Dobry, 1994, UBC, 1997). S_B is defined as a soil profile consisting of rock with shear wave velocity ranging between 760 m/s to 1500 m/s (2500 to 5000 feet/sec), whereas, S_C is defined as very dense soil and soft rock with shear wave velocity ranging between 360 m/s and 760 m/s (1200 to 2500 feet/sec). The site classes S_B and S_C correspond to Site Class A and B of Boore et. al. (1993), respectively.

V SEISMIC RISK ANALYSIS

To assess the seismic risk and to establish design earthquake ground motions at the site, we performed a seismic risk analysis using the basic approach outlined by Cornell (1968), which is the industry standard for seismic risk analysis. This approach is described in detail in following sections.

A. Design Earthquake Level

We have performed our seismic hazard studies for two levels of earthquakes. The Lower Level Event (LLE) for this project is defined as an earthquake with 10 percent probability of exceedance in 50 years (return period of 475 years) and the Upper Level Event (ULE) is defined as an earthquake with 10 percent probability of exceedance in 100 years (return period of 975 years).

B. Earthquake Recurrence Relationships

The earthquake probabilities for the faults and their segments were developed using a magnitude-frequency relationship derived from the seismicity catalogs and the fault activity based on their slip rates. Earthquake recurrence was modeled by a truncated form of the Gutenberg-Richter magnitude-frequency relation given by:

$$\log N = a - bM$$

where N is the cumulative number of earthquakes with magnitude greater than or equal to M. The relation is truncated at the maximum earthquake. The maximum likelihood of the a- and b-values was estimated for each seismic source based on the recurrence rates of earthquakes and events per year associated with that seismic source reported by Siddharthan et al., 1993. All aftershock sequences were removed from the earthquake catalog because statistically the

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mainshock is not a member of the aftershock population (Utsu, 1971). The resulting a- and b-values are listed in Table 1.

C. Ground Motion Attenuation

A probabilistic seismic hazard analysis was used to develop the site-specific ground motions for the design level earthquakes discussed above. This analysis involves the selection of an appropriate predictive relationship to estimate the ground motion parameters, and, through probabilistic methods, development of uniform-risk elastic response spectra.

Site-specific ground motions can be influenced by the styles of faulting, magnitudes of the earthquakes, and the local soil conditions. The attenuation relationships used to estimate ground motion from an earthquake source at some distance from the site need to consider these effects.

Many attenuation relationships have been developed to estimate the variation of peak ground surface acceleration with earthquake magnitude, distance from the site to the source of an earthquake and subsurface soil conditions. Out of several available attenuation relationships to assess peak ground accelerations, we have selected the relationship proposed by Boore et. al. (1993, 1994) because of its wide acceptance by seismologists. Since the site can be classified as a site in between Site Class A and B, we have used the respective relationship by Boore et. al. (1993, 1994). This relationship has also been used in developing recent Interim National Seismic Hazard Maps (Frankel et. al., 1996) for the State of California and Nevada. The predictive relationships by Boore et. al. (1993, 1994) were developed from statistical analyses of recorded earthquakes from Western North America, including the records from the 1989 Loma Prieta earthquake, and 1992 Landers earthquake. This predictive relationships was developed from statistical analyses of recorded earthquakes from Western North America, including the records from the 1989 Loma Prieta earthquake. The attenuation relationships provide mean values of ground motions associated with one set of parameters: magnitude, distance, site soil conditions, and mechanism of faulting. The uncertainty in the predicted ground motion is taken into consideration by including a magnitude-dependent standard error in the probabilistic analysis.

Spudich and others (1996) have proposed a new attenuation relationship for extensional tectonic regimes as part of a study for the Yucca Mountain Seismic Hazards Evaluation Project. According to Spudich (personal communication), all of Nevada including Las Vegas, is an extensional tectonic regime. However, their relationship has been developed for only two types of site classes, i.e., rock or soil. They have combined the data from all the rock sites (soft and hard) together to develop their rock relationship. The average Vs of their rock site is 620 m/s. Similarly, data from all the soil sites were combined together to develop soil relationship. Their soil site has an average Vs of 310 m/s. In contrast, Boore and others (1993, 1994) developed their relationships for three different site classes including different classifications for soft and hard rock sites.

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In addition to the above, there are several other well known relationships such as Idriss (1985, 1991, 1994), Campbell (1993), Sadigh (1994), etc. However, of these relationships, the relationship presented by Boore et. al. (1993, 1994) is widely accepted by seismologists. This relationship has also been used in developing recent Interim National Seismic Hazard Maps (Frankel et. al., 1996) for the State of California and Nevada.

Based on the above discussion, we feel that the relationship proposed by Boore et. al. (1993, 1994) for Site Class A and B is the most appropriate one to use at this site.

D. Probabilistic Analysis

Probabilistic modeling procedure was used to estimate the peak ground motions corresponding to the design level earthquake. The probabilistic analysis approach is based on the characteristics of the earthquake and of the causative fault associated with the earthquake. These characteristics include such items as magnitude of the earthquake, distance from the site to the causative fault, maximum credible earthquake, length, and activity of the fault. The effects of site soil conditions and mechanism of faulting are accounted for in the attenuation relationship for this site.

The theory behind seismic risk analysis has been developed over many years (Cornell, 1968, 1971; Merz and Cornell, 1973) and is based on the "total probability theorem" and on the assumption that earthquakes are events that are independent of time and space from one another. According to this approach, the probability of exceeding $P_E(Z)$ at a given level of ground motion, Z, at the site within a specified time period, T, is given by

$$P_E(Z) = 1 - e^{\vartheta(Z)T}$$

where $\vartheta(Z)$ is the mean annual rate of exceedance of ground motion level Z. Different probabilities of exceedance may be selected, depending on the level of performance required.

E. Peak Ground Acceleration

Based on the result of our seismic risk analyses, the calculated peak horizontal bedrock accelerations (in units of gravity) for the two levels of earthquakes together with their return periods and annual probabilities of occurrence are presented in the Table 2.

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TABLE 2: PEAK BEDROCK ACCELERATION

Earthquake Level	Return Period (years)	Annual Probability of Exceedance	Probability of Occurrence	Peak Horizontal Acceleration
LLE	475	0.0021	10% in 50 years	0.22g
ULE	950	0.001	10% in 100 years	0.28g

If using relationship by Spudich and others (1996) for rocks, the peak horizontal acceleration for LLE and ULE are 0.24g and 0.30g, respectively.

Our peak horizontal acceleration values of 0.22g and 0.28g compare well with the values presented in the National Seismic Hazard Maps (Frankel et. al., 1996). Alternately, our values are low compared to the values of 0.35g and 0.40g presented by Siddharthan and others (1993). In our opinion, following are the reasons for this discrepancy.

- Siddharthan and others (1993) have used the Idriss (1985) relationship.
- This relationship combines soft and hard rocks together for the rock classification.
- To account for larger (transverse) of the two horizontal components of ground motion (parallel and transverse), they have multiplied their results by 1.15. However, in our opinion, average of the two values (random values in Boore and others, 1993) are more appropriate for the regions of low to moderate seismicity.
- Some of the regional seismic activity associated with the filling of Lake Mead has been included in their analysis, which we feel should not be included to assess the fault related seismic activity.

Therefore, it is our opinion that peak acceleration values of 0.22g and 0.28g for LLE and ULE, respectively, are appropriate for this site.

F. Dynamic Earth Pressure

In addition to the active soil pressure, the flexible walls (free to rotate at the top) at the proposed facility should be designed for the incremental dynamic earth pressures. The incremental dynamic earth pressure for the design of the flexible walls under seismic conditions were

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calculated for both levels of earthquakes using the method proposed by Mononobe-Okabe (1929). Assuming a backfill unit weight of 125 pcf, the incremental dynamic earth pressures (ΔP_E) at the proposed site in pounds per square foot are 5H and 6.5H for LLE and ULE events, respectively. These incremental pressures should be applied uniformly over the wall height, H, where H is in feet.

Similarly, the incremental dynamic earth pressure for the design of rigid walls (restrained against rotation at the top) for the proposed facility under seismic conditions were calculated for both levels of earthquakes using the method proposed by Yong (1985). The incremental dynamic earth pressures (ΔP_E) for the rigid walls at the proposed site in pounds per square foot are 13H and 16H for LLE and ULE events, respectively. However, the application of seismic loads to below-grade walls is currently the subject of wide debate in the geotechnical engineering profession and a wide range of acceptable design practices, with supporting literature, exist. We are not aware of documented failures of restrained below-grade walls in firm ground conditions as the result of additional soils loads incurred during seismic events. Seed and Whitman (1970) indicated in their paper titled "Design of Earth Retaining Structures for Dynamic Loads" that for ground accelerations of about 0.2g, many walls adequately designed for static earth pressures will have the capacity to withstand earthquake forces and, in many cases, additional seismic earth pressures need not be required in the design. Therefore, it is our opinion that it would be acceptable to design restrained walls at this site for at-rest pressures without the application of incremental dynamic pressures.

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APPENDIX B

EAST C-1 DETENTION BASIN
SEEPAGE ANALYSIS
1:4 UPSTREAM SLOPE - WITHOUT CUT OFF TRENCH

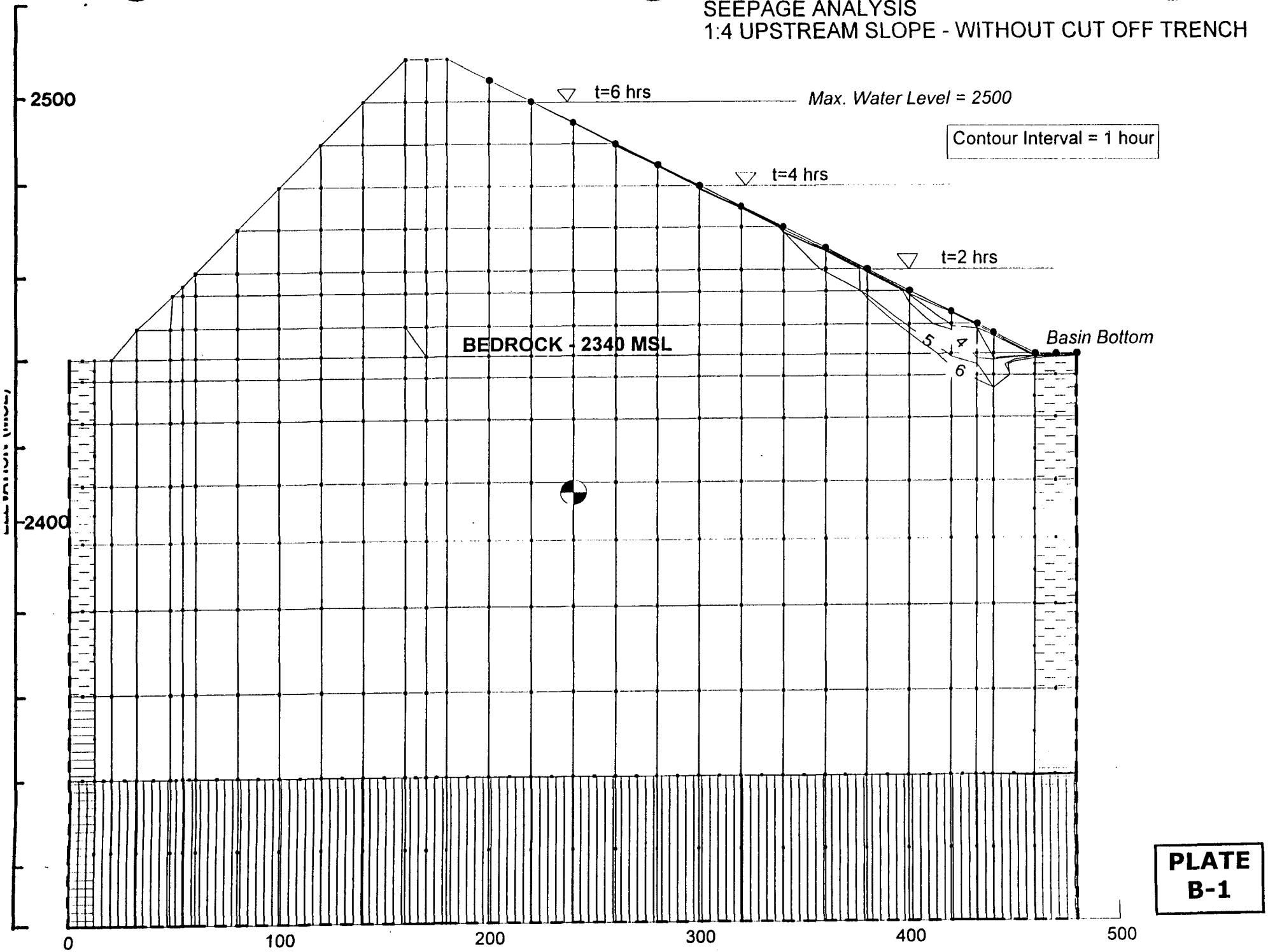


PLATE
B-1

EAST C-1 DETENTION BASIN
SEEPAGE ANALYSIS
1:4 UPSTREAM SLOPE - WITH CUT OFF TRENCH

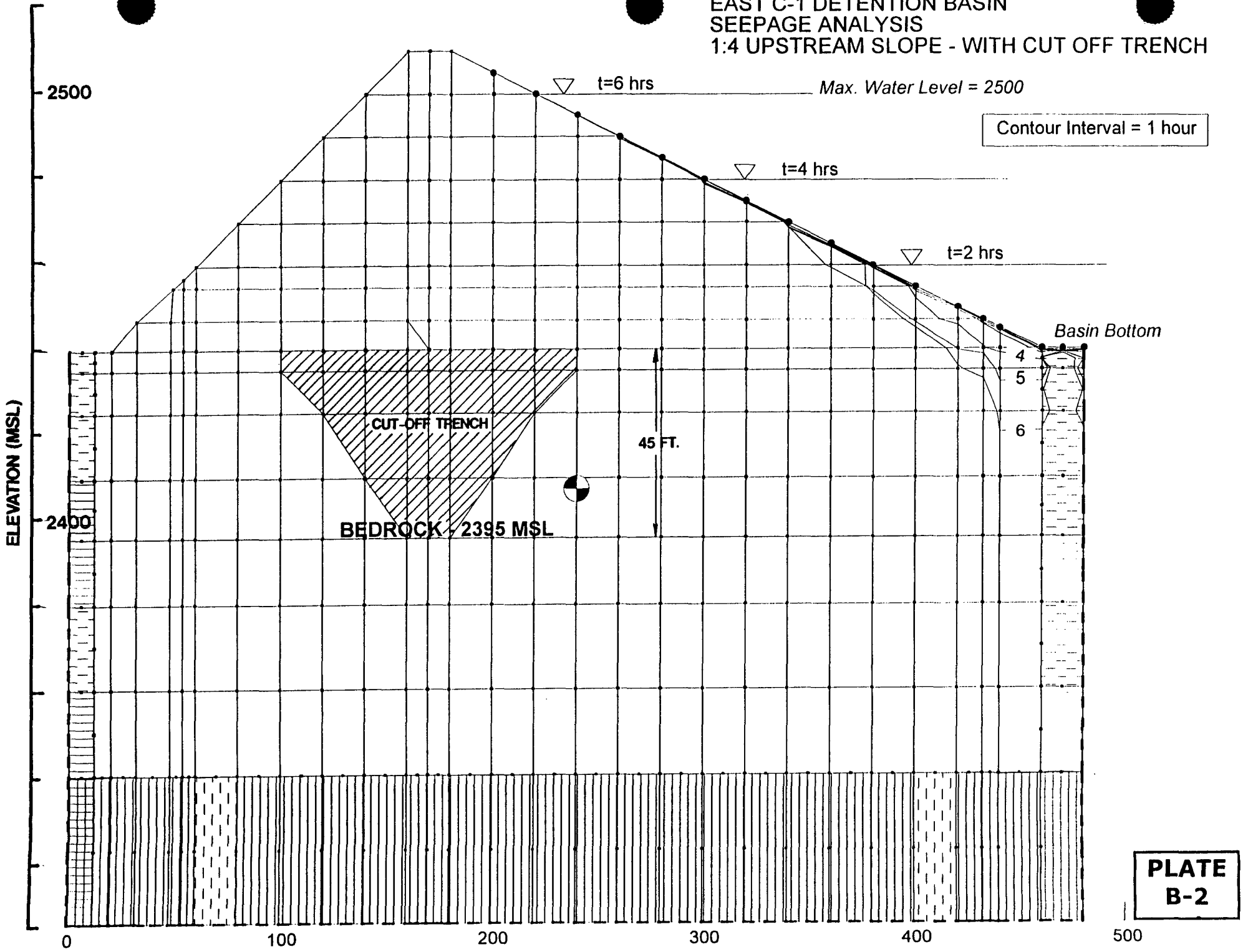


PLATE
B-2

EAST C-1 DETENTION BASIN
SEEPAGE ANALYSIS
1:4 UPSTREAM SLOPE - WITHOUT CUT OFF TRENCH

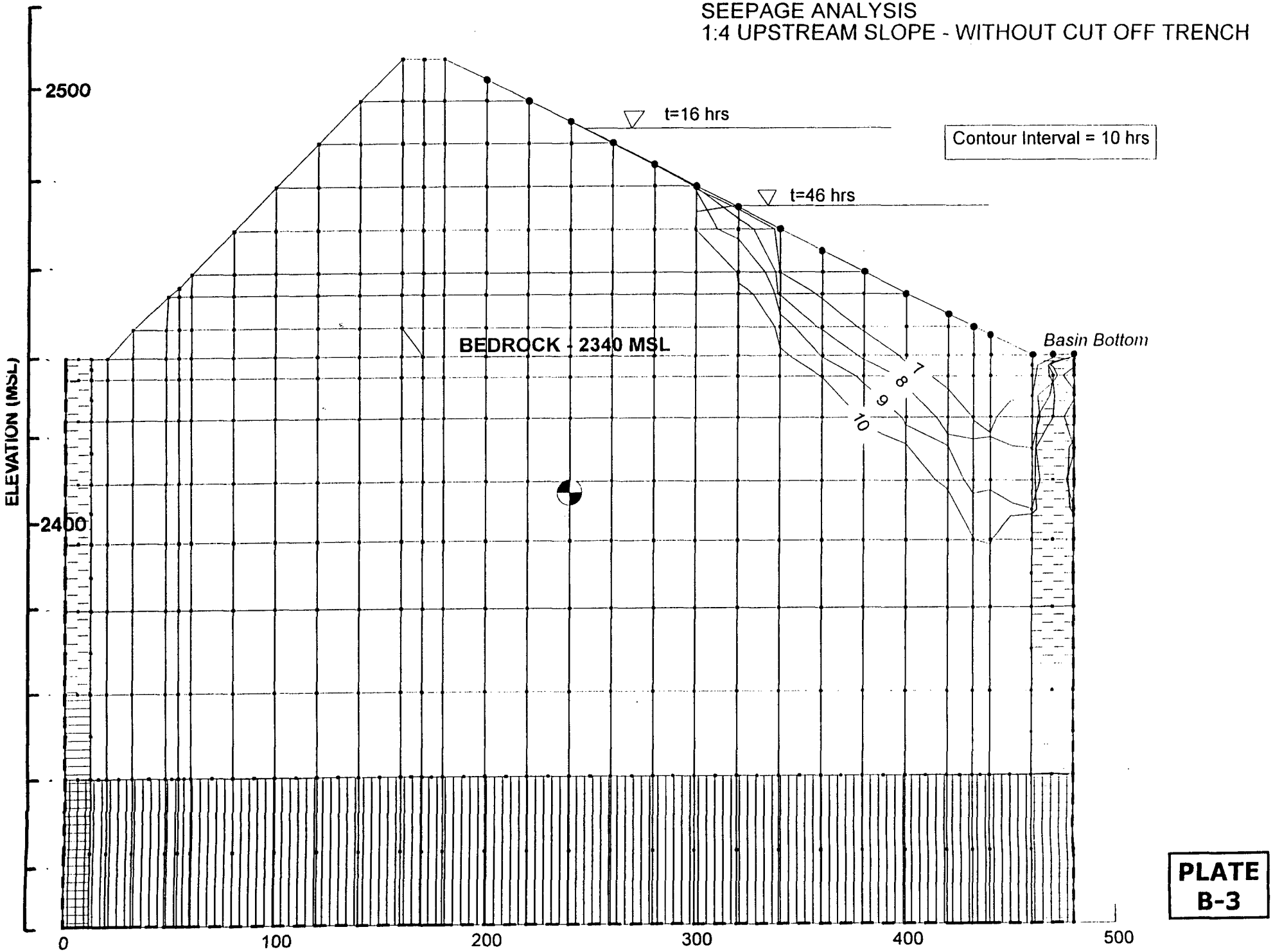


PLATE
B-3

EAST C-1 DETENTION BASIN
SEEPAGE ANALYSIS
1:4 UPSTREAM SLOPE - WITHOUT CUT OFF TRENCH

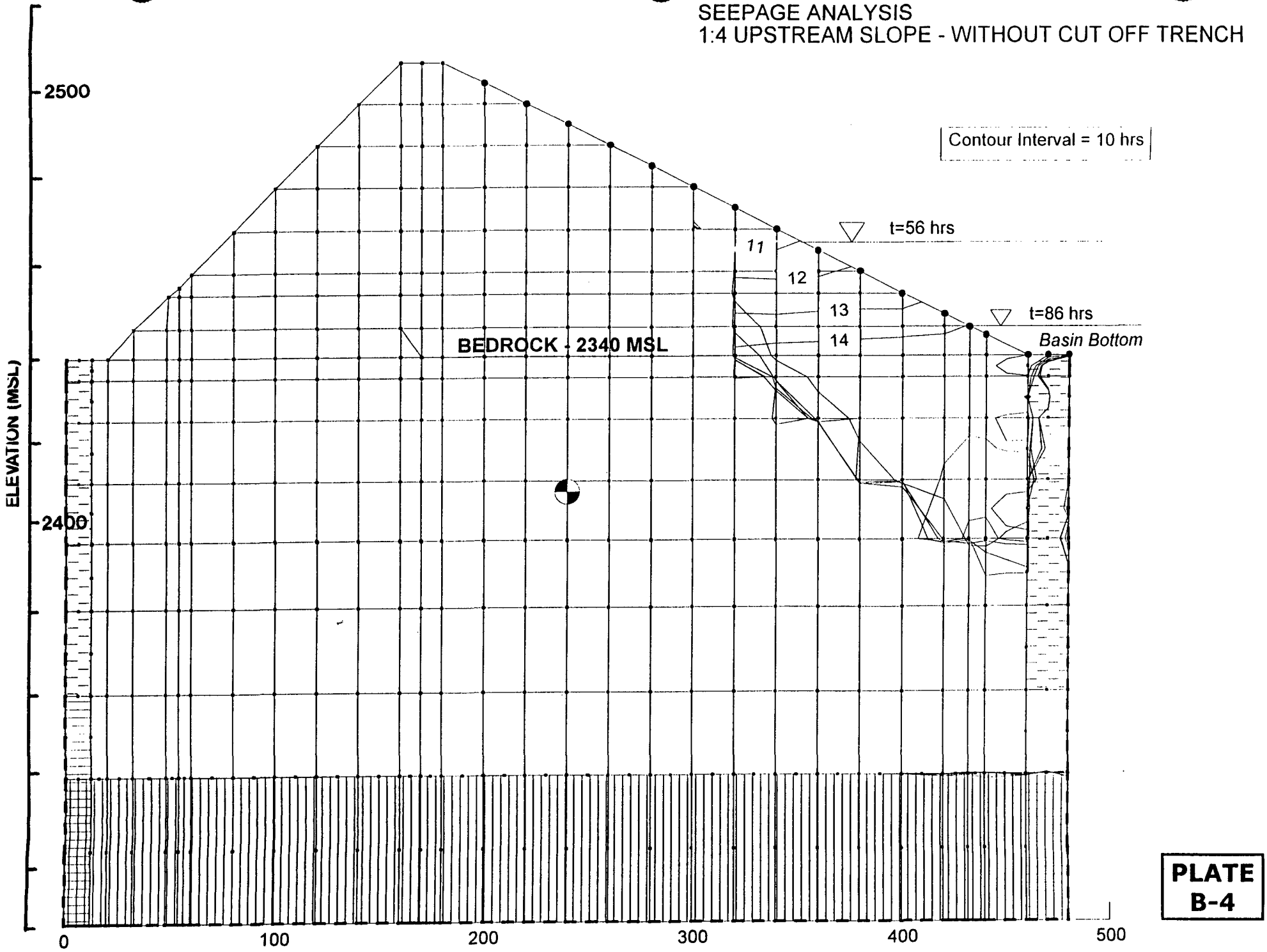


PLATE
B-4

EAST C-1 DETENTION BASIN
SEEPAGE ANALYSIS
1:4 UPSTREAM SLOPE - WITH CUT OFF TRENCH

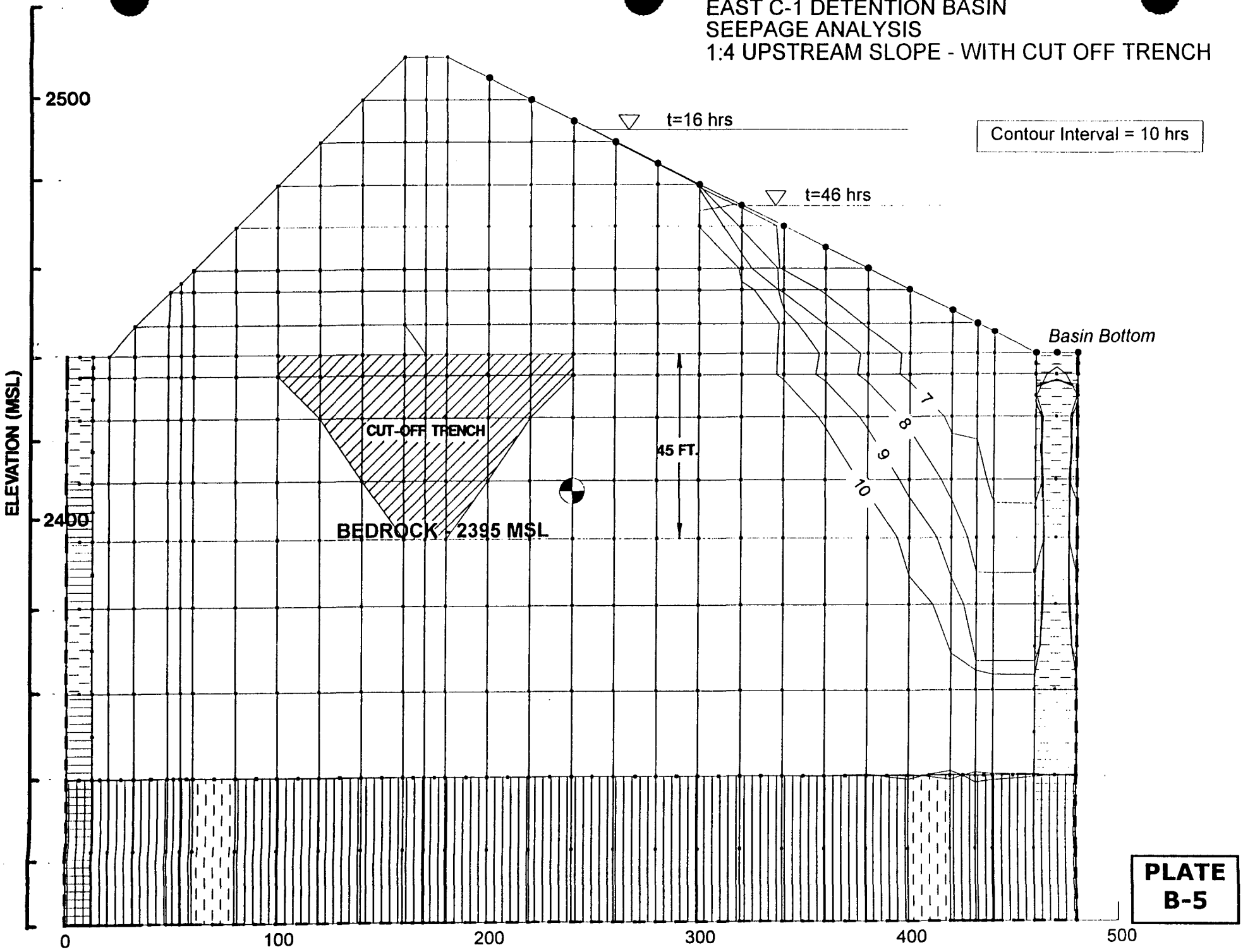


PLATE
B-5

EAST C-1 DETENTION BASIN
SEEPAGE ANALYSIS
1:4 UPSTREAM SLOPE - WITH CUT OFF TRENCH

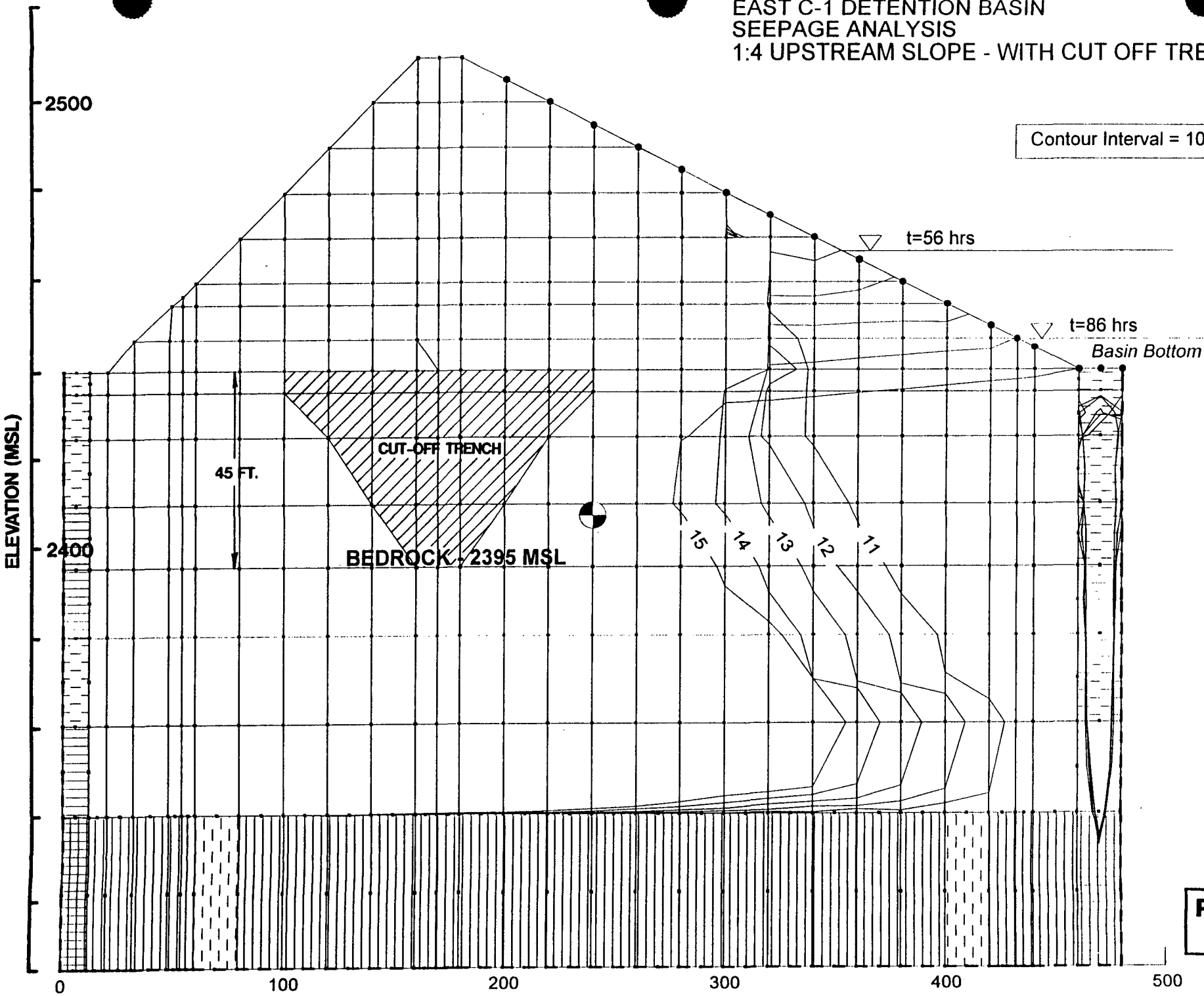


PLATE
B-6

APPENDIX C

SOIL PARAMETERS USED IN SLOPE STABILITY ANALYSIS

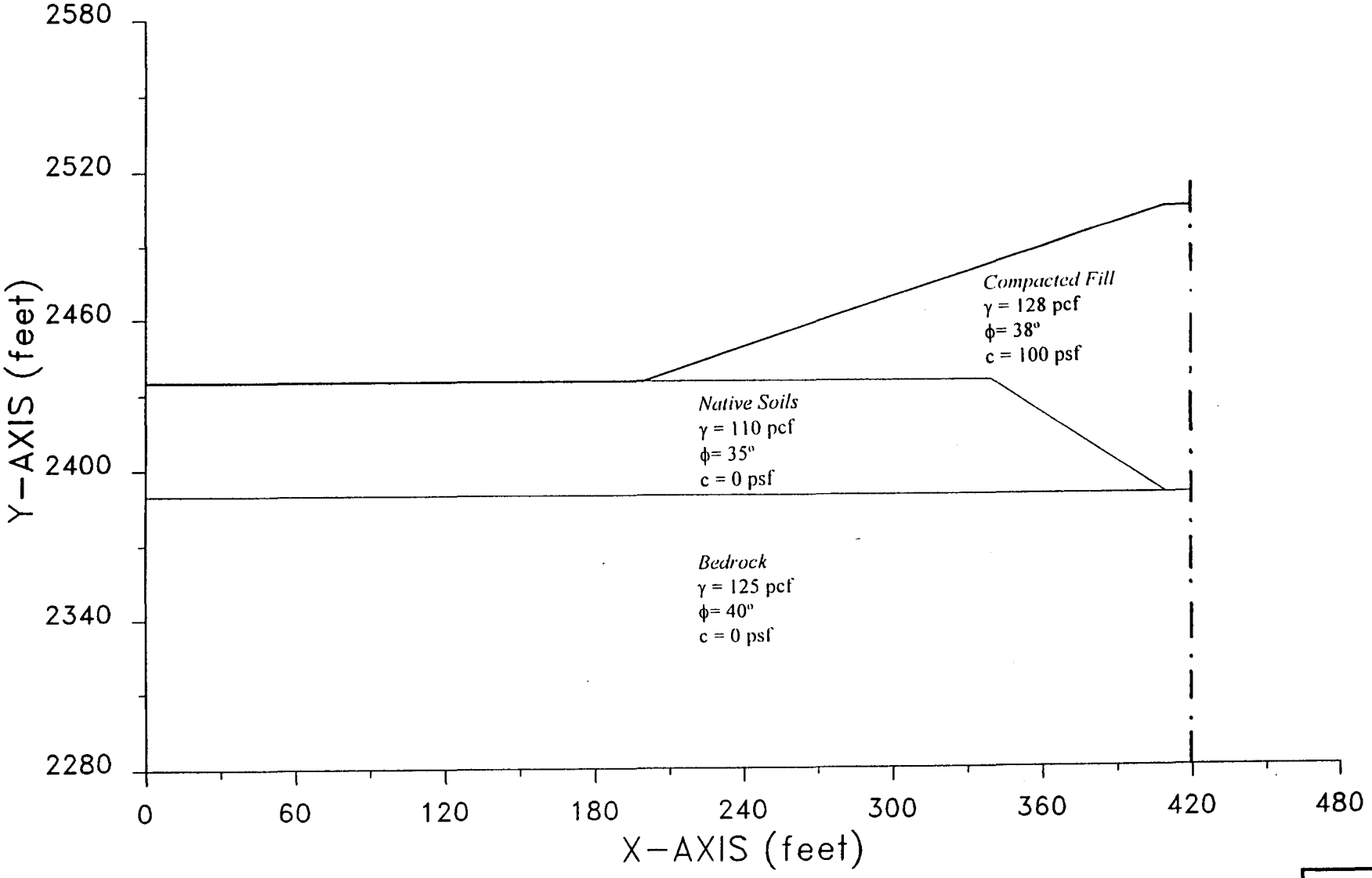


PLATE C-1

3 Y 1-19-98 8:31

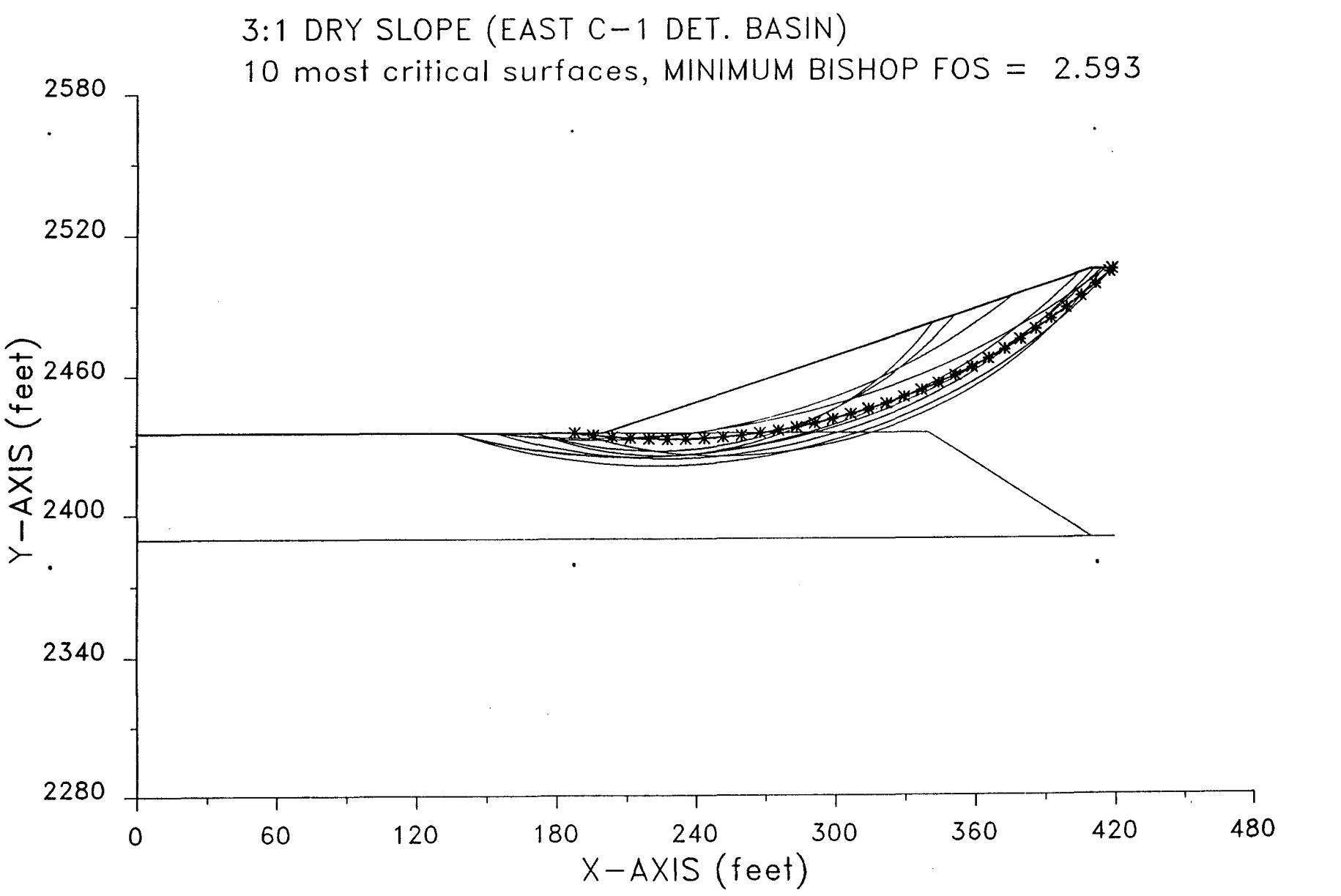


PLATE C-2

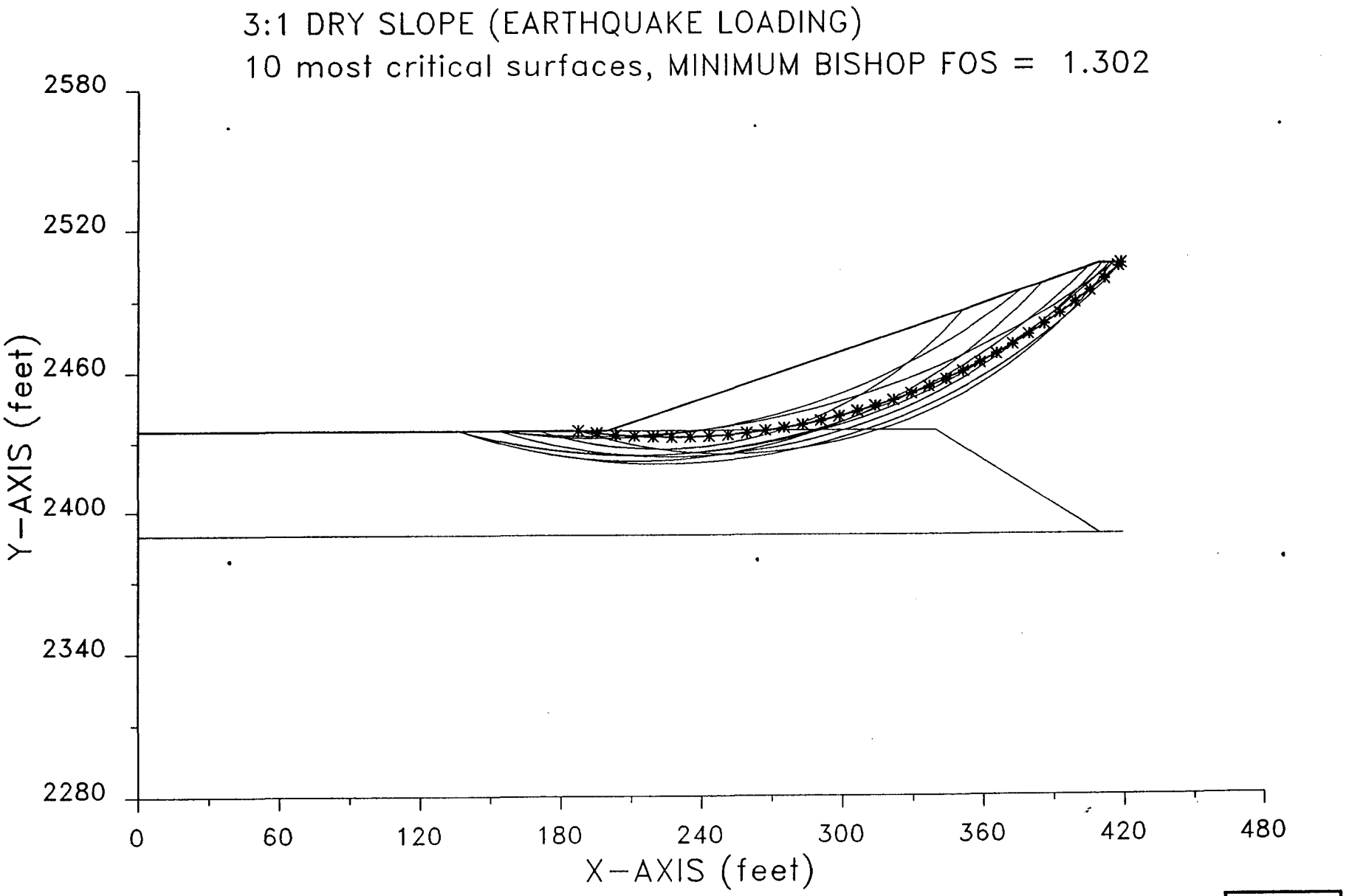

3:1 DRY SLOPE (EARTHQUAKE LOADING)
10 most critical surfaces, MINIMUM BISHOP FOS = 1.302
Y-AXIS (feet)
2580
2520
2460
2400
2340
2280
0
60
120
180
240
300
360
420
480
X-AXIS (feet)

PLATE C-3

4 .Y 1-19-98 8:29

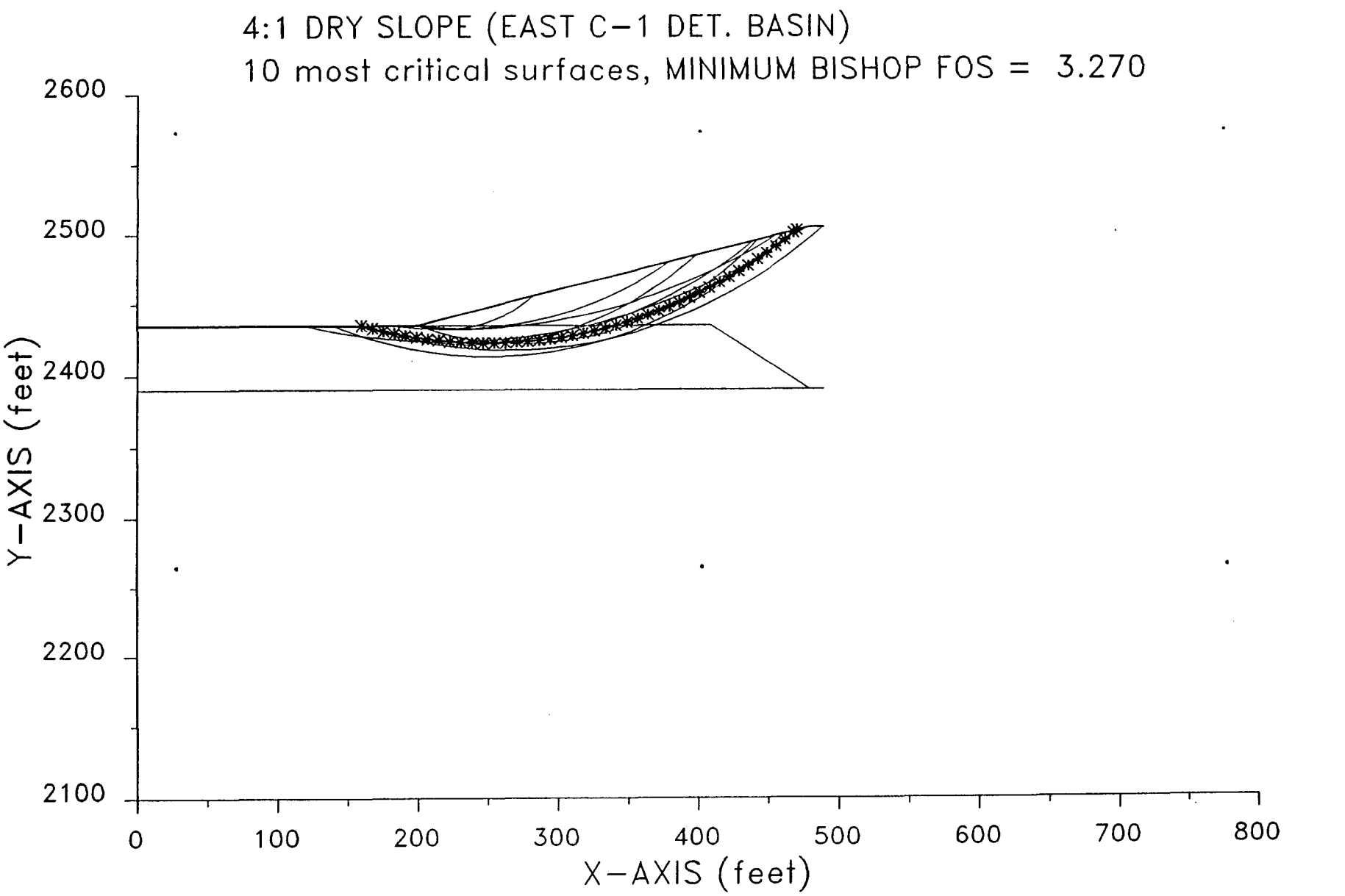


PLATE C-4

4 .YE 1-19-98 8:30

4:1 DRY SLOPE (EARTHQUAKE LOADING)
10 most critical surfaces, MINIMUM BISHOP FOS = 1.450

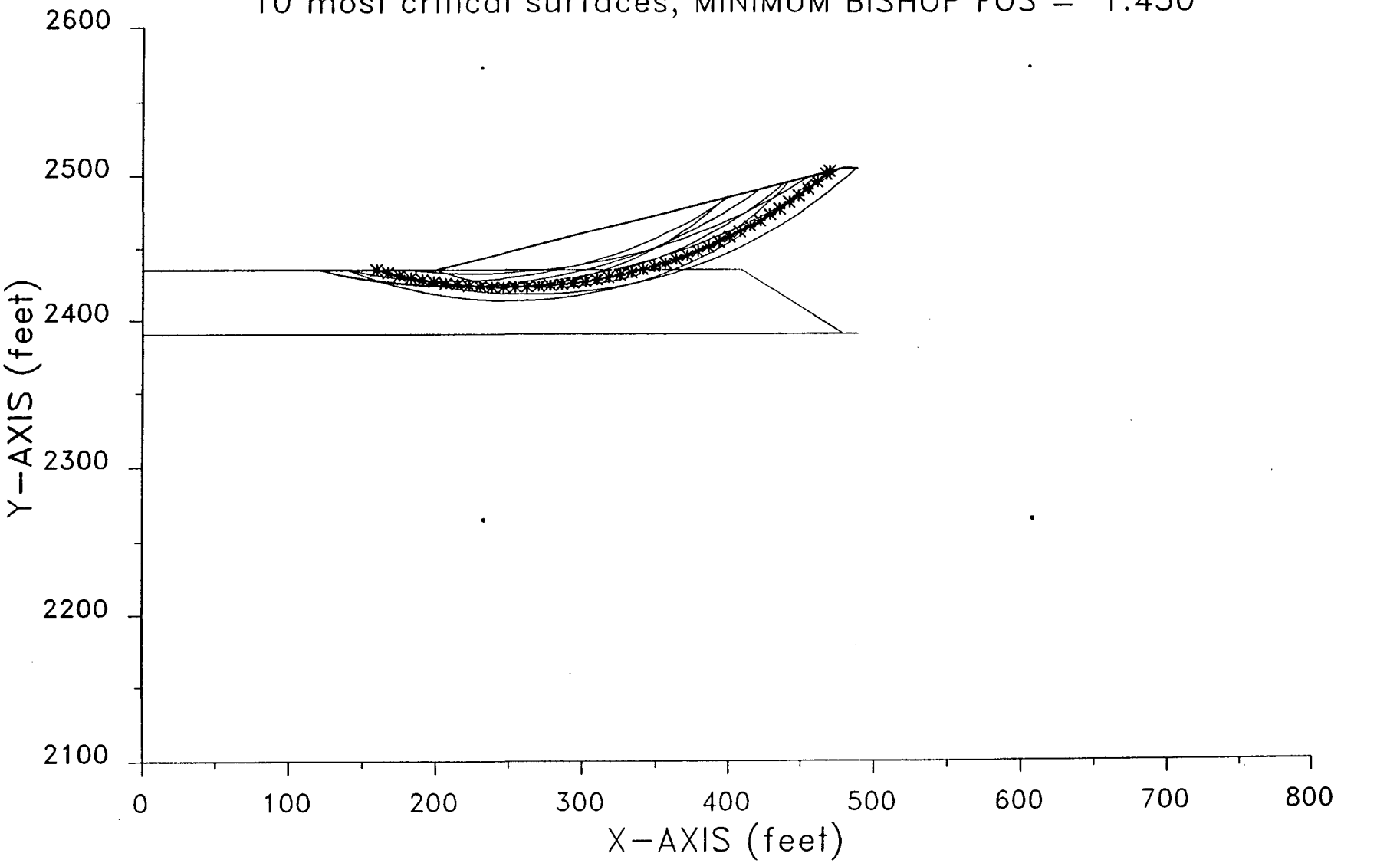


PLATE C-5

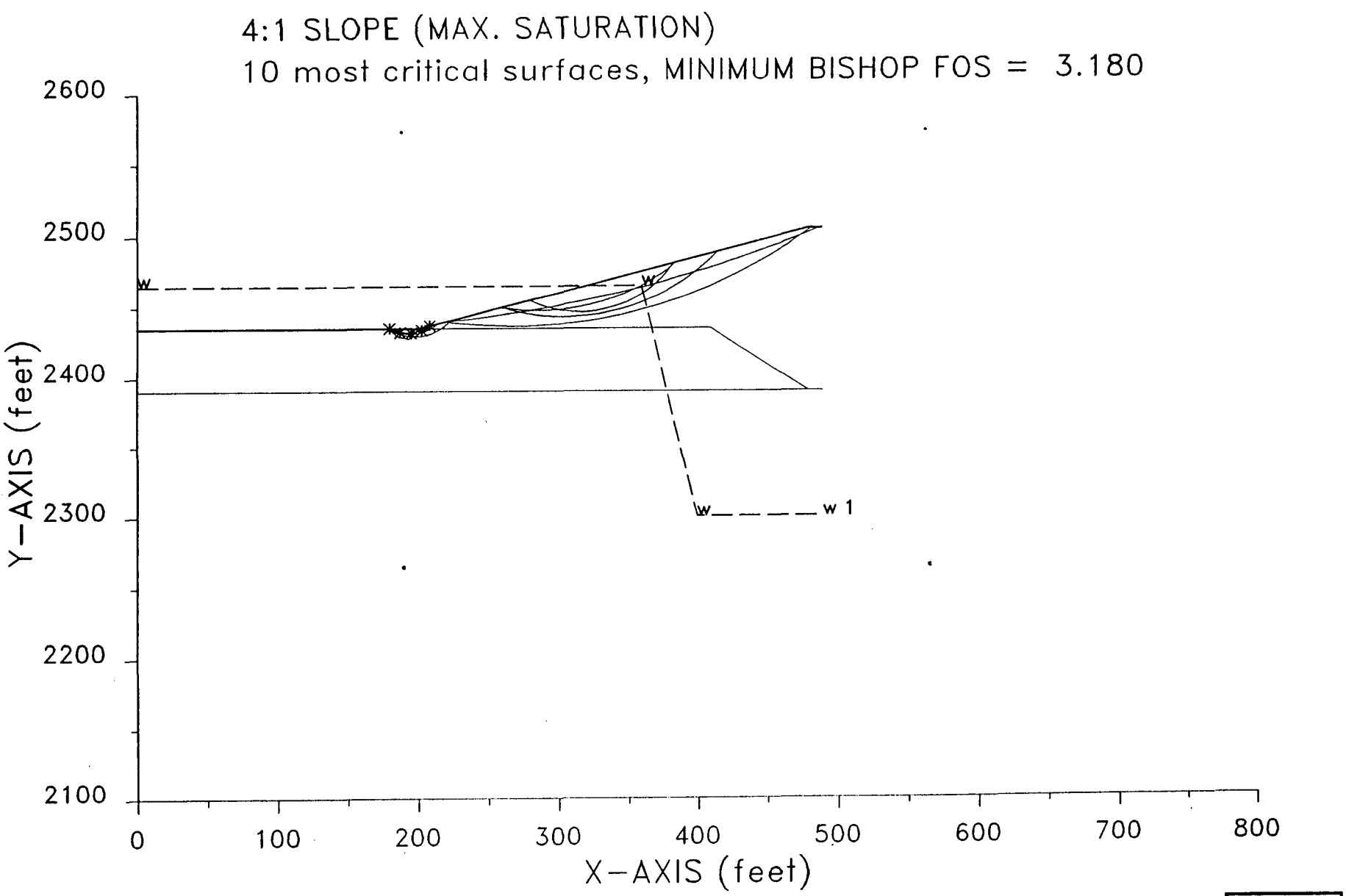

4:1 SLOPE (MAX. SATURATION)
10 most critical surfaces, MINIMUM BISHOP FOS = 3.180
2600
2500
2400
2300
2200
2100
Y-AXIS (feet)
0
100
200
300
400
500
600
700
800
X-AXIS (feet)
w
w
w
w 1

PLATE C-6

4:1 SLOPE (MAX. SATURATION/E'QUAKE)
10 most critical surfaces, MINIMUM BISHOP FOS = 1.115

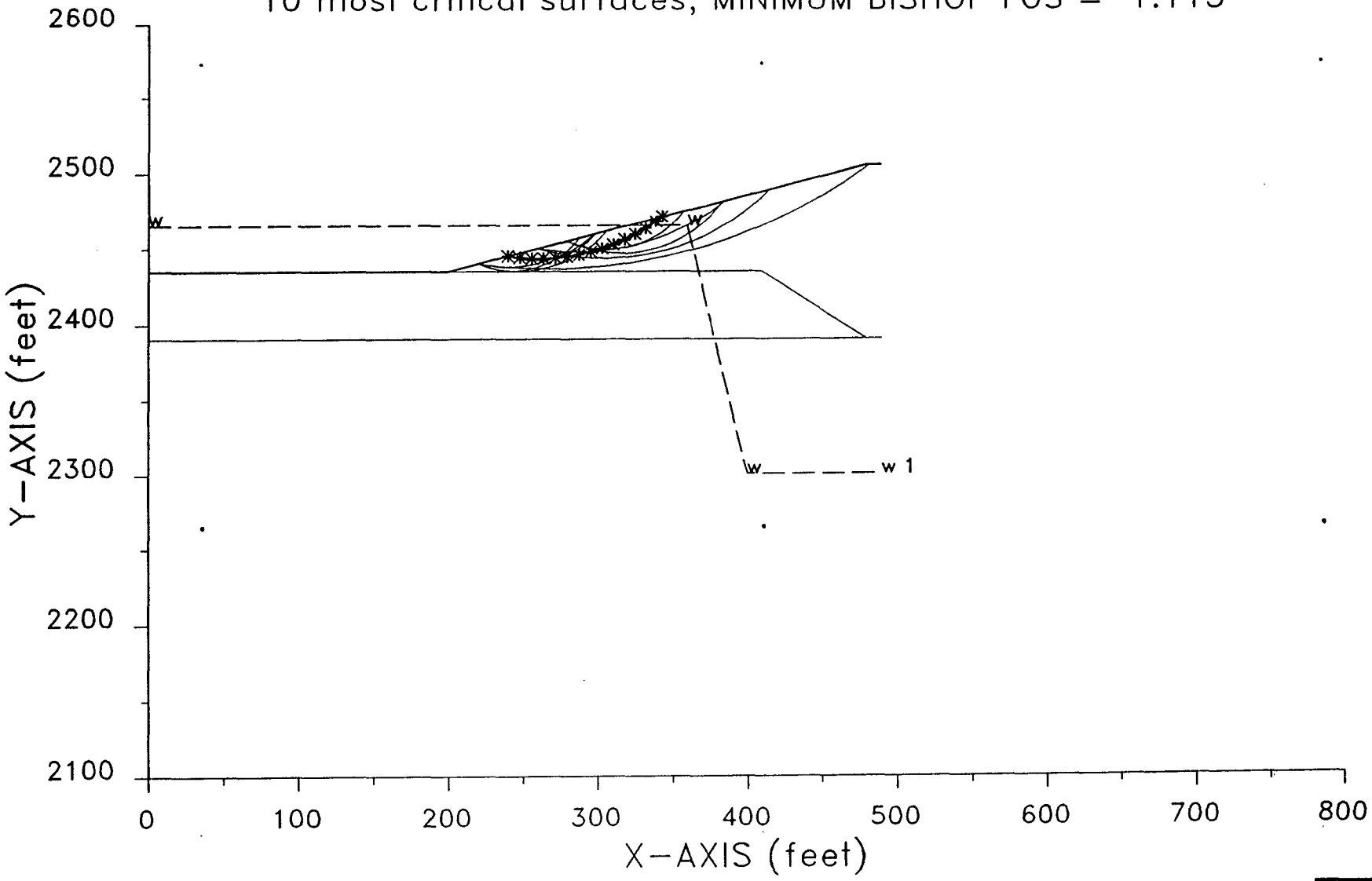


PLATE C-7

4 ‹P 1-19-98 8:56

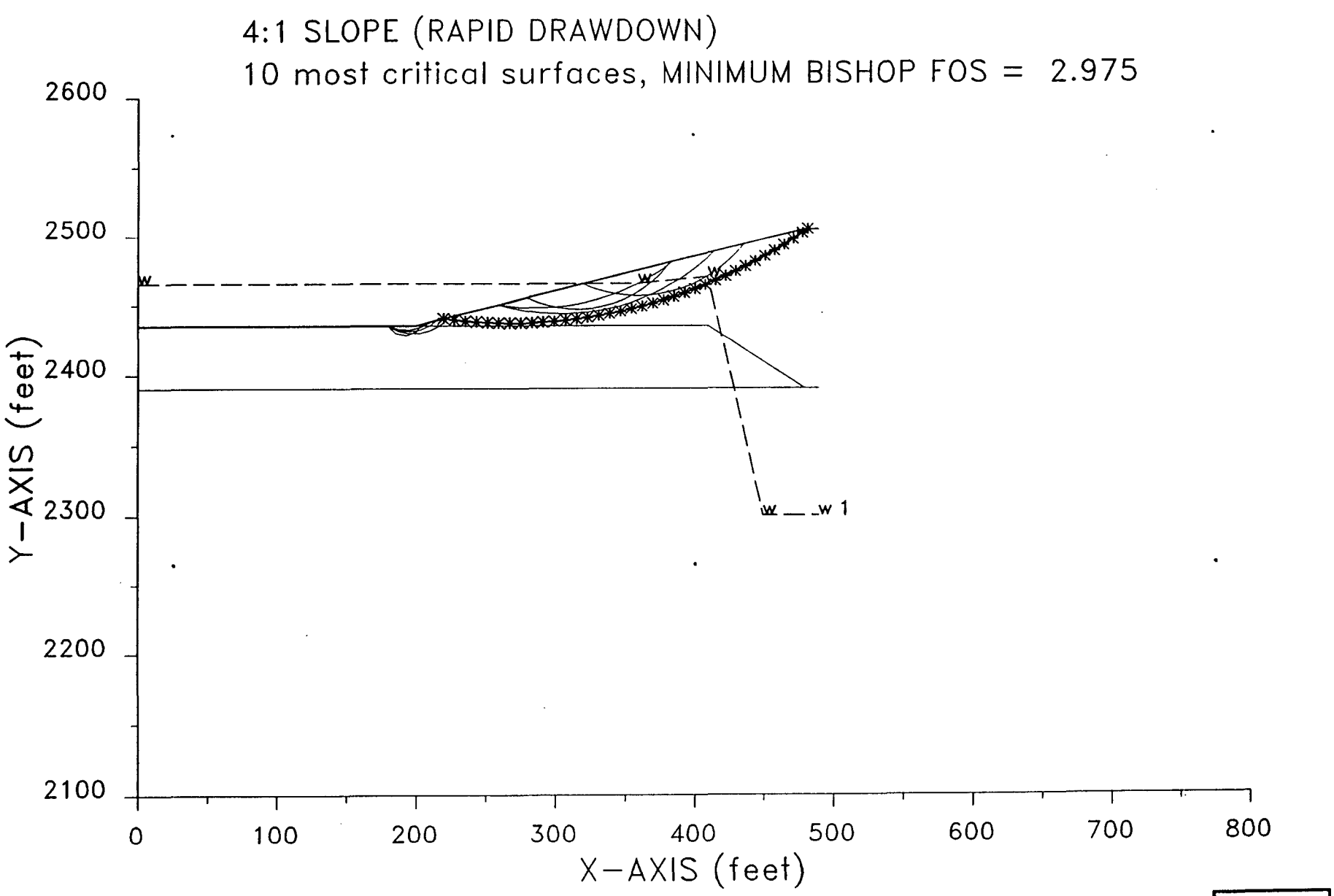


PLATE C-8

4:1 SLOPE (RAPID DRAWDOWN/E'QUAKE)
10 most critical surfaces, MINIMUM BISHOP FOS = 1.050

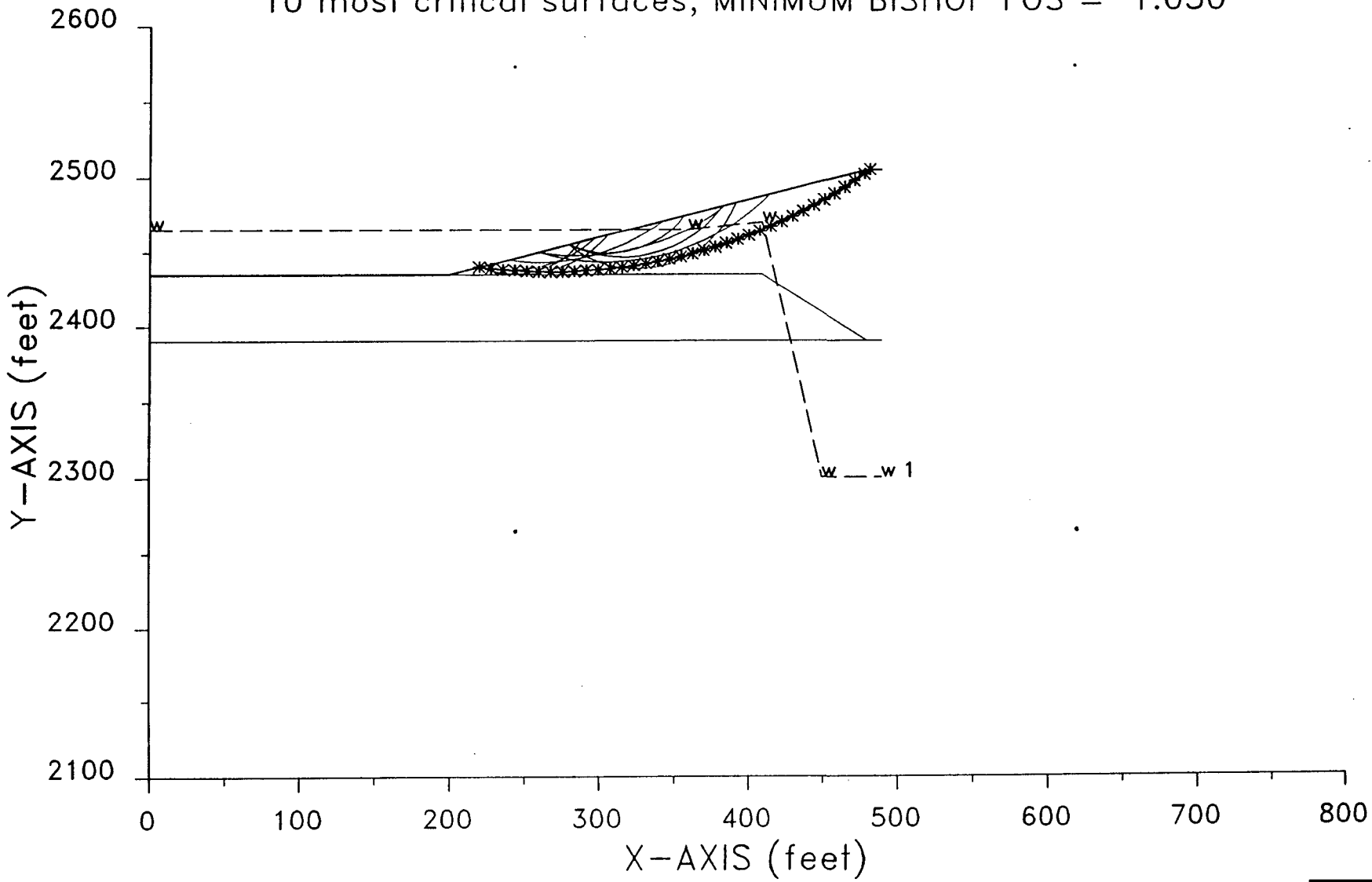


PLATE C-9

APPENDIX D

XSTABL File: 3-DRY 1-19-98 8:31

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 á 97         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                 96 á 1598   *
*******************************************
```

Problem Description : 3:1 DRY SLOPE (EAST C-1 DET. BASIN)

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	410.0	2505.0	1
3	410.0	2505.0	420.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	340.0	2435.0	4
2	340.0	2435.0	410.0	2390.0	4
3	410.0	2390.0	420.0	2390.0	2
4	.0	2390.0	410.0	2390.0	2

ISOTROPIC Soil Parameters

---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	0
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 410.0 ft

Each surface terminates between x = 200.0 ft
and x = 420.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

```
**********************************************************
**     Factor of safety calculation for surface #    19   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was 792.8964   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS=792.8964) is defined by: xcenter = 102.70
ycenter = 2533.52 Init. Pt. = .00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    21   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was 145.1649   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS=145.1649) is defined by: xcenter = 114.54
ycenter = 2532.09 Init. Pt. = 17.08 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    36     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  67.2490     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS= 67.2490) is defined by: xcenter =    117.72
ycenter =   2536.99   Init. Pt. =     17.08   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    44     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  85.0033     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS= 85.0033) is defined by: xcenter =    120.32
ycenter =   2668.89   Init. Pt. =     34.17   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    49     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 146.5106     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS=146.5106) is defined by: xcenter =    122.00
ycenter =   2542.45   Init. Pt. =     34.17   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    53     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  89.6405     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS= 89.6405) is defined by: xcenter =    124.35
ycenter =   2521.18   Init. Pt. =     34.17   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    54     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 100.3384     **
**    This will be ignored for final summary of results     **
**********************************************************
```

Circular surface (FOS=100.3384) is defined by: xcenter = 123.07
ycenter = 2545.59 Init. Pt. = 34.17 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    55    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  46.2531    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS= 46.2531) is defined by: xcenter = 126.44
ycenter = 2550.00 Init. Pt. = 34.17 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    64    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was*********    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS=********) is defined by: xcenter = 125.78
ycenter = 2521.71 Init. Pt. = 51.25 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    69    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 491.0811    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS=491.0811) is defined by: xcenter = 127.73
ycenter = 2548.38 Init. Pt. = 51.25 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    72    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  41.5760    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS= 41.5760) is defined by: xcenter = 135.92
ycenter = 2514.36 Init. Pt. = 51.25 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    76    **
**     failed to converge within FIFTY iterations          **
```

```
**                                                              **
**    The last calculated value of the FOS was  28.3544         **
**    This will be ignored for final summary of results         **
**************************************************************
```

Circular surface (FOS= 28.3544) is defined by: xcenter = 138.00
ycenter = 2526.97 Init. Pt. = 51.25 Seg. Length = 8.00

```
**************************************************************
**     Factor of safety calculation for surface #    81     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  28.1899     **
**    This will be ignored for final summary of results     **
**************************************************************
```

Circular surface (FOS= 28.1899) is defined by: xcenter = 142.21
ycenter = 2566.97 Init. Pt. = 68.33 Seg. Length = 8.00

```
**************************************************************
**     Factor of safety calculation for surface #    98     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 116.0260     **
**    This will be ignored for final summary of results     **
**************************************************************
```

Circular surface (FOS=116.0260) is defined by: xcenter = 139.16
ycenter = 2503.29 Init. Pt. = 68.33 Seg. Length = 8.00

```
**************************************************************
**     Factor of safety calculation for surface #   100     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 163.8226     **
**    This will be ignored for final summary of results     **
**************************************************************
```

Circular surface (FOS=163.8226) is defined by: xcenter = 138.11
ycenter = 2509.72 Init. Pt. = 68.33 Seg. Length = 8.00

```
**************************************************************
**     Factor of safety calculation for surface #   108     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  78.1989     **
**    This will be ignored for final summary of results     **
**************************************************************
```

Circular surface (FOS= 78.1989) is defined by: xcenter = 148.25
ycenter = 2492.40 Init. Pt. = 85.42 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   110    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 133.9322    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=133.9322) is defined by: xcenter =    145.58
ycenter =   2541.39   Init. Pt. =     85.42   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   122    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  49.3199    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 49.3199) is defined by: xcenter =    157.48
ycenter =   2484.70   Init. Pt. =    102.50   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   142    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 511.5423    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=511.5423) is defined by: xcenter =    161.27
ycenter =   2471.98   Init. Pt. =    119.58   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   148    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  41.8142    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 41.8142) is defined by: xcenter =    164.74
ycenter =   2489.69   Init. Pt. =    119.58   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   172    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was3572.0330    **
**    This will be ignored for final summary of results    **
**********************************************************
```

```
Circular surface (FOS=********) is defined by: xcenter =    168.74
ycenter =   2462.19   Init. Pt. =    136.67   Seg. Length =   8.00
-------------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   180    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was 336.7023     **
    **    This will be ignored for final summary of results     **
    ************************************************************

Circular surface (FOS=336.7023) is defined by: xcenter =    169.36
ycenter =   2494.95   Init. Pt. =    136.67   Seg. Length =   8.00
-------------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   192    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was  42.2025     **
    **    This will be ignored for final summary of results     **
    ************************************************************

Circular surface (FOS= 42.2025) is defined by: xcenter =    180.37
ycenter =   2456.30   Init. Pt. =    153.75   Seg. Length =   8.00
-------------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   201    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was 534.5356     **
    **    This will be ignored for final summary of results     **
    ************************************************************

Circular surface (FOS=534.5356) is defined by: xcenter =    186.27
ycenter =   2446.02   Init. Pt. =    170.83   Seg. Length =   8.00
-------------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   208    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was1195.6850     **
    **    This will be ignored for final summary of results     **
    ************************************************************

Circular surface (FOS=********) is defined by: xcenter =    186.17
ycenter =   2444.93   Init. Pt. =    170.83   Seg. Length =   8.00
-------------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   211    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was  43.4744     **
```

```
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 43.4744) is defined by: xcenter =    187.35
ycenter =   2454.65   Init. Pt. =    170.83   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   214    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  41.3345    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 41.3345) is defined by: xcenter =    187.34
ycenter =   2455.97   Init. Pt. =    170.83   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   215    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 201.3495    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=201.3495) is defined by: xcenter =    186.16
ycenter =   2456.83   Init. Pt. =    170.83   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   217    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 747.8647    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=747.8647) is defined by: xcenter =    186.22
ycenter =   2445.52   Init. Pt. =    170.83   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   481    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-179.1828    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.45
ycenter =   2509.74   Init. Pt. =    410.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
```

```
**     Factor of safety calculation for surface #   482     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-142.0307     **
**    This will be ignored for final summary of results     **
************************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.52
ycenter =   2509.70   Init. Pt. =    410.00   Seg. Length =   8.00
------------------------------------------------------------

************************************************************
**     Factor of safety calculation for surface #   483     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-171.0405     **
**    This will be ignored for final summary of results     **
************************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.41
ycenter =   2509.48   Init. Pt. =    410.00   Seg. Length =   8.00
------------------------------------------------------------

************************************************************
**     Factor of safety calculation for surface #   484     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-147.0269     **
**    This will be ignored for final summary of results     **
************************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.53
ycenter =   2509.79   Init. Pt. =    410.00   Seg. Length =   8.00
------------------------------------------------------------

************************************************************
**     Factor of safety calculation for surface #   485     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-152.8156     **
**    This will be ignored for final summary of results     **
************************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.54
ycenter =   2509.89   Init. Pt. =    410.00   Seg. Length =   8.00
------------------------------------------------------------

************************************************************
**     Factor of safety calculation for surface #   486     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-142.0334     **
**    This will be ignored for final summary of results     **
************************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.54
ycenter =   2509.78   Init. Pt. =    410.00   Seg. Length =   8.00
```

```
**********************************************************
**     Factor of safety calculation for surface #   487    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-133.8395    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.55
ycenter =   2509.71   Init. Pt. =    410.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   488    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-133.7575    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.54
ycenter =   2509.65   Init. Pt. =    410.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   489    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-141.1710    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.56
ycenter =   2509.86   Init. Pt. =    410.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   490    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-245.5109    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.52
ycenter =   2510.68   Init. Pt. =    410.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   491    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-137.8721    **
**    This will be ignored for final summary of results    **
**********************************************************
```

```
Circular surface (FOS=********) is defined by: xcenter =    414.56
ycenter =   2509.82   Init. Pt. =    410.00   Seg. Length =   8.00
-------------------------------------------------------------------

     ***************************************************************
     **     Factor of safety calculation for surface #   492     **
     **     failed to converge within FIFTY iterations           **
     **                                                          **
     **    The last calculated value of the FOS was-122.0716     **
     **    This will be ignored for final summary of results     **
     ***************************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.56
ycenter =   2509.58   Init. Pt. =    410.00   Seg. Length =   8.00
-------------------------------------------------------------------

                          .                          .

     ***************************************************************
     **     Factor of safety calculation for surface #   493     **
     **     failed to converge within FIFTY iterations           **
     **                                                          **
     **    The last calculated value of the FOS was-276.7236     **
     **    This will be ignored for final summary of results     **
     ***************************************************************

Circular surface (FOS=********) is defined by: xcenter =    414.55
ycenter =   2511.10   Init. Pt. =    410.00   Seg. Length =   8.00
-------------------------------------------------------------------

*********************************************************************
ERROR # 29
*********************************************************************
The program has made 200 attempts to generate a single trial failure
surface.  It is possible that the search limitations are either too
restrictive, or they actually prevent successful generation of a
trial failure surface.  Check and revise the search limitations.
*********************************************************************

                          .                          .

          ************************************************
          ***   The above error occurred in attempting   ***
          ***     to generate surface #   14 from the     ***
          ***  initiation point located at x =   410.00   ***
          ************************************************


     Factors of safety have been calculated by the :

     * * * * *   SIMPLIFIED BISHOP METHOD   * * * * *


       The most critical circular failure surface
       is specified by 33 coordinate points

            Point       x-surf       y-surf
```

No.	(ft)	(ft)
1	187.92	2435.00
2	195.85	2433.97
3	203.81	2433.16
4	211.79	2432.57
5	219.78	2432.21
6	227.78	2432.07
7	235.78	2432.16
8	243:77	2432.46
9	251.75	2433.00
10	259.72	2433.75
11	267.66	2434.73
12	275.57	2435.93
13	283.44	2437.35
14	291.27	2438.99
15	299.05	2440.84
16	306.78	2442.92
17	314.44	2445.21
18	322.04	2447.71
19	329.57	2450.42
20	337.01	2453.35
21	344.38	2456.48
22	351.65	2459.82
23	358.82	2463.35
24	365.90	2467.09
25	372.86	2471.02
26	379.72	2475.15
27	386.45	2479.47
28	393.06	2483.97
29	399.55	2488.66
30	405.90	2493.52
31	412.11	2498.57
32	418.18	2503.78
33	419:52	2505.00

**** Simplified BISHOP FOS = 2.593 ****

****
** **
** Out of the 493 surfaces generated and analyzed by XSTABL, **
** 42 surfaces were found to have MISLEADING FOS values. **
** **
****

The following is a summary of the TEN most critical surfaces

Problem Description : 3:1 DRY SLOPE (EAST C-1 DET. BASIN)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.593	228.77	2718.22	286.15	187.92	419.52	1.203E+08
2.	2.610	252.13	2631.83	207.04	187.92	415.76	1.145E+08
3.	2.620	227.77	2671.84	248.13	153.75	411.42	1.265E+08
4.	2.633	222.81	2598.00	171.08	170.83	351.73	4.557E+07
5.	2.640	196.63	2803.21	370.70	153.75	416.64	1.244E+08
6.	2.667	214.43	2714.07	289.70	136.67	414.76	1.438E+08

7.	2.673	224.65	2574.40	149.43	170.83	342.36	3.970E+07
8.	2.683	197.13	2722.12	290.38	153.75	376.46	6.771E+07
9.	2.688	212.71	2697.42	273.21	136.67	405.07	1.245E+08
10.	2.689	223.63	2690.95	270.32	136.67	419.71	1.629E+08

* * * END OF FILE * * *

XSTABL File: 3-DRYE 1-19-98 8:36

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*              using the                  *
*           Method of Slices              *
*                                         *
*         Copyright (C) 1992 á 97         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                96 á 1598    *
*******************************************
```

Problem Description : 3:1 DRY SLOPE (EARTHQUAKE LOADING)

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	410.0	2505.0	1
3	410.0	2505.0	420.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	340.0	2435.0	4
2	340.0	2435.0	410.0	2390.0	4
3	410.0	2390.0	420.0	2390.0	2
4	.0	2390.0	410.0	2390.0	2

ISOTROPIC Soil Parameters

---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	0
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

A horizontal earthquake loading coefficient
of .220 has been assigned

A vertical earthquake loading coefficient
of .220 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 410.0 ft

Each surface terminates between x = 200.0 ft
and x = 420.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****

ERROR # 29

****

The program has made 200 attempts to generate a single trial failure surface. It is possible that the search limitations are either too restrictive, or they actually prevent successful generation of a trial failure surface. Check and revise the search limitations.

****

****

*** The above error occurred in attempting ***
*** to generate surface # 14 from the ***
*** initiation point located at x = 410.00 ***

****

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 33 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	187.92	2435.00
2	195.85	2433.97
3	203.81	2433.16
4	211.79	2432.57
5	219.78	2432.21
6	227.78	2432.07
7	235.78	2432.16
8	243.77	2432.46
9	251.75	2433.00
10	259.72	2433.75
11	267.66	2434.73
12	275.57	2435.93
13	283.44	2437.35
14	291.27	2438.99
15	299.05	2440.84
16	306.78	2442.92
17	314.44	2445.21
18	322.04	2447.71
19	329.57	2450.42
20	337.01	2453.35
21	344.38	2456.48
22	351.65	2459.82
23	358.82	2463.35
24	365.90	2467.09
25	372.86	2471.02
26	379.72	2475.15
27	386.45	2479.47
28	393.06	2483.97
29	399.55	2488.66
30	405.90	2493.52
31	412.11	2498.57
32	418.18	2503.78
33	419.52	2505.00

**** Simplified BISHOP FOS = 1.302 ****

The following is a summary of the TEN most critical surfaces

Problem Description : 3:1 DRY SLOPE (EARTHQUAKE LOADING)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.302	228.77	2718.22	286.15	187.92	419.52	8.718E+07

2.	1.304	227.77	2671.84	248.13	153.75	411.42	9.156E+07
3.	1.308	214.43	2714.07	289.70	136.67	414.76	1.042E+08
4.	1.316	212.71	2697.42	273.21	136.67	405.07	9.035E+07
5.	1.319	222.81	2598.00	171.08	170.83	351.73	3.307E+07
6.	1.321	223.63	2690.95	270.32	136.67	419.71	1.182E+08
7.	1.321	196.63	2803.21	370.70	153.75	416.64	9.067E+07
8.	1.323	252.13	2631.83	207.04	187.92	415.76	8.290E+07
9.	1.338	197.13	2722.12	290.38	153.75	376.46	4.946E+07
10.	1.341	213.93	2655.74	233.87	136.67	385.55	7.336E+07

* * * END OF FILE * * *

XSTABL File: 4-DRY 1-19-98 8:29

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*              using the                  *
*           Method of Slices              *
*                                         *
*        Copyright (C) 1992 á 97          *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                96 á 1598    *
*******************************************
```

Problem Description : 4:1 DRY SLOPE (EAST C-1 DET. BASIN)

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	480.0	2505.0	1
3	480.0	2505.0	490.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	410.0	2435.0	4
2	410.0	2435.0	480.0	2390.0	4
3	480.0	2390.0	490.0	2390.0	2
4	.0	2390.0	480.0	2390.0	2

ISOTROPIC Soil Parameters

---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	0
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 480.0 ft

Each surface terminates between x = 200.0 ft
and x = 490.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

```
**********************************************************
**     Factor of safety calculation for surface #    19   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was 854.1028   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS=854.1028) is defined by: xcenter = 103.20
ycenter = 2534.02 Init. Pt. = .00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    21   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was 157.3614   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS=157.3614) is defined by: xcenter = 117.06
ycenter = 2531.66 Init. Pt. = 20.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #    37     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  72.8862     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS= 72.8862) is defined by: xcenter =    120.84
ycenter =   2537.19   Init. Pt. =     20.00   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    40     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  21.4954     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS= 21.4954) is defined by: xcenter =    124.48
ycenter =   2700.52   Init. Pt. =     20.00   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    45     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 128.2418     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS=128.2418) is defined by: xcenter =    124.15
ycenter =   2663.18   Init. Pt. =     40.00   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    47     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  22.3443     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS= 22.3443) is defined by: xcenter =    141.29
ycenter =   2530.66   Init. Pt. =     40.00   Seg. Length =    8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    50     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 161.2015     **
**    This will be ignored for final summary of results     **
**********************************************************
```

Circular surface (FOS=161.2015) is defined by: xcenter = 125.71
ycenter = 2539.70 Init. Pt. = 40.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 54 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 97.4816 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 97.4816) is defined by: xcenter = 128.32
ycenter = 2519.27 Init. Pt. = 40.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 55 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 110.5715 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=110.5715) is defined by: xcenter = 126.99
ycenter = 2543.07 Init. Pt. = 40.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 56 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 50.8563 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 50.8563) is defined by: xcenter = 131.01
ycenter = 2548.34 Init. Pt. = 40.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 65 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was********* **
** This will be ignored for final summary of results **
****

Circular surface (FOS=********) is defined by: xcenter = 130.18
ycenter = 2516.28 Init. Pt. = 60.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 70 **
** failed to converge within FIFTY iterations **

```
**                                                              **
**    The last calculated value of the FOS was 559.7409         **
**    This will be ignored for final summary of results         **
**************************************************************

Circular surface (FOS=559.7409) is defined by: xcenter =    132.41
ycenter =   2541.94   Init. Pt. =     60.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #    72     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 110.8388     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=110.8388) is defined by: xcenter =    136.50
ycenter =   2517.10   Init. Pt. =     60.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #    79     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  57.7807     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS= 57.7807) is defined by: xcenter =    139.39
ycenter =   2521.79   Init. Pt. =     60.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #    81     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 619.0282     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=619.0282) is defined by: xcenter =    142.30
ycenter =   2495.34   Init. Pt. =     80.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #    85     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was 755.5637     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=755.5637) is defined by: xcenter =    142.10
ycenter =   2493.14   Init. Pt. =     80.00   Seg. Length =   8.00
--------------------------------------------------------------------
```

```
**********************************************************
**     Factor of safety calculation for surface #    88    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  21.8419    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 21.8419) is defined by: xcenter =    152.38
ycenter =   2557.40   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    95    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was3436.6590    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    140.75
ycenter =   2556.27   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   100    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 127.9818    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=127.9818) is defined by: xcenter =    145.37
ycenter =   2497.59   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   102    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 164.8002    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=164.8002) is defined by: xcenter =    153.77
ycenter =   2491.17   Init. Pt. =    100.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   110    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  86.5711    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS= 86.5711) is defined by: xcenter = 155.70
ycenter = 2485.24 Init. Pt. = 100.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   112   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was 162.5518   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS=162.5518) is defined by: xcenter = 153.08
ycenter = 2527.84 Init. Pt. = 100.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   124   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was  55.5713   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS= 55.5713) is defined by: xcenter = 166.03
ycenter = 2475.70 Init. Pt. = 120.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   144   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was 564.6497   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS=564.6497) is defined by: xcenter = 171.31
ycenter = 2461.35 Init. Pt. = 140.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   150   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was  50.0013   **
**    This will be ignored for final summary of results   **
**********************************************************
```

Circular surface (FOS= 50.0013) is defined by: xcenter = 174.37
ycenter = 2475.01 Init. Pt. = 140.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   174   **
**     failed to converge within FIFTY iterations         **
**                                                        **
**    The last calculated value of the FOS was*********   **
```

```
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    180.42
ycenter =   2450.23   Init. Pt. =    160.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   182    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-758.4728    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    190.54
ycenter =   2447.98   Init. Pt. =    180.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   190    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  40.0012    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 40.0012) is defined by: xcenter =    191.45
ycenter =   2457.75   Init. Pt. =    180.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   194    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  62.0000    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 62.0000) is defined by: xcenter =    192.10
ycenter =   2441.57   Init. Pt. =    180.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   481    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-142.3822    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.52
ycenter =   2509.70   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
```

```
**     Factor of safety calculation for surface #   482     **
**     failed to converge within FIFTY iterations   .       **
**                                                          **
**    The last calculated value of the FOS was-171.0754     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.41
ycenter =   2509.48   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   483     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-147.0576     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.53
ycenter =   2509.79   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   484     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-152.8389     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.54
ycenter =   2509.89   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   485     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-142.0690     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.54
ycenter =   2509.78   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   486     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-133.8685     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.55
ycenter =   2509.71   Init. Pt. =    480.00   Seg. Length =   8.00
```

```
**********************************************************
**     Factor of safety calculation for surface #   487     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-133.7823     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.54
ycenter =   2509.65   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   488     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-141.1986     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.86   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   489     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-245.5419     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =.   484.52
ycenter =   2510.68   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   490     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-138.2181     **
**    This will be ignored for final summary of results     **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.82   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   491     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-122.0952     **
**    This will be ignored for final summary of results     **
**********************************************************
```

Circular surface (FOS=********) is defined by: xcenter = 484.56
ycenter = 2509.58 Init. Pt. = 480.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 492 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was-276.7377 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=********) is defined by: xcenter = 484.55
ycenter = 2511.10 Init. Pt. = 480.00 Seg. Length = 8.00

****
ERROR # 29
****
The program has made 200 attempts to generate a single trial failure surface. It is possible that the search limitations are either too restrictive, or they actually prevent successful generation of a trial failure surface. Check and revise the search limitations.
****

****
*** The above error occurred in attempting ***
*** to generate surface # 13 from the ***
*** initiation point located at x = 480.00 ***
****

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	160.00	2435.00
2	167:74	2432.96
3	175.52	2431.10
4	183.34	2429.42
5	191.20	2427.93
6	199.09	2426.62
7	207.01	2425.50
8	214.96	2424.56
9	222.92	2423.81
10	230.90	2423.24
11	238.89	2422.86
12	246.89	2422.67

13	254.89	2422.66
14	262.89	2422.85
15	270.88	2423.22
16	278.86	2423.77
17	286.82	2424.52
18	294.77	2425.45
19	302.69	2426.56
20	310.59	2427.86
21	318.45	2429.34
22	326.27	2431.01
23	334.05	2432.86
24	341.79	2434.89
25	349.48	2437.11
26	357.11	2439.50
27	364.69	2442.07
28	372.20	2444.81
29	379.65	2447.73
30	387.03	2450.83
31	394.33	2454.10
32	401.56	2457.53
33	408.70	2461.14
34	415.75	2464.91
35	422.72	2468.84
36	429.59	2472.94
37	436.37	2477.19
38	443.04	2481.61
39	449.61	2486.18
40	456.06	2490.90
41	462.41	2495.77
42	468.64	2500.78
43	470.96	2502.74

**** Simplified BISHOP FOS = 3.270 ****

****
**
** Out of the 492 surfaces generated and analyzed by XSTABL, **
** 41 surfaces were found to have MISLEADING FOS values. **
**
****

The following is a summary of the TEN most critical surfaces

Problem Description : 4:1 DRY SLOPE (EAST C-1 DET. BASIN)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	3.270	251.15	2764.79	342.16	160.00	470.96	2.247E+08
2.	3.283	265.42	2748.05	330.33	160.00	489.15	2.838E+08
3.	3.292	243.95	2726.26	303.12	160.00	439.74	1.608E+08
4.	3.320	275.15	2651.01	228.71	200.00	443.02	1.350E+08
5.	3.342	228.36	2855.15	422.92	180.00	456.52	1.704E+08
6.	3.347	238.30	2658.88	237.18	160.00	399.43	1.000E+08
7.	3.382	232.49	2688.50	255.58	200.00	380.41	5.620E+07
8.	3.392	251.59	2710.09	296.86	140.00	461.92	2.421E+08
9.	3.410	220.85	2871.82	448.31	120.00	477.64	2.804E+08
10.	3.460	221.39	2527.03	94.48	200.00	283.47	5.670E+06

* * * END OF FILE * * *

XSTABL File: 4-DRYE 1-19-98 8:30

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*              using the                  *
*           Method of Slices              *
*                                         *
*         Copyright (C) 1992 á 97         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                96 á 1598    *
*******************************************
```

Problem Description : 4:1 DRY SLOPE (EARTHQUAKE LOADING)

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	480.0	2505.0	1
3	480.0	2505.0	490.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	410.0	2435.0	4
2	410.0	2435.0	480.0	2390.0	4
3	480.0	2390.0	490.0	2390.0	2
4	.0	2390.0	480.0	2390.0	2

ISOTROPIC Soil Parameters

---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	0
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

A horizontal earthquake loading coefficient
of .220 has been assigned

A vertical earthquake loading coefficient
of .220 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 480.0 ft

Each surface terminates between x = 200.0 ft
and x = 490.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****

ERROR # 29

****

The program has made 200 attempts to generate a single trial failure surface. It is possible that the search limitations are either too restrictive, or they actually prevent successful generation of a trial failure surface. Check and revise the search limitations.

****

****
*** The above error occurred in attempting ***
*** to generate surface # 13 from the ***
*** initiation point located at x = 480.00 ***
****

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	160.00	2435.00
2	167.74	2432.96
3	175.52	2431.10
4	183.34	2429.42
5	191.20	2427.93
6	199.09	2426.62
7	207.01	2425.50
8	214.96	2424.56
9	222.92	2423.81
10	230.90	2423.24
11	238.89	2422.86
12	246.89	2422.67
13	254.89	2422.66
14	262.89	2422.85
15	270.88	2423.22
16	278.86	2423.77
17	286.82	2424.52
18	294.77	2425.45
19	302.69	2426.56
20	310.59	2427.86
21	318.45	2429.34
22	326.27	2431.01
23	334.05	2432.86
24	341.79	2434.89
25	349.48	2437.11
26	357.11	2439.50
27	364:69	2442.07
28	372.20	2444.81
29	379.65	2447.73
30	387.03	2450.83
31	394.33	2454.10
32	401.56	2457.53
33	408.70	2461.14
34	415.75	2464.91
35	422.72	2468.84
36	429.59	2472.94
37	436.37	2477.19
38	443.04	2481.61
39	449.61	2486.18
40	456.06	2490.90
41	462.41	2495.77
42	468.64	2500.78
43	470.96	2502.74

**** Simplified BISHOP FOS = 1.450 ****

The following is a summary of the TEN most critical surfaces

Problem Description : 4:1 DRY SLOPE (EARTHQUAKE LOADING)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.450	251.15	2764.79	342.16	160.00	470.96	1.651E+08
2.	1.457	243.95	2726.26	303.12	160.00	439.74	1.182E+08
3.	1.462	265.42	2748.05	330.33	160.00	489.15	2.086E+08
4.	1.470	220.85	2871.82	448.31	120.00	477.64	2.066E+08
5.	1.480	238.30	2658.88	237.18	160.00	399.43	7.372E+07
6.	1.489	228.36	2855.15	422.92	180.00	456.52	1.259E+08
7.	1.494	212.38	2764.35	337.21	140.00	401.87	8.061E+07
8.	1.495	251.59	2710.09	296.86	140.00	461.92	1.786E+08
9.	1.498	275.15	2651.01	228.71	200.00	443.02	9.938E+07
10.	1.499	211.60	2788.35	365.03	120.00	423.29	1.208E+08

* * * END OF FILE * * *

XSTABL File: 4-WET 1-19-98 8:39

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 á 97         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                96 á 1598    *
*******************************************
```

Problem Description : 4:1 SLOPE (MAX. SATURATION)

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	480.0	2505.0	1
3	480.0	2505.0	490.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	410.0	2435.0	4
2	410.0	2435.0	480.0	2390.0	4
3	480.0	2390.0	490.0	2390.0	2
4	.0	2390.0	480.0	2390.0	2

ISOTROPIC Soil Parameters

---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	1
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 4 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	2465.00
2	360.00	2465.00
3	400.00	2300.00
4	490.00	2300.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 480.0 ft

Each surface terminates between x = 200.0 ft
and x = 490.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS .

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
** Factor of safety calculation for surface # 19 **
** failed to converge within FIFTY iterations **
**

```
**    The last calculated value of the FOS was  61.1454    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 61.1454) is defined by: xcenter =    103.20
ycenter =   2534.02   Init. Pt. =       .00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    21    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  25.0746    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 25.0746) is defined by: xcenter =    117.06
ycenter =   2531.66   Init. Pt. =     20.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    45    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  26.0927    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 26.0927) is defined by: xcenter =    124.15
ycenter =   2663.18   Init. Pt. =     40.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    50    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  22.8944    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 22.8944) is defined by: xcenter =    125.71
ycenter =   2539.70   Init. Pt. =     40.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    65    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 548.5110    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=548.5110) is defined by: xcenter =    130.18
ycenter =   2516.28   Init. Pt. =     60.00   Seg. Length =   8.00
----------------------------------------------------------------
```

```
**********************************************************
**     Factor of safety calculation for surface #    70    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  36.8773    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 36.8773) is defined by: xcenter =    132.41
ycenter =   2541.94   Init. Pt. =     60.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    81    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  32.6496    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 32.6496) is defined by: xcenter =    142.30
ycenter =   2495.34   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   .85    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  35.7913    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 35.7913) is defined by: xcenter =    142.10
ycenter =   2493.14   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    95    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  82.9780    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 82.9780) is defined by: xcenter =    140.75
ycenter =   2556.27   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   174    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  27.5079    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 27.5079) is defined by: xcenter =    180.42
```

ycenter = 2450.23 Init. Pt. = 160.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   203  **
**     failed to converge within FIFTY iterations        **
**                                                       **
**    The last calculated value of the FOS was -53.4916  **
**    This will be ignored for final summary of results  **
**********************************************************
```

Circular surface (FOS=-53.4916) is defined by: xcenter = 209.72
ycenter = 2439.99 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   206  **
**     failed to converge within FIFTY iterations        **
**                                                       **
**    The last calculated value of the FOS was  51.5247  **
**    This will be ignored for final summary of results  **
**********************************************************
```

Circular surface (FOS= 51.5247) is defined by: xcenter = 212.38
ycenter = 2445.68 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   209  **
**     failed to converge within FIFTY iterations        **
**                                                       **
**    The last calculated value of the FOS was  24.1078  **
**    This will be ignored for final summary of results  **
**********************************************************
```

Circular surface (FOS= 24.1078) is defined by: xcenter = 218.43
ycenter = 2448.52 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   210  **
**     failed to converge within FIFTY iterations        **
**                                                       **
**    The last calculated value of the FOS was -60.9054  **
**    This will be ignored for final summary of results  **
**********************************************************
```

Circular surface (FOS=-60.9054) is defined by: xcenter = 209.88
ycenter = 2439.40 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   211  **
**     failed to converge within FIFTY iterations        **
**                                                       **
**    The last calculated value of the FOS was  26.0028  **
**    This will be ignored for final summary of results  **
```

```
**********************************************************

Circular surface (FOS= 26.0028) is defined by: xcenter =    215.22
ycenter =   2451.11   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   213    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 109.3744    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=109.3744) is defined by: xcenter =    208.64
ycenter =   2443.50   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   216    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  58.4152    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 58.4152) is defined by: xcenter =    208.35
ycenter =   2443.82   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   217    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was -38.3148    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=-38.3148) is defined by: xcenter =    207.27
ycenter =   2443.31   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   218    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  21.0441    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 21.0441) is defined by: xcenter =    212.87
ycenter =   2459.95   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   219    **
```

```
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was -55.1342    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS=-55.1342) is defined by: xcenter =    209.79
ycenter =   2439.73   Init. Pt. =    200.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   220    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  30.6388    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS= 30.6388) is defined by: xcenter =    215.84
ycenter =   2445.57   Init. Pt. =    200.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   224    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  41.9568    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS= 41.9568) is defined by: xcenter =    232.45
ycenter =   2447.36   Init. Pt. =    220.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   231    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  23.0679    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS= 23.0679) is defined by: xcenter =    233.49
ycenter =   2448.30   Init. Pt. =    220.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   242    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was -68.1571    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS=-68.1571) is defined by: xcenter =    249.85
ycenter =   2449.19   Init. Pt. =    240.00   Seg. Length =   8.00
-------------------------------------------------------------------
```

```
**********************************************************
**     Factor of safety calculation for surface #   251    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was -14.2206    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=-14.2206) is defined by: xcenter =    242.98
ycenter =   2453.83   Init. Pt. =    240.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************************
   --  WARNING  --  WARNING  --  WARNING  --  WARNING  --  (# 50)
**********************************************************************
This warning is usually reported for cases where slices near the toe
of the slide mass have steep, negative base angles.  Generally, this
error condition can be avoided by "raising" the lower angular limit
boundary to prevent generation of such deep failure surfaces.
**********************************************************************

Surface No:   284       Slice No:  1        m_alpha =  -.330832
Alpha =   -3.93 deg     Phi =  38.00 deg       FOS =   .040

**********************************************************
**     Factor of safety calculation for surface #   284    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  80.4336    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 80.4336) is defined by: xcenter =    284.54
ycenter =   2462.69   Init. Pt. =    280.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   312    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was    .0048    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=   .0048) is defined by: xcenter =    303.68
ycenter =   2466.63   Init. Pt. =    300.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   481    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-142.3822    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS=********) is defined by: xcenter = 484.52
ycenter = 2509.70 Init. Pt. = 480.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 482 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was-171.0754 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=********) is defined by: xcenter = 484.41
ycenter = 2509.48 Init. Pt. = 480.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 483 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was-147.0576 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=********) is defined by: xcenter = 484.53
ycenter = 2509.79 Init. Pt. = 480.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 484 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was-152.8389 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=********) is defined by: xcenter = 484.54
ycenter = 2509.89 Init. Pt. = 480.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 485 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was-142.0690 **
** This will be ignored for final summary of results **
****

Circular surface (FOS=********) is defined by: xcenter = 484.54
ycenter = 2509.78 Init. Pt. = 480.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 486 **
** failed to converge within FIFTY iterations **

```
**                                                              **
**    The last calculated value of the FOS was-133.8685         **
**    This will be ignored for final summary of results         **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.55
ycenter =   2509.71   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   487      **
**     failed to converge within FIFTY iterations             **
**                                                            **
**    The last calculated value of the FOS was-133.7823       **
**    This will be ignored for final summary of results       **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.54
ycenter =   2509.65   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   488      **
**     failed to converge within FIFTY iterations             **
**                                                            **
**    The last calculated value of the FOS was-141.1986       **
**    This will be ignored for final summary of results       **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.86   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   489      **
**     failed to converge within FIFTY iterations   .         **
**                                                            **
**    The last calculated value of the FOS was-245.5419       **
**    This will be ignored for final summary of results       **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.52
ycenter =   2510.68   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   490      **
**     failed to converge within FIFTY iterations             **
**                                                            **
**    The last calculated value of the FOS was-138.2181       **
**    This will be ignored for final summary of results       **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.82   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------
```

```
**************************************************************
**     Factor of safety calculation for surface #   491     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-122.0952     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.58   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   492     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was-276.7377     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.55
ycenter =   2511.10   Init. Pt. =    480.00   Seg. Length =   8.00
--------------------------------------------------------------------

**********************************************************************
ERROR # 29
**********************************************************************
The program has made 200 attempts to generate a single trial failure
surface.  It is possible that the search limitations are either too
restrictive, or they actually prevent successful generation of a
trial failure surface.  Check and revise the search limitations.
**********************************************************************

      ************************************************
      ***   The above error occurred in attempting   ***
      ***     to generate surface #   13 from the     ***
      ***  initiation point located at x =   480.00   ***
      ************************************************

Factors of safety have been calculated by the :

* * * * *   SIMPLIFIED BISHOP METHOD   * * * * *

 The most critical circular failure surface
 is specified by  5 coordinate points

      Point        x-surf        y-surf
       No.          (ft)          (ft)

        1          180.00       2435.00
        2          187.50       2432.21
        3          195.49       2431.78
        4          203.24       2433.75
```

5 208.92 2437.23

**** Simplified BISHOP FOS = 3.180 ****

****
** **
** Out of the 492 surfaces generated and analyzed by XSTABL, **
** 39 surfaces were found to have MISLEADING FOS values. **
** **
****

The following is a summary of the TEN most critical surfaces

Problem Description : 4:1 SLOPE (MAX. SATURATION)

	FOS (BISHOP)	Circle x-coord (ft)	Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	3.180	192.91	2458.23	26.58	180.00	208.92	3.134E+05
2.	3.183	192.10	2441.57	13.77	180.00	204.24	2.216E+05
3.	3.222	269.38	2802.98	366.32	220.00	482.30	1.408E+08
4.	3.254	305.05	2600.07	156.68	260.00	415.45	2.895E+07
5.	3.290	195.24	2461.58	30.64	180.00	215.55	6.516E+05
6.	3.311	287.27	2608.22	160.55	260.00	385.63	1.436E+07
7.	3.325	193.39	2461.91	30.06	180.00	211.15	3.949E+05
8.	3.365	316.24	2529.77	83.09	280.00	383.26	8.774E+06
9.	3.437	198.81	2462.84	33.60	180.00	224.29	1.269E+06
10.	3.489	124.82	3419.16	983.77	220.00	488.04	1.851E+08

* * * END OF FILE * * *

XSTABL File: 4-WETE 1-19-98 8:40

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*              using the                  *
*           Method of Slices              *
*                                         *
*         Copyright (C) 1992 á 97         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                96 á 1598    *
*******************************************
```

Problem Description : 4:1 SLOPE (MAX. SATURATION/E'QUAKE)

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	480.0	2505.0	1
3	480.0	2505.0	490.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	410.0	2435.0	4
2	410.0	2435.0	480.0	2390.0	4
3	480.0	2390.0	490.0	2390.0	2
4	.0	2390.0	480.0	2390.0	2

ISOTROPIC Soil Parameters

---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	1
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 4 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	2465.00
2	360.00	2465.00
3	400.00	2300.00
4	490.00	2300.00

A horizontal earthquake loading coefficient
of .220 has been assigned

A vertical earthquake loading coefficient
of .220 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 480.0 ft

Each surface terminates between x = 200.0 ft
and x = 490.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

```
**********************************************************
**     Factor of safety calculation for surface #   203    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  68.9850    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 68.9850) is defined by: xcenter =    209.72
ycenter =   2439.99   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   210    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  63.5386    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 63.5386) is defined by: xcenter =    209.88
ycenter =   2439.40   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   213    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  21.1112    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 21.1112) is defined by: xcenter =    208.64
ycenter =   2443.50   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   217    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 158.2194    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=158.2194) is defined by: xcenter =    207.27
ycenter =   2443.31   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   219    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  69.0328    **
**    This will be ignored for final summary of results    **
```

****

Circular surface (FOS= 69.0328) is defined by: xcenter = 209.79
ycenter = 2439.73 Init. Pt. = 200.00 Seg. Length = 8.00

****
** Factor of safety calculation for surface # 251 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was .0033 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= .0033) is defined by: xcenter = 242.98
ycenter = 2453.83 Init. Pt. = 240.00 Seg. Length = 8.00

****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
****
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.
****

USER SELECTED option to discard surfaces with effective normal stresses less than zero
---

ERROR #48: NEGATIVE effective stress calculated for at least
1 slice(s) out of 8 slices for surface # 282

Circular surface (FOS= 1.7657) is defined by: xcenter = 288.19
ycenter = 2509.38 Init. Pt. = 280.00 Seg. Length = 8.00

ERROR #48: NEGATIVE effective stress calculated for at least
1 slice(s) out of 10 slices for surface # 293

Circular surface (FOS= 1.8146) is defined by: xcenter = 300.69
ycenter = 2471.09 Init. Pt. = 280.00 Seg. Length = 8.00

****
ERROR # 29
****
The program has made 200 attempts to generate a single trial failure surface. It is possible that the search limitations are either too restrictive, or they actually prevent successful generation of a trial failure surface. Check and revise the search limitations.
****

```
**************************************************
***   The above error occurred in attempting   ***
***     to generate surface #   13 from the     ***
***  initiation point located at x =   480.00   ***
**************************************************
```

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 15 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	240.00	2445.00
2	247.93	2443.96
3	255.91	2443.39
4	263.91	2443.29
5	271.90	2443.67
6	279.86	2444.51
7	287.75	2445.83
8	295.55	2447.62
9	303.23	2449.86
10	310.76	2452.55
11	318.12	2455.68
12	325.28	2459.25
13	332.22	2463.23
14	338.91	2467.61
15	343.20	2470.80

**** Simplified BISHOP FOS = 1.115 ****

```
**********************************************************************
**                                                                  **
**  Out of the    492 surfaces generated and analyzed by XSTABL,    **
**        8 surfaces were found to have MISLEADING FOS values.      **
**                                                                  **
**********************************************************************
```

The following is a summary of the TEN most critical surfaces

Problem Description : 4:1 SLOPE (MAX. SATURATION/E'QUAKE)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.115	261.55	2578.34	135.07	240.00	343.20	4.281E+06
2.	1.134	287.27	2608.22	160.55	260.00	385.63	9.119E+06

3.	1.165	305.05	2600.07	156.68	260.00	415.45	1.852E+07
4.	1.170	247.79	2513.42	78.50	220.00	306.81	2.527E+06
5.	1.186	269.38	2802.98	366.32	220.00	482.30	9.241E+07
6.	1.188	316.24	2529.77	83.09	280.00	383.26	5.543E+06
7.	1.196	306.65	2513.71	64.47	280.00	357.65	2.220E+06
8.	1.200	239.96	2526.36	88.63	220.00	298.01	1.886E+06
9.	1.246	243.22	2492.65	57.54	220.00	288.27	1.309E+06
10.	1.306	258.46	2498.02	56.15	240.00	299.59	9.064E+05

* * * END OF FILE * * *

XSTABL File: 4-RAP 1-19-98 8:56

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*               using the                 *
*            Method of Slices             *
*                                         *
*         Copyright (C) 1992 á 97         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                 96 á 1598   *
*******************************************
```

Problem Description : 4:1 SLOPE (RAPID DRAWDOWN)

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	480.0	2505.0	1
3	480.0	2505.0	490.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	410.0	2435.0	4
2	410.0	2435.0	480.0	2390.0	4
3	480.0	2390.0	490.0	2390.0	2
4	.0	2390.0	480.0	2390.0	2

ISOTROPIC Soil Parameters

---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	1
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	2465.00
2	360.00	2465.00
3	410.00	2470.00
4	450.00	2300.00
5	490.00	2300.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 480.0 ft

Each surface terminates between x = 200.0 ft
and x = 490.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
** Factor of safety calculation for surface # 19 **
** failed to converge within FIFTY iterations **

```
**                                                              **
**    The last calculated value of the FOS was  61.1454         **
**    This will be ignored for final summary of results         **
****************************************************************

Circular surface (FOS= 61.1454) is defined by: xcenter =    103.20
ycenter =   2534.02   Init. Pt. =       .00   Seg. Length =   8.00
----------------------------------------------------------------

****************************************************************
**     Factor of safety calculation for surface #    21       **
**     failed to converge within FIFTY iterations              **
**                                                             **
**    The last calculated value of the FOS was  25.0746        **
**    This will be ignored for final summary of results        **
****************************************************************

Circular surface (FOS= 25.0746) is defined by: xcenter =    117.06
ycenter =   2531.66   Init. Pt. =     20.00   Seg. Length =   8.00
----------------------------------------------------------------

****************************************************************
**     Factor of safety calculation for surface #    45       **
**     failed to converge within FIFTY iterations              **
**                                                             **
**    The last calculated value of the FOS was  26.0927        **
**    This will be ignored for final summary of results        **
****************************************************************

Circular surface (FOS= 26.0927) is defined by: xcenter =    124.15
ycenter =   2663.18   Init. Pt. =     40.00   Seg. Length =   8.00
----------------------------------------------------------------

****************************************************************
**     Factor of safety calculation for surface #    50       **
**     failed to converge within FIFTY iterations              **
**                                                             **
**    The last calculated value of the FOS was  22.8944        **
**    This will be ignored for final summary of results        **
****************************************************************

Circular surface (FOS= 22.8944) is defined by: xcenter =    125.71
ycenter =   2539.70   Init. Pt. =     40.00   Seg. Length =   8.00
----------------------------------------------------------------

****************************************************************
**     Factor of safety calculation for surface #    65       **
**     failed to converge within FIFTY iterations              **
**                                                             **
**    The last calculated value of the FOS was 548.5110        **
**    This will be ignored for final summary of results        **
****************************************************************

Circular surface (FOS=548.5110) is defined by: xcenter =    130.18
ycenter =   2516.28   Init. Pt. =     60.00   Seg. Length =   8.00
----------------------------------------------------------------
```

```
**********************************************************
**     Factor of safety calculation for surface #    70    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  36.8773    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 36.8773) is defined by: xcenter =    132.41
ycenter =   2541.94   Init. Pt. =     60.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    81    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  32.6496    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 32.6496) is defined by: xcenter =    142.30
ycenter =   2495.34   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    85    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  35.7913    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 35.7913) is defined by: xcenter =    142.10
ycenter =   2493.14   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #    95    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  82.9780    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 82.9780) is defined by: xcenter =    140.75
ycenter =   2556.27   Init. Pt. =     80.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   174    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  27.5079    **
**    This will be ignored for final summary of results    **
**********************************************************
```

```
Circular surface (FOS= 27.5079) is defined by: xcenter =    180.42
ycenter =   2450.23   Init. Pt. =    160.00   Seg. Length =   8.00
-------------------------------------------------------------------


    ************************************************************
    **     Factor of safety calculation for surface #   203     **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was -53.4916     **
    **    This will be ignored for final summary of results     **
    ************************************************************


Circular surface (FOS=-53.4916) is defined by: xcenter =    209.72
ycenter =   2439.99   Init. Pt. =    200.00   Seg. Length =   8.00
-------------------------------------------------------------------


    ************************************************************
    **     Factor of safety calculation for surface #   206     **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was  51.5247     **
    **    This will be ignored for final summary of results     **
    ************************************************************


Circular surface (FOS= 51.5247) is defined by: xcenter =    212.38
ycenter =   2445.68   Init. Pt. =    200.00   Seg. Length =   8.00
-------------------------------------------------------------------


    ************************************************************
    **     Factor of safety calculation for surface #   209     **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was  24.1078     **
    **    This will be ignored for final summary of results     **
    ************************************************************


Circular surface (FOS= 24.1078) is defined by: xcenter =    218.43
ycenter =   2448.52   Init. Pt. =    200.00   Seg. Length =   8.00
-------------------------------------------------------------------


    ************************************************************
    **     Factor of safety calculation for surface #   210     **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was -60.9054     **
    **    This will be ignored for final summary of results     **
    ************************************************************


Circular surface (FOS=-60.9054) is defined by: xcenter =    209.88
ycenter =   2439.40   Init. Pt. =    200.00   Seg. Length =   8.00
-------------------------------------------------------------------


    ************************************************************
    **     Factor of safety calculation for surface #   211     **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was  26.0028     **
```

```
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 26.0028) is defined by: xcenter =    215.22
ycenter =   2451.11   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   213    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 109.3744    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=109.3744) is defined by: xcenter =    208.64
ycenter =   2443.50   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   216    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  58.4152    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 58.4152) is defined by: xcenter =    208.35
ycenter =   2443.82   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   217    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was -38.3148    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=-38.3148) is defined by: xcenter =    207.27
ycenter =   2443.31   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   218    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  21.0441    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 21.0441) is defined by: xcenter =    212.87
ycenter =   2459.95   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
```

```
**     Factor of safety calculation for surface #   219     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was -55.1342     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=-55.1342) is defined by: xcenter =    209.79
ycenter =   2439.73   Init. Pt. =    200.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   220     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  30.6388     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS= 30.6388) is defined by: xcenter =    215.84
ycenter =   2445.57   Init. Pt. =    200.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   224     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  41.9568     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS= 41.9568) is defined by: xcenter =    232.45
ycenter =   2447.36   Init. Pt. =    220.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   231     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was  23.0679     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS= 23.0679) is defined by: xcenter =    233.49
ycenter =   2448.30   Init. Pt. =    220.00   Seg. Length =   8.00
--------------------------------------------------------------------

**************************************************************
**     Factor of safety calculation for surface #   242     **
**     failed to converge within FIFTY iterations           **
**                                                          **
**    The last calculated value of the FOS was -68.1571     **
**    This will be ignored for final summary of results     **
**************************************************************

Circular surface (FOS=-68.1571) is defined by: xcenter =    249.85
ycenter =   2449.19   Init. Pt. =    240.00   Seg. Length =   8.00
```

```
---------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   251    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was -14.2206    **
    **    This will be ignored for final summary of results     **
    ************************************************************

Circular surface (FOS=-14.2206) is defined by: xcenter =    242.98
ycenter =   2453.83   Init. Pt. =    240.00   Seg. Length =   8.00
---------------------------------------------------------------

************************************************************************
    --  WARNING  --  WARNING  --  WARNING  --  WARNING  --  (# 50)
************************************************************************
This warning is usually reported for cases where slices near the toe
of the slide mass have steep, negative base angles.  Generally, this
error condition can be avoided by "raising" the lower angular limit
boundary to prevent generation of such deep failure surfaces.
************************************************************************

    Surface No:   284       Slice No:  1        m_alpha =  -.330832
    Alpha =   -3.93 deg     Phi =  38.00 deg       FOS =   .040

    ************************************************************
    **     Factor of safety calculation for surface #   284    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was  80.4336    **
    **    This will be ignored for final summary of results     **
    ************************************************************

Circular surface (FOS= 80.4336) is defined by: xcenter =    284.54
ycenter =   2462.69   Init. Pt. =    280.00   Seg. Length =   8.00
---------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   312    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was     .0048    **
    **    This will be ignored for final summary of results     **
    ************************************************************

Circular surface (FOS=    .0048) is defined by: xcenter =    303.68
ycenter =   2466.63   Init. Pt. =    300.00   Seg. Length =   8.00
---------------------------------------------------------------

    ************************************************************
    **     Factor of safety calculation for surface #   481    **
    **     failed to converge within FIFTY iterations           **
    **                                                          **
    **    The last calculated value of the FOS was-142.3822    **
    **    This will be ignored for final summary of results     **
```

```
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.52
ycenter =   2509.70   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   482    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-171.0754    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.41
ycenter =   2509.48   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   483    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-147.0576    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.53
ycenter =   2509.79   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   484    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-152.8389    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.54
ycenter =   2509.89   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   485    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-142.0690    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.54
ycenter =   2509.78   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   486    **
```

```
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-133.8685    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.55
ycenter =   2509.71   Init. Pt. =    480.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   487    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-133.7823    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.54
ycenter =   2509.65   Init. Pt. =    480.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   488    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-141.1986    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.86   Init. Pt. =    480.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   489    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-245.5419    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.52
ycenter =   2510.68   Init. Pt. =    480.00   Seg. Length =   8.00
-------------------------------------------------------------------

*************************************************************
**     Factor of safety calculation for surface #   490    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-138.2181    **
**    This will be ignored for final summary of results    **
*************************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.82   Init. Pt. =    480.00   Seg. Length =   8.00
-------------------------------------------------------------------
```

```
**********************************************************
**     Factor of safety calculation for surface #   491    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-122.0952    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.56
ycenter =   2509.58   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   492    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was-276.7377    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=********) is defined by: xcenter =    484.55
ycenter =   2511.10   Init. Pt. =    480.00   Seg. Length =   8.00
----------------------------------------------------------------

**************************************************************************
ERROR # 29
**************************************************************************
The program has made 200 attempts to generate a single trial failure
surface.  It is possible that the search limitations are either too
restrictive, or they actually prevent successful generation of a
trial failure surface.  Check and revise the search limitations.
**************************************************************************

      ************************************************
      ***   The above error occurred in attempting   ***
      ***     to generate surface #   13 from the    ***
      ***  initiation point located at x =   480.00  ***
      ************************************************

Factors of safety have been calculated by the :

* * * * *   SIMPLIFIED BISHOP METHOD   * * * * *

The most critical circular failure surface
is specified by 36 coordinate points

     Point       x-surf       y-surf
      No.         (ft)         (ft)

       1         220.00      2440.00
       2         227.94      2439.01
       3         235.90      2438.19
```

4	243.87	2437.55
5	251.86	2437.08
6	259.85	2436.78
7	267.85	2436.66
8	275.85	2436.72
9	283.85	2436.95
10	291.84	2437.35
11	299.82	2437.93
12	307.78	2438.68
13	315.73	2439.61
14	323.65	2440.71
15	331.55	2441.98
16	339.42	2443.43
17	347.25	2445.04
18	355.05	2446.83
19	362.81	2448.79
20	370.52	2450.92
21	378.18	2453.21
22	385.79	2455.67
23	393.35	2458.30
24	400.85	2461.09
25	408.28	2464.05
26	415.65	2467.17
27	422.95	2470.44
28	430.17	2473.88
29	437.32	2477.47
30	444.39	2481.22
31	451.37	2485.12
32	458.27	2489.18
33	465.07	2493.38
34	471.79	2497.73
35	478.40	2502.23
36	482.30	2505.00

**** Simplified BISHOP FOS = 2.975 ****

****
** **
** Out of the 492 surfaces generated and analyzed by XSTABL, **
** 39 surfaces were found to have MISLEADING FOS values. **
** **
****

The following is a summary of the TEN most critical surfaces

Problem Description : 4:1 SLOPE (RAPID DRAWDOWN)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.975	269.38	2802.98	366.32	220.00	482.30	1.300E+08
2.	3.085	305.05	2600.07	156.68	260.00	415.45	2.745E+07
3.	3.180	192.91	2458.23	26.58	180.00	208.92	3.134E+05
4.	3.183	192.10	2441.57	13.77	180.00	204.24	2.216E+05
5.	3.290	195.24	2461.58	30.64	180.00	215.55	6.516E+05
6.	3.311	287.27	2608.22	160.55	260.00	385.63	1.436E+07
7.	3.316	316.24	2529.77	83.09	280.00	383.26	8.648E+06
8.	3.325	193.39	2461.91	30.06	180.00	211.15	3.949E+05

9.	3.437	198.81	2462.84	33.60	180.00	224.29	1.269E+06
10.	3.447	359.91	2552.94	96.57	320.00	436.42	1.537E+07

* * * END OF FILE * * *

XSTABL File: 4-RAP-E 1-19-98 8:57

```
*******************************************
*              X S T A B L                *
*                                         *
*        Slope Stability Analysis         *
*              using the                  *
*           Method of Slices              *
*                                         *
*         Copyright (C) 1992 á 97         *
*   Interactive Software Designs, Inc.    *
*        Moscow, ID 83843, U.S.A.         *
*                                         *
*          All Rights Reserved            *
*                                         *
*  Ver. 5.202                96 á 1598    *
*******************************************
```

Problem Description : 4:1 SLOPE (RAPID DRAWDOWN/E'QUAKE)

SEGMENT BOUNDARY COORDINATES
---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	2435.0	200.0	2435.0	4
2	200.0	2435.0	480.0	2505.0	1
3	480.0	2505.0	490.0	2505.0	1

4 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	2435.0	410.0	2435.0	4
2	410.0	2435.0	480.0	2390.0	4
3	480.0	2390.0	490.0	2390.0	2
4	.0	2390.0	480.0	2390.0	2

ISOTROPIC Soil Parameters
---

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	128.0	128.0	100.0	38.00	.000	.0	1
2	125.0	125.0	.0	40.00	.000	.0	0
3	125.0	125.0	.0	40.00	.000	.0	0
4	110.0	110.0	.0	35.00	.000	.0	0

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	2465.00
2	360.00	2465.00
3	410.00	2470.00
4	450.00	2300.00
5	490.00	2300.00

A horizontal earthquake loading coefficient
of .220 has been assigned

A vertical earthquake loading coefficient
of .220 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

500 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 25 points equally spaced along the ground surface between x = .0 ft
and x = 480.0 ft

Each surface terminates between x = 200.0 ft
and x = 490.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

8.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees

Upper angular limit := (slope angle - 5.0) degrees

```
**********************************************************
**     Factor of safety calculation for surface #   203    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  68.9850    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS= 68.9850) is defined by: xcenter = 209.72
ycenter = 2439.99 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   210    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  63.5386    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS= 63.5386) is defined by: xcenter = 209.88
ycenter = 2439.40 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   213    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  21.1112    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS= 21.1112) is defined by: xcenter = 208.64
ycenter = 2443.50 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   217    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was 158.2194    **
**    This will be ignored for final summary of results    **
**********************************************************
```

Circular surface (FOS=158.2194) is defined by: xcenter = 207.27
ycenter = 2443.31 Init. Pt. = 200.00 Seg. Length = 8.00

```
**********************************************************
**     Factor of safety calculation for surface #   219    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was  69.0328    **
```

```
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS= 69.0328) is defined by: xcenter =    209.79
ycenter =   2439.73   Init. Pt. =    200.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************
**     Factor of safety calculation for surface #   251    **
**     failed to converge within FIFTY iterations          **
**                                                         **
**    The last calculated value of the FOS was    .0033    **
**    This will be ignored for final summary of results    **
**********************************************************

Circular surface (FOS=   .0033) is defined by: xcenter =    242.98
ycenter =   2453.83   Init. Pt. =    240.00   Seg. Length =   8.00
----------------------------------------------------------------

**********************************************************************
    -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
**********************************************************************
Negative effective stresses were calculated at the base of a slice.
This warning is usually reported for cases where slices have low self
weight and a relatively high "c" shear strength parameter.  In such
cases, this effect can only be eliminated by reducing the "c" value.
**********************************************************************

    ------------------------------------------------------------
    USER SELECTED option to maintain strength greater than zero
    ------------------------------------------------------------

**********************************************************************
ERROR # 29
**********************************************************************
The program has made 200 attempts to generate a single trial failure
surface.  It is possible that the search limitations are either too
restrictive, or they actually prevent successful generation of a
trial failure surface.  Check and revise the search limitations.
**********************************************************************

        **************************************************
        ***   The above error occurred in attempting   ***
        ***     to generate surface #   13 from the     ***
        ***  initiation point located at x =   480.00   ***
        **************************************************

    Factors of safety have been calculated by the :

    * * * * *   SIMPLIFIED BISHOP METHOD   * * * * *

      The most critical circular failure surface
      is specified by 36 coordinate points
```

Point No.	x-surf (ft)	y-surf (ft)
1	220.00	2440.00
2	227.94	2439.01
3	235.90	2438.19
4	243.87	2437.55
5	251.86	2437.08
6	259.85	2436.78
7	267.85	2436.66
8	275.85	2436.72
9	283.85	2436.95
10	291.84	2437.35
11	299.82	2437.93
12	307.78	2438.68
13	315.73	2439.61
14	323.65	2440.71
15	331.55	2441.98
16	339.42	2443.43
17	347.25	2445.04
18	355.05	2446.83
19	362.81	2448.79
20	370.52	2450.92
21	378.18	2453.21
22	385.79	2455.67
23	393.35	2458.30
24	400.85	2461.09
25	408.28	2464.05
26	415.65	2467.17
27	422.95	2470.44
28	430.17	2473.88
29	437:32	2477.47
30	444.39	2481.22
31	451.37	2485.12
32	458.27	2489.18
33	465.07	2493.38
34	471.79	2497.73
35	478.40	2502.23
36	482.30	2505.00

**** Simplified BISHOP FOS = 1.050 ****

****
** **
** Out of the 492 surfaces generated and analyzed by XSTABL, **
** 6 surfaces were found to have MISLEADING FOS values. **
** **
****

The following is a summary of the TEN most critical surfaces

Problem Description : 4:1 SLOPE (RAPID DRAWDOWN/E'QUAKE)

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.050	269.38	2802.98	366.32	220.00	482.30	8.180E+07

2.	1.077	305.05	2600.07	156.68	260.00	415.45	1.713E+07
3.	1.115	261.55	2578.34	135.07	240.00	343.20	4.281E+06
4.	1.134	287.27	2608.22	160.55	260.00	385.63	9.119E+06
5.	1.165	316.24	2529.77	83.09	280.00	383.26	5.435E+06
6.	1.170	247.79	2513.42	78.50	220.00	306.81	2.527E+06
7.	1.196	306.65	2513.71	64.47	280.00	357.65	2.220E+06
8.	1.200	239.96	2526.36	88.63	220.00	298.01	1.886E+06
9.	1.246	243.22	2492.65	57.54	220.00	288.27	1.309E+06
10.	1.262	325.84	2510.28	71.81	280.00	392.20	7.652E+06

* * * END OF FILE * * *

2.0 FIELD EXPLORATION

A total of thirty-five(35) borings were drilled between July 24, 1997 and January 14, 1998. Ten auger borings were drilled in the area of the proposed embankment; three core borings were drilled in the area of the proposed spillway; eight auger borings were drilled along the alignment of the proposed levee; and fourteen auger borings were drilled in the area of preliminary proposed basin alternative. Five of the locations drilled in the basin area are within the limits of the basin alternative selected for final design.

The approximate locations of the borings are shown on the accompanying Figures 1A, 1B and 1C. In addition to the 35 borings, two seismic refraction surveys were performed at locations in the vicinity of the proposed levee. The seismic refraction survey lines have been designated A-B and C-D and are shown on Figure 1B. Additional information regarding the seismic refraction testing is presented in Section 4.0.

Borings B-1 through B-30, B-34 and B-35 were drilled with a truck mounted Mobile B-61 continuous flight hollow-stem auger drill rig. The augers used for drilling have an outside diameter (O.D.) of approximately 6 inches and an inner diameter (I.D.) of 3.25 inches. Soil samples were obtained using a two-inch diameter (I.D.) California Modified split-spoon sampler lined with brass tubes and a 1.375 I.D. Standard Penetration Test (SPT) sampler. The two sampler types were alternated during sampling. The California Modified provides samples which are better suited for laboratory testing, while the SPT sampler provides a standardized penetration test. Both samplers were driven with a 140 pound hammer free-falling through a distance of 30 inches. Sampler driving resistance, expressed as "blows/inches", was recorded at the respective sampling depths. Bulk "grab" samples of auger cuttings were also obtained at each boring.

Core borings C-31 through C-33 were cored with a truck-mounted Mobile B-61 drill rig equipped with an NQ wireline coring assembly. The surficial, unconsolidated overburden soils penetrated by the borings were supported by 7.25-inch O.D. hollow stem auger casing. The NQ coring assembly used has an O.D. of 2.94 inches with side discharge, diamond impregnated coring bits (Longyear "Black") and a solid barrel core tube ten feet in length. The core diameter is 2.00 inches. A polymer admixture ("Clear Mud") was added to the drilling fluid (water) to improve circulation. All borings were backfilled with cuttings upon completion.

The borings were logged by field geological and geotechnical personnel. These personnel maintained a record of the soils encountered, sampling procedures and drilling operations. The core obtained in each of borings C31 through C-33 was measured and logged by our geologists upon recovery in the field. A record of recovery, RQD, lithology, texture, fracturing, and other notes concerning rock mass characteristics was maintained during drilling. The recovered core was boxed in the

field and transferred to our Las Vegas office for additional logging and review. All of the recovered core is currently stored at this location.

The logs of the borings performed for his investigation are presented on Plates A-1 through A-35 in Appendix A. A key to the descriptive terms used to the logs and in this report is presented on Plate A-36 following the logs in Appendix A. A key to rock description terms used is presented on Plates A-37 and A-38.

3.0 LABORATORY TESTING

Soil samples from the borings were tested in the laboratory to support our field classifications and to provide information regarding engineering characteristics of the subsurface soils. The laboratory testing program was directed primarily toward classification of the onsite soil deposits, strength testing and permeability testing. The laboratory testing program consisted of:

- Fifty-eight moisture content tests (ASTM D4959) performed to evaluate the in-place moisture conditions of the soils.
- Thirty dry density tests (ASTM D2937) performed to evaluate the in-place density conditions of the various soils deposits.
- Thirty-one grain size distribution analyses (ASTM D422) performed to characterize the subsurface soils and to support our field classifications.
- Eleven direct shear tests (ASTM D3080) performed to evaluate strength characteristics of the on-site soils.
- Four unconfined compression strength tests (ASTM D2166) performed to evaluate the strength characteristics of the rock core.
- Two constant head permeability tests (ASTM D2434) performed to measure the hydraulic conductivity of the on-site soils.
- One moisture density curve (ASTM D-1557).
- Eight corrosivity tests (ASTM D1498, Methods 426C, 427C, 205, and 407A).

The results of the laboratory tests are presented on the Boring Summary Sheets (Plates A-1 through A-35 in Appendix A), and on the Laboratory Test Data Sheets, Plates B-1 through B-21 in Appendix B.

4.0 SEISMIC REFRACTION TESTING

The seismic refraction testing was performed by LGS and Associates. A total of 450 linear feet was tested along 2 survey lines. The locations of the seismic refraction survey lines are shown on Figure 1. A Geometrics S-12, 16-bit, 12 channel, signal enhancement seismograph, equipped with filters with a 0 to 400 Hz range, and 8 Hz geophones, were used in the data collection. A 12 pound sledge hammer striking a steel plate placed on the ground surface was used for the energy source or shots.

Typical geophone spacing of 20 to 25 feet was used during testing. Each geophone was set within a hand-dug hole three to four inches deep to improve detection of the transmitted energy. Data for each of the lines was typically recorded from five successive shot points per line, consisting of one shot point at each end of the line, one at the center of the line and two extended shot points.

Relative elevations between the surveyed end points A, B, C and D were obtained by hand leveling between shot points and geophone stations in order to determine the approximate topography along the line and establish a datum for the subsequent seismic data reduction. The data obtained from each shot point was digitized and recorded on magnetic media in the field for subsequent processing in the office.

Data obtained during seismic refraction testing consists of the distance between the shot point and the geophones and travel time based upon an interpretation of first arrival. Seismic compression wave velocities, depths of the velocity layer interfaces, and inferences about geologic conditions are interpretations which comprise the seismic analysis. A summary of the seismic refraction survey results is presented in Section D.

5.0 SITE CONDITIONS

5.1 TOPOGRAPHY AND TERRAIN

The detention basin and embankment is located at the confluence of several drainages originating in a broad valley within the River Mountains. The embankment will span the principal drainage channel which is approximately 150 feet wide at the embankment location. The channel sides are underlain by rocky slopes which range between 1:1 and 2:1 (horizontal:vertical) on the south side and as steep as approximately 3.5 to 1 on the north side.

The basin proper will be located in the wash areas and on the shallow slopes at the base of the low hills to the east of the proposed embankment. The south half of the proposed detention area is occupied by a broad alluvial plain approximately 300 feet in width. The alluvial plain is traversed by a braided system of northwest trending washes, resulting in an irregular ground surface. The north half of the detention basin site is underlain by shallow to moderately steep slopes underlain by volcanic and sedimentary bedrock with a cover of up to approximately 5 feet of talus and rocky colluvium. At the time of our field explorations, the detention basin site was covered by scattered brush. The site was accessed from an unpaved power line road which followed the ravine floor through the main drainage and then branched into several tracks in the detention basin area.

The spillway site is located northeast along contour from the north abutment of the embankment. The spillway site occupies a saddle area flanked by 5:1 (horizontal:vertical) slopes which dip southwest toward the detention basin area and 2:1 (horizontal:vertical) slopes which dip northwest toward the drainage to receive water from the spillway.

The proposed levee follows an alignment parallel to and immediately west of the River Mountains range front. The ground surface along the levee slopes at approximately 4 percent to the northeast and has a light cover of desert brush.

5.2 SITE GEOLOGY

The site is located on the western margin of the River Mountains, a low rugged range of predominantly volcanic rocks separating the Las Vegas Valley and Lake Mead. The River Mountains are composed of a complex assemblage of volcanic rock types which include rhyolite and dacite flows, andesite and basalt flows and dikes, volcanic debris flows, and tuff or volcanic ash deposits.

A geologic map of the embankment and detention basin area is presented on Figure 2. A total of five geologic units have been mapped at the detention basin site and are shown on Figure 2. These units are Quaternary alluvium, Tertiary fanglomerate, Tertiary dacite flows, Tertiary dacite breccia, and Tertiary dacite tuff.

The Quaternary alluvium is shown as Qa on the map and is composed of sand and gravel with typically small amounts of silt. Scattered cobbles and boulders are also present at the ground surface in the areas mapped as alluvium. The alluvium is present in the main drainage areas in the south half of the detention basin site and embankment area, as well as in the drainage leading to the spillway.

The fanglomerate, shown as Tf on Figure 2, consists of moderately to well-bedded conglomerate and sandstone with silt which is moderately to well-cemented with calcium carbonate. The fanglomerate is mapped in the eastern edge of the detention basin area and is generally covered with 1 to 3 feet of alluvium.

The remaining three units are volcanic in origin and are Tertiary dacite flows, breccia, and tuff. These volcanic units underlie the majority of the slopes and highlands at the site. The dacite flows, mapped as Tdf, outcrop primarily in the center and north portion of the embankment areas. The flows are finely crystalline and gray in color. Surface exposures of the dacite flows are typically slightly weathered to fresh and strong.

The dacite breccia, mapped as Tdb, underlies the south abutment area of the embankment as well as the majority of the north half of the detention basin. The breccia also caps the small knoll northeast of the saddle in the spillway area. The breccia is composed of clasts of volcanic rock held together in a matrix of dacite flows. Surface exposures of this unit are typically oxidized to dark red-brown or black in color. The breccia is typically slightly weathered to fresh, strong to very strong, and is overall the most resistant of the bedrock units at the site.

The dacite tuff, mapped as Tdt, underlies the majority of the spillway area and an isolated area at the base of the slope to the east of the embankment. The tuff is the least resistant of the rock units encountered at the site. Surface exposures are typically moderately weathered and weak to moderately strong.

The volcanic layers in the immediate vicinity of the site typically dip shallowly to steeply to the east-northeast. The bedded units of the fanglomerate typically dip shallowly to the northeast and northwest.

The site is traversed by a series of northeast and northwest trending faults. The fault traces observed ranged from a few inches to a few feet in width and appeared to be brecciated and re-cemented with calcium carbonate. Isolated areas of bleached, altered dacite in the vicinity of the fault traces were observed at the base of the slope on the north side of the drainage in the vicinity of the embankment.

6.0 RESULTS OF EXPLORATIONS

6.1 GENERAL

As shown on the accompanying boring logs, three types of materials were encountered in the borings drilled for this investigation: surficial alluvial soils, fanglomerate bedrock, and volcanic bedrock. Typical auger drilling rates in the alluvial soils were 1.0 to 5.0 feet per minute. Typical auger drilling rates in the fanglomerate deposits were on the order of one to two feet per minute. Typical auger drilling rates in the volcanic bedrock ranged from less than 0.1 to 2.5 feet per minute. The depth of auger penetration into the volcanic bedrock varied. At several locations, auger refusal was met within 0.5 to 1.0 feet of penetration into the volcanic bedrock layer, while at other locations, auger refusal was not met to the depth explored, which included penetration of the volcanic bedrock by up to 25 feet. Depths to auger refusal at specific locations are included in the following discussion of the results of explorations.

6.2 EMBANKMENT

Borings B-13, B-16 through B-20, and B-27 through B-30 were drilled in the area of the proposed embankment. All borings in the embankment area were auger drilled to top of bedrock.

The subsurface conditions at these locations consist of alluvial soils overlying volcanic bedrock at varying depths. Alluvial soils at these locations typically consist of interlayered dense to very dense sandy and gravelly soil, with up to approximately 20 percent silt and a few areas with trace clay. Cementation was observed only as localized zones of partial cementation; no layers of hard, fully cemented soils were encountered.

The bedrock encountered consisted of finely crystalline dacite in all of the borings except Borings B-28 and B-30. In B-28, highly weathered dacite tuff was encountered. Dacite breccia was encountered in B-30. The following table summarizes the depth to bedrock at each of the embankment explorations.

BORING NO.	SURFACE ELEVATION (MSL)	TOP OF BEDROCK ELEVATION (MSL)
B-13	2439	2419.5
B-16	2439	2396.5
B-17	2439	2428.5
B-18	2439	2405.5
B-19	2439	2435.5
B-20	2460	2459
B-27	2435	2434
B-28	2433	2374.5
B-29	2446	2425.5
B-30	2445	2421

6.3 SPILLWAY

The spillway site was investigated by rock coring at three locations, designated C-31 through C-33. The subsurface conditions at these locations consist of surficial colluvium over volcanic bedrock to the maximum depths explored. Dacite tuff was encountered to the maximum depth explored in Borings C-31 and C-33; dacite tuff with an interlayered zone of dacite breccia was encountered in Boring C-33.

Boring C-31 was drilled at the top of the south slope for the proposed spillway. Borings C-32 and C-33 were drilled in the area of the proposed spillway. In all the borings drilled, slightly to moderately weathered and moderately strong dacite tuff was encountered at the proposed spillway apron elevation, 2495. The majority of the dacite tuff encountered in the core borings is slightly to moderately weathered and moderately strong. Approximately 10 to 20 percent of the dacite tuff encountered at these locations was highly weathered and weak in zones ranging between less than one foot and up to four feet in thickness. In Boring C-32, dacite breccia was encountered between the elevations of 2542 and 2520. The majority of the dacite breccia encountered was moderately to highly weathered and friable to weak.

6.4 DETENTION BASIN

Five borings were drilled within the limits of the area selected for the detention basin: B-1, B-2, B-3, B-14 and B-15. The subsurface conditions at these locations consist of alluvial soils over volcanic bedrock at varying depths.

Alluvial soils at these locations typically consist of dense to very dense sandy and gravelly soils with up to approximately 20 percent silt. Some cobbles and boulders, up to about two feet in diameter, were noted on the surface at the boring locations. There appeared little cementation in each of the 5 borings. Cementation was observed only as localized zones of partial cementation; no layers of hard, fully cemented soils were

encountered. The following table summarizes the depth to bedrock at each of the basin explorations.

EXPLORATION	SURFACE ELEVATION (MSL)	TOP OF BEDROCK ELEVATION (MSL)
B-1	2461	2433
B-2	2478	2455
B-3	2499	2496
B-14	2461	2454
B-15	2482	2479

Borings B-4 through B-12 were drilled outside the limits of the detention basin alternative selected for design. The logs of these borings have been included for reference on Plates A-4 through A-12.

6.5 LEVEE

The levee site was investigated by drilling eight exploratory soil borings at approximately 500 feet centers along the alignment of the proposed levee crest. These borings are designated B-21 through B-26, B-34 and B-35.

The subsurface conditions encountered at these locations consist of interlayered alluvial sands and gravels with typically 5 to 10 percent silt. Volcanic dacite bedrock was encountered at elevation 2325 MSL in B-21, but was not encountered in any of the other borings to the depths explored.

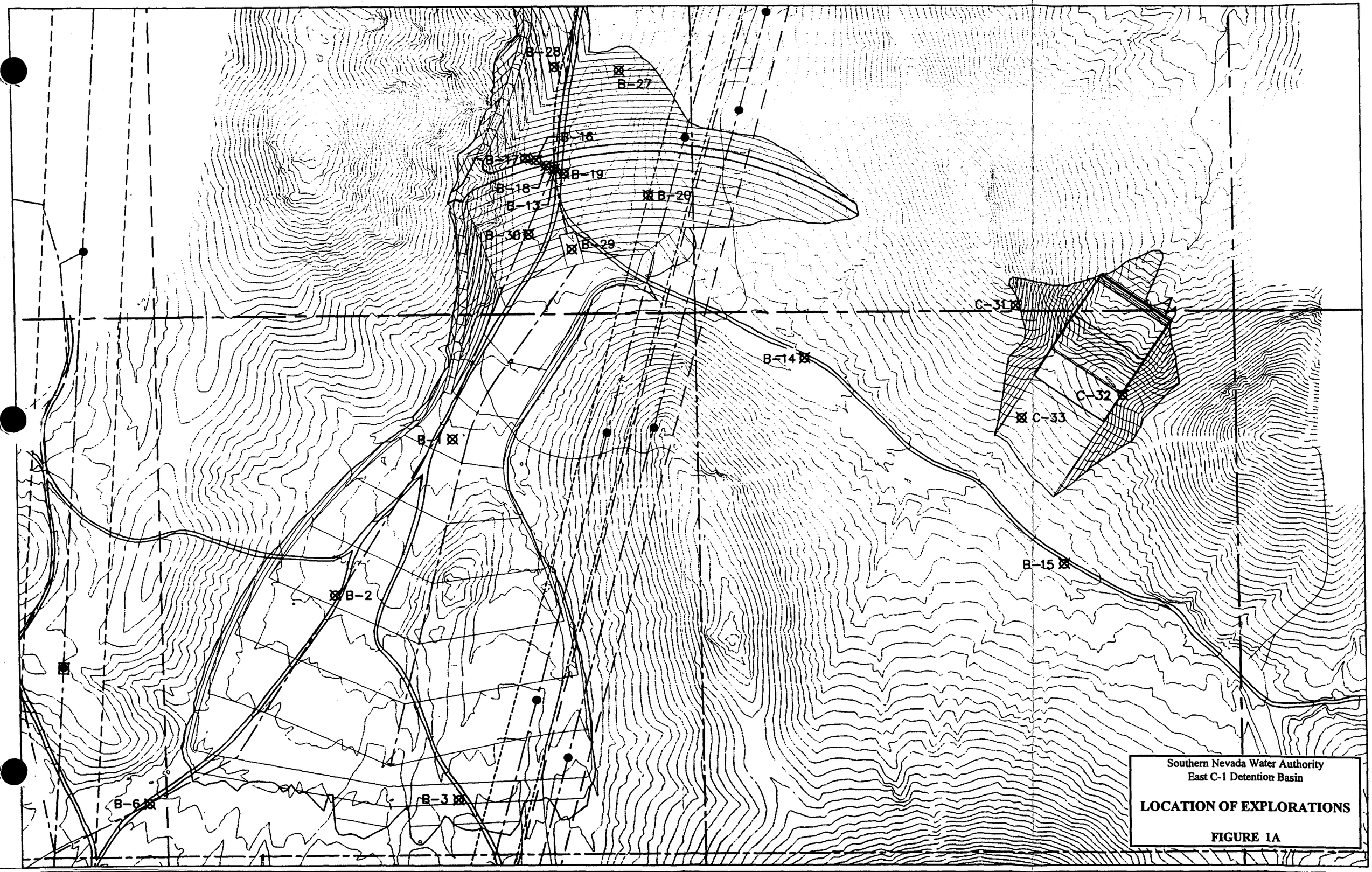
The soils encountered in each of these borings were typically dense to very dense in consistency. Zones of interlayered partial cementation were noted during drilling, along with a thin layer of hard, fully cemented soil in Boring B-35. Cobbles and boulders up to about 2 feet in diameter were also noted at the surface at several of the boring locations.

7.0 CLOSURE

7.1 LIMITATIONS

The information in this report is based on our field exploration and laboratory tests. The subsurface data used in the preparation of this report was obtained from the thirty-five borings drilled during the field investigation. It is anticipated that variations in the soils and groundwater conditions will exist between the points explored. If conditions are encountered at the site which are different from those described in this report, our firm should be immediately notified. This report was prepared in accordance with generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made.

FIGURES



Southern Nevada Water Authority
East C-1 Detention Basin

LOCATION OF EXPLORATIONS

FIGURE 1A

B-26

B-25

B-24

B-23

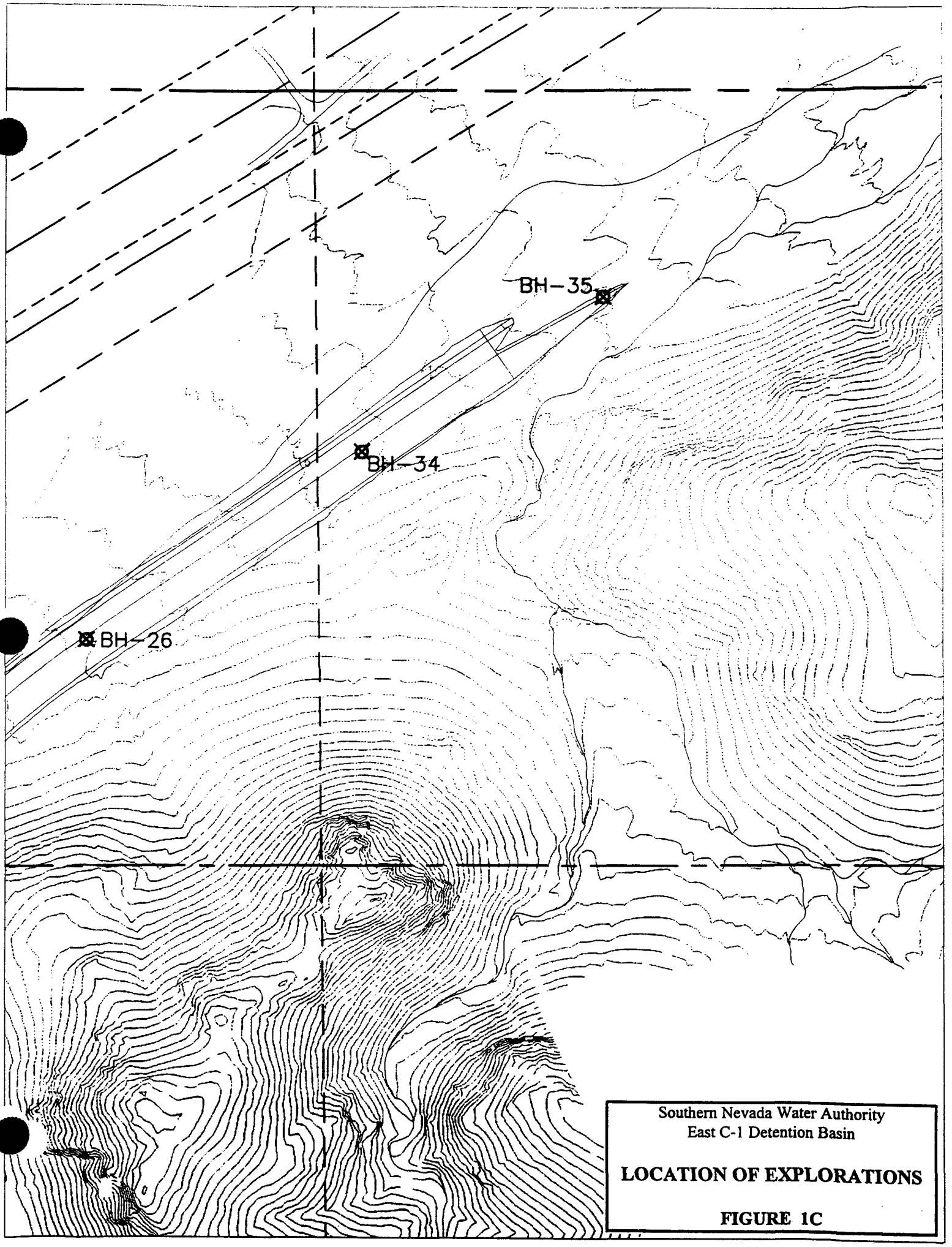
B-22

B-21

Southern Nevada Water Authority
East C-1 Detention Basin

LOCATION OF EXPLORATIONS

FIGURE 1B



Southern Nevada Water Authority
East C-1 Detention Basin

LOCATION OF EXPLORATIONS

FIGURE 1C

LEGEND

Qa	Quarterary alluvium: sand and gravel with cobbles and silt	Tdbr	Tertiary dacite breccia: mottled purple-gray to red-gray, with oxidized dark red-brown to black coating on weathered surfaces, slightly weathered to fresh, strong to very strong
	Tertiary fanglomerate: moderately to well-bedded conglomerate and sandstone with silt; moderately to well-cemented with calcium carbonate		
Tdf	Tertiary dacite flow: gray, slightly weathered to fresh, strong	Tdt	Tertiary dacite tuff: light gray to green-gray, moderately weathered, weak to moderately strong
(1)	0'-2' of talus over bedrock	45	Strike and dip of sedimentary beds or volcanic layers
(2)	0'-4' of talus or alluvium over bedrock	45	Strike and dip of joints
	Approximate location of fault; arrow indicates direction and amount of dip	⊠	Boring location
	Approximate location of geologic contact	●	Power poles

N

Scale: 1" = 200'

B-28 B-27 B-17 B-16 B-19 B-18 B-13 B-30 B-29 B-20 B-14 B-1 B-2 B-6 B-3 C-31 C-32 C-33 B-15

N7E 20SE

N45-80W 70-90 SW

N25E 90°

N35W 10NE

N10W 80NE

N50W 90°

N40W 90°

N45E 45SE

Tdbr Tdf Tdt Qa Tf

KLEINFELDER	Southern Nevada Water Authority East C-1 Detention Basin GEOLOGIC MAP OF EMBANKMENT AND DETENTION BASIN AREAS	FIGURE 2
Project No. 31-110021-001		

APPENDIX A

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B- 1

ELEVATION: 2461 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714675
Easting - 857145

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2461 / 0			G Perm				SANDY GRAVEL (GW) - fine to very coarse grained, trace silt, medium brown	slightly moist	very dense
							SANDY GRAVEL (GP) - fine to coarse grained, trace silt, light brown		
2456 / 5	3	99	S	91/12			SAND (SP) - very fine to very coarse grained, some gravel, trace silt, medium brown		
2451 / 10				89/10					
							SAND (SP-SM) - very fine to very coarse grained, some gravel, trace to little silt, light brown		dense
2446 / 15	3	97		44/12					
2441 / 20				75/12					very dense
							SANDY GRAVEL (GP-GM) - some silt, brown		
2436 / 25	2		G	50/5					
							WEATHERED VOLCANIC BEDROCK - Dacite, finely crystalline, mod. to highly weathered, trace clay, friable, red-brown to gray; Note: drill rate approx. 2.5 feet/min.		medium hard
2431 / 30				50/6					
							Bottom at 30.5 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: BY:

B-FT A0021 4/10/98

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-1

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B- 2

ELEVATION: 2478 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714383
Easting - 857524

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2478 / 0			G Perm				SAND (SW-SM) - very fine to coarse grained, with gravel, some silt, light gray to brown	dry to slightly moist	med. dense
2473 / 5	3	100		98/11					very dense
2468 / 10				50/5			SILTY SAND (SM) - very fine to fine grained, trace gravel, trace cementation, light gray to brown		
2463 / 15	3	91		50/3			SAND (SP-SM) - some silt and gravel, trace cementation, light gray to brown		
2458 / 20			G	64/12			SANDY GRAVEL (GP-GM) - some silt, brown		
2453 / 25	13	72		50/4			WEATHERED VOLCANIC BEDROCK - Dacite, finely crystalline, highly weathered, friable, purple to gray Note: drilling rate approx. 2 feet per minute		moderately hard to hard
2448 / 30				50/0			Bottom at 30 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

VB-FT A0021 4/10/98

APPROV:

BY:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-2

DATE DRILLED: 7/25/97

LOCATION: See Figure 1.

BORING NO. B- 3

ELEVATION: 2499 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714677
Easting - 858025

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2499 / 0			G				**SILTY GRAVEL (GM)** - with sand, zones of cobbles, light brown	dry to slightly moist	dense to very dense
2494 / 5	3			50/1			**WEATHERED VOLCANIC BEDROCK** - Dacite, finely crystalline, fresh to moderately weathered, purple to gray Note: drilling rate approximately 1 foot per minute		hard
2489 / 10	4			50/0			Auger refusal on volcanic bedrock at 10 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-3

BY:

APPROV:

.GPJ-FT A0021 4/10/98

DATE DRILLED: 7/25/97

LOCATION: See Figure 1.

BORING NO. B- 4

ELEVATION: 2529 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714680
Easting - 858712

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2529 / 0							**SANDY GRAVEL (GP-GM)** - fine to very coarse grained, some cobbles and silt, boulders up to 4" diameter on surface, light brown	dry	very dense
							- areas of cementation below 3 feet		
2524 / 5				50/1			**WEATHERED VOLCANIC BEDROCK** - Dacite, finely crystalline, moderately weathered, light gray to brown Note: drilling rate approximately 1 foot per minute		moderately hard to hard
2519 / 10	2			50/5			Note: drilling rate approximately 1.5 to 2.0 feet per minute		
2514 / 15				50/1					
2509 / 20	1			50/3			Note: drilling rate approximately 1.5 feet per minute		
2504 / 25				50/0			Note: drilling rate approximately 1 foot per minute		
2499 / 30	1			50/0			Bottom at 30 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOC[ATION] AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT [THIS] LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-4

DATE DRILLED: 7/25/97

LOCATION: See Figure 1.

BORING NO. B- 5

ELEVATION: 2552 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714522
Easting - 859331

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2552 / 0							**SILTY SAND (SM)** - very fine to coarse grained, with gravel, light brown	dry to slightly moist	very dense
2547 / 5	3		G	50/0					
							SEDIMENTARY BEDROCK - well bedded conglomerate and sandstone, with silt, moderately to well cemented with calcium carbonate, light red to brown		moderately hard to hard
							Note: drilling rate approximately 1.5 feet per minute		
2542 / 10				50/0					
2537 / 15	6	83		50/1					
2532 / 20				50/1					
2527 / 25	7			50/1					
2522 / 30				50/1			Bottom at 30 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOC[illegible]N AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT [illegible]IS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-5

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B- 6

ELEVATION: 2500 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 713920
Easting - 858033

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2500 / 0							SANDY GRAVEL (GW) - fine to very coarse, light brown	dry to slightly moist	very dense
							SAND (SW-SM) - very fine to very coarse grained, with gravel, trace silt, light brown		dense
2495 / 5			G	32/12					
							- gravel content increases below 9 feet		very dense
2490 / 10	5	100	S	98/11					
2485 / 15	3	108		79/12					
2480 / 20				80/12					
							WEATHERED VOLCANIC BEDROCK - Dacite, finely crystalline, moderately weathered, light purple to gray		hard to very hard
2475 / 25				50/0			Note: drilling rate approximately 0.5 to 1.0 foot per minute		
2470 / 30	2			50/0			Bottom at 30 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-6

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B- 7

ELEVATION: 2529 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 713718
Easting - 858577

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2529 / 0							SILTY SAND (SM) - very fine to coarse grained, some gravel, some cobbles and boulders up to 1.5' diameter at surface, light brown	dry to slightly moist	dense
							SAND (SP-SM) - very fine to coarse grained, with gravel and trace to little silt, light brown		very dense
2524 / 5	3	101		100/8					
2519 / 10				43/12			SILTY SAND (SM) - very fine to fine grained, trace gravel, light brown		dense
2514 / 15	3	106		83/9			SAND (SP-SM) - very fine to coarse grained, with gravel, trace to little silt, trace cementation, light brown		very dense
2509 / 20				50/4					
2504 / 25	3		G	50/4			SANDY GRAVEL (GP-GM) - fine to very coarse grained, some silt, light brown		
2499 / 30				50/3			SAND (SP) - trace silt, brown Bottom at 30.25 feet		

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical

* LAB TESTS: test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-7

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B- 8

ELEVATION: 2547 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714074
Easting - 859310

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2547 / 0							**SAND (SP-SM)** - very fine to very coarse grained, trace to little silt, trace gravel, trace cobbles and boulders up to 2 feet diameter on surface, light brown	dry to slightly moist	dense to very dense
							SEDIMENTARY BEDROCK - well bedded conglomerate and sandstone, moderately to well cemented with calcium carbonate, light red to brown	moist	moderately hard to hard
2542 / 5			S	50/3			Note: drilling rate approximately 2 feet per minute		
2537 / 10				50/3			Note: drilling rate approximately 1.5 feet per minute		
2532 / 15	20			50/1					
2527 / 20				50/1			Note: drilling rate approximately 2 feet per minute		
2522 / 25	10			50/5					
2517 / 30				50/1			Bottom at 30 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-8

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B- 9

ELEVATION: 2525 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 713355
Easting - 858380

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2525 / 0			G				GRAVELLY SAND (SW-SM) - very fine to very coarse grained, some silt, zones of cobbles, medium brown to light gray	dry to slightly moist	dense
2520 / 5	3	99	S	39/12					
2515 / 10				50/5			WEATHERED VOLCANIC BEDROCK - Dacite, finely crystalline, moderately to highly weathered, friable, light gray Note: drilling rate approximately 2 feet per minute		moderately hard to hard
2510 / 15	5			50/1					
2505 / 20				50/1					
2500 / 25	4			50/1			Note: drilling rate approximately 1.5 feet per minute		
2495 / 30				50/1			Bottom at 30 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

LVB-FT A0021 4/10/98

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-9

DATE DRILLED: 7/25/97

LOCATION: See Figure 1.

BORING NO. B-10

ELEVATION: 2553 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 713676
Easting - 859269

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2553 / 0			G				SILTY SAND (SM) - very fine to coarse grained, with gravel, zones of cobbles on surface, light brown	dry to slightly moist	dense
2548 / 5	2			50/3					very dense
							SEDIMENTARY BEDROCK - well bedded conglomerate and sandstone, moderately to well cemented with calcium carbonate, light red to brown Note: drilling rate approximately 1.5 feet per minute		moderately hard to hard
2543 / 10				50/1					
2538 / 15	4			50/0			Note: drilling rate approximately 1.5 to 2.0 feet per minute		
2533 / 20				50/0					
2528 / 25	5			50/0					
2523 / 30				50/2			Bottom at 30 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-10

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B-11

ELEVATION: 2555 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 712737
Easting - 858987

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2555 / 0							SAND (SW) - very fine to very coarse grained, some gravel, trace silt, medium brown	slightly moist	dense
							SAND (SP-SM) - very fine to very coarse grained, with gravel, some silt, light brown		very dense
2550 / 5				50/1			SEDIMENTARY BEDROCK - well bedded conglomerate and sandstone, moderately to well cemented with calcium carbonate, light red to brown Note: drilling rate approximately 1 foot per minute		moderately hard to hard
2545 / 10	7			50/2			Note: drilling rate approximately 0.3 feet per minute		
2540 / 15	5			50/2			VOLCANIC BEDROCK - Dacite, fine grained, slightly weathered, red to brown Note: drilling rate appoximately 0.4 feet per minute		hard to very hard
							Auger refusal in volcanic bedrock at 17.5 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LO[CATION] AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE A[T] THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-11

DATE DRILLED: 7/24/97

LOCATION: See Figure 1.

BORING NO. B-12

ELEVATION: 2550 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 712678
Easting - 858482

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2550 / 0							**GRAVELLY SAND (SW-SM)** - very fine to very coarse grained, some silt, medium brown - colour change to light gray	dry to slightly moist	dense
2545 / 5			G	60/12			- colour change to light brown with zones of trace cementation		very dense
2540 / 10	4			50/6			**SANDY GRAVEL (GP-GM)** - fine to coarse grained, trace to little silt, trace cementation, light gray to brown		
							SAND (SP-SM) - very fine to medium grained, trace to little silt, some gravel, trace cementation, light brown		
2535 / 15				50/3					
2530 / 20				50/2			**WEATHERED VOLCANIC BEDROCK** - Dacite, finely crystalline, moderately weathered, red to brown Note: drilling rate approximately 1.5 feet per minute. Note: Light gray fine grained dacite outcrops about 60 feet east of boring location, and 80 feet west of boring location.		moderately hard to hard
2525 / 25				50/1			Note: drilling rate approximately 1.5 to 2.0 feet per minute		
2520 / 30	4			50/0			Bottom at 30 feet.		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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BY: APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-12

DATE DRILLED: 8/15/97

LOCATION: See Figure 1.

BORING NO. B-13

ELEVATION: 2439 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714926
Easting - 856486

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2439 / 0			G				GRAVELLY SAND (SW) - fine to very coarse grained, trace silt, light gray	dry	medium dense to dense
							- color change to medium brown	slightly moist to moist	
							- decrease in gravel below 3 feet		
2434 / 5	3	102	G	14/6 19/6 20/6					
							SANDY GRAVEL (GP) - fine to coarse grained, trace silt, medium brown		very dense
2429 / 10	6			22/6 35/6			SILTY SAND (SM) - very fine to very coarse grained, with gravel, medium brown to red-brown		
				26/6			SAND (SP-SM) - very fine to very coarse grained, with gravel, trace to little silt, light brown		
							SANDY GRAVEL (GM) - very fine to very coarse grained, with silt, medium brown to red-brown		dense
2424 / 15	9	91	S,G	24/6 23/6 27/6					
							SAND (SP) - very fine to very coarse grained, with gravel, trace silt, medium brown		medium dense
2419 / 20				50/0			VOLCANIC BEDROCK - Dacite, finely crystalline, slightly weathered to fresh, purple to gray	dry	very hard
							Note: drilling rate approximately 0.1 feet per minute		
							Auger refusal at 20 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: APPROV:

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-13

DATE DRILLED: 8/15/97

LOCATION: See Figure 1.

BORING NO. B-14

ELEVATION: 2461 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 715534
Easting - 856950

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2461 / 0			G				GRAVELLY SAND (SP-SM) - very fine to very coarse grained, some silt, light gray - color change to medium brown	dry	dense
								slightly moist to moist	
2456 / 5	10	91	G,S	30/6 50/3			SAND (SM) - fine to coarse grained, with gravel and silt, trace cementation, medium brown		very dense
2451 / 10	10			50/3			WEATHERED VOLCANIC BEDROCK - Dacite, finely crystalline, slightly to moderately weathered, light gray Note: drilling rate approximately 0.4 feet per minute		hard
2446 / 15				50/0			Note: drilling rate approximately 0.3 feet per minute Note: drilling rate approximately 0.1 feet per minute Auger refusal at 15.5 feet		very hard

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE WITH TIME. DATA PRESENTED IS A SIMPLIFICATION

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-14

ALVB-FT A0021 4/10/98

APPROV:

BY:

DATE DRILLED: 8/15/97

LOCATION: See Figure 1.

BORING NO. B-15

ELEVATION: 2482 Ft.

** HAMMER WEIGHT: 140 lb

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	Northing - 716170 Easting - 857451 SOIL DESCRIPTION	MOISTURE	CONSIST.
2482 / 0			G				GRAVELLY SAND (SW-SM) - very fine to very coarse grained, trace to some silt, medium brown	dry to slightly moist	medium dense
							VOLCANIC BEDROCK - Dacite, finely crystalline, light gray Note: drilling rate approximately 0.1 feet per minute		hard to very hard
				50/0			Auger refusal at 5 feet		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: APPROV: .VB-FT A0021 4/10/98

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-15

DATE DRILLED: 11/10/97

LOCATION: See Figure 1.

BORING NO. B-16

ELEVATION: 2439 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714883
Easting - 856464

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2439 / 0							SAND (SW) - very fine to very coarse grained, some gravel, trace silt, light brown	dry to slightly moist	dense to very dense
2434 / 5	3	110	G	27/6 36/6 31/6			SANDY GRAVEL (GW-GM) - very fine to very coarse grained, trace to some silt, light brown		very dense
2429 / 10				33/6 48/6 50/5					
2424 / 15	4		S	40/6 50/6					
2419 / 20				25/6 27/6 22/6			SILTY SAND (SM) - very fine to very coarse grained, some gravel, light brown		dense to very dense
2414 / 25	4	96		31/6 34/6 33/6			SAND (SP-SM) - very fine to very coarse grained, some gravel, some silt, light brown		very dense
2409 / 30				30/6			- decrease to trace gravel, trace clay below 30 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: _____ APPROV: _____ VB-FT A0021 4/10/98

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-16a

DATE DRILLED: 11/10/97

LOCATION: See Figure 1.

BORING NO. B-16

ELEVATION: 2439 Ft.

** HAMMER WEIGHT: 140 lb

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	Northing - 714883 Easting - 856464 SOIL DESCRIPTION	MOISTURE	CONSIST.
				50/6			SAND (SP-SM) - cont.	dry to slightly moist	very dense
2404 35	6	96		50/6 50/4			SANDY GRAVEL (GP-GC) - fine to very coarse grained, some clay and silt, brown		
2399 40				30/6 27/6 32/6					
							VOLCANIC BEDROCK - Dacite, fresh, red-gray and gray Note: drilling rate approximately 0.05 to 0.1 feet per minute		hard to very hard
2394 45				50/1					
				50/0			Auger refusal at 46.5 feet on volcanic bedrock		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

LVB-FT A0021 4/10/98

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-16b

DATE DRILLED: 11/10/97

LOCATION: See Figure 1.

BORING NO. B-17

ELEVATION: 2439 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714857
Easting - 856459

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2439 / 0							SAND (SW) - very fine to very coarse, trace silt and gravel, light brown	dry to slightly moist	dense to very dense
							SANDY GRAVEL (GP) - fine to very coarse, trace silt, light brown		
							SANDY GRAVEL (GP-GM) - very fine to very coarse grained, trace to some silt and clay, brown		dense
2434 / 5			G,S	12/6 21/6 31/6					
							SAND (SP) - very fine to very coarse grained, trace silt, brown		very dense
2429 / 10				50/5					
				50/1			VOLCANIC BEDROCK - Dacite, fresh, red-gray and gray Note: drilling rate approximately 0.02 feet per minute		very hard
							Auger refusal at 11.5 feet on volcanic bedrock		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

LVB-FT A0021 4/10/98

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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-17

DATE DRILLED: 11/11/97

LOCATION: See Figure 1.

BORING NO. B-18

ELEVATION: 2439 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714906
Easting - 856477

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2439 / 0							SAND (SP-SM) - very fine to very coarse grained, some silt, some gravel, light brown	slightly moist to moist	med. dense
									dense
2434 / 5	6	101		15/6 19/6 27/6			SAND (SW) - very fine to very coarse grained, brown		
							- trace to some gravel below 7 feet		very dense
2429 / 10				28/6 35/6 26/6			SAND (SW-SM) - very fine to very coarse grained, some gravel, trace silt and clay, brown		
2424 / 15	4			50/6			- increased gravel below 15 feet		
2419 / 20				17/6 15/6 17/6			SANDY GRAVEL (GP) - fine to coarse, trace silt and clay, brown		dense
							GRAVEL (GW) - fine to coarse, with sand, trace silt and clay, brown		very dense
2414 / 25	10	101	G	28/6 34/6 34/6					
2409 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical

* LAB TESTS: test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: APPROV: .LVB-FT A0021 4/10/98

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-18a

DATE DRILLED: 11/11/97

BORING NO. B-18

ELEVATION: 2439 Ft.

LOCATION: See Figure 1.

** HAMMER WEIGHT: 140 lb

Northing - 714906
Easting - 856477

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2409 30				21/6 25/6 25/6			GRAVEL (GW) - cont. - color change to brown, with some gray and red below 30 feet	slightly moist to moist	very dense
				50/1			VOLCANIC BEDROCK - Dacite, fresh, red-gray Note: drilling rate approximately 0.05 feet per minute Auger refusal at 34 feet on volcanic bedrock		very hard

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-18b

DATE DRILLED: 11/11/97

LOCATION: See Figure 1.

BORING NO. B-19

ELEVATION: 2439 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714949
Easting - 856497

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2439 / 0			G				**SANDY GRAVEL (GW)** - very fine to very coarse grained, trace silt, light brown	dry to slightly moist	loose
									very dense
							VOLCANIC BEDROCK - Dacite, finely to medium crystalline, fresh, pink-gray Note: drilling rate approximately 0.05 feet per minute		very hard
							Auger refusal at 4 feet on volcanic bedrock		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

LVB-FT A0021 4/10/98

APPROV:

BY:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-19

DATE DRILLED: 11/11/97

LOCATION: See Figure 1.

BORING NO. B-20

ELEVATION: 2460 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 715155
Easting - 856551

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2460 / 0			G				SILTY, GRAVELLY SAND (SM) - very fine to fine grained, some cobbles, light brown	dry	dense
							VOLCANIC BEDROCK - Dacite, slightly weathered, red-brown and red-gray Note: drilling rate approximately 0.4 feet per minute		hard
							Note: drilling rate approximately 0.1 feet per minute		very hard
							Auger refusal at 4.5 feet on volcanic bedrock		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

LVB-FT A0021 4/10/98

APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-20

DATE DRILLED: 11/11/97

LOCATION: See Figure 1.

BORING NO. B-21

ELEVATION: 2338 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 716528
Easting - 853623

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2338 0			G				**GRAVELLY SAND (SW-SM)** - very fine to very coarse grained, some silt, light brown	dry to slightly moist	dense
2333 5	3			50/1			- increased coarse gravel with zones of partial cementation below 6 feet		very dense
2328 10				50/0					
2323 15				50/1			**VOLCANIC BEDROCK** - Dacite, finely crystalline, slightly to moderately weathered, light gray and red-brown Note: drilling rate approximately 0.7 feet per minute		hard
2318 20				50/0			Bottom at 20 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: ..VB-FT A0021 4/10/98 APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-21

DATE DRILLED: 11/12/97
LOCATION: See Figure 1.

BORING NO. B-22

ELEVATION: 2323 Ft.
** HAMMER WEIGHT: 140 lb

Northing - 717049
Easting - 853531

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2323 / 0							**SAND (SP-SM)** - very fine to very coarse grained, some gravel, some silt, light brown	slightly moist	very dense
2318 / 5	3	103	S	31/6 33/6 50/5			- increase in gravel below 8 feet		
2313 / 10				50/6 42/6 43/6			**SAND (SP)** - very fine to very coarse grained, trace gravel, trace silt, brown		
2308 / 15	4	108	G	34/6 46/6 50/5			**SANDY GRAVEL (GW-GM)** - very fine to very coarse grained, some silt, brown - color change to light brown below 18 feet		
2303 / 20				23/6 26/6 31/6			Bottom at 21.5 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

KLEINFELDER
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PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-22

VB-FT A0021 4/10/98
APPROV:
BY:

DATE DRILLED: 11/12/97

LOCATION: See Figure 1.

BORING NO. B-23

ELEVATION: 2303 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 717534
Easting - 853295

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2303 / 0							SANDY GRAVEL (GP-GM) - fine to very coarse, trace silt, some cobbles and boulders up to 1.5 feet in diameter nearby on surface, light brown	dry to slightly moist	dense to very dense
2298 / 5			G	25/6 21/6 16/6			GRAVELLY SAND (SW-SM) - very fine to very coarse grained, some silt, light brown		dense
									very dense
2293 / 10				27/6 26/6 50/6					
2288 / 15				19/6 25/6 37/6			- color change to light brown and light red-brown below 15 feet		
									medium dense
2283 / 20	3	99		12/6 13/6 16/6			- light brown with decrease in gravel below 19 feet		
							Bottom at 21.5 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: _____ APPROV: _____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-23

DATE DRILLED: 11/12/97

LOCATION: See Figure 1.

BORING NO. B-24

ELEVATION: 2284 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 717982
Easting - 853067

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2284 0							GRAVELLY SAND (SW-SM) - very fine to very coarse grained, some silt, light brown	dry to slightly moist	dense to very dense
2279 5	3		G	44/6 50/3					
									dense
2274 10			S	14/6 15/6 27/6					
2269 15	3	107		23/6 39/6 40/6					very dense
2264 20				26/6 26/6 32/6					

Bottom at 21.5 feet

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-24

DATE DRILLED: 11/12/97

LOCATION: See Figure 1.

BORING NO. B-25

ELEVATION: 2270 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 718379
Easting - 852814

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2270 / 0			G				SAND (SW-SM) - very fine to very coarse grained, with gravel, some silt, light brown	slightly moist	dense to very dense
2265 / 5	6	92		25/6 50/5					
2260 / 10				19/6 19/6 50/6					
2255 / 15	4	90		40/6 50/5					
2250 / 20	3	93		14/6 50/3			Bottom at 20.5 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

VB-FT A0021 4/10/98

APPROV:

BY:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-25

DATE DRILLED: 11/12/97

LOCATION: See Figure 1.

BORING NO. B-26

ELEVATION: 2254 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 718788
Easting - 852475

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2254 / 0							SAND (SW-SM) - very fine to very coarse, with gravel, some silt, some cobbles and boulders up to 2 feet in diameter nearby on surface, light brown	dry to slightly moist	medium dense to dense
2249 / 5			G,S	10/6 11/6 34/6					very dense
2244 / 10	3	108		29/6 50/6 48/6					medium dense to dense
2239 / 15				12/6 13/6 28/6					dense to very dense
2234 / 20	3	108		24/6 38/6 38/6					

Bottom at 21.5 feet

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

VB-FT A0021 4/10/98

BY: APPROV:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-26

DATE DRILLED: 12/29/97

LOCATION: See Figure 1.

BORING NO. B-27

ELEVATION: 2435 Ft.

** HAMMER WEIGHT: 140 lb

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	Northing - 715086 Easting - 856245 SOIL DESCRIPTION	MOISTURE	CONSIST.
2435 0							SILTY SAND (SM) - with gravel, light brown	dry	med. dense
			NR	50/0			VOLCANIC BEDROCK - Dacite, slightly weathered, light brown Note: drilling rate approximately 0.1 feet per minute Auger refusal at 2 feet on volcanic bedrock		very hard

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

VB-FT A021 4/10/98

APPROV:

BY:

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D.; Shelby Tube; Bulk; Ca. S.S. Sample 1.925" I. D.; SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

KLEINFELDER

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-27

DATE DRILLED: 12/23/97

LOCATION: See Figure 1.

BORING NO. B-28

ELEVATION: 2433 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714929
Easting - 856236

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2433 / 0							WELL GRADED SAND (SW-SM) - with gravel, trace silt, light brown to brown	dry to slightly moist	loose to medium dense
									dense
2428 / 5				13/6 17/6 19/6					
							- trace clay and color change to red-brown below 9 feet		very dense
2423 / 10				33/6 34/6 32/6					
2418 / 15				32/6 31/6 32/6			- some silt and trace gravel below 15 feet		
2413 / 20				33/6 50/6 41/6					
2408 / 25				30/6 40/6 35/6					
2403 / 30				50/6					

NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical

* LAB TESTS: test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: APPROV: ALVB-FT A0021 4/10/98

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-28a

DATE DRILLED: 12/23/97

LOCATION: See Figure 1.

BORING NO. B-28

ELEVATION: 2433 Ft.

** HAMMER WEIGHT: 140 lb

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
				50/6 50/5			Northing - 714929 Easting - 856236 **WELL GRADED SAND (SW-SM)** - cont.	dry to slightly moist	very dense
2398 35				50/6 60/6 50/5					
2393 40				40/6 57/6 50/1					
							HIGHLY WEATHERED VOLCANIC BEDROCK - Dacite Tuff, white to light olive Note: Drilling rate approximately 0.75 feet per minute		mod. hard
2388 45				50/1					
2383 50				50/1					
2378 55				50/1					
							VOLCANIC BEDROCK - Dacite Tuff, slightly weathered, white to light olive Note: drilling rate approximately 0.04 feet per minute		very hard
							Auger refusal at 58.5 feet on volcanic bedrock		

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

..VB-FT A0021 4/10/98

APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-28b

DATE DRILLED: 12/23/97

LOCATION: See Figure 1.

BORING NO. B-29

ELEVATION: 2446 Ft.

** HAMMER WEIGHT: 140 lb

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
							Northing - 714965 Easting - 856682		
2446 0							**WELL GRADED SAND (SW-SM)** - with silt and gravel, some cobbles and boulders up to 1.5 feet in diamater nearby on surface, light brown to brown	dry to slightly moist	loose to med. dense
									dense
							SANDY GRAVEL (GP-GM) - some silt, brown		very dense
2441 5				26/6 42/6 42/6			**WELL GRADED SAND (SW-SM)** - some silt and gravel, brown to red-brown		
2436 10				50/6 50/6 41/6					dense
2431 15				14/6 16/6 28/6					
2426 20				50/5			**VOLCANIC BEDROCK** - Dacite, slightly weathered to fresh, red-brown Note: drilling rate approximately 0.2 feet per minute		very hard
							Auger refusal at 22.5 feet on volcanic bedrock		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-29

LVB-FT A0021 4/10/98

BY: APPROV:

DATE DRILLED: 12/22/97

LOCATION: See Figure 1.

BORING NO. B-30

ELEVATION: 2445 Ft.

** HAMMER WEIGHT: 140 lb

Northing - 714863
Easting - 856646

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2445 / 0							**WELL GRADED GRAVEL (GW-GM)** - with sand, some silt, light brown	dry	loose to medium dense
							WELL GRADED SAND (SW-SM) - some silt and gravel, partially cemented, red-brown	slightly moist	dense
2440 / 5				40/6 50/6 50/6					very dense
2435 / 10				28/6 27/6 20/6					dense
								moist	
2430 / 15				17/6 16/6 18/6					
2425 / 20				50/5				slightly moist	very dense
2420 / 25			NR	50/0			**VOLCANIC BEDROCK** - Dacite Breccia, slightly weathered to fresh, red-brown Note: drilling rate approximately 0.25 feet per minute Auger refusal at 25 feet on volcanic bedrock		very hard

THIS SUMMARY APPLIES ONLY AT THIS LO[CATION] AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE A[T] THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-30

BY:

APPROV:

LVB-FT A0021 4/10/98

Location: See Figure 1.
Coordinates: N 716053
E 856821

BORING NO.: C-31

Date Start: 10/27/97
End: 10/31/97
Total Depth : 75 feet

Groundwater Data:
Groundwater was not encountered during drilling.

Surface Elevation: 2562 MSL
Bottom Elevation : 2487 MSL

Orientation : Vertical
Core Size : NQ 1.88 inch

Depth (ft) Elev. MSL	Core Run Feet	RQD %	Recovery %	DISCONTINUITIES & DESCRIPTION: Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
2562						Dacite Tuff - very fine to finely crystalline, with crystals of quartz, feldspar, amphibole and biotite in white to light green gray matrix; predominantly slightly weathered to fresh, strong.	Removed 3' to form drill pad; hollow stem auger casing from 2562 to 2558; Auger penetration rate 1'/min. Begin coring with 2.94" OD NQ rod and coring bit at 2558
				Begin coring at 2558			
2557	20	90		2558 to 2551: very closely fractured at 0 to 30 and 70 to 90 with approximately 40% broken zones up to 1' thick, mod. planar to mod. rough; approx. 10% with gypsum infilling 0.1" thick		- slightly to moderately weathered, weak from 2558 to 2553	Core run 2558 to 2553 ROP 3.6 min/ft; smooth Fluids return light gray
10 2552	54	100		2551 to 2542.4: as above, but closely fractured with approx 30% broken zones up to 5' thick		- moderately to highly weathered, friable to weak from 2553 to 2549	Core run 2553 to 2546 ROP 5.5 min/ft; smooth, slow
						- slightly to moderately weathered, weak to moderately strong from 2549 to 2546	
2547	28	100				- slightly weathered to fresh, predominantly mod. strong, with approximately 30% strong to very strong zones from 2546 to 2487	Core run 2546 to 2542.4 ROP 8.2 min/ft; smooth, blocked
20 2542	72	100		2542.4 to 2487: closely to mod. fractured at predominantly 0 to 20 degrees and 70 to 90 degrees, mod. planar to mod. rough approx. 5% with weathered clayey coating 0.05" thick, approx. 20% with gypsum coating up to 0.2" thick			Core run 2542.4 to 2536 ROP 7.3 min/ft;smooth
2537	100	100					Core run 2536 to 2535.6
	75	100					Core run 2535.6 to 2526 ROP 9.6 min/feet; smooth, slow
30 2532							

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____

BY: ____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-31a

Location: See Figure 1.
Coordinates: N 716053
E 856821

BORING NO.: C-31

Date Start: 10/27/97
End: 10/31/97
Total Depth : 75 feet

Groundwater Data:
Groundwater was not encountered during drilling.

Surface Elevation: 2562 MSL
Bottom Elevation : 2487 MSL

Orientation : Vertical
Core Size : NQ 1.88 inch

Depth (ft) / Elev. MSL	Core Run Feet	DISCONTINUITIES & DESCRIPTION: RQD %	Recovery %	Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
2527						Dacite Tuff - cont.	ROP 9.1 min/ft; smooth
		75	100				Core run 2526 to 2516.3 ROP 9.3 min/ft; smooth, blocked
40 2522							ROP 7.2 min/ft; smooth
				- very closely fractured to broken from 2519 to 251.5 and 2517.5 to 2516.3			
2517						- moderately to highly weathered, weak to friable from 2517.7 to 2516.3	
		55	100				Core run 2516.6 to 2513 ROP 7.1 min/ft; blocked
		80	100				Core run 2513 to 2503 ROP 9.2 min/ft; smooth
50 2512							ROP 7.0 min/ft; smooth
				- 0.5' broken zone at 2508.5		- moderately to highly weathered, weak to friable from 2508.5 to 2508	
2507							ROP 8.0 min/ft; smooth
				- very widely fractured from 2503 to 2496.8			
		91	100	- 0.5' broken zone at 2503.5			Core run 2503 to 2493 ROP 7.9 min/ft; smooth
60 2502							ROP 6.6 min/ft; smooth

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-31b

Location: See Figure 1.
Coordinates: N 716053
E 856821

BORING NO.: C-31

Date Start: 10/27/97
End: 10/31/97
Total Depth : 75 feet
Groundwater Data:
Groundwater was not encountered during drilling.
Orientation : Vertical
Core Size : NQ 1.88 inch

Surface Elevation: 2562 MSL
Bottom Elevation : 2487 MSL

Depth (ft) Elev. MSL	Core Run Feet	DISCONTINUITIES & DESCRIPTION: RQD % / Recovery %	DISCONTINUITIES & DESCRIPTION: Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
2497					Dacite Tuff - cont.	unconfined compression test at 2501: 7580 psi ROP 6.2 min/ft; smooth
			- very closely fractured from 2494 to 2493.5			
	97	100				Core run 2493 to 2487 ROP 6.4 min/ft; smooth
70 2492						ROP 5.0 min/ft; smooth
2487					Bottom at 2487	Boring backfilled with bentonite chips upon completion

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-31c

Location: See Figure 1.
Coordinates: N 717313
E 857039

BORING NO.: C-32

Date Start: 11/3/97
End: 11/4/97
Total Depth : 70 feet

Groundwater Data:
Groundwater was not encountered during drilling.

Surface Elevation: 2554 MSL
Bottom Elevation : 2484 MSL

Orientation : Vertical
Core Size : NQ 1.88 inch

Depth (ft) Elev. MSL	Core Run Feet	DISCONTINUITIES & DESCRIPTION: RQD %	Recovery %	Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
2554						**COLLUVIUM** - sand and gravel, very fine to very coarse grained, trace silt, trace cobbles with boulders up to 2 feet diameter nearby on surface, light brown	8" OD hollow stem auger casing drilled to 2545
						Dacite Tuff - finely crystalline, with crystals of quartz, feldspar, amphibole and biotite in light gray matrix, less than 5% rock fragments, mod. weathered, weak to mod. strong	Auger rate of penetration approx. 2 min/ft from 2554 to 2549
2549							Auger rate of penetration approx. 1.5 min/ft from 2549 to 2545
				Begin coring at 2545			Begin coring with 2.94" OD NQ coring rod and bit at 2545
10 2544	5	29	100	2545 to 2541.6: very closely fractured at 0, 45 and 90 degrees; non to mod. planar, mod. smooth to mod. rough, 10% with 0.05" quartz infilling		- slightly weathered, moderately strong from 2545 to 2541.6 feet	Core run 2545 to 2541.9 ROP 13.0 min/foot; blocked Fluids return light gray ROP 11.7 min/foot; blocked
	5	0	50	2541.6 to 2538: >75% broken		**Dacite Breccia** - composed of 20 to 80 percent volcanic rock fragments, in finely crystalline, light red-gray tuffaceous matrix, 25% slightly weathered, mod. strong to very strong, 75% mod. to highly weathered and weak to friable	Core run 2541.9 to 2540.7 ROP 11.9 min/foot; blocked
	5	0	36				Core run 2540.7 to 2539.3 ROP 8.9 min/foot; blocked
2539	5	68	98				Core run 2539.3 to 2534 ROP 9.9 min/foot; smooth
				2538 to 2529.5: closely to mod. fractured at 0 and 45 to 60 degrees; predominantly non planar, rough, with approx. 20% planar, smooth, 15% broken zones up to 0.5' thick			unconfined compression test at 18.3': 1470 psi
20 2534	5	74	100				Core run 2534 to 2529 ROP 9.1 min/foot; smooth
2529	5	12	91	2529.5 to 2519.8: approx. 75% broken; 25% very closely fractured at 0 and 45 to 60 degrees, non to mod. planar, mod. smooth, with zones of gypsum coating up to 0.05" thick on about 30% of surfaces			Core run 2529 to 2525.7 ROP 8.2 min/foot; blocked
	5	19	95				Core run 2525.7 to 2523.6 ROP 19.9 min/foot; smooth
30 2524	5	0	41				Core run 2523.6 to 2520.7

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____

BY: ____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-32a

Location: See Figure 1.
Coordinates: N 717313
E 857039

BORING NO.: C-32

Date Start: 11/3/97
End: 11/4/97
Total Depth : 70 feet

Groundwater Data:
Groundwater was not encountered during drilling.

Surface Elevation: 2554 MSL
Bottom Elevation : 2484 MSL

Orientation : Vertical
Core Size : NQ 1.88 inch

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____

BY: ____

Depth (ft) / Elev. MSL	Core Run Feet	RQD %	Recovery %	DISCONTINUITIES & DESCRIPTION: Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
		0	67			**Dacite Breccia** - cont.	ROP 16.6 min/foot; blocked
		74	95	2519.8 to 2514: closely to mod. spaced at 30 and 45 degrees, planar, smooth; with up to 0.1" gypsum infilling on about 20% of surfaces			Core run 2520.7 to 2520.1 ROP 15.8 min/foot; blocked Core run 2520.1 to 2514 ROP 15.6 min/foot; smooth ROP 8.5 min/foot; smooth
2519						**Dacite Tuff** - finely crystalline, with crystals of quartz, feldspar, amphibole and biotite in light gray matrix, less than 5% rock fragments, slightly weathered, mod. strong	
40 2514		47	100	2514 to 2499: 50% very closely to mod. fractured to broken; 50% closely fractured at 45, 70 and 90 degrees, mod. planar, mod. smooth; with approx. 10% patchy gypsum infilling up to 0.1" thick		- mod. to highly weathered and weak to friable from 2514 to 2508 feet	Core run 2514 to 2512.1 ROP 6.8 min/foot; blocked
		66	100				Core run 2512.1 to 2505.9 ROP 9.2 min/foot;
2509							ROP 9.0 min/foot; blocked
						- slightly weathered, mod. strong to strong from 2508 to 2506.3 feet	
		0	100			- 30% mod. to highly weathered and friable to weak, 70% fresh to slightly weathered, and mod. strong to strong from 2506.3 to 2499	Core run 2505.9 to 2504.1 ROP 6.8 min/foot; blocked
50 2504		57	97				Core run 2504.1 to 2500.6 ROP 6.4 min/foot; blocked
		25	100				Core run 2500.6 to 2499 ROP 7.1 min/foot; blocked
2499		83	100	2499 to 2484: widely to mod. spaced at 0, 45, 70 and 90 degrees, mostly mod. planar, mod. smooth, with 20% planar and smooth and 10% with patchy gypsum infilling up to 0.1" thick		- slightly weathered to fresh, mod. strong to strong below 2499	Core run 2499 to 2498.4 ROP 4.5 min/foot; blocked Core run 2498.4 to 2489 ROP 5.1 min/foot; smooth
		86	97				unconfined compression test at 2495.6: 6260 psi
60 2494							

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-32b

Location: See Figure 1.
Coordinates: N 717313
E 857039

BORING NO.: C-32

Date Start: 11/3/97
End: 11/4/97
Total Depth : 70 feet

Groundwater Data:
Groundwater was not encountered during drilling.

Surface Elevation: 2554 MSL
Bottom Elevation : 2484 MSL

Orientation : Vertical
Core Size : NQ 1.88 inch

Depth (ft) Elev. MSL	Core Run Feet	DISCONTINUITIES & DESCRIPTION: RQD % / Recovery %	DISCONTINUITIES & DESCRIPTION: Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
2489		94 / 100			Dacite Tuff - cont.	Core run 2489 to 2484 ROP 4.4 min/foot; smooth
70 2484					Bottom at 2484	Boring backfilled with bentonite chips upon completion

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____

BY: ____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-32c

Location: See Figure 1.
Coordinates: N 716066
E 857095

BORING NO.: C-33

Date Start: 11/6/97
End: 11/7/97
Total Depth : 35 feet

Groundwater Data:
Groundwater was not encountered during drilling.

Surface Elevation: 2507 MSL
Bottom Elevation : 2472 MSL

Orientation : Vertical
Core Size : NQ 1.88 inch

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

Depth (ft) / Elev. MSL	Core Run Feet	RQD %	Recovery %	DISCONTINUITIES & DESCRIPTION: Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
2507						**COLLUVIUM** - Sand and gravel, fine to very coarse grained, some cobbles, light brown	8" OD hollow stem auger casing from 2507 to 2503, Begin coring at 2503 with 2.94" OD NQ rod and coring bit
				Begin coring at 2503		**Dacite Tuff** - finely crystalline, with crystals of quartz, feldspar, amphibole and biotite in light gray matrix, less than 5 percent rock fragments, mostly slightly weathered, mod. strong to strong	ROP 6.9 min/foot;
	5	35	82	2503 to 2488: very closely fractured to mod. fractured, 0 to 45 and to 90 degrees, slightly to mod. rough, planar			Begin coring at 2503
2502							Core run 2503 to 2501.3
	5	62	100	- very closely fractured to broken, 2501.3 to 2501			ROP 3.5 min/foot; blocked
							Fluids return light gray
							Core run 2501.3 to 2500
	5	57	83				ROP 7.7 min/foot; blocked
							Core run 2500 to 2496.5
							ROP 19.3 min/foot; blocked
				- broken, 2498 to 2497.5		- highly weathered, friable from 2498.1 to 2497.8	
10 2497						- fresh to slightly weathered, mod. strong to strong from 2497.8 to 2485	
	10	67	99				Core run 2496.5 to 2488.9
							ROP 7.2 min/foot; blocked
							unconfined compression test at 2495: 9180 psi
2492							
				- very closely fractured to broken 2490 to 2488			
	5	50	94				Core run 2488.9 to 2485.7
							ROP 7.1 min/foot; blocked
20 2487				2488 to 2472: 75% very closely to closely fractured, and 25% mod. fractured, mostly at 50 to 70 degrees, mod. rough, planar			
	5	18	95				Core run 2485.7 to 2481.8
							ROP 12.8 min/foot; blocked
				- very closely fractured to broken, 2484 to 2481.5		- slightly to moderately weathered, approximately 80% weak to moderately strong from 2485 to 2472	
2482							
	5	48	100				Core run 2481.8 to 2476.8
							ROP 7.3 min/foot; blocked
				- very closely fractured to broken, 2478 to 2476.5			
30 2477							

BY: _____ APPROV: _____

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-33a

Location: See Figure 1.
Coordinates: N 716066
E 857095

BORING NO.: C-33

Date Start: 11/6/97
End: 11/7/97
Total Depth : 35 feet

Groundwater Data:
Groundwater was not encountered during drilling.

Surface Elevation: 2507 MSL
Bottom Elevation : 2472 MSL

Orientation : Vertical
Core Size : NQ 1.88 inch

Depth (ft) Elev. MSL	Core Run Feet	DISCONTINUITIES & DESCRIPTION: RQD %	DISCONTINUITIES & DESCRIPTION: Recovery %	DISCONTINUITIES & DESCRIPTION: Depth, Type, Orientation, Roughness, Planarity, Infilling Material and Thickness Surface Staining and Tightness	Graphic Log	LITHOLOGY: Rock Type, Color, Mineralogy, Texture, Weathering, Hardness, and Rock Mass Characteristics	COMMENTS: Size and Depth of Casing, Fluid Loss, Coring Rate and Smoothness, Caving, Rod Drops, Test Results, Etc.
2477		41	97	2476.5 to 2475.5: mod. fractured,90 degrees, mod. rough planar - very closely fractured at 0 to 20 and 70 to 90 degrees, with 30% broken, below 2475.5		Dacite Tuff - cont.	Core run 2476.8 to 2473.9 ROP 3.2 min/foot; blocked
		0	100				Core run 2473.9 to 2472 ROP 4.4 min/foot; smooth
2472						Bottom at 2472	Boring backfilled with bentonite chips upon completion

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPRQV: _____

BY: _____

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

LOG OF EXPLORATION

PLATE
A-33b

DATE DRILLED: 1/14/98
LOCATION: See Figure 1.

BORING NO. B-34

ELEVATION: 2235 Ft.
** HAMMER WEIGHT: 140 lb

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	Northing - Easting - SOIL DESCRIPTION	MOISTURE	CONSIST.
2235 / 0							SAND (SP) - very fine to very coarse grained, trace gravel, light gray - brown	dry to slightly moist	dense to very dense
							SANDY GRAVEL (GP) - fine to very coarse, gray		very dense
2230 / 5			NR	50/2					
							SAND (SP) - very fine to very coarse grained, some gravel, light brown		dense to very dense
2225 / 10			G	24/6			SANDY GRAVEL (GP) - fine to very coarse grained, partially cemented, gray		very dense
				50/6			GRAVELLY SAND (SW-SM) - very fine to very coarse grained, some silt, light brown to light gray		
				43/6					
2220 / 15	4	103		22/6			- decreased gravel below 15 feet		dense
				21/6					
				21/6					
2215 / 20				26/6					
				27/6					
				29/6					

Bottom at 21.5 feet

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

LVB-FT A0021 2/12/98

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-34

DATE DRILLED: 1/14/98
LOCATION: See Figure 1.

BORING NO. B-35

ELEVATION: 2221 Ft.
** HAMMER WEIGHT: 140 lb

ELEV. MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	LAB TESTS *	BLOWS/ INCHES **	SAMPLER +	SYMBOL	Northing - Easting - SOIL DESCRIPTION	MOISTURE	CONSIST.
2221 0							COBBLY GRAVEL (GP) - with sand, cobbles up to 1 foot in diameter, gray to brown	dry to slightly moist	very dense
2216 5			G	16/6 10/6 40/6			GRAVELLY SAND (SW-SM) - very fine to very coarse grained, some silt, light gray to brown		dense to very dense
							CEMENTED SAND AND GRAVEL - light gray		hard
2211 10	3	108		35/6 50/6 33/6			SAND (SP-SM) - very fine to very caorse grained, some gravel and silt, light gray to brown		very dense
2206 15				30/6 31/6 3/6					
2201 20	3			34/6 50/5					
							Bottom at 21 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* LAB TESTS: NR=No Recovery, C=Consolidation, A=Atterberg, Ch=Chemical test, S=Direct Shear, G=Grain-Size, E=Expansion, Sol=Solubility, Res=Resistivity, R-Val=R-Value, ASTM D1557=Compaction test, Perm=Permeability

+SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater was not encountered during drilling.

BY: .VB-FT A0021 2/12/98
APPROV:

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

BORING LOG AND TEST SUMMARY

PLATE A-35

THE UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			Group Symbols	TYPICAL NAMES
COARSE GRAINED SOIL More than 50% of the material is LARGER than the No. 200 Sieve.	GRAVELS More than 50% of coarse part is LARGER than the No. 4 Sieve.	CLEAN GRAVELS Less than 5% finer than No. 200 Sieve.	GW	Well graded gravels, gravel - sand mixtures, little or no fines, Cu > 4 & 1 < Cc > 3
			GP	Poorly graded gravels or gravel - sand mixtures, little or no fines Cu < 4 or 1 > Cc < 3
		GRAVEL with fines More than 12% Finer than No. 200 Sieve. PI < 4	GM	Silty gravels, gravel - sand - silt mixtures
		PI > 7	GC	Clayey gravels, gravel - sand - clay mixtures
	SANDS More than 50 % of coarse part is SMALLER than the No. 4 Sieve.	CLEAN SANDS Less than 5% Finer than No. 200 Sieve.	SW	Well graded sands, gravelly sands, little or no fines. Cu > 6& 1 < Cc > 3
			SP	Poorly graded sands or gravelly sands, little or no fines. Cu < 6 or 1 > Cc < 3
		SAND with fines More than 12% Finer than No. 200 Sieve. PI < 5	SM	Silty sands, sand - silt mixtures
		PI > 7	SC	Clayey sands, sand - clay mixtures
FINE GRAINED SOIL More than 50 % of the material is SMALLER than the No. 200 Sieve	SILTS & CLAYS Liquid Limit LESS than 50	PI - Below A - Line	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with low plasticity
		PI - Above A - Line	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic clays of low plasticity
	SILTS & CLAYS Liquid Limit GREATER than 50	PI - Below A - line	MH	Inorganic silts, Micaceous or diatomaceous fine sands or silty soils, elastic silts
		PI - Above A - Line	CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

CLAY	SILT	SAND			GRAVEL		COBBLES	BOULDERS
		Fine	Medium	Coarse	Fine	Coarse		
0.002 mm	#200	#40	#10	#4	3/4"	3"	12"	

U. S. Standard Sieve Size

Descriptive Terms Used With Soils

CONSISTANCY			Moisture Content
	SILTS & CLAYS	SANDS & GRAVELS	
Strongest ↑	Very Stiff	Very Dense	Wettest ↑ Wet
	Stiff	Dense	Very Moist
	Medium Stiff	Medium Dense	Moist
	Soft	Loose	Slightly Moist
Weakest ↓			Driest ↓ Dry

Strongest ↑	CALICHE	Cemented Sand & Gravel	
	Very Hard	Very Hard	Difficult to scratch or break
	Hard	Hard	Scratches leave only dust, Requires many hammer blows to break
	Moderately Hard	Moderately Hard	Readily cut by knife, Crumbles with several hammer blows
Weakest ↓	Partially cemented	Partially cemented	Gouges easily with knife, Crumbles readily with few hammer blows

KEY TO SOIL SYMBOLS AND TERMS

PROJECT : EAST C-1 DETENTION BASIN PLATE NO: A-36

PROJECT NO: 31-110021-001

TABLE 1: FRACTURING	
> 6 ft.	Very Widely
2-6 ft.	Widely
8-24 in.	Moderately
2-1/2 - 8 in.	Closely
3/4 - 2-1/2 in.	Very Closely

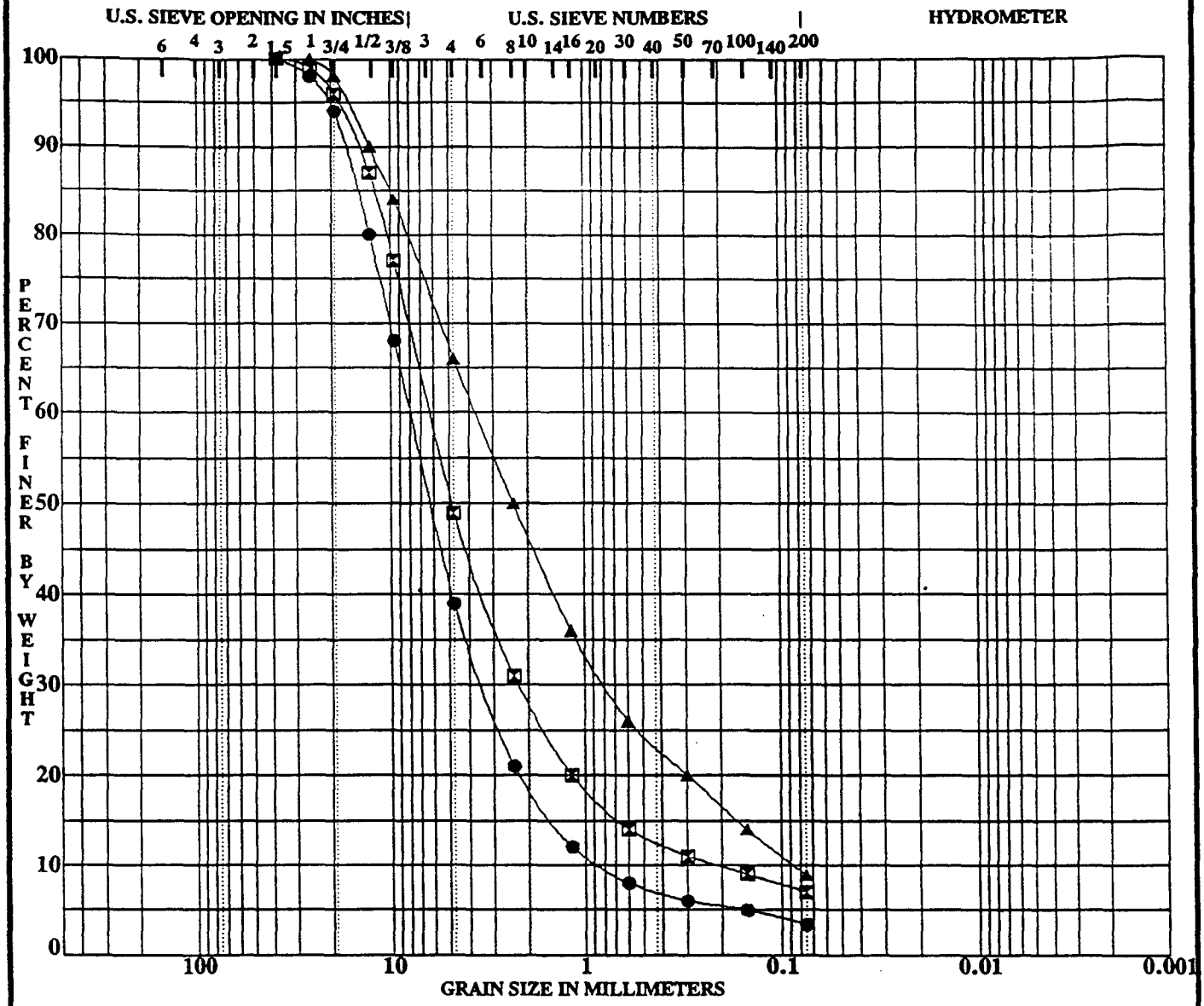
TABLE 2: WEATHERING	
Weathering	**Field Test**
Fresh	No visible sign of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	Slight discoloration inwards from open fractures, otherwise similar to Fresh.
Moderately Weathered	Discoloration throughout. Weaker minerals such as feldspar discomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped with a knife. Texture preserved.
Highly Weathered	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	Minerals decomposed to soil but fabric and structure preserved. Specimens easily crumbled or penetrated.

TABLE 3: COMPETENCY			
Class	**Strength**	**Field Test**	**Approximate Range of Unconfined Compressive Strength (ksi)**
I	Extremely Strong	Many blows with geologic hammer required to break specimen.	>28
II	Very Strong	Hand-held specimen breaks with pick end of hammer under more than one blow.	14 - 28
III	Strong	Cannot be scraped or peeled with knife, hand-held specimen can be broken with single moderate blow with pick end of hammer.	7 - 14
IV	Moderately Strong	Can just be scraped or peeled with knife. Indentations 1 mm to 3 mm show in specimen with moderate blow with pick end of hammer.	3.5 - 7
V	Low Strong or Weak	Material crumbles under moderate blow with pick end of hammer and can be peeled with a knife, but is hard to hand-trim for triaxial test specimen.	.1 to 3.5
VI	Friable	Material crumbles in hand.	N/A

*RQD (%)	Rock Quality
90 - 100	Excellent
75 - 90	Good
50 - 75	Fair
25 - 50	Poor
0 - 25	Very Poor

* Rock Quality Designation (RQD) - The RQD is a modified core recovery percentage in which all of the pieces of sound core more than four inches long (for Nx core) are summed and divided by the length of the core run.

APPENDIX B



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B- 1	0.0	WELL GRADED GRAVEL with SAND (GW)	NP	NP	NP	1.69	9.3
⊠	B- 1	25.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	3.71	29.4
▲	B- 2	0.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.94	42.0

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B- 1	0.0	38.10	7.87	3.348	0.8414	61.0	35.6	3.4	
⊠	B- 1	25.0	38.10	6.24	2.216	0.2121	51.0	42.0	7.0	
▲	B- 2	0.0	25.40	3.65	0.786	0.0871	34.0	57.1	8.9	

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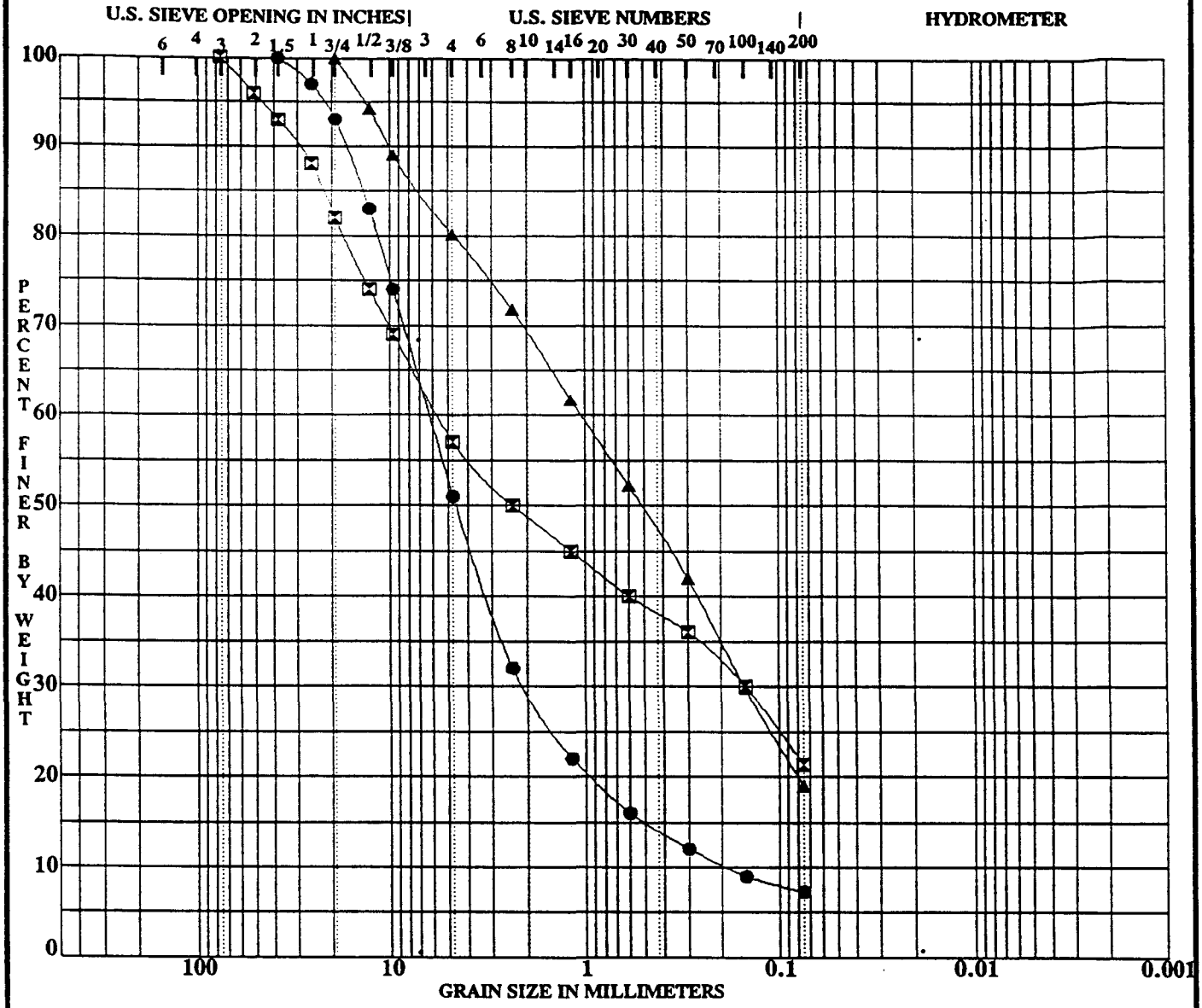
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B- 2	20.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	3.58	33.0
⊠	B- 3	0.0	SILTY GRAVEL with SAND (GM)	NP	NP	NP		
▲	B- 5	5.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B- 2	20.0	38.10	6.24	2.054	0.1890	49.0	43.7	7.3	
⊠	B- 3	0.0	76.20	5.65	0.150		42.8	35.7	21.3	
▲	B- 5	5.0	19.10	1.05	0.152		19.9	61.1	19.0	

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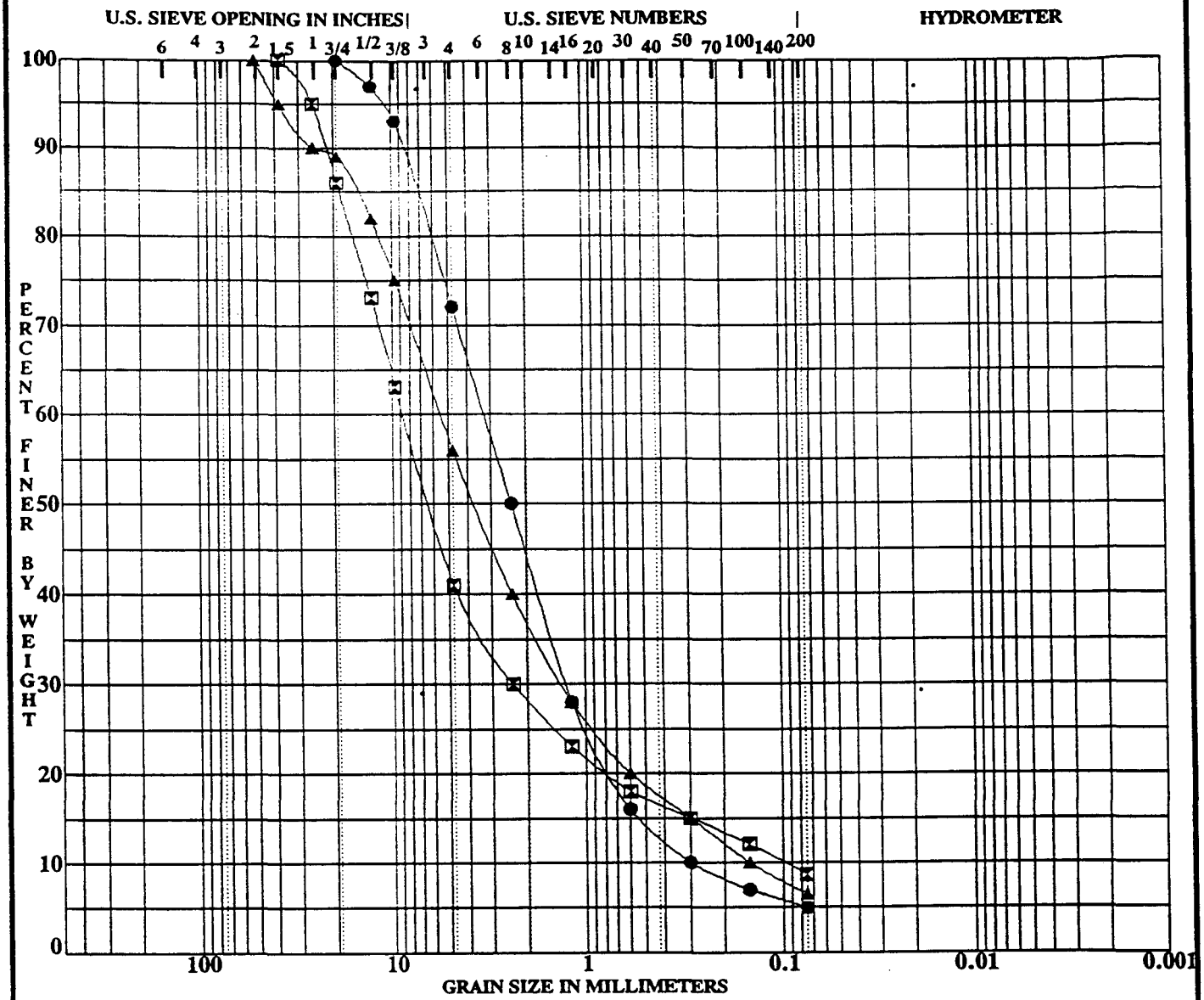
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-6	5.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.62	10.8
⊠	B-7	27.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	6.52	87.9
▲	B-9	0.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	2.13	36.7

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-6	5.0	19.10	3.24	1.257	0.3000	28.0	67.0	5.0	
⊠	B-7	27.0	38.10	8.67	2.360	0.0985	59.0	32.3	8.7	
▲	B-9	0.0	50.80	5.50	1.325	0.1500	44.0	49.5	6.5	

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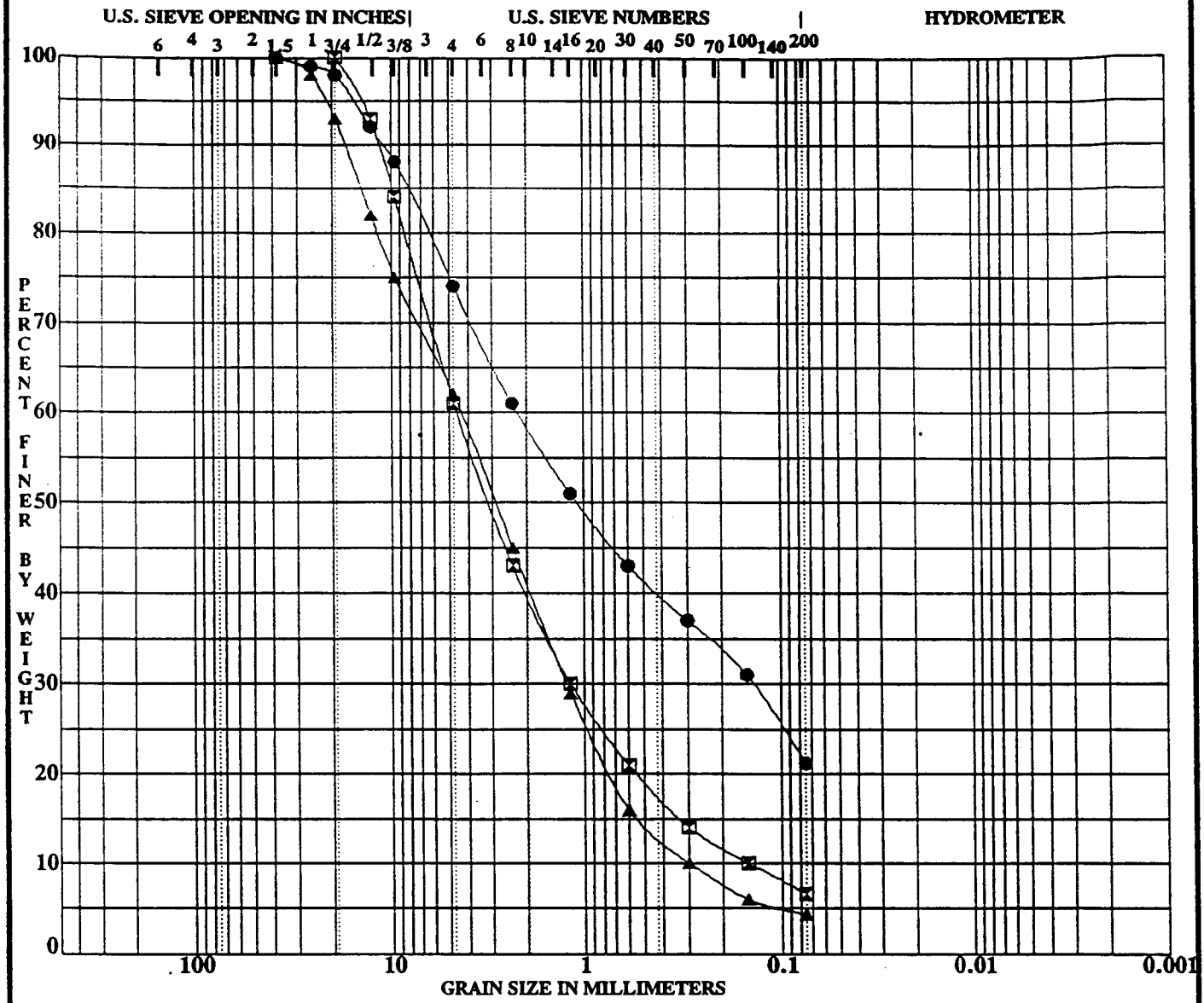
PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-10	0.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
⊠	B-12	5.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	2.03	30.5
▲	B-13	0.0	WELL GRADED SAND with GRAVEL (SW)	NP	NP	NP	1.16	14.6

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-10	0.0	38.10	2.20	0.140		26.0	52.8	21.2	
⊠	B-12	5.0	19.10	4.57	1.180	0.1500	39.0	54.4	6.6	
▲	B-13	0.0	38.10	4.38	1.232	0.3000	38.0	57.6	4.4	

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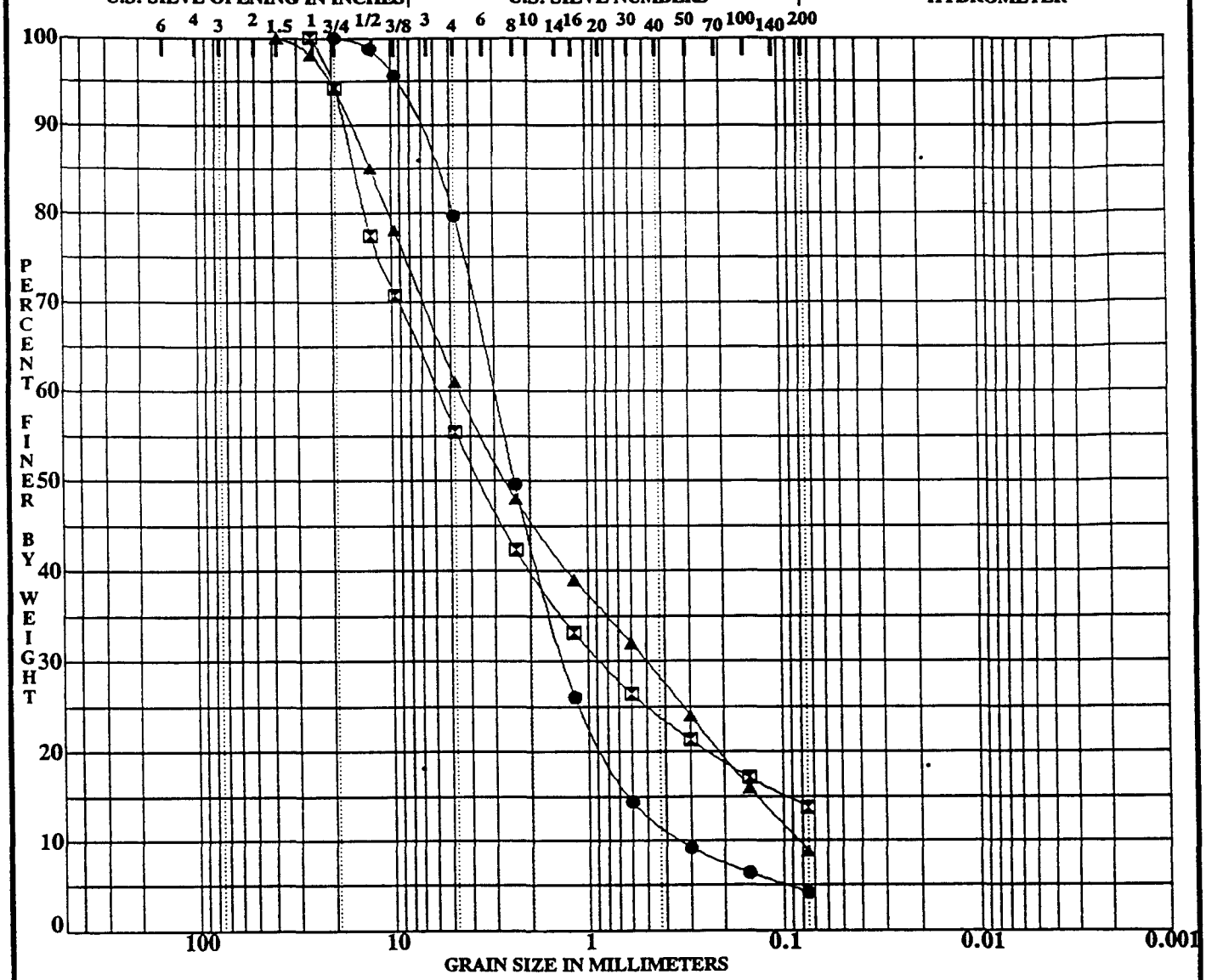
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-4



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-13	5.0	WELL GRADED SAND with GRAVEL (SW)	NP	NP	NP	1.75	9.0
⊠	B-13	15.0	SILTY GRAVEL with SAND (GM)	NP	NP	NP		
▲	B-14	0.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.67	53.5

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-13	5.0	19.10	3.01	1.327	0.3338	20.4	75.4	4.2	
⊠	B-13	15.0	25.40	5.84	0.863		44.5	41.7	13.8	
▲	B-14	0.0	38.10	4.50	0.505	0.0842	39.0	52.2	8.8	

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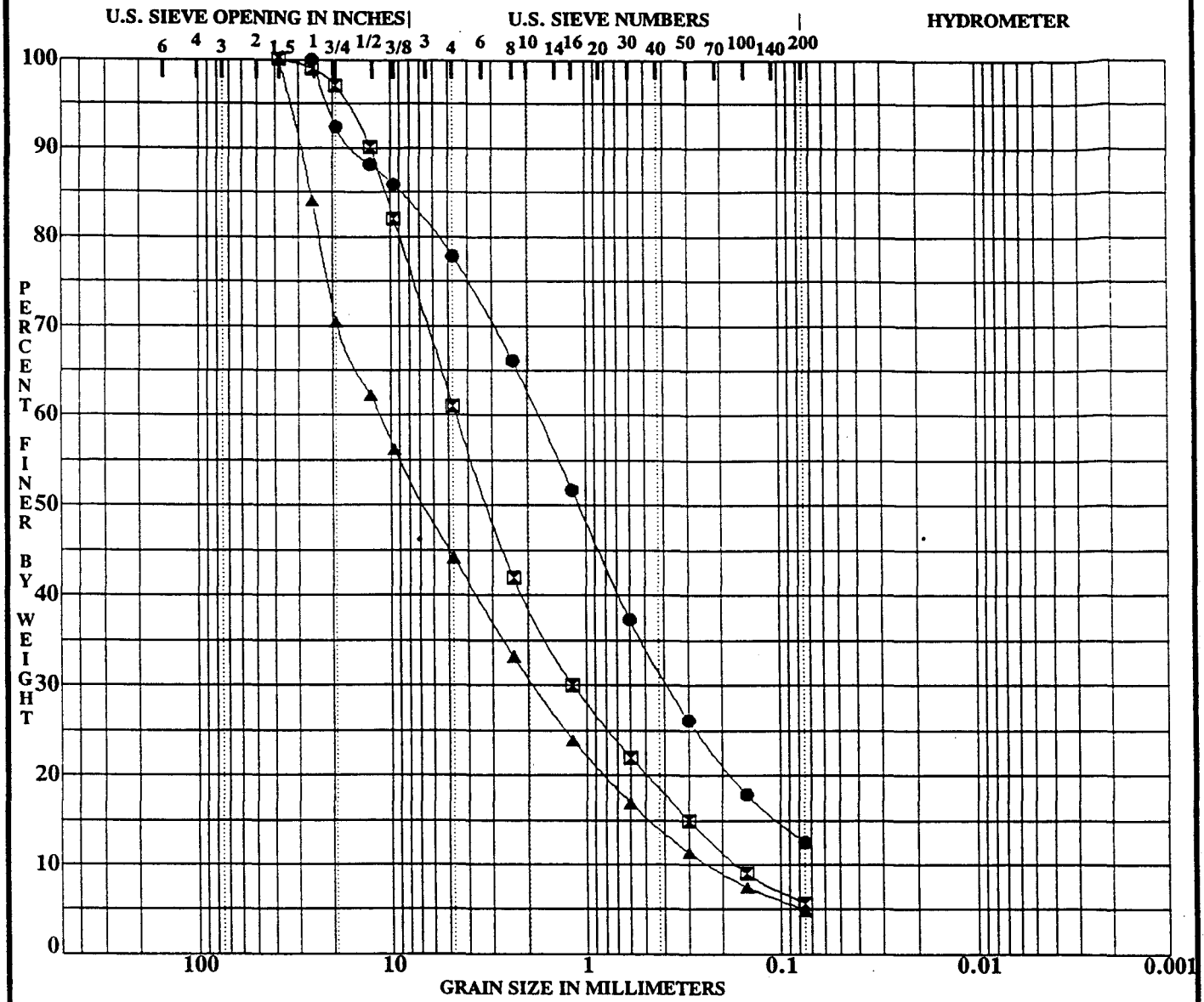
PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-5



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-14	5.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
⊠	B-15	0.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.81	27.2
▲	B-16	5.0	WELL GRADED GRAVEL with SILT and SAND (GW-GM)	NP	NP	NP	1.28	48.3

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-14	5.0	25.40	1.76	0.382		22.2	65.3	12.5	
⊠	B-15	0.0	38.10	4.58	1.180	0.1684	39.0	55.3	5.7	
▲	B-16	5.0	38.10	11.43	1.859	0.2367	55.8	39.3	4.9	

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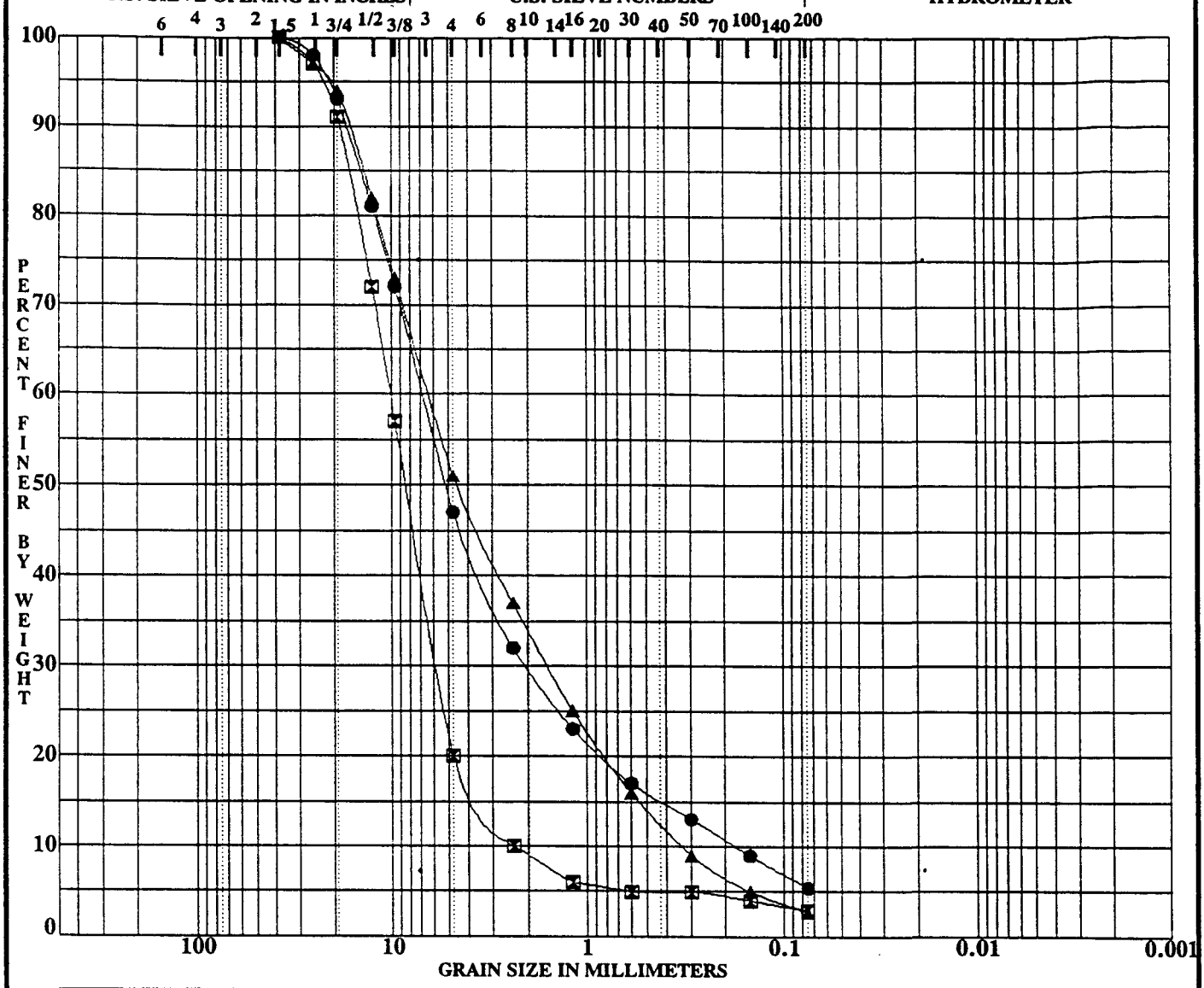
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-6



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-17	5.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	3.36	38.2
⊠	B-18	25.0	WELL GRADED GRAVEL with SAND (GW)	NP	NP	NP	1.38	4.3
▲	B-19	0.0	WELL GRADED GRAVEL with SAND (GW)	NP	NP	NP	1.19	19.1

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-17	5.0	38.10	6.82	2.023	0.1784	53.0	41.6	5.4	
⊠	B-18	25.0	38.10	10.09	5.734	2.3600	80.0	17.1	2.9	
▲	B-19	0.0	38.10	6.32	1.575	0.3312	49.0	48.3	2.7	

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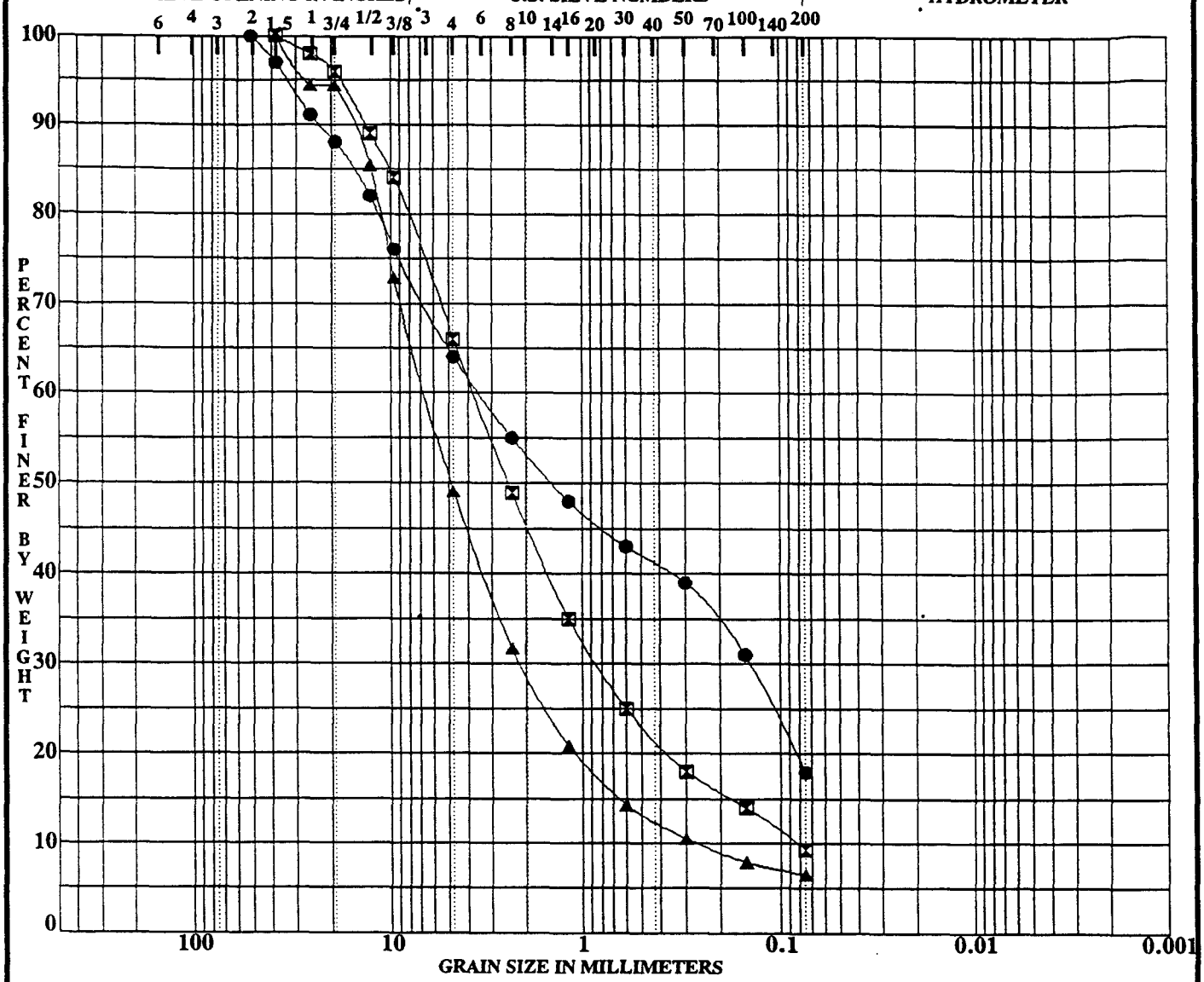
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-7



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-20	0.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
⊠	B-21	0.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	2.29	44.6
▲	B-22	15.0	WELL GRADED GRAVEL with SILT and SAND (GW-GM)	NP	NP	NP	2.61	24.9

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-20	0.0	50.80	3.48	0.142		36.0	46.1	17.9	
⊠	B-21	0.0	38.10	3.71	0.841	0.0832	34.0	56.7	9.3	
▲	B-22	15.0	38.10	6.54	2.118	0.2626	50.9	42.6	6.5	

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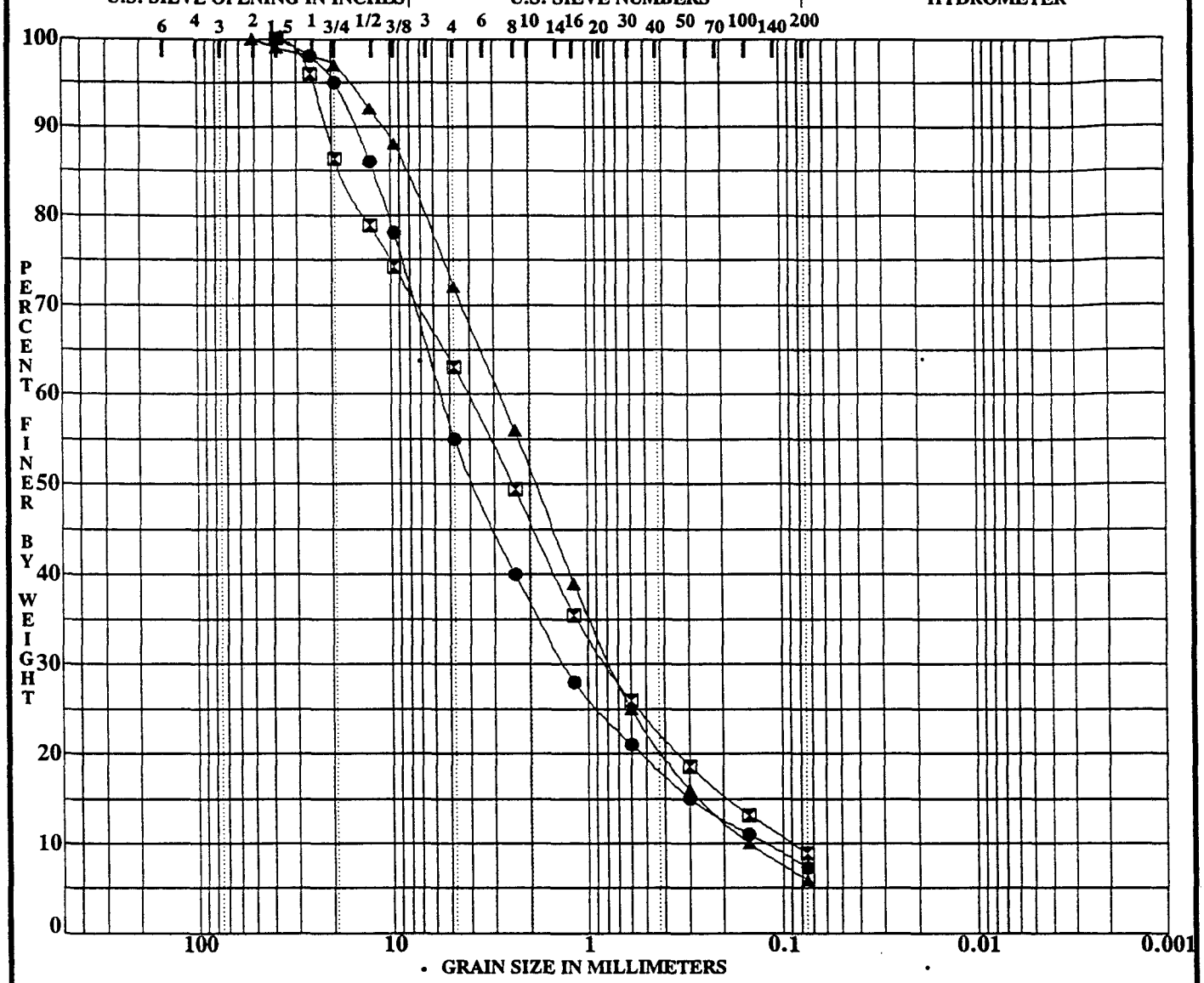
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-8



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-23	5.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	2.55	44.4
⊠	B-24	5.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.76	45.5
▲	B-25	0.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.38	18.7

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-23	5.0	38.10	5.53	1.325	0.1244	45.0	47.7	7.3	
⊠	B-24	5.0	38.10	4.07	0.801	0.0896	37.0	54.1	8.9	
▲	B-25	0.0	50.80	2.81	0.764	0.1500	28.0	66.1	5.9	

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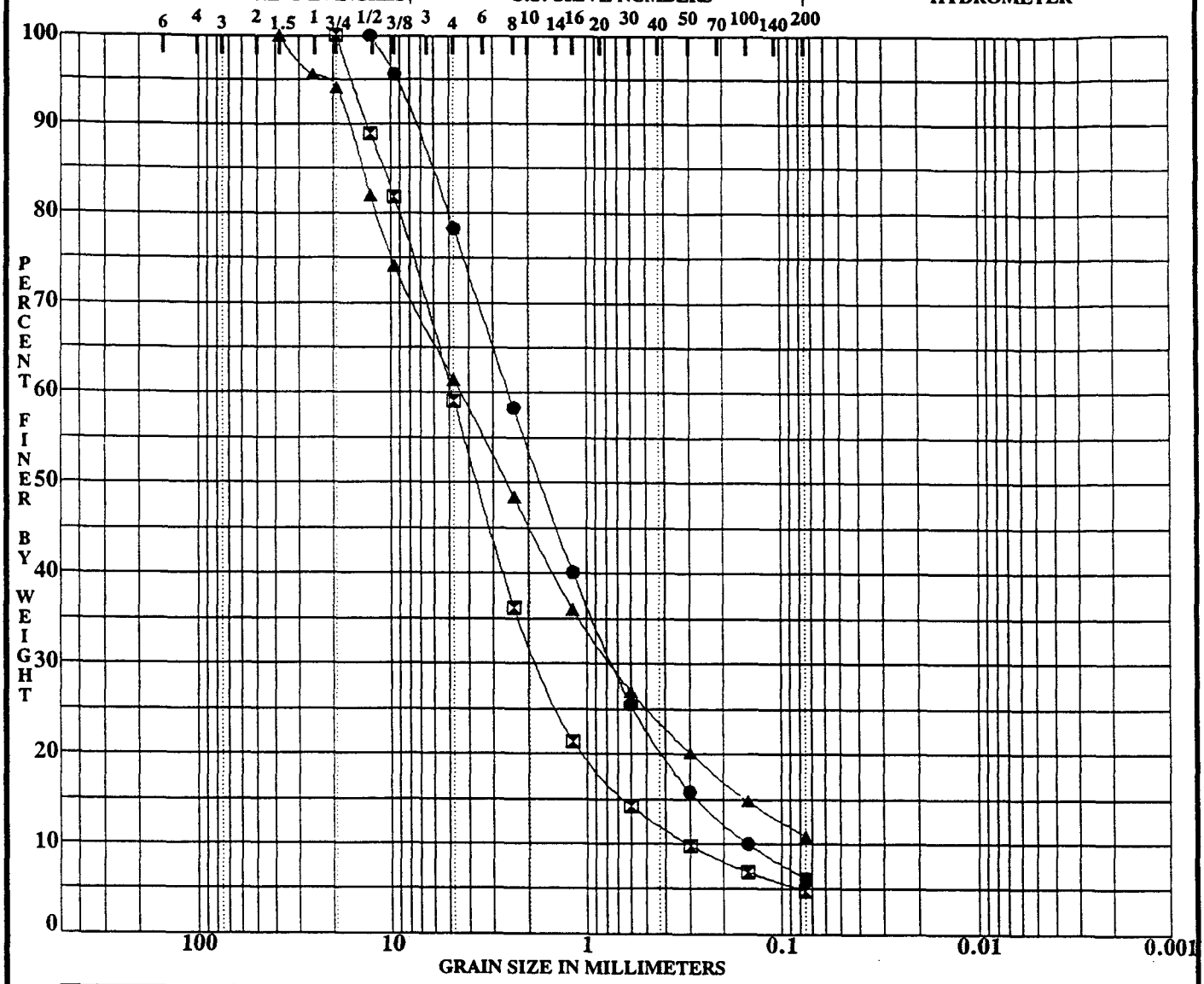
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-9



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-26	5.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.45	16.7
⊠	B-30	15.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	2.07	15.8
▲	B-34	10.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.85	62.9

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-26	5.0	12.70	2.51	0.739	0.1500	21.8	72.0	6.2	
⊠	B-30	15.0	19.10	4.88	1.769	0.3096	40.9	54.3	4.8	
▲	B-34	10.0	38.10	4.41	0.756		38.6	50.6	10.8	

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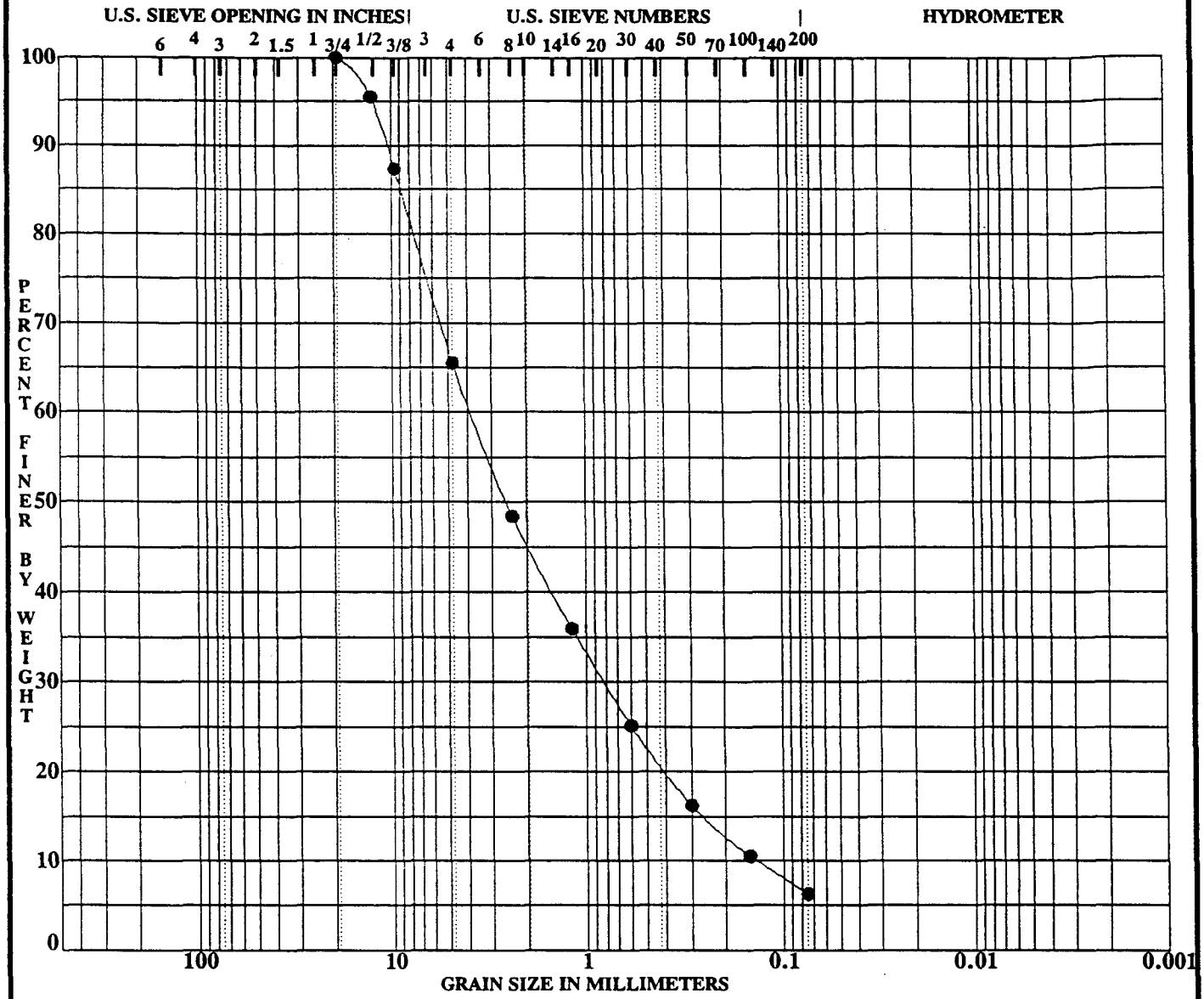
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE
B-10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-35	5.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)	NP	NP	NP	1.27	27.5

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-35	5.0	19.10	3.79	0.816	0.1381	34.5	59.2	6.3	

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

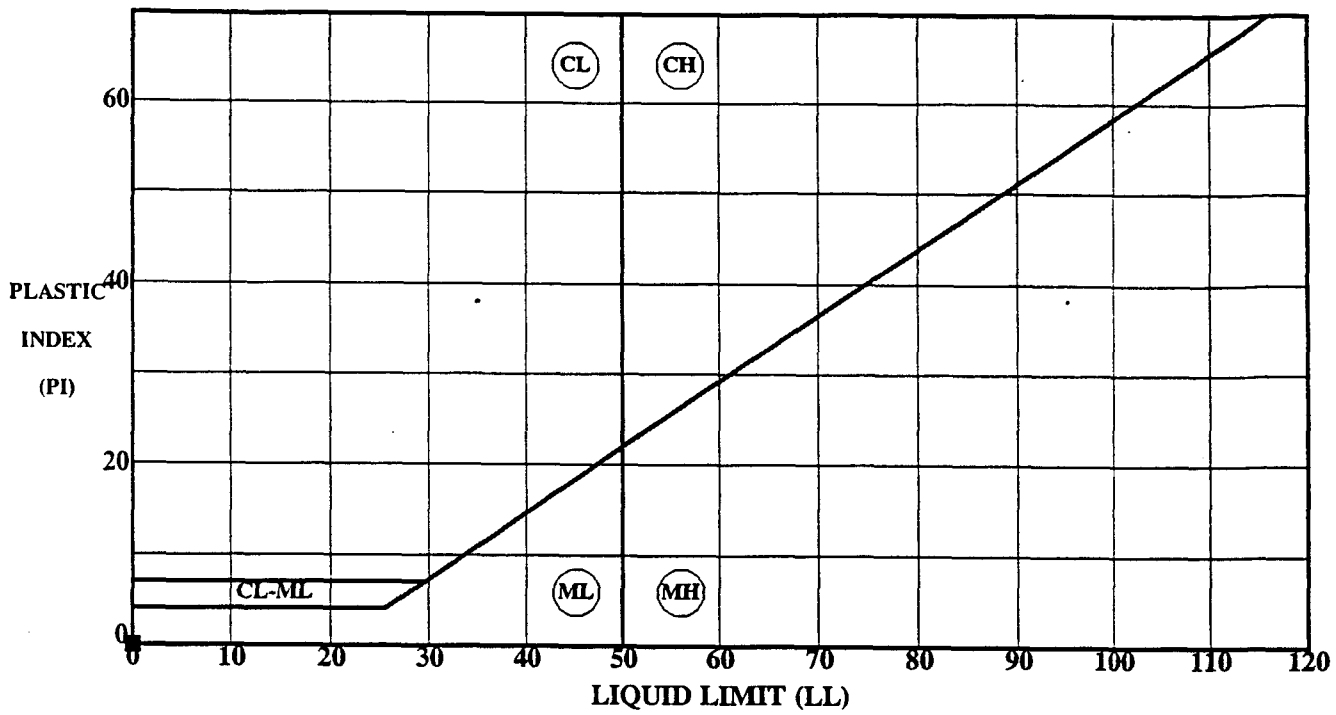
PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

GRAIN SIZE ANALYSES

PLATE

B-11



	Exploration No.	Depth(ft)	LL	PL	PI	Fines	Classification
●	B-1	0.0	NP	NP	NP	3.4	WELL GRADED GRAVEL with SAND (GW)
⊠	B-1	25.0	NP	NP	NP	7.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)
▲	B-2	0.0	NP	NP	NP	8.9	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
★	B-2	20.0	NP	NP	NP	7.3	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)
✕	B-3	0.0	NP	NP	NP	21.3	SILTY GRAVEL with SAND (GM)
✪	B-5	5.0	NP	NP	NP	19.0	SILTY SAND with GRAVEL (SM)
◆	B-6	5.0	NP	NP	NP	5.0	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
■	B-7	27.0	NP	NP	NP	8.7	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)
⊗	B-9	0.0	NP	NP	NP	6.5	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
⊕	B-10	0.0	NP	NP	NP	21.2	SILTY SAND with GRAVEL (SM)

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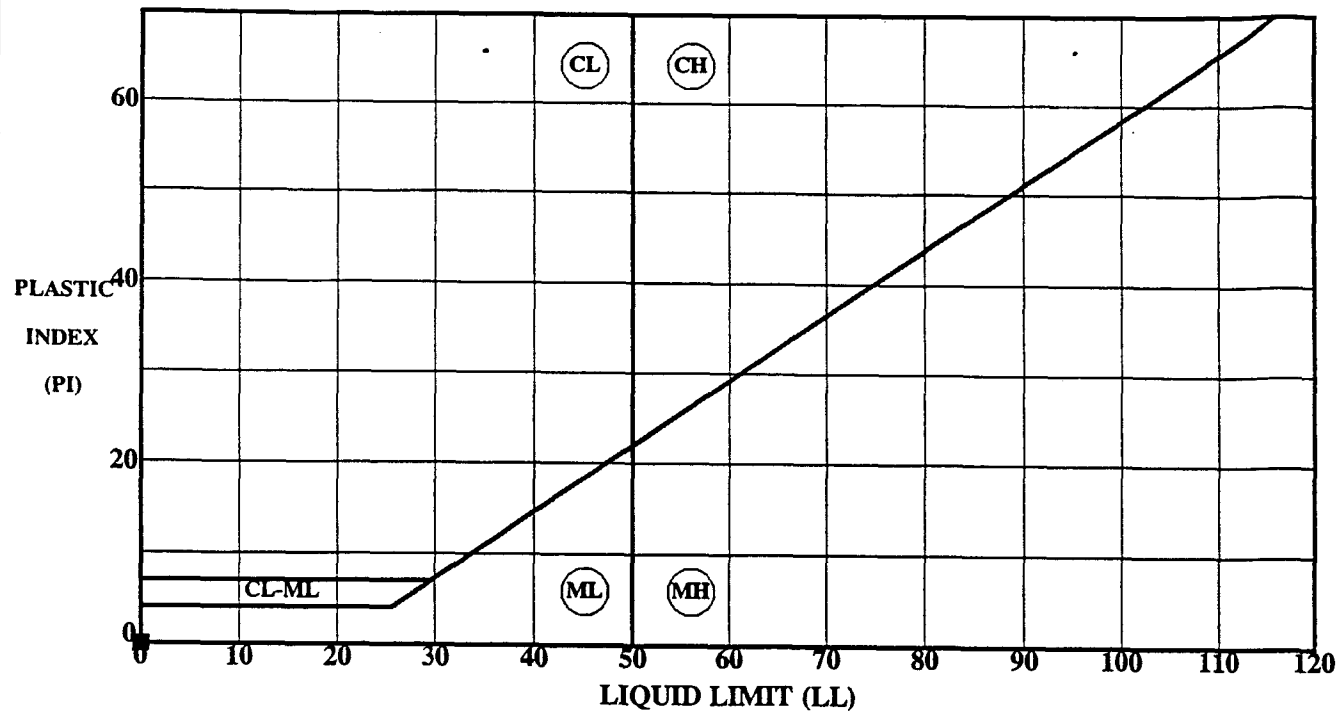
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

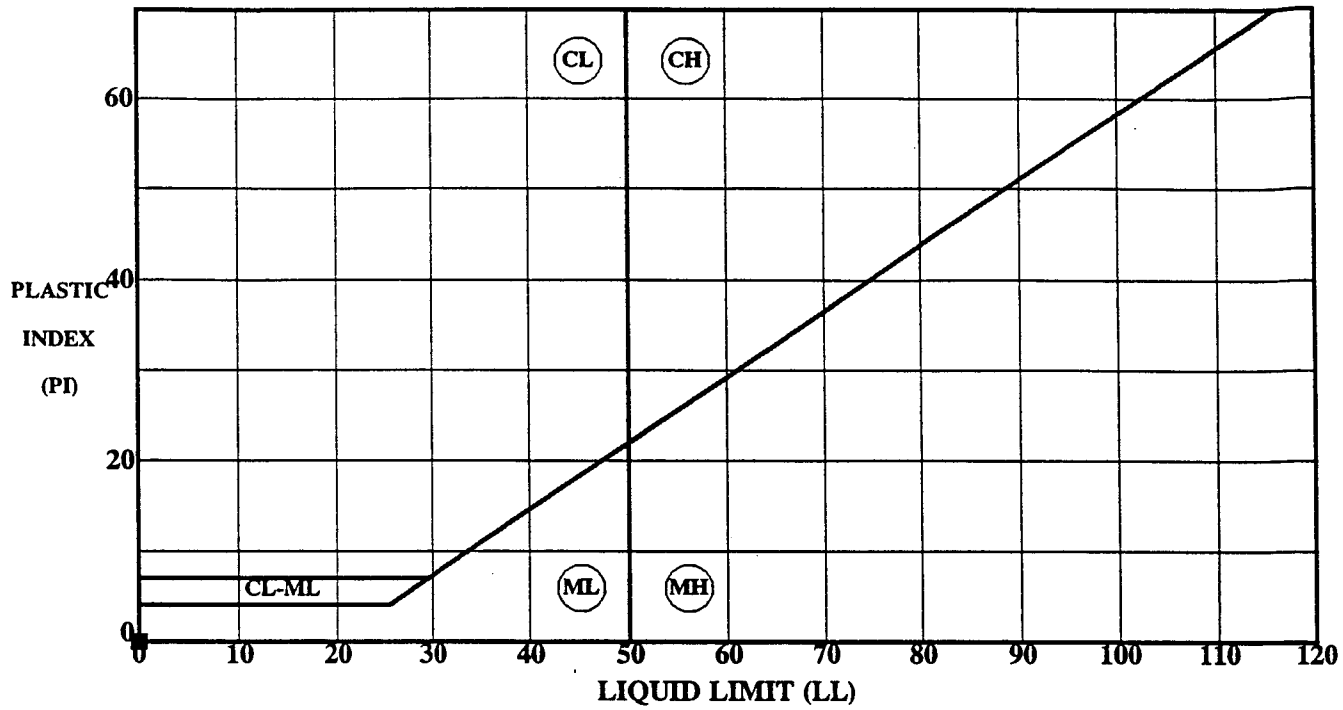
PROJECT: East C-1 Detention Basin

ATTERBERG LIMITS TEST RESULTS

PLATE
B-12



	Exploration No.	Depth(ft)	LL	PL	PI	Fines	Classification
●	B-12	5.0	NP	NP	NP	6.6	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
⊠	B-13	0.0	NP	NP	NP	4.4	WELL GRADED SAND with GRAVEL (SW)
▲	B-13	5.0	NP	NP	NP	4.2	WELL GRADED SAND with GRAVEL (SW)
★	B-13	15.0	NP	NP	NP	13.8	SILTY GRAVEL with SAND (GM)
✕	B-14	0.0	NP	NP	NP	8.8	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)
✿	B-14	5.0	NP	NP	NP	12.5	SILTY SAND with GRAVEL (SM)
◆	B-15	0.0	NP	NP	NP	5.7	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
■	B-16	5.0	NP	NP	NP	4.9	WELL GRADED GRAVEL with SILT and SAND (GW-GM)
⊗	B-17	5.0	NP	NP	NP	5.4	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)
⊕	B-18	25.0	NP	NP	NP	2.9	WELL GRADED GRAVEL with SAND (GW)



	Exploration No.	Depth(ft)	LL	PL	PI	Fines	Classification
●	B-19	0.0	NP	NP	NP	2.7	WELL GRADED GRAVEL with SAND (GW)
⊠	B-20	0.0	NP	NP	NP	17.9	SILTY SAND with GRAVEL (SM)
▲	B-21	0.0	NP	NP	NP	9.3	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
★	B-22	15.0	NP	NP	NP	6.5	WELL GRADED GRAVEL with SILT and SAND (GW-GM)
✕	B-23	5.0	NP	NP	NP	7.3	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
✿	B-24	5.0	NP	NP	NP	8.9	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
◆	B-25	0.0	NP	NP	NP	5.9	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
■	B-26	5.0	NP	NP	NP	6.2	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
⊗	B-30	15.0	NP	NP	NP	4.8	WELL GRADED SAND with SILT and GRAVEL (SW-SM)
⊕	B-34	10.0	NP	NP	NP	10.8	WELL GRADED SAND with SILT and GRAVEL (SW-SM)

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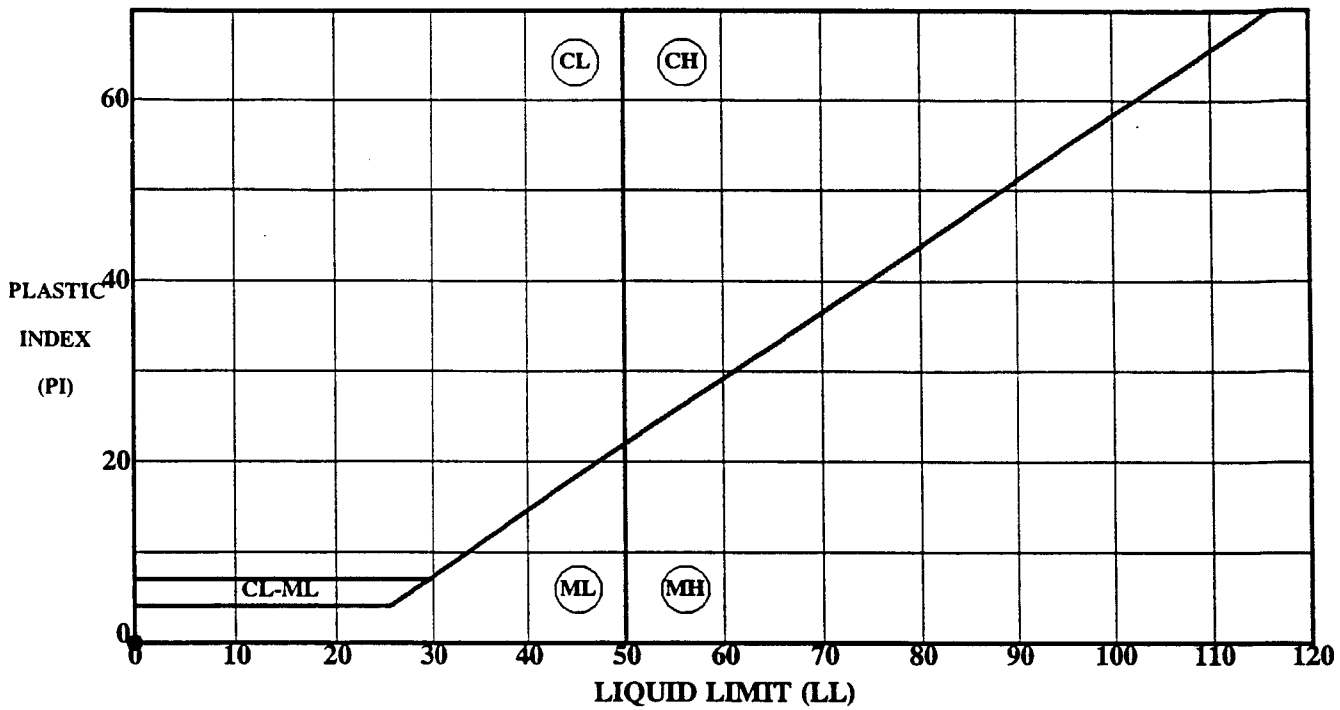
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

ATTERBERG LIMITS TEST RESULTS

PLATE B-14



	Exploration No.	Depth(ft)	LL	PL	PI	Fines	Classification
●	B-35	5.0	NP	NP	NP	6.3	WELL GRADED SAND with SILT and GRAVEL (SW-SM)

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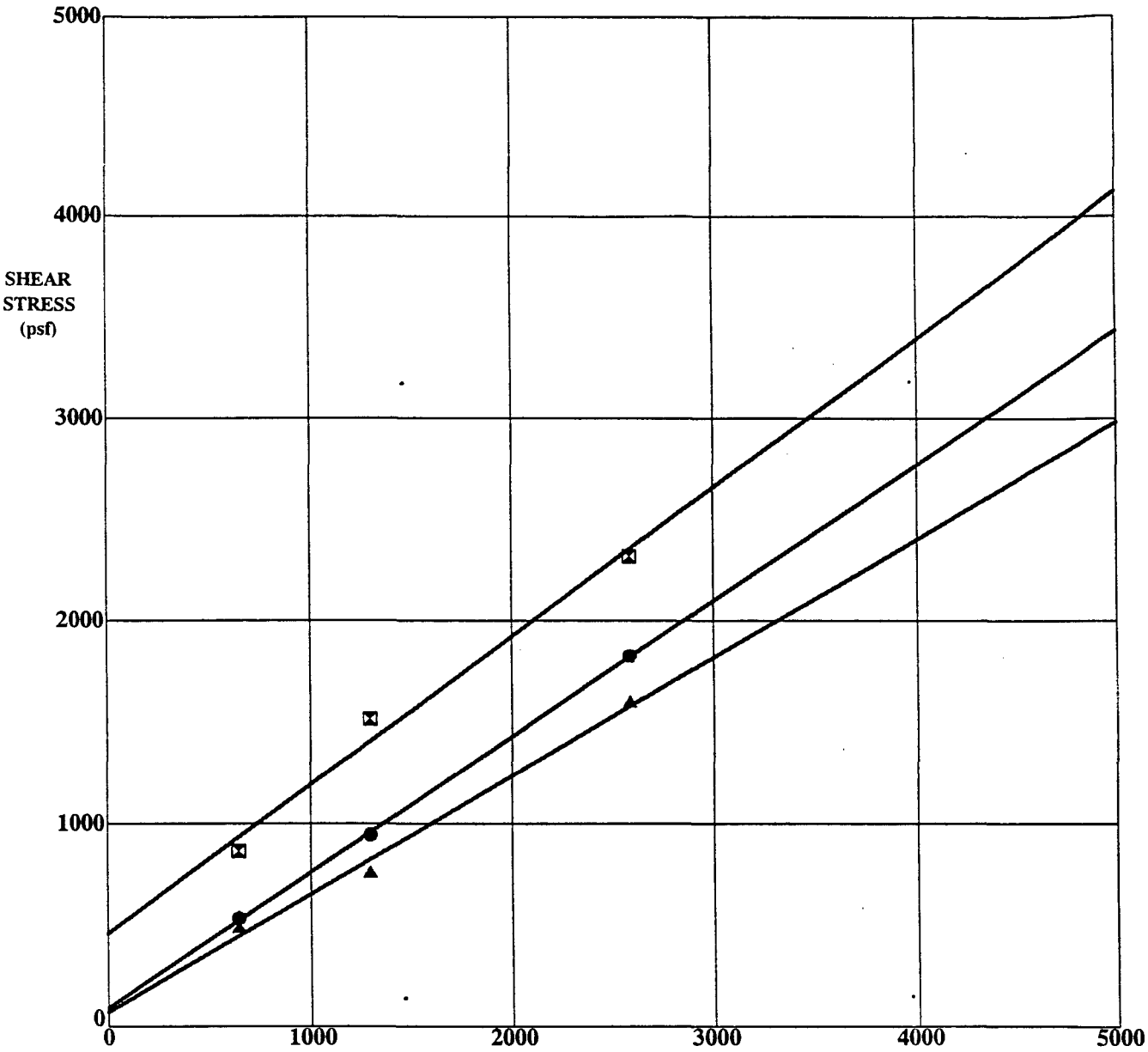
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

ATTERBERG LIMITS TEST RESULTS

PLATE
B-15



Exploration No.	Depth (ft.)	Soil Description	Remolded Dry Density (pcf)	PHI Angle Degrees	Cohesion (psf)
● B-1	5.0	POORLY GRADED SAND (SP) - some GRAVEL	108	34	93
⊠ B-6	10.0	WELL GRADED SAND (SW-SM) - some SILT	110	36	462
▲ B-8	5.0	FANGLOMERATE (Tf)	117	30	72

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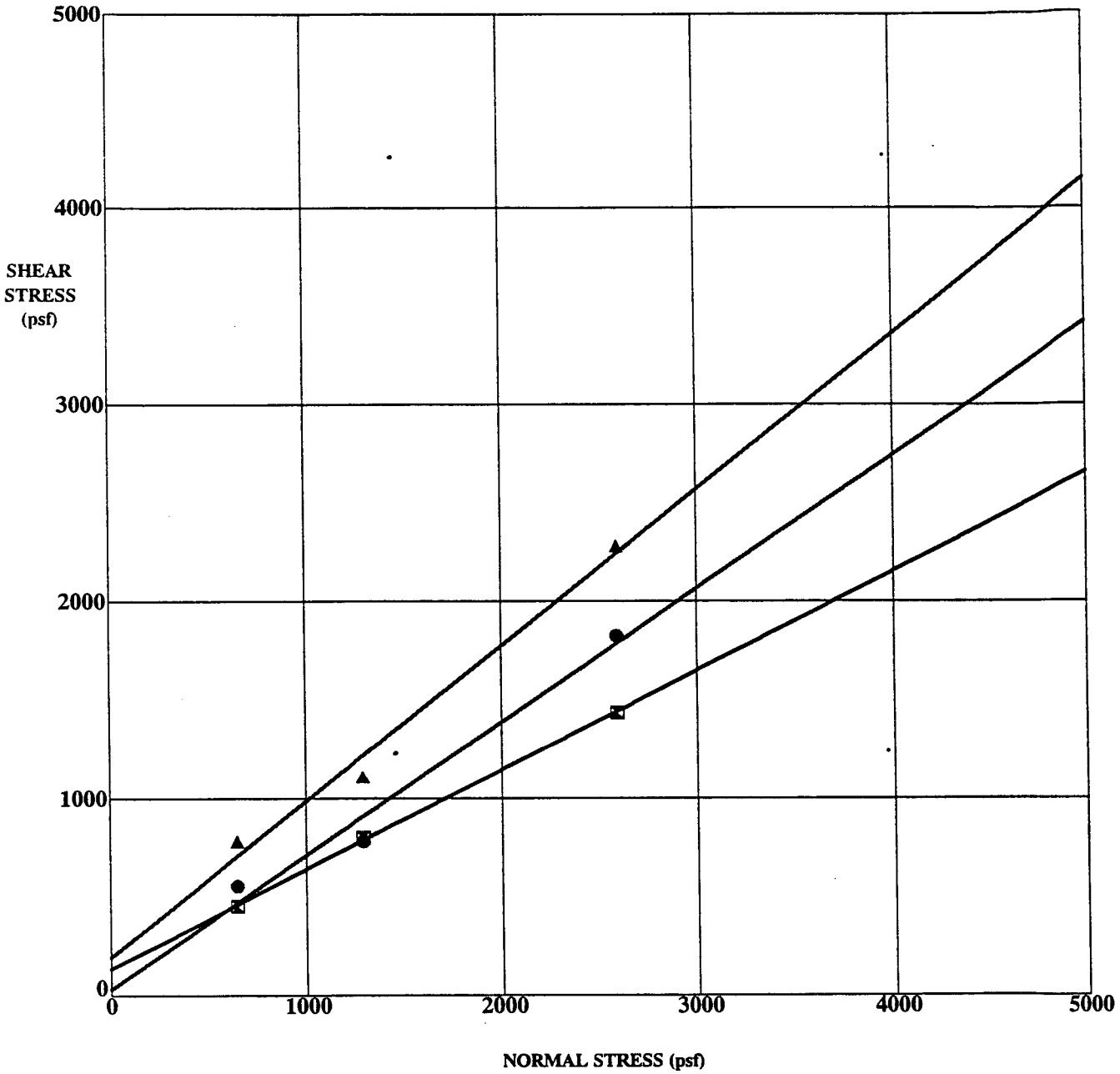
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

DIRECT SHEAR TEST RESULTS

PLATE
B-16



Exploration No.	Depth (ft.)	Soil Description	Remolded Dry Density (pcf)	PHI Angle Degrees	Cohesion (psf)
● B-9	5.0	WELL GRADED SAND (SW-SM) - with SILT and GRAVEL	108	34	31
⊠ B-13	15.0	CLAYEY SAND (SC) with GRAVEL	103	27	134
▲ B-14	5.0	SANDY GRAVEL (GC) with CLAY	111	38	195

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SOILS AND MATERIALS TESTING

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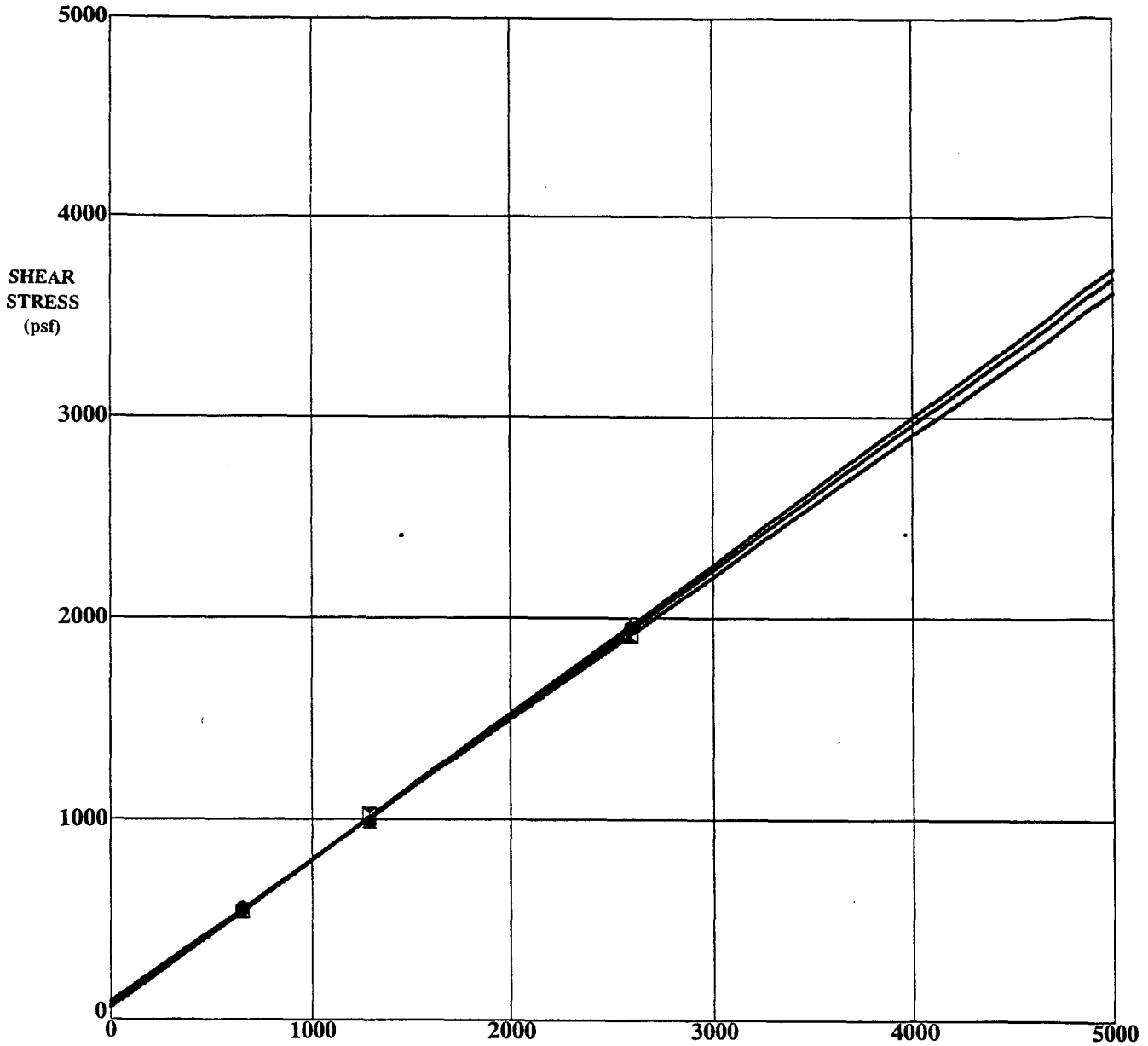
DIRECT SHEAR TEST RESULTS

PLATE
B-17



Exploration No.	Depth (ft.)	Soil Description	Remolded Dry Density (pcf)	PHI Angle Degrees	Cohesion (psf)
● B-16	15.5	SANDY GRAVEL (GW-GM)	108	36	72
⊠ B-17	5.0	SANDY GRAVEL (GP-GM)	109	35	93
▲ B-22	6.0	SAND some GRAVEL and SILT (SP-SM)	112	36	61

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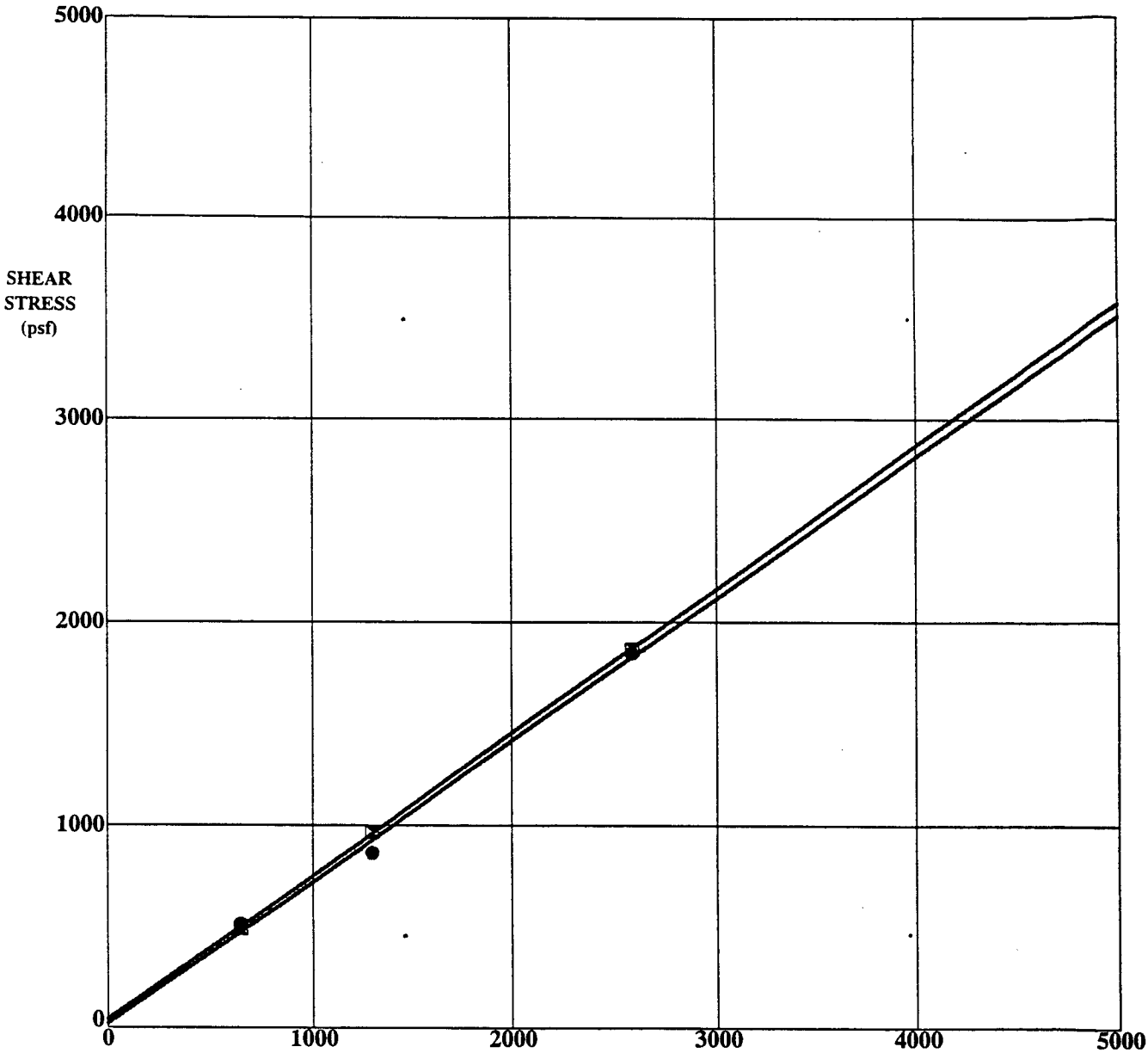
SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

DIRECT SHEAR TEST RESULTS

PLATE
B-18



Exploration No.	Depth (ft.)	Soil Description	Remolded Dry Density (pcf)	PHI Angle Degrees	Cohesion (psf)
● B-24	10.0	SAND with GRAVEL some SILT (SW-SM)	104	35	20
⊠ B-26	5.0	SAND with GRAVEL some SILT (SW-SM)	103	35	42

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

DIRECT SHEAR TEST RESULTS

PLATE
B-19

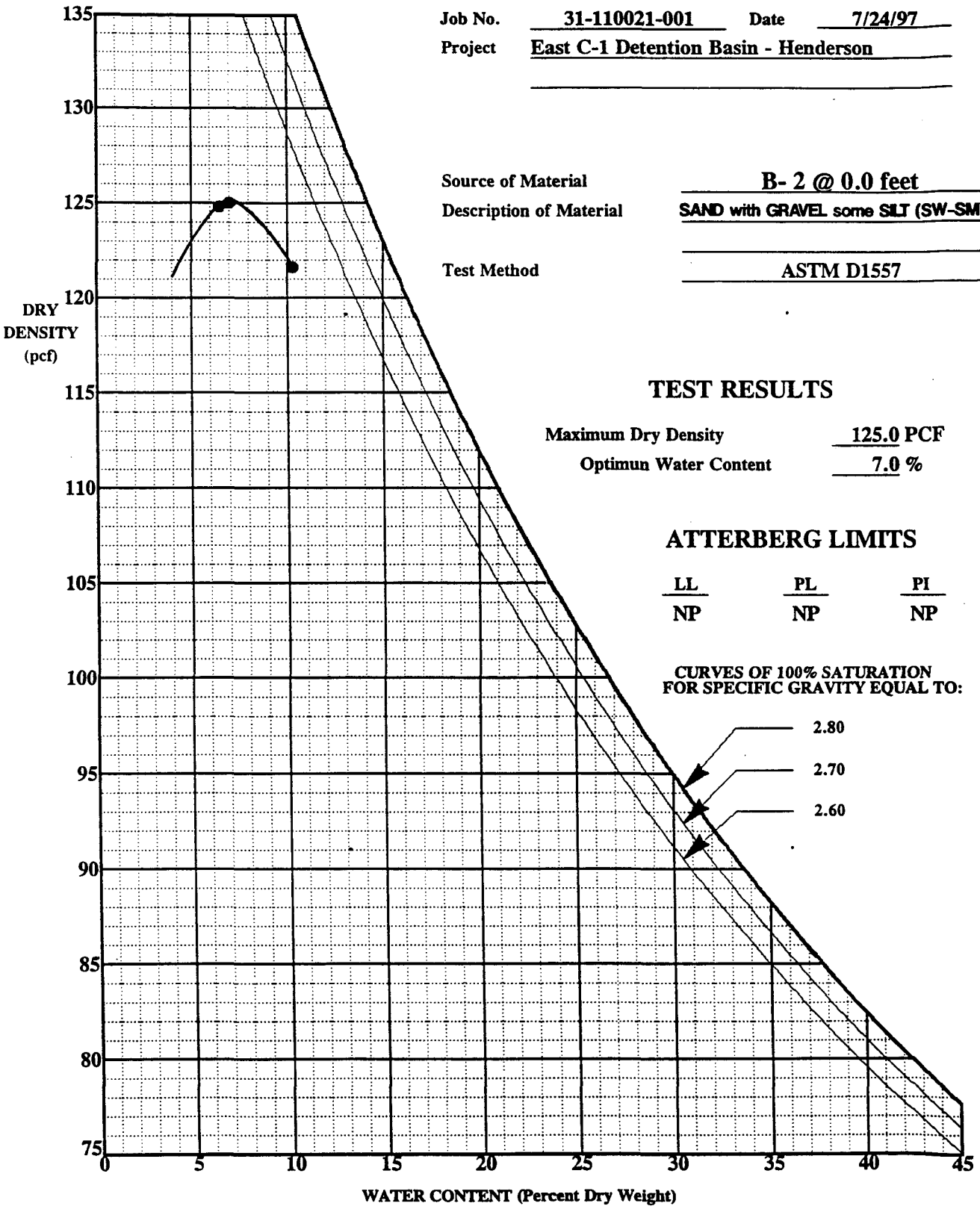
Job No. 31-110021-001 Date 7/24/97

Project East C-1 Detention Basin - Henderson

Source of Material B- 2 @ 0.0 feet

Description of Material SAND with GRAVEL some SILT (SW-SM)

Test Method ASTM D1557



TEST RESULTS

Maximum Dry Density	125.0 PCF
Optimun Water Content	7.0 %

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

CURVES OF 100% SATURATION FOR SPECIFIC GRAVITY EQUAL TO:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-110021-001

PROJECT: East C-1 Detention Basin

MOISTURE-DENSITY RELATIONSHIP

PLATE B-20

UNCONFINED COMPRESSION STRENGTH TEST RESULTS

Sample Location	Depth (feet)	Sample Description	Compressive Strength (psi)
C-31	61 - 61.5	Dacite Tuff	7580
C-32	18.3 - 19.0	Dacite Breccia	1470
C-32	58.4 - 59.2	Dacite Tuff	6260
C-33	12 - 12.8	Dacite Tuff	9180

PERMEABILITY TEST RESULTS

Sample Location	Depth (feet)	Sample Description	Permeability* (cm/sec)
B-1	0 - 5	SANDY GRAVEL trace silt (GP-GW)	1×10^{-2}
B-2	0 - 5	SAND - with GRAVEL, some SILT (SW-SM)	2.5×10^{-3}

* Samples remolded to 90 percent of 125 pcf at a moisture content of 7 percent.

APPENDIX C

Atlas Chemical Testing Laboratories

2120 Western Avenue, Suite C-6 • Las Vegas, Nevada 89102
(702) 383-1199 • Fax (702) 383-4983

CHEMICAL
PHYSICAL
FORENSIC

member of
AMERICAN SOCIETY FOR
TESTING MATERIALS

LABORATORY NO:	8019(a)	DATE:	November 18, 1997
SAMPLE:	Soil	P.O.:	
MARKED:	31-110021-001		
DATE RECEIVED:	November 17, 1997		
SUBMITTED BY:	Kleinfelder, Inc.		

REPORT OF DETERMINATION

BORING NUMBER	B-1	B-1	B-2	B-2	B-16	B-18
SAMPLE NUMBER						
DEPTH (feet)	10.0	25.0	10.0	20.0	0-5	10.0
pH VALUE	9.35	9.33	9.17	9.30	9.20	9.26
RED-OX (MV)	+609	+605	+605	+596	+595	+594
SULFATE (ppm)	75	50	25	50	25	75
SULFIDE (ppm)	Nil	Nil	Nil	Nil	Nil	Nil
TOTAL SALTS (ppm)	73	61	108	144	58	74
CHLORIDE (ppm)	10	5	15	10	5	10

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Richard A. Coomes

NOTES:

1. The soil water extract ratio was 1:5, therefore, to convert a solution ppm (or mg/1) to a soil ppm (or mg/kg) for this extract ratio multiply by five (5). To convert soil ppm to a weight percent divide by ten thousand (10,000).

2. The standard methods used for the determination above are the glass electrode/ silver-silver chloride, ASTM D 1498; Turbidimetric/Std. Meth. 426C; Methylene Blue/Std. Meth. 427C, Electrical Conductivity, factor empirically determined/Std. Meth. 205 and Argentometric/Std. Meth. 407A respectively.

PLATE
C-1

Atlas Chemical Testing Laboratories

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CHEMICAL
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TESTING MATERIALS

LABORATORY NO:	8019(a)	DATE:	November 18, 1997
SAMPLE:	Soil	P.O.:	
MARKED:	31-110021-001		
DATE RECEIVED:	November 17, 1997		
SUBMITTED BY:	Kleinfelder, Inc.		

REPORT OF DETERMINATION

BORING NUMBER	B-23	B-25				
SAMPLE NUMBER						
DEPTH (feet)	5-10	0-5				
pH VALUE	9.32	9.32				
RED-OX (MV)	+589	+590				
SULFATE (ppm)	50	25				
SULFIDE (ppm)	Nil	Nil				
TOTAL SALTS (ppm)	58	56				
CHLORIDE (ppm)	5	5				

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Richard A. Coomes

NOTES:

1. The soil water extract ratio was 1:5, therefore, to convert a solution ppm (or mg/1) to a soil ppm (or mg/kg) for this extract ratio multiply by five (5). To convert soil ppm to a weight percent divide by ten thousand (10,000).

2. The standard methods used for the determination above are the glass electrode/ silver-silver chloride, ASTM D 1498; Turbidimetric/Std. Meth. 426C; Methylene Blue/Std. Meth. 427C, Electrical Conductivity, factor empirically determined/Std. Meth. 205 and Argentometric/Std. Meth. 407A respectively.

PLATE
C-2

APPENDIX D

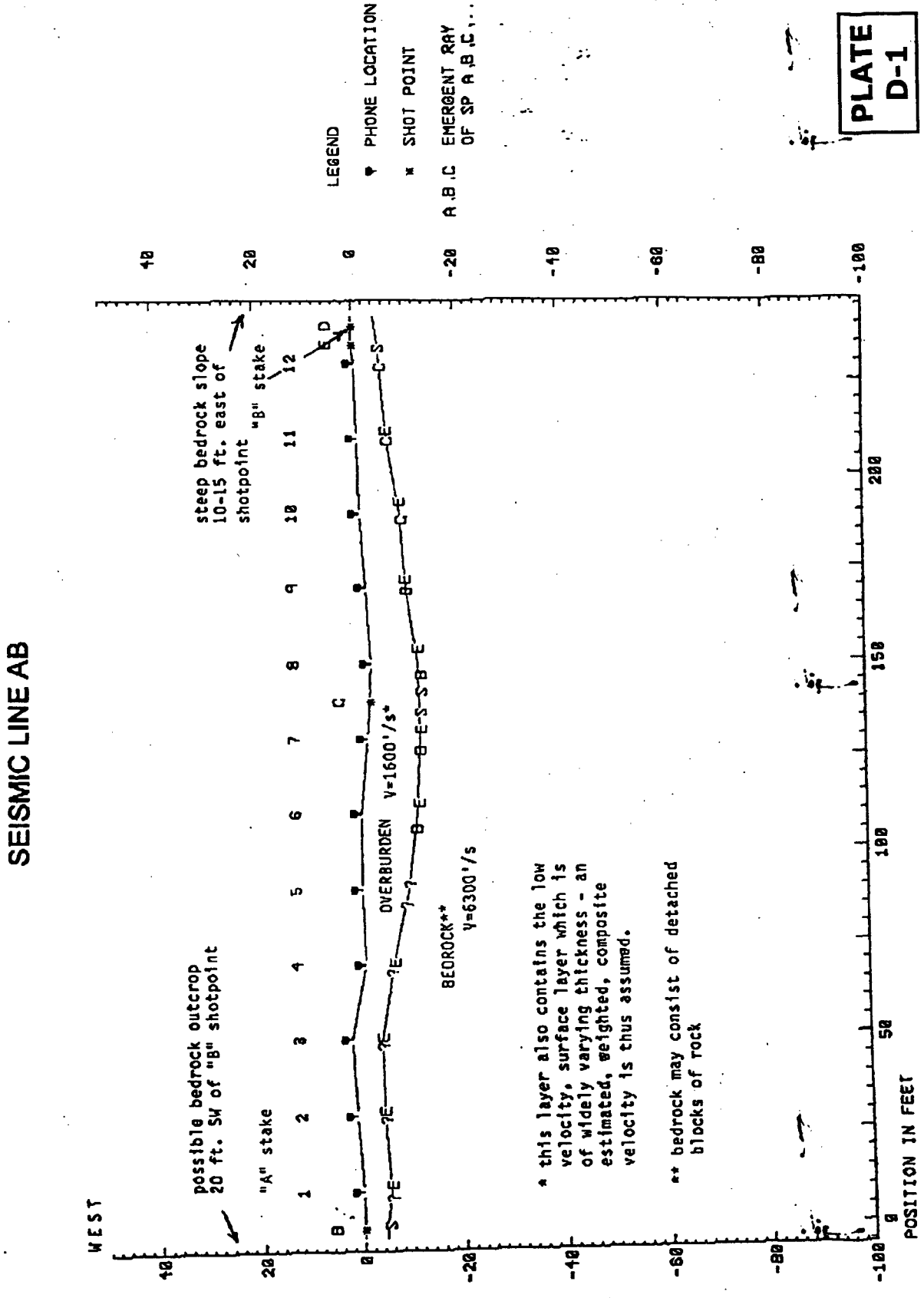

SEISMIC LINE AB
PLATE D-1
LEGEND
PHONE LOCATION
SHOT POINT
EMERGENT RAY OF SP A,B,C,...
A,B,C
steep bedrock slope 10-15 ft. east of shotpoint "B" stake
possible bedrock outcrop 20 ft. SW of "B" shotpoint
"A" stake
OVERBURDEN V=1600'/s*
BEDROCK** V=6300'/s
* this layer also contains the low velocity, surface layer which is of widely varying thickness - an estimated, weighted, composite velocity is thus assumed.
** bedrock may consist of detached blocks of rock
WEST
POSITION IN FEET
ELEVATION IN FEET

Figure 2

PLATE D-2

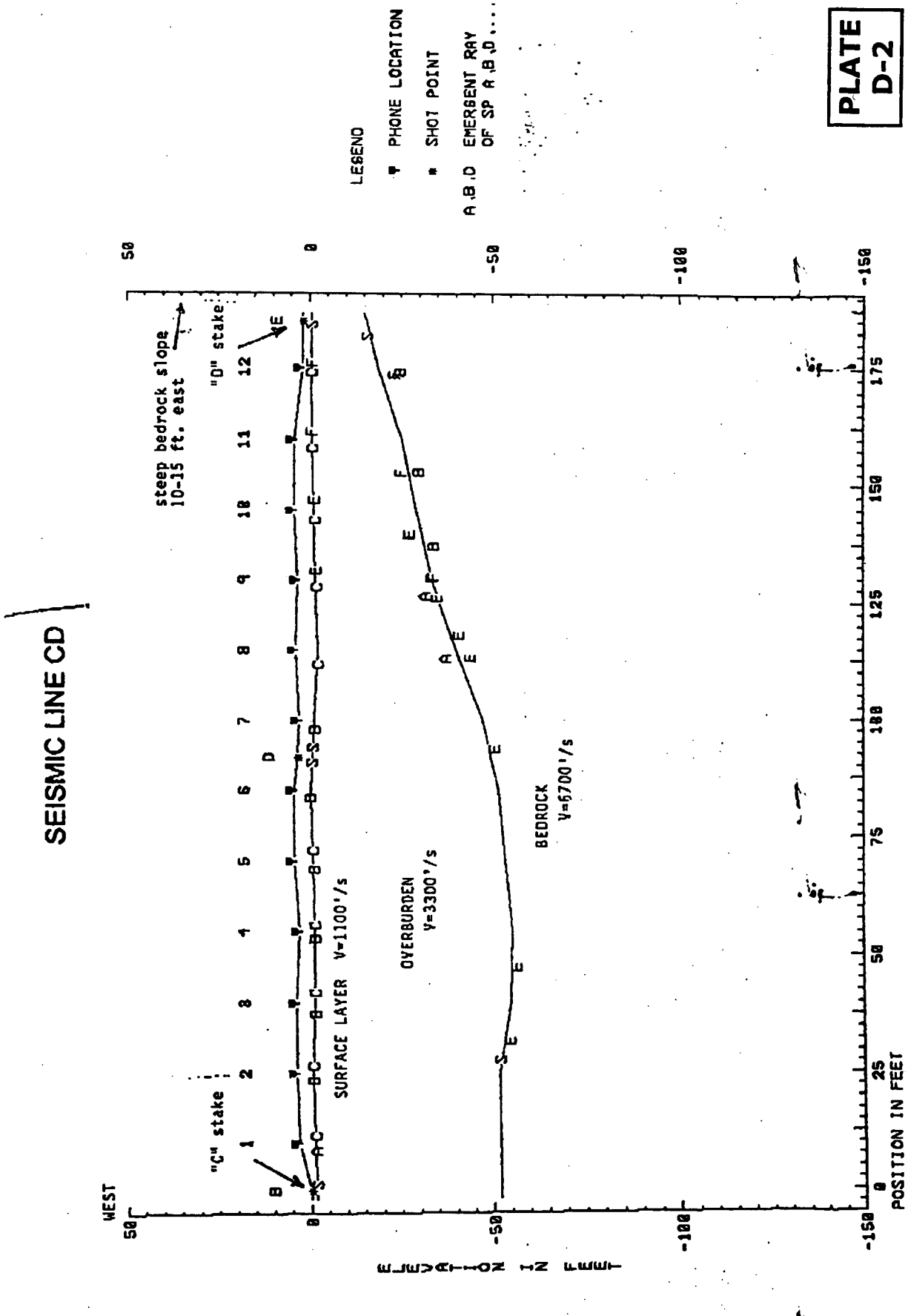


Figure 3

TECHNICAL DRAINAGE STUDY

LETTER OF MAP REVISION
FOR
EQUESTRIAN DETENTION BASIN

PDG PROJECT #1002005

BOOK 5
RECORD DRAWINGS

PREPARED FOR:
THE CITY OF HENDERSON
DRAFT
DECEMBER 18, 1998
PREPARED BY:

POGGEMEYER DESIGN GROUP, INC.
ENGINEERS – PLANNERS – SURVEYORS – LANDSCAPE ARCHITECTS
2601 NORTH TENAYA WAY
LAS VEGAS, NEVADA 89128
(702) 255-8100 FAX (702) 255-8375
pdg-lv@pdg-lv.com

APPENDIX O

EQUESTRIAN DRIVE

DRAINAGE STUDY AND PLANS

HYDROLOGY STUDY
TO ACCOMPANY STREET WIDENING
FOR EQUESTRIAN DRIVE AND APPALOOSA ROAD
CITY OF HENDERSON

HYDROLOGY STUDY
TO ACCOMPANY STREET WIDENING
FOR EQUESTRIAN DRIVE AND APPALOOSA ROAD
CITY OF HENDERSON

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: EQUESTRIAN DRIVE Date: 11/18/96

Location of Development: a) Descriptive Equestrian east of Boulder Highway
b) Sect. 27 Twn. 22 Rng. 63

Name of Owner: City of Henderson Assessors Parcel No: n/a

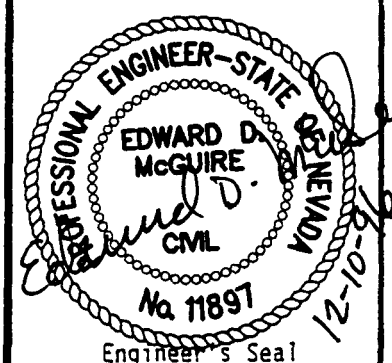
Contact Person-Name: Ed McGuire Telephone No: 702-565-2036

Firm: Public Works Engineering
City of Henderson
Address: 240 Water Street
Henderson, Nv. 89015

Type of Land Development/Land Disturbance Process:

- ☐ Rezoning
- ☐ Parcel Map
- ☐ Large Parcel Map
- ☐ Subdivision Map
- ☒ Planned Unit Development
- ☐ Building Permit
- ☐ Clearing and Grading Only
- ☒ Other (Please specify below) road construction

1. Total Owned Land Area: At Site: n/a Being Developed/Disturbed: n/a
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? (YES*) NO
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? (YES*) NO
4. Proposed type of development (Residential, Commercial, Etc.)? street construction
5. Approximate upstream land area which drains to the subject site? 750 acres
6. Has the site drainage been evaluated in the past? (YES) NO. If yes, please identify documentation: Racetrack Homes, Equestrian Basin, CI System The Downs
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Equestrian to Magic Way
8. Briefly describe your proposed schedule for the subject project: as soon as possible



Engineer's Seal

12-10-96

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

* Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

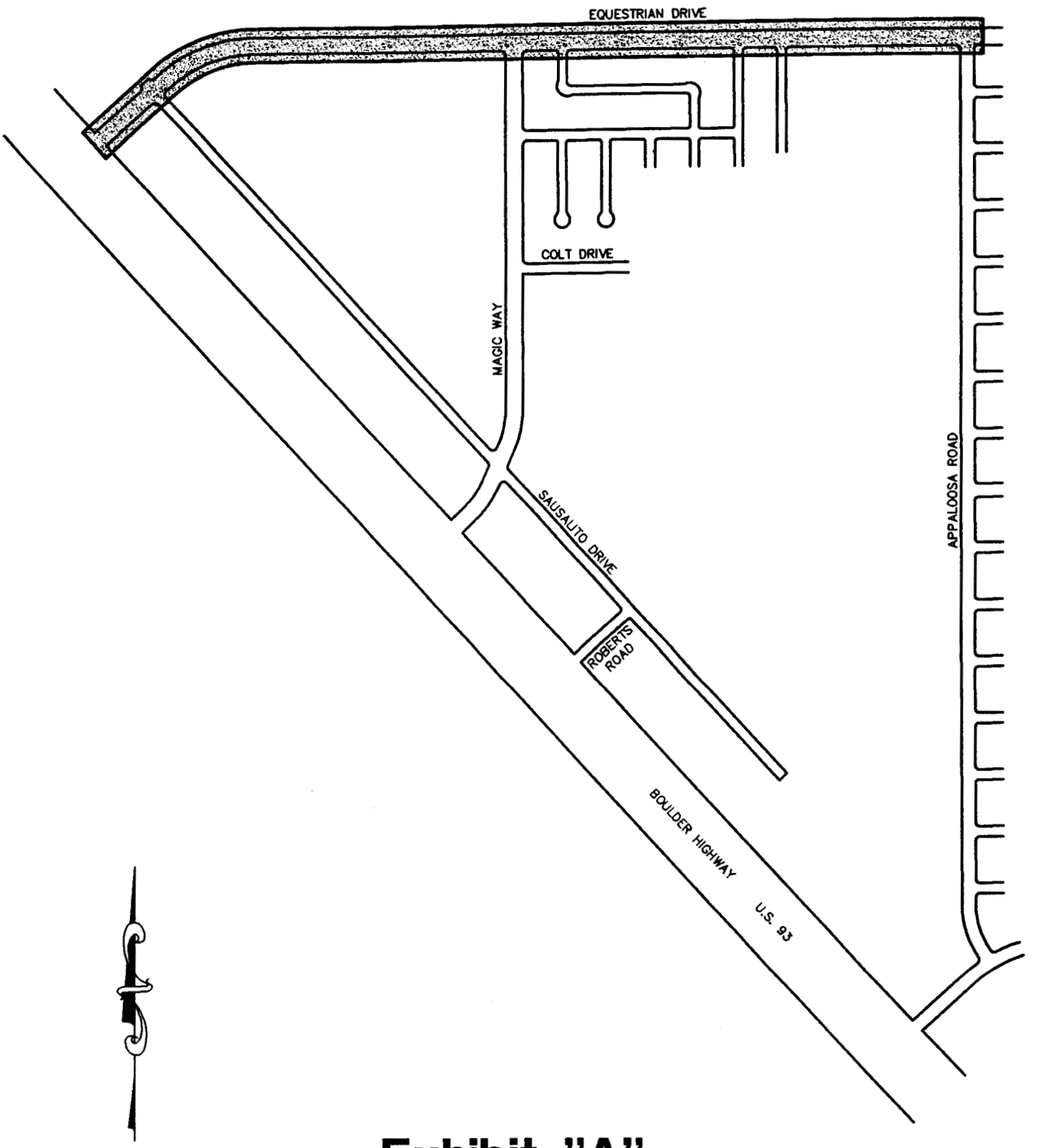


Exhibit "A"

Equestrian Drive
Appaloosa Road to Boulder Highway

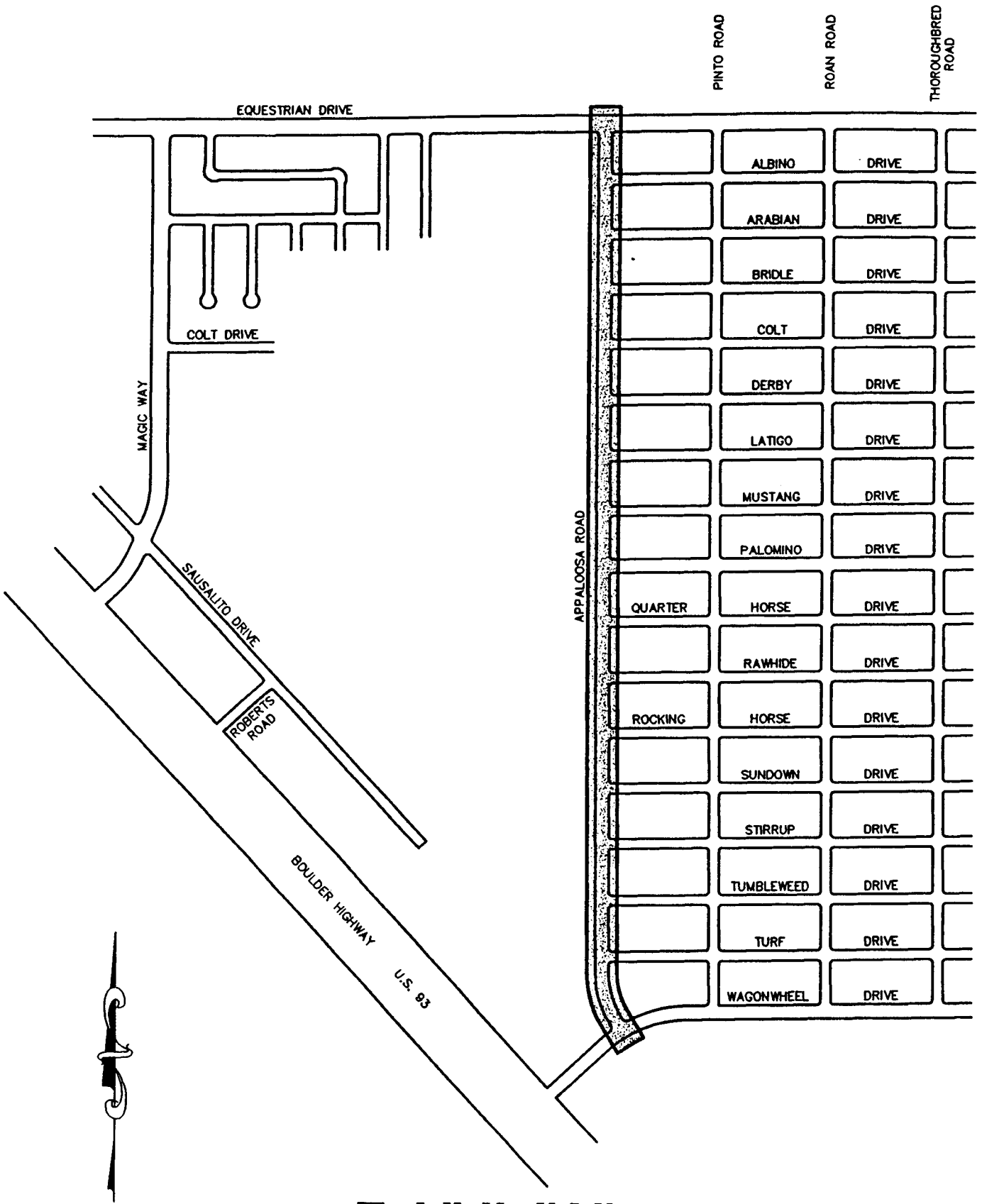


Exhibit "A"

Appaloosa Drive
Equestrian Drive to Wagonwheel Drive

Project:

Equestrian Drive will be widened 26' from Appaloosa Road west to the Boulder Highway (pavement only). Additionally curb and gutter will be installed adjacent to the Equestrian Detention Basin. Appaloosa Road will be widened 15' from Wagon Wheel north to Equestrian (pavement only). See Exhibits A for the limits.

Location:

The improvements are located in the center and along the north edge of Section 27, Township 22 South, Range 63 east., MDB.

Both Equestrian Drive and Appaloosa Road are generally north and east of the Boulder Highway, north of the Wagon Wheel interchange at US95.

Equestrian Drive parallels Master-planned facility C1DC-0352 and is adjacent to and south of the Equestrian Detention Basin (facility C1DC-0297.)

Equestrian Drive road improvements are adjacent and north of Foothills North by Lewis Homes. Appaloosa Road improvements are adjacent and east of said Lewis Homes and west of the "Horsey Acres" custom home area (1/3 to 1 acre home lots.)

Description:

Both Equestrian Drive and Appaloosa Road exist as partially constructed streets. The area to be disturbed is approximately 8 acres adjacent to existing street improvements. Most of the area to be improved has been previously disturbed.

There are drop inlets at the following locations:

- At the intersection of Appaloosa Road and Equestrian Drive at the southwest corner; existing 15' modified Type "C" inlet drains north to the north side of Equestrian Drive thru a 42" R.C.P.

- South side of Equestrian, 120' east of Blue Cloud Drive; existing 10' modified Type"C" inlet drains west and north across Equestrian Drive through 24" R.C.P.

- At the intersection of Blue Cloud Street and Equestrian Drive; two existing 15' modified Type "C" inlets, one each side of Blue Cloud south of Equestrian Drive. Both drain north of Equestrian Drive through a 48" R.C.P.

- At the intersection of Magic Way and Equestrian Drive, one existing 20' Type "B" inlet on the southwest corner, drains to the northeast through a 42" R.C.P., one existing 4' Type "B" inlet drains to the 42" R.C.P. thru an 18" R.C.P.

- On the west side of Appaloosa Road, near Quarter Horse Drive. This inlet was sized for nuisance flows only, drains north then west into the Foothills North subdivision in an 18" R.C.P.

Inlet and pipe capacity calculations are attached. Based on the inlet calculations, street flows were reduced and street capacity calculation for the existing 10 and 100 year conditions and the future 10 and 100 year flow conditions were performed.

The street depth calculations are attached (both existing and future conditions.) The existing conditions assume full build-out of the surrounding area, but no channel along the Boulder Highway. Approximately 750 CFS will overtop the Boulder Highway at Magic Way flowing north and east toward the intersection of Magic Way and Equestrian Drive. A proposed CCRFCD channel along Boulder Highway will ultimately eliminate this flow. This channel will be proposed in the 1996 Master Plan Update. Without the channel, depths in the street will be excessive at the intersection of Magic Way and Equestrian Drive.

In both the Existing and Future conditions a substantial quantity of water will weir into the Equestrian Basin inlet structure located north of Equestrian Drive on the east side of Magic Way. In the existing condition the flow in is approximately 750 cfs. In the future condition approximately 200 cfs enters the basin via the drop inlets and 150 cfs by weir flow over the curb into the basin inlet.

The following matrix shows existing and future (ultimate) 10 and 100 year flows and depths in the street at various study points (see attached Figures 1 and 2). A "Y" in the right two columns means that both RTC and CCRFCD criteria's are met for depths and velocities. A "N" means one or both criteria are not met.

Street	Point	Ex. Q10	Ex. Q100	Fut. Q100	Fut. Q10	Street Criteria (future) Q10	Q100
	1	321	1415	365	65	N	N
Equestrian	2	96	404	5	11	Y	Y
	3	85	185	16	46	Y	Y
	4	179	576	87	29	Y	Y
	C	55	310	310	55	N	Y
	D	50	300	300	50	N	Y
	E2	0	100	100	0	Y	Y
Appaloosa	E1	19	197	147	19	Y	Y
	F	28	164	164	28	Y	Y
	G	28	144	144	28	Y	Y
	H	44	174	174	44	Y	Y

Section D does not meet the 10 year dry lane criteria, 9' will be dry (not 12') however no additional improvements are proposed. At this location the full street does not yet exist and the actual depth of flow is less than calculated. In the future when the remaining improvements are constructed the adjacent developer will be conditioned to upgrade the facilities to meet the dry lane requirement. The property to the north of Equestrian Drive is currently Bureau of Reclamation.

Section C does not meet the 10 year dry lane criteria, only a 7' dry lane exists. At Point 1 the depths are in excess of 1' for the Q100 and 0.5' for Q10 with no dry lane in the 10 year storm. An additional drop inlet is proposed at the intersection of Equestrian Drive and Magic Way to meet the depth and dry lane criteria.

In the existing condition the 10 year criteria is not met on Equestrian Drive west of Magic Way, and the 100 year depth criteria is not met at Equestrian Drive and Magic Way.

Drainage Basin:

The area is protected by the Master plan facility C1DC-0400, a rock levee adjacent and east of Foothills Drive from the Boulder Highway to Equestrian Drive. All flows east of Foothills Drive in this area are routed to the Equestrian Basin.

The area between Appaloosa Road and Foothills Drive, existing condition, has been analyzed by Pentacore Engineering for the Foothills North project. Flows at points along the streets were taken from the approved study.

The area west of Appaloosa Road from Boulder Highway to Equestrian Drive drains to Equestrian Drive and is routed to Magic Way (Magic Way being a low point.).

The hydrology for Equestrian Drive, existing condition is from the approved Racetrack Homes Conceptual Hydrology study by PBS&J, Inc.

At all of the study points, an existing and future 100 year and 10 year flow is given. The future flow assumes all Master planned facilities are constructed and all areas are fully developed.

A HEC 1 Model was constructed by the City of Henderson staff to show future (ultimate) flows with the proposed Master plan channel constructed southwest of the Boulder Highway from the Wagon Wheel interchange to the C1 Channel near Horizon Drive. This channel would eliminate any flows overtopping Boulder Highway and the culvert flows crossing under the highway.

Recommendations:

With the future channel constructed, the RTC/CCRFCD criteria for depth and dry lane is not met in Equestrian Drive east of Magic Way. The paving of the north half of Equestrian Drive does not make the situation worse or better. With full improvements being proposed adjacent to the Equestrian Detention Basin, an additional inlet is proposed at the intersection of Magic Way and Equestrian Drive to meet the 100 year depth and 10 year depth criteria in the future condition. To meet both criteria, the depth must be decreased in the street 0.25' in the 100 year and 0.23' in the 10 year storm. To decrease the depths, approximately 150 CFS of the 100 year flow needs to be intercepted. A 20' modified type "C" inlet and 48" R.C.P. will convey enough water to meet the criteria. The flows will be discharged directly into the Equestrian Detention Basin inlet structure. Inlet calculations are attached for the proposed inlet and pipe.

The existing stormdrain in Equestrian Drive will be extended beyond the proposed pavement and ditched to drain on the Bureau of Reclamation property to the north of Equestrian. The City is currently in negotiations with the Bureau of Reclamation for permission to extend the drainage facilities.

With the addition of the inlet at Equestrian Drive and Magic Way, both Equestrian Drive and Appaloosa Road meet the applicable RTC and CCRFCD criteria in the ultimate condition.

Master Plan Information:

The adjacent Master planned facilities are existing. The Equestrian Detention Basin and related channel and rock levee were constructed during early 1996. The facilities are labeled C1DC-0297 (Basin) C1DC-0352 (Inlet Channel), C1DC-0400 (Rock Levee) and the proposed Boulder Highway Channel. See attached Figure F-24 from the 1991 MPU. The Boulder Highway Channel will be made a City of Henderson priority when the 1996 MPU is published.

Flood Plain Information:

Much of the road improvements are located on an alluvial fan and are currently shown in a FEMA Zone A, see the attached FIRM Panel No. 2620 to see the limits of the flood zone. With the construction of the Equestrian Detention Basin a Letter Of Map Revision (LOMR) application is being forwarded to FEMA with the goal of removing the Zone A designation.

Previous Drainage Studies:

The area has been extensively studied. The following studies are pertinent:

"Conceptual Drainage Study for Racetrack Homes" by PBS&J, Inc. 1994

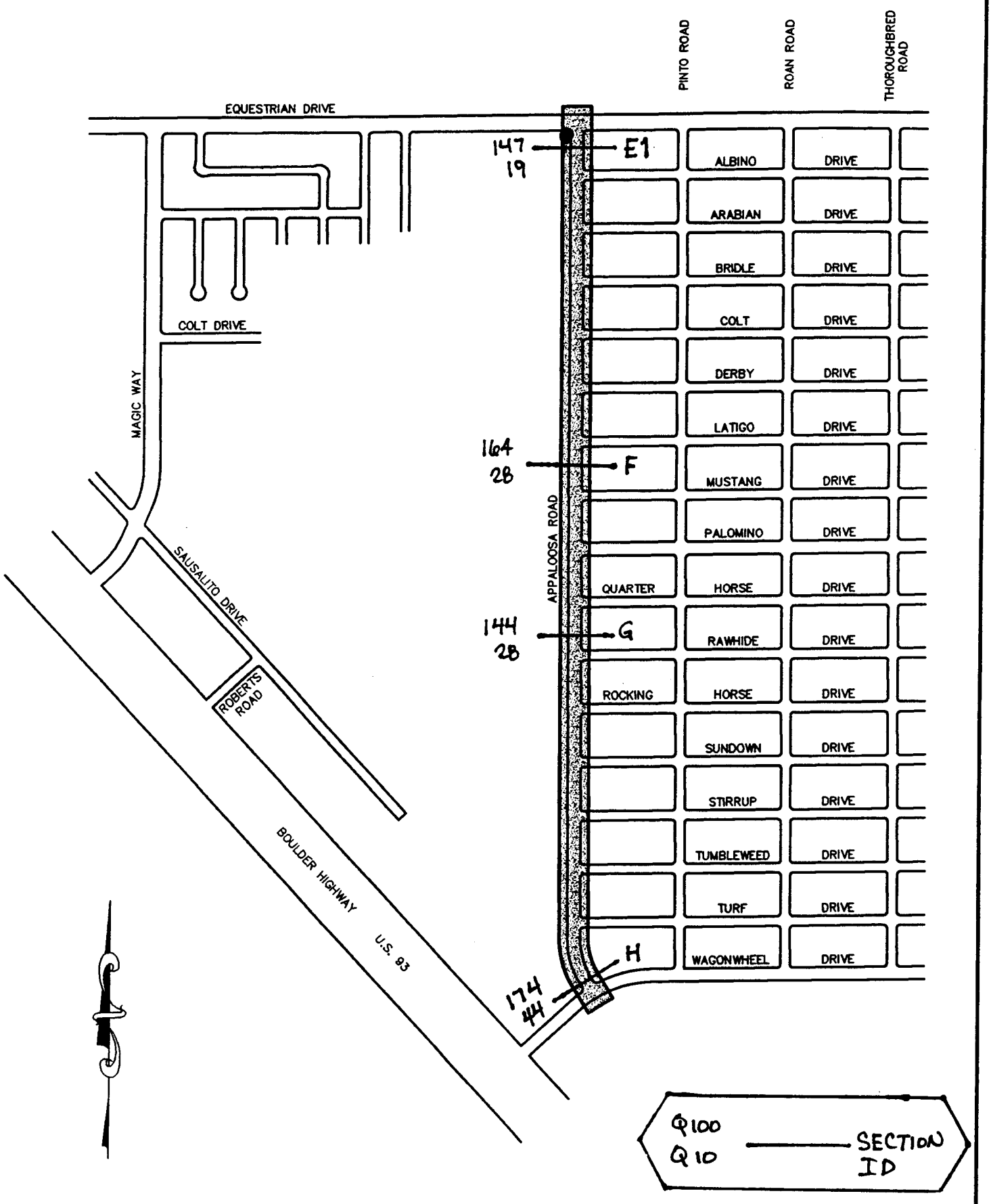
"Sue Morrow Elementary School Hydrology Study" by PBS&J, Inc. 1996 (updated the Racetrack hydrology to include Equestrian Drive Detention Basin)

"Foothills North 7C" (and other units) by Pentacore Engineering 1996

"Facilities Report for the C-1 Channel Flood Control System", VTN 1992.

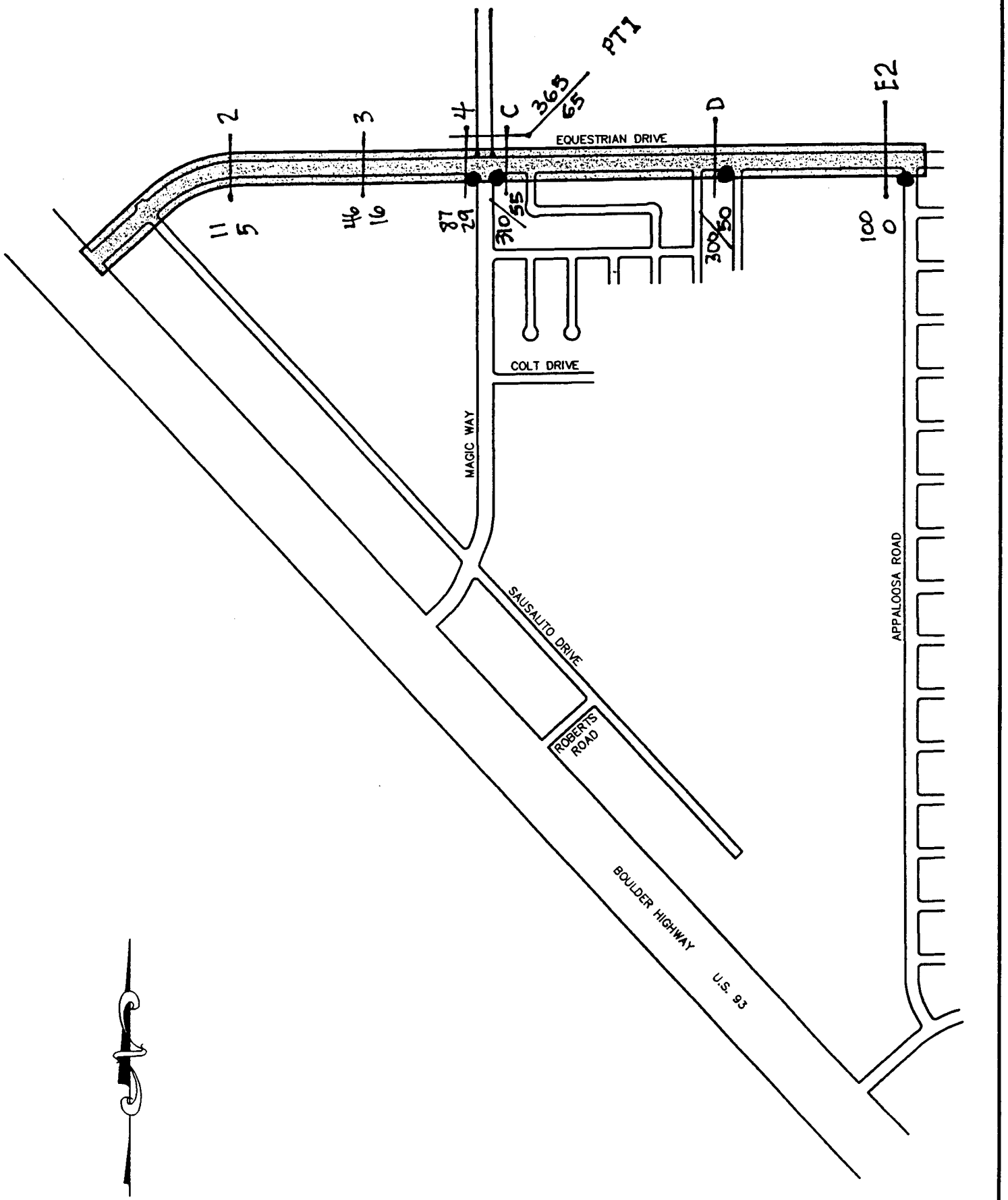
"Focus 2000" (Old Vegas site), G. C. Wallace Inc. 1996

F:\HOME\SHRDPW\WP\HYDROLGY\EQUSTWID.EDM



Appaloosa Drive
Equestrian Drive to Wagonwheel Drive

FIG. 1



Equestrian Drive
Appaloosa Road to Boulder Highway

FIG. 2

EXISTING FLOW POINT 1 @ MAGIC

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
POINT 1

Input variables:		Output variables:	
Flow depth, d	2.31 ft	Capacity at d	1422.19 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	8.6 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	19.8
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
POINT 1

Input variables:		Output variables:	
Flow depth, d	1.27 ft	Capacity at d	320.32 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	5.0 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	6.3
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW

POINT 1 @ MAGIC WAY

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Point 1 on Magic Way

Input variables:		Output variables:	
Flow depth, d	1.33 ft	Capacity at d	365.29 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	5.2 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	7.0
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Point 1 on Magic Way

Input variables:		Output variables:	
Flow depth, d	0.77 ft	Capacity at d	65.40 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	2.9 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	2.2
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

SECTION 2, EXISTING

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
EQUESTRIAN, POINT AS SHOWN

Input variables:		Output variables:	
Flow depth, d	1.08 ft	Capacity at d	407.05 cfs
Road width	89.0 ft	@ top of curb	34.5 cfs
Crown height	1.00 ft	@ back of walk	61.1 cfs
Street slope	2.20 %	Velocity at d	8.5 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	9.2
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
EQUESTRIAN, POINT AS SHOWN

Input variables:		Output variables:	
Flow depth, d	0.70 ft	Capacity at d	99.00 cfs
Road width	89.0 ft	@ top of curb	34.5 cfs
Crown height	1.00 ft	@ back of walk	61.1 cfs
Street slope	2.20 %	Velocity at d	5.5 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	3.9
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE SECTION 2 FLOW

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.35 ft	Capacity at d	11.26 cfs
Road width	89.0 ft	@ top of curb	34.5 cfs
Crown height	1.00 ft	@ back of walk	61.1 cfs
Street slope	2.20 %	Velocity at d	3.5 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	1.2
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.27 ft	Capacity at d	5.00 cfs
Road width	89.0 ft	@ top of curb	34.5 cfs
Crown height	1.00 ft	@ back of walk	61.1 cfs
Street slope	2.20 %	Velocity at d	2.9 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	0.8
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

SECTION 3, EXISTING FLOW

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
EQUESTRIAN, POINT AS SHOWN

Input variables:		Output variables:	
Flow depth, d	1.00 ft	Capacity at d	182.08 cfs
Road width	89.0 ft	@ top of curb	20.2 cfs
Crown height	1.00 ft	@ back of walk	35.7 cfs
Street slope	0.75 %	Velocity at d	4.5 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	4.5
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
EQUESTRIAN, POINT AS SHOWN

Input variables:		Output variables:	
Flow depth, d	0.78 ft	Capacity at d	83.60 cfs
Road width	89.0 ft	@ top of curb	20.2 cfs
Crown height	1.00 ft	@ back of walk	35.7 cfs
Street slope	0.75 %	Velocity at d	3.6 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	2.8
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW SECTION 3

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.66 ft	Capacity at d	45.99 cfs
Road width	89.0 ft	@ top of curb	20.2 cfs
Crown height	1.00 ft	@ back of walk	35.7 cfs
Street slope	0.75 %	Velocity at d	3.0 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	2.0
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.47 ft	Capacity at d	16.11 cfs
Road width	89.0 ft	@ top of curb	20.2 cfs
Crown height	1.00 ft	@ back of walk	35.7 cfs
Street slope	0.75 %	Velocity at d	2.5 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	1.2
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

POINT 4 EXISTING FLOW

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
EQUESTRIAN, POINT AS SHOWN

Input variables:		Output variables:	
Flow depth, d	1.62 ft	Capacity at d	579.27 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	6.0 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	9.7
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
EQUESTRIAN, POINT AS SHOWN

Input variables:		Output variables:	
Flow depth, d	1.05 ft	Capacity at d	176.47 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	3.9 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	4.1
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE SECTION 4 FLOW

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.84 ft	Capacity at d	86.82 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	3.1 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	2.6
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.62 ft	Capacity at d	30.16 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	2.3 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	1.4
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW SECTION C

Q100

Input dataInput flow and culvert parameters/xmMenu 9.1

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	1.25 ft	Capacity at d	308.73 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	4.9 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	6.1
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Q10

Input dataInput flow and culvert parameters/xmMenu 9.1

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.73 ft	Capacity at d	55.64 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	2.8 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	2.0
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW

IMPROVED SECTION C

(NEW INLETS)

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Improved section C

Input variables:		Output variables:	
Flow depth, d	1.00 ft	Capacity at d	148.67 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	3.7 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	3.7
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Improved section C

Input variables:		Output variables:	
Flow depth, d	0.50 ft	Capacity at d	16.46 cfs
Road width	89.0 ft	@ top of curb	16.5 cfs
Crown height	1.00 ft	@ back of walk	29.1 cfs
Street slope	0.50 %	Velocity at d	2.2 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	1.1
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW
SECTION D

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	1.15 ft	Capacity at d	300.58 cfs
Road width	89.0 ft	@ top of curb	20.8 cfs
Crown height	1.00 ft	@ back of walk	36.9 cfs
Street slope	0.80 %	Velocity at d	5.6 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	6.4
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.67 ft	Capacity at d	51.03 cfs
Road width	89.0 ft	@ top of curb	20.8 cfs
Crown height	1.00 ft	@ back of walk	36.9 cfs
Street slope	0.80 %	Velocity at d	3.2 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	2.1
Curb height	6 in	Gutter width	2 ft
Median width	12.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW
SECTION E1

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.85 ft	Capacity at d	148.68 cfs
Road width	69.0 ft	@ top of curb	26.5 cfs
Crown height	0.82 ft	@ back of walk	47.4 cfs
Street slope	1.10 %	Velocity at d	4.8 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	4.1
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.45 ft	Capacity at d	19.03 cfs
Road width	69.0 ft	@ top of curb	26.5 cfs
Crown height	0.82 ft	@ back of walk	47.4 cfs
Street slope	1.10 %	Velocity at d	3.0 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	1.3
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW
SECTION E2

Input dataInput flow and culvert parameters/xmMenu 9.1 Q 100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.69 ft	Capacity at d	101.35 cfs
Road width	89.0 ft	@ top of curb	36.8 cfs
Crown height	1.00 ft	@ back of walk	66.2 cfs
Street slope	2.00 %	Velocity at d	5.2 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	3.6
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q 10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Equestrian Drive, Sections as shown

Input variables:		Output variables:	
Flow depth, d	0.00 ft	Capacity at d	0.61 cfs
Road width	89.0 ft	@ top of curb	36.8 cfs
Crown height	1.00 ft	@ back of walk	66.2 cfs
Street slope	2.00 %	Velocity at d	1.2 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	0.0
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW
SECTION F

Input dataInput flow and culvert parameters/xmMenu 9.1 **Q100**

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.90 ft	Capacity at d	164.76 cfs
Road width	69.0 ft	@ top of curb	23.9 cfs
Crown height	0.82 ft	@ back of walk	42.9 cfs
Street slope	0.90 %	Velocity at d	4.7 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	4.3
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 **Q10**

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.55 ft	Capacity at d	27.61 cfs
Road width	69.0 ft	@ top of curb	23.9 cfs
Crown height	0.82 ft	@ back of walk	42.9 cfs
Street slope	0.90 %	Velocity at d	2.7 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	1.5
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW SECTION G

Input dataInput flow and culvert parameters/xmMenu 9.1 **Q100**

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.79 ft	Capacity at d	147.26 cfs
Road width	69.0 ft	@ top of curb	33.9 cfs
Crown height	0.82 ft	@ back of walk	60.7 cfs
Street slope	1.80 %	Velocity at d	5.6 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	4.5
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 **Q10**

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.47 ft	Capacity at d	27.91 cfs
Road width	69.0 ft	@ top of curb	33.9 cfs
Crown height	0.82 ft	@ back of walk	60.7 cfs
Street slope	1.80 %	Velocity at d	3.9 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	1.8
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

FUTURE FLOW
SECTION H

Input dataInput flow and culvert parameters/xmMenu 9.1 Q100

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.83 ft	Capacity at d	175.02 cfs
Road width	69.0 ft	@ top of curb	34.0 cfs
Crown height	0.82 ft	@ back of walk	61.0 cfs
Street slope	1.82 %	Velocity at d	6.0 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	5.0
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1 Q10

S T R E E T F L O W S

Manning's Equation for flow capacity in a street section.
Appaloosa Road, Section as shown

Input variables:		Output variables:	
Flow depth, d	0.57 ft	Capacity at d	44.19 cfs
Road width	69.0 ft	@ top of curb	34.0 cfs
Crown height	0.82 ft	@ back of walk	61.0 cfs
Street slope	1.82 %	Velocity at d	3.9 fps
Sidewalk width	5.5 ft	V*d FACTOR.....	2.2
Curb height	6 in	Gutter width	2 ft
Median width	0.0 ft	Gutter depression	1.5 in
Rt back of walk	100.0 %	Asphalt lip	0 in
Lt back of walk	100.0 %	Manning's n	0.017

Input dataInput flow and culvert parameters/xmMenu 9.1

S T R E E T F L O W S

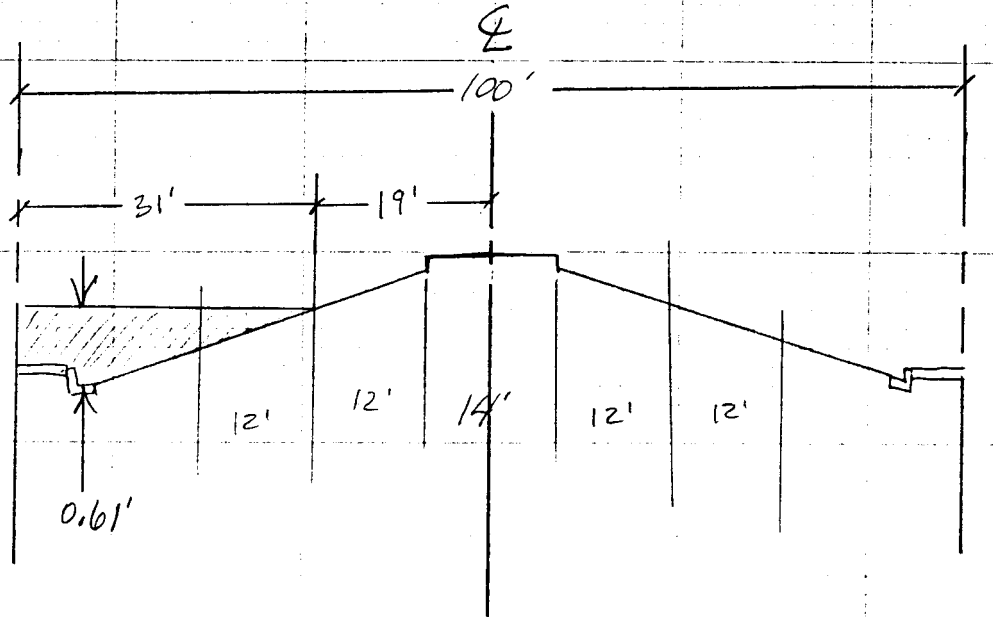
: flow capacity in a street section.

CITY OF HENDERSON

COMP BY: EDM SHEET NO.: 2/2
CHK. BY: _____ JOB NO.: _____
DATE: _____

SUBJECT: DRY LANE CALCS, 100' STREET

EQUESTRIAN DRIVE (100' ROW) ULTIMATE CONDITIONS



50' - 7' (½ island) - 5' (sidewalk) - 2' (curb&Gutter) = 36'

36' - 12' (LANE) = 24'

24' @ 2% = 0.48' + 1½" (gutter) = 0.61'

SECTIONS

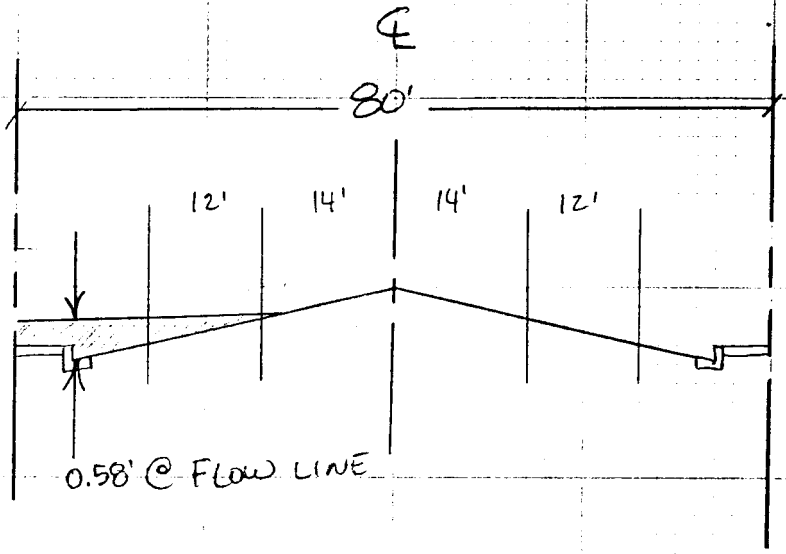
	DEPTH	
E2	0.45'	OK
D	0.67'	No Good (9' Dry Lane)
C	0.73'	No Good (7' Dry Lane)
2	0.27'	OK
3	0.47'	OK
4	0.62'	OK
PT1	0.77	NO (5' DRY LANE)

CITY OF HENDERSON

COMP BY: EDM SHEET NO.: 1/2
CHK. BY: _____ JOB NO.: _____
DATE: _____

SUBJECT: DRY LANE CALCS, 80' STREET

APPALOOSA ROAD (80' ROW) ULTIMATE CONDITIONS



12' FROM ℄ @ 2.00% = 0.24'

CROWN HIEGHT = 0.82'

MAX WATER DEPTH IN 10 YEAR STORM = CROWN - LANE

0.82 - 0.24 = 0.58'

SECTIONS

	DEPTH	
E1 -	0.45'	OK
F -	0.55'	OK
G -	0.47'	OK
H -	0.57	OK

CITY OF HENDERSON

COMP BY: _____ SHEET NO.: _____
CHK. BY: _____ JOB NO.: _____
DATE: _____

SUBJECT: PROPOSED Inlet MAGIC @ EQUESTRIAN

Q100 DATA

Depth = 1.0'
(Sump condition)

CURB OPENING 2.3 CFS per Foot

GRATE OPENING 13½ CFS per Grate
Grate = 1½' X 2½'.

2.3 CFS X 2.5' = 5.75 CFS per equ. Grate + 13.5 = 19 CFS per 2.5'

$\frac{150 \text{ CFS}}{19 \text{ CFS/Grate}}$ = 7.8 grates → Use 8 grates = 20' MOD. Type "C"

150 CFS inlet control with 2.2 * dia
head water = 150 CFS

2.2 X 4' = 8.8' deep inlet. ±

CITY OF HENDERSON

COMP BY: EDM SHEET NO.: 1/2
CHK. BY: _____ JOB NO.: _____
DATE: _____

SUBJECT: EQUESTRIAN & APPALOOSA STREETS

INLET CAPICITY CALCULATIONS:

POINT E1
INLET AT APPALOOSA AND EQUESTRIAN, 15' LONG MODIFYED TYPE "C" INLET (CONTINOUS GRATE)
STREET SCOPE IS 1.10%.

Q_{100} DEPTH = 0.85' USE FIG 804 & FIG 806 19 + 31 = 50

Q_{10} DEPTH = 0.45' 8 + 24 = 32

STORM DRAINPIPE IS 42" R.C.P. CAPICITY FULL = 100CFS ±

* ASSUME INLET CAPICITY IS 50 CFS Q_{100}
32 CFS Q_{10}

NEAR POINT D
INLET SOUTH SIDE OF EQUESTRIAN EAST OF BLUE CLOUD
10' LONG MODIFIED TYPE C (CONT. GRATE).

STREET SCOPE = 0.80% USE FIG 804 & 806

Q_{100} D = 1.15' 16 + 38 = 54 CFS

Q_{10} D = 0.67' 9 + 24 = 33 CFS

STORM DRAIN PIPE IS 24" RCP CAPICITY FULL = 30 CFS

* ASSUME INLET CAPICITY IS 30 CFS MAX

CITY OF HENDERSON

COMP BY: EDM SHEET NO.: 2/2
CHK. BY: _____ JOB NO.: _____
DATE: _____

SUBJECT: INLET CALCS. CONT.

NEAR POINT 1 MAGIC AT EQUESTRIAN

20' TYPE "B" INLET IN SUMP USE FIG. 807

DEPTH 100 = 1.33' → 56 CFS

DEPTH 10 = 0.77' → 40 CFS

Drains thru 48" RCP, capicity = 150 CFS ±

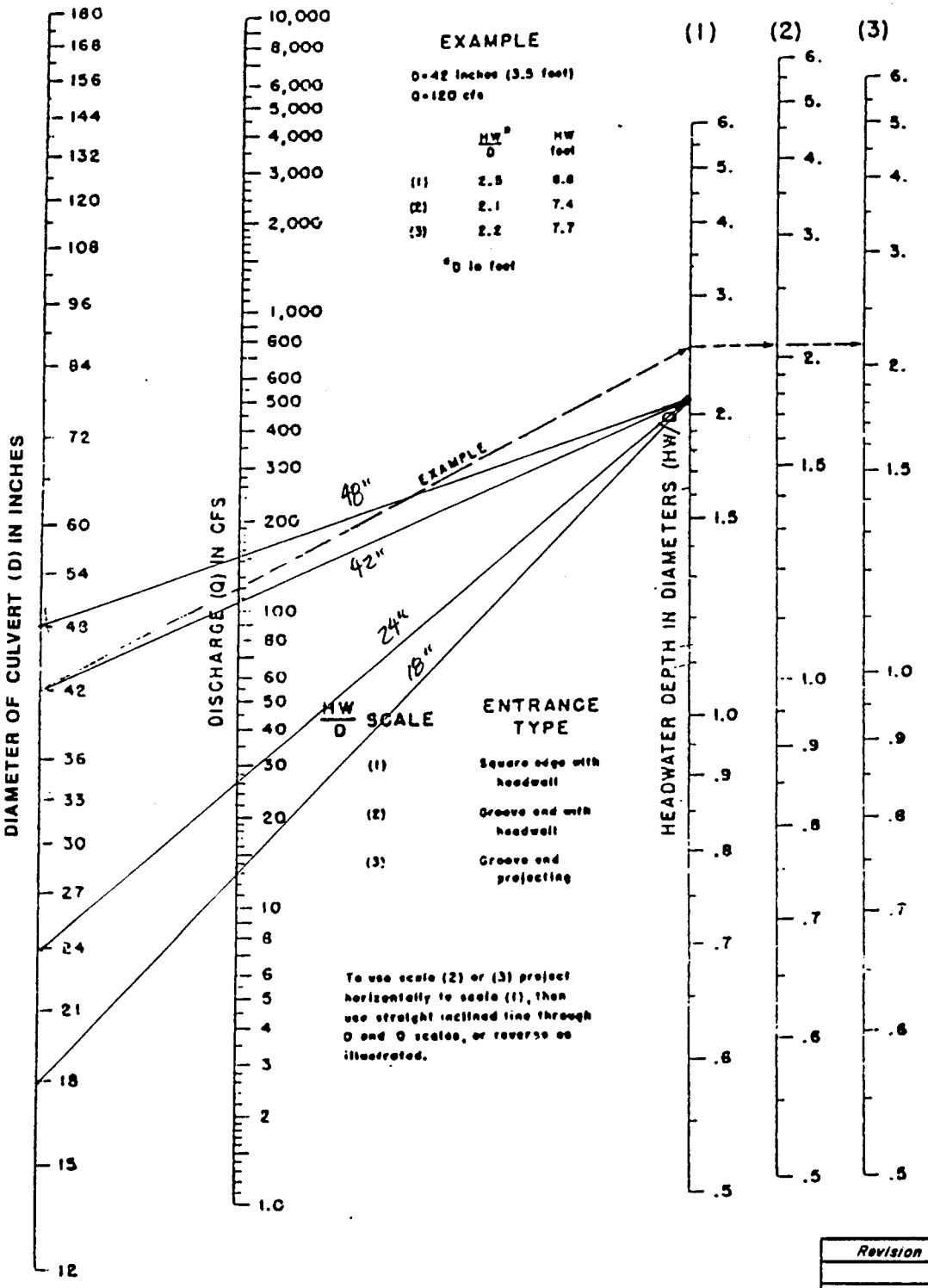
4' TYPE "B" INLET IN SUMP USE 807

DEPTH 100 = 1.33 = 9CFS

DEPTH 10 = 0.77 = 6CFS

DRAINS THRU 18" RCP capicity is 13CFS.

NOMOGRAPH – INLET CONTROL RCP



Revision	Date

WRC ENGINEERING	REFERENCE: USDOT, FHWA, HDS, No. 5, 1985	FIGURE 1005

TIME OF CONCENTRATION

REFERENCE:

STANDARD FORM 4

SQ MILES

DEVELOPMENT EQUESTRIAN / APPLOOSA

CACULATED BY EDM DATE 11-18-96

SUB-BASIN DATA			INITIAL/OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				t_c CHECK (URBANIZED BASINS)		FINAL t_c	REMARKS
DESIG: (1)	K (2)	AREA Ac (3)	LENGTH Ft (4)	SLOPE % (5)	t_i Min (6)	LENGTH Ft (7)	SLOPE % (8)	VEL. FPS (9)	t_t Min (10)	TOTAL LENGTH Ft (11)	$t_c = (L/180)+10$ Min (12)	Min (13)	CN
C5CAb	.732	.930	500	1.33	13.51	13,500	.9%	3.5	64.3	14000	87.78	77.8	74
C5CAa	.732	.345	500	.9%	15.34	7000	1.14%	4.3	27.1	7500	51.67	42.4	80
OFF23	.732	.061	500	.5%	18.66	2400	1.13%	4.3	9.3	2900	26.1	28.0	81
OFF21	.732	.047	500	.5%	18.66	1400	1.36%	4.7	4.96	1900	20.56	23.6	81
OFFPD	.811	.009	350	.5%	12.26	600	.6%	2.9	3.45	950	15.28	15.71	89
		1.392 SQ Mi	TOTAL										

$t_i = 1.8\,(1.1 - K)\,L^{1/2} / S^{1/3}$ $\qquad t_c = t_i + t_t$

$K = 0.0132CN - 0.39$

t_c Min = 0.167 Hrs. min

Revision	Date

CITY OF HENDERSON

COMP BY: EDM SHEET NO.: _____
CHK. BY: _____ JOB NO.: _____
DATE: 11-18-96

SUBJECT: CURVE NUMBERS, EQUESTRIAN

BASIN			
C5CA6 (595 AC) CN74	46 AC	D SOIL	184 AC Commercial 46 D CN 95 → 90.5 138 A CN 89 411 AC Residential 246 AC 1/3 AC+ CN 57 165 AC 1/8 AC CN77 (65)
	549 AC	A SOIL	
C5CAa (221 AC) 180	221 AC	A SOIL	57 AC Comm CN89 164 AC 1/8 AC Res CN 77 (80)
OFF 23 (39 AC) CN 81	39 AC	A SOIL	11 AC comm CN89 28 AC 1/8 AC Res CN 77
OFF 21 (30 AC) CN 81	30 AC	A SOIL	11 AC Comm CN89 19 AC 1/8 AC Res CN 77
OFF 190 (6 AC) CN89	6 AC	A SOIL	6 AC Comm CN89

HEC1 S/N: 1330000004 HMVersion: 6.40 Data File: equest.hc1

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*  RUN DATE  12/10/1996  TIME  09:56:49 *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X      X  XXXXXXX   XXXXX            X
X      X  X         X     X          XX
X      X  X         X                 X
XXXXXXXX  XXXX      X         XXXXX   X
X      X  X         X                 X
X      X  X         X     X           X
X      X  XXXXXXX    XXXXX           XXX
```

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:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
:::                                     :::
:::  Full Microcomputer Implementation  :::
:::                by                   :::
:::        Haestad Methods, Inc.        :::
:::                                     :::
:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

    1     ID  FILE = EQUEST.HC1
    2     ID
    3     ID  HENDERSON PROJECT 9219 AND 9304
    4     ID
    5     ID  EQUESTRIAN AND APPLOOSA STREET PROJECT
    6     ID  ULTIMATE DRAINAGE CONDITION
    7     ID  ALL FUTURE FACILITIES CONSTRUCTED, FULLY BUILT OUT
    8     ID
    9     ID  10 AND 100 YEAR STORM MODELS, 6 HOUR DURATION
   10     ID  5 MINUTE COMPUTATION INTERVAL
   11     ID  DARF OF 0.96 USED FOR TOTAL DRAINAGE AREA OF 1.392 SQ. MILES
   12     ID
          *DIAGRAM
   13     IT       5       0       0     300
   14     IO       4       0       0
   15     IN       5       0       0
   16     JR    PREC     .57     .98

   17     KK   C5CAbFULLY DEVELOPED
   18     KM  NAMED BY MPU
   19     BA    .930
   20     PC       0     .02    .057     .07    .087    .108    .124     .13     .13     .13
   21     PC     .13     .13     .13    .133    .140    .142    .148    .158    .172    .181
   22     PC    .190    .197    .199      .2    .201    .204    .214    .229    .241    .249
   23     PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   24     PC    .499     .59    .710    .744    .781    .812    .819    .835    .851    .856
   25     PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   26     PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   27     PC    .998    .999     1.0
   28     PB    2.97
   29     LS       0      74
   30     UD     1.3

   31     KK     PT1INTERSECTION OF EQUST. AND MAGIC
   32     RK     700    .004    .016            TRAP     100       1

   33     KK   C5CAaFULLY DEVELOPRD
   34     KM  NAME FROM MPU STUDY
   35     BA    .345
   36     LS       0      80
   37     UD   .0707

   38     KK     PT1DRAIN ACROSS EQUESTRIAN
   39     KM  SHORT STREET ROUTE
   40     RK     100    .005    .016            TRAP     100       1

   41     KK   OFF23
   42     KM  ROUTE TO PT1
   43     BA    .061
   44     LS       0      81
   45     UD     .43
```

HEC-1 INPUT

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  46      KK     PT1
  47      KM  ROUTE TO PT1 IN EQUESTRIAN
  48      RK     600     .004     .016              TRAP      100        1

  49      KK   OFF21
  50      KM  ROUTE TO PT1
  51      BA    .047
  52      LS       0       81
  53      UD    .350

  54      KK     PT1
  55      KM  ROUTE FLOWS IN EQUEST.
  56      RK    1200     .005     .016              TRAP      100        1

  57      KK  OFF190
  58      KM  FULLY DEVELOPED BASIN
  59      BA    .009
  60      LS       0       89
  61      UD    .255

  62      KK     PT1
  63      KM  ROUTE TO PT1
  64      RK    2050     .005     .016              TRAP      100        1

  65      KK     CP1COMBINE HYDROGRAPHS AT PT1 (EQUESTRIAN AND MAGIC)
  66      HC       5
  67      ZZ
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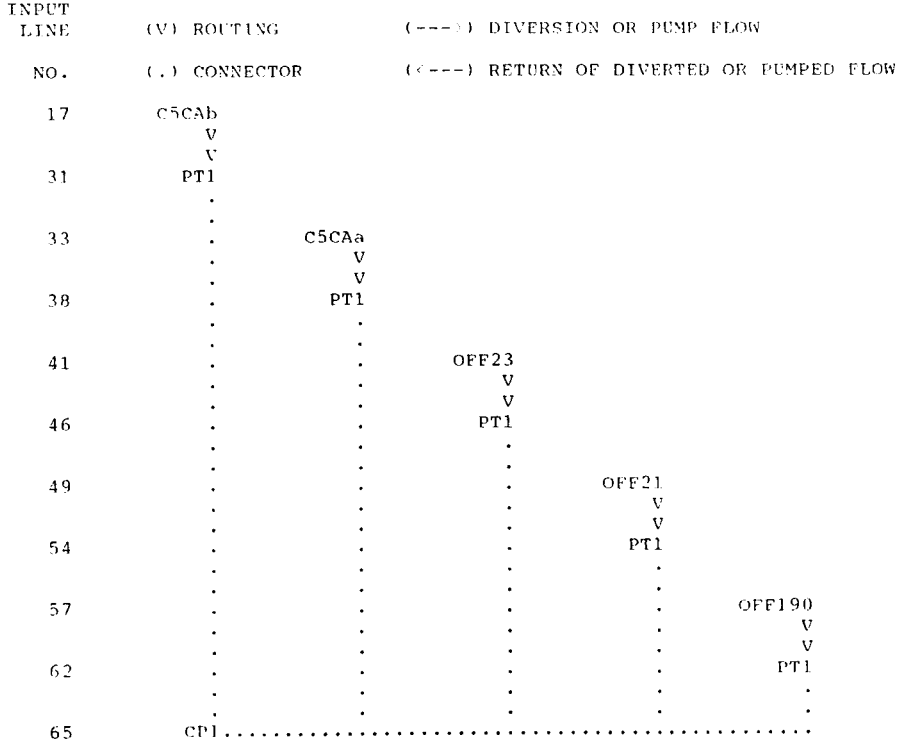
SCHEMATIC DIAGRAM OF STREAM NETWORK

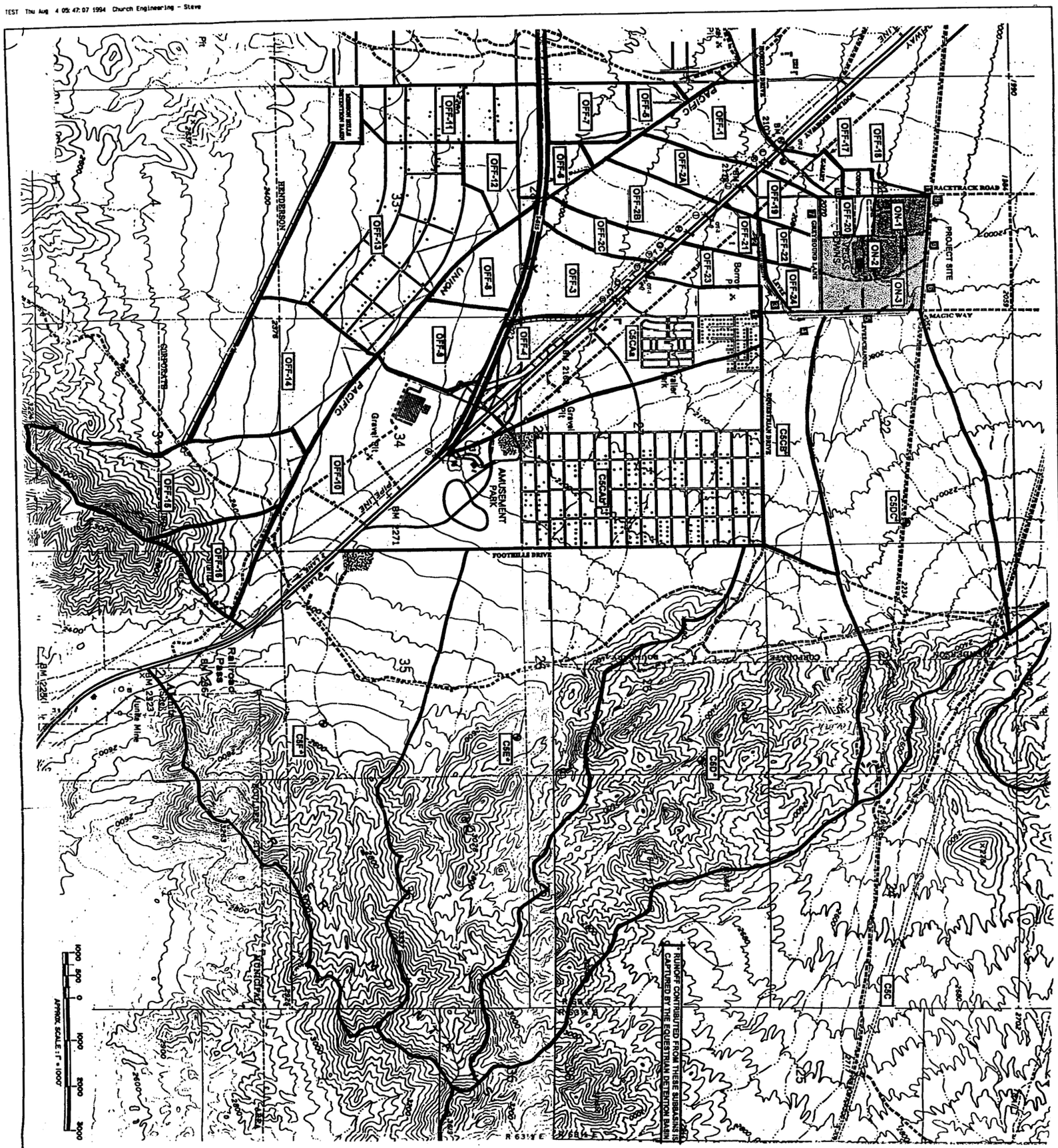


(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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
					.57	.98
HYDROGRAPH AT	C5CAb	.93	1	FLOW	52.	207.
				TIME	5.33	5.00
ROUTED TO	PT1	.93	1	FLOW	52.	207.
				TIME	5.42	5.00
HYDROGRAPH AT	C5CAa	.34	1	FLOW	140.	433.
				TIME	3.50	3.50
ROUTED TO	PT1	.34	1	FLOW	137.	429.
				TIME	3.50	3.50
HYDROGRAPH AT	OFF23	.06	1	FLOW	13.	41.
				TIME	3.92	3.92
ROUTED TO	PT1	.06	1	FLOW	13.	41.
				TIME	4.00	3.92
HYDROGRAPH AT	OFF21	.05	1	FLOW	12.	35.
				TIME	3.83	3.83
ROUTED TO	PT1	.05	1	FLOW	11.	35.
				TIME	3.92	3.83
HYDROGRAPH AT	OFF190	.01	1	FLOW	5.	11.
				TIME	3.67	3.67
ROUTED TO	PT1	.01	1	FLOW	5.	11.
				TIME	4.00	3.83
5 COMBINED AT	CP1	1.39	1	FLOW	138.	454.
				TIME	3.50	3.50

TEST Thu Aug 4 05:47:07 1994 Church Engineering - Steve



EXISTING DRAINAGE CONDITIONS STORM FLOW SUMMARY

Offsite Subbasin ID	Area (mi^2)	Q_{100} (cfs)
Southern Watershed		
OFF-1	.11	108
OFF-2A	.11	67
OFF-2B	.11	66
OFF-2C	.08	46
OFF-3	.14	173
OFF-4	.09	103
OFF-5	.05	40
OFF-6	.03	29
OFF-7	.11	106
OFF-8	.09	94
OFF-9	.15	119
OFF-10	.41	284
OFF-11	.20	214
OFF-12	.07	52
OFF-13	.56	656
OFF-14	.31	116
OFF-15	.34	382
OFF-16	.11	156
OFF-17	.07	58
OFF-18	.03	28
OFF-19	.07	71
OFF-20	.04	39
OFF-21	.04	32
OFF-22	.04	29
OFF-23	.07	38
OFF-24	.04	28
C5CAa	.34	130
Eastern Watershed		
C5CAb	.83	98
C5CB	.21	23
C5DC	1.00	286
C5D	1.66	1214
C5E	1.57	905
C5F	1.34	937

Onsite Subbasin ID	Area (mi^2)	Q_{100} (cfs)
ON-1	.04	13
ON-2	.07	61
ON-3	.06	29

Combination Point	Q_{100} (cfs)
A	747
B	397
C	548
D	3111
E	4474
F	4503
G	138
H	160
I	62
J	238
K	317

Culvert Location	Assumed Size/Type	HW/D	Q_{100} (cfs)
A	36" RCP	1.3	50
B	18" CMP	3.0	16
C	56" x 36" CMAP	1.4	86
D	18" CMP	2.7	15
E	24" CMP	2.0	25
F	30" CMP	2.2	50
G	56" x 36" CMAP	1.7	100
H	24" CMP	2.3	45
I	36" CMP	1.8	28
J	18" CMP	2.7	85
K	56" x 36" CMAP	1.7	15
L	36" CMP	1.3	100
M	56" x 36" CMAP	1.3	50
N			80

Job Number	Drawn by	Scale	EXISTING CONDITION DRAINAGE MAP	RACETRACK PHASES 1 & 2	POST, BUCKLEY, SCHUH & JERNIGAN ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES	6600 West Charleston Blvd, Suite 100, Las Vegas, Nevada 89102 Telephone 702/878-6344 Fax 702/878-7738		
Sheet Number	Checked by	1" = 1000'						
	Date	File No.						

No.	REVISIONS	Date	Init.	Appr.	Date

DRAWING: DWGNAME PLOT DATE: DWGDATE

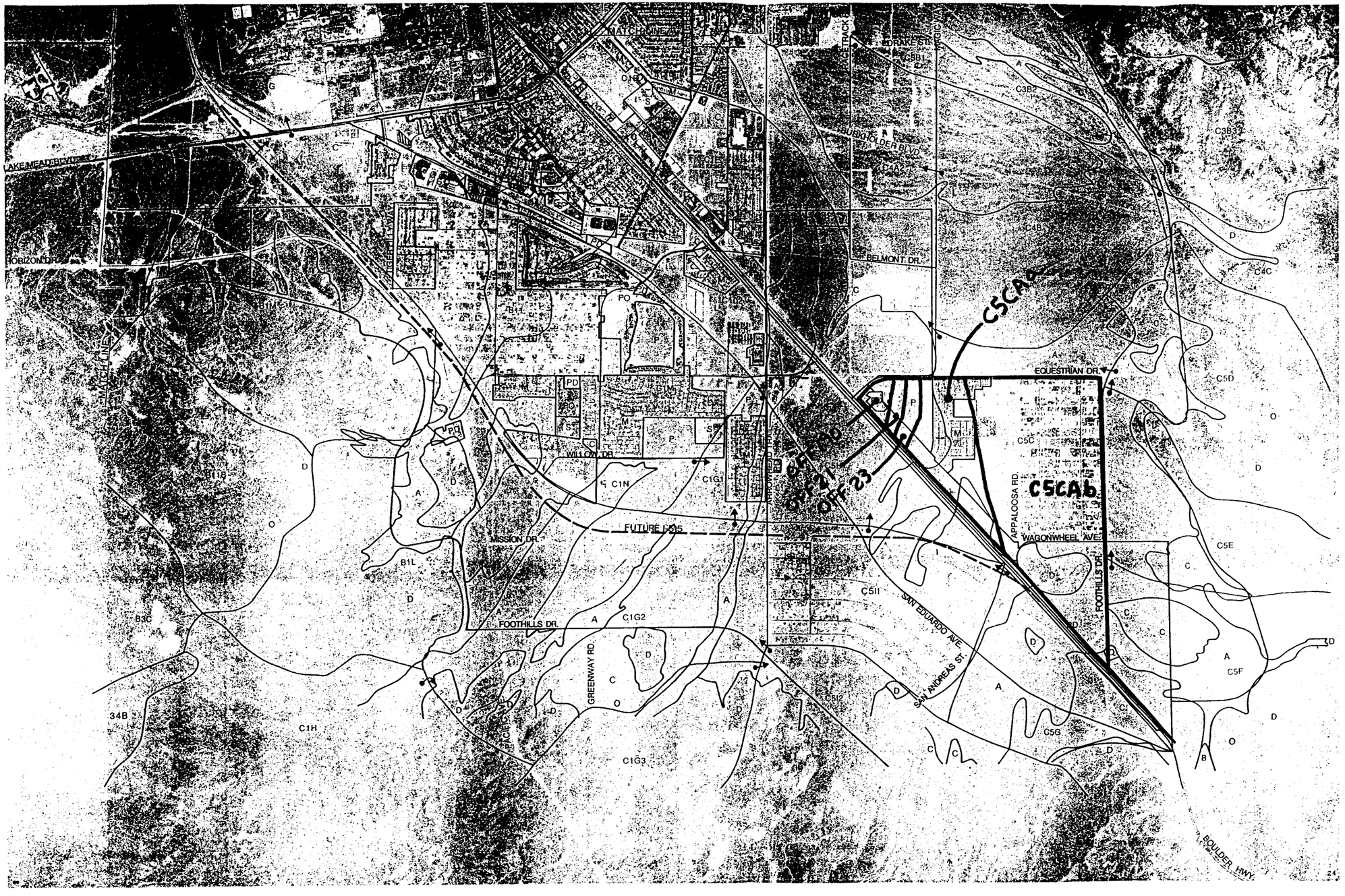


PHOTO DATE : 5/18/90

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
	25	26	

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

1991 FLOOD CONTROL MASTER PLAN UPDATE LAS VEGAS VALLEY

LEGEND

SUBAREAS

SOILS
- A LOW RUN-OFF POTENTIAL
- B MODERATELY LOW RUN-OFF POTENTIAL
- C MODERATELY HIGH RUN-OFF POTENTIAL
- D HIGH RUN-OFF POTENTIAL

LAND USE
- C COMMERCIAL
- H HIGH DENSITY RESIDENTIAL
- I INDUSTRIAL
- L LOW DENSITY RESIDENTIAL
- M MEDIUM DENSITY RESIDENTIAL
- O OPEN LAND
- P PUBLIC FACILITY / UNDETERMINED
- PD PUBLIC FACILITY / MOSTLY DEVELOPED
- PO PUBLIC FACILITY / MOSTLY OPEN
- R RURAL RESIDENCE
- S SCHOOL

N

0 1500 3000 4500
(APPROXIMATE)

HYDROLOGIC SUBAREAS, SOILS AND LAND USE

FIGURE H-24

JMM James M. Montgomery Consulting Engineers, Inc.
Las Vegas, Nevada

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

1991 FLOOD CONTROL MASTER PLAN UPDATE LAS VEGAS VALLEY

LEGEND

- EXISTING MASTER PLAN FACILITIES
- LOCAL OR UNSTUDIED FACILITIES
- PROPOSED MASTER PLAN FACILITIES
- BRIDGE
- CULVERT
- DEBRIS BASIN
- DETENTION BASIN
- DIKE / LEVEE
- PIPELINE
- NATURAL WASH
- FLOODWAY
- UNLINED IMPROVED CHANNEL
- LINED CHANNEL
- DROP STRUCTURE
- SECONDARY FACILITY
- ENVIRONMENTAL AREAS

N

0 1500 3000 4500
(APPROXIMATE)

FLOOD CONTROL FACILITIES AND ENVIRONMENTAL AREAS

FIGURE F-24

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
	25	26	

James M. Montgomery
Consulting Engineers, Inc.
Las Vegas, Nevada

1991 FLOOD CONTROL MASTER PLAN UPDATE LAS VEGAS VALLEY

L E G E N D

STREAM NAME DESIGNATOR PARENT STREAM NAME STREAM NAME	AABB
ID / RIVER MILE DISTANCE ABOVE CONFLUENCE WITH PARENT STREAM: MILES TENTHS OF A MILE	0000
EXISTING FACILITY	E
PROPOSED OR MODIFIED FACILITY	P
CONTINGENCY LEVEL:	
MASTER PLAN	PI
FACILITY PLAN	P2
PRELIMINARY DESIGN	P3
DESIGN	P4
BOTTOM WIDTH	W
DEPTH	D
SIDE SLOPE, H:V	SS
CORRUGATED METAL PIPE CULVERT	CMPC
CORRUGATED METAL ARCH PIPE CULVERT	CMAPC
REINFORCED CONCRETE BOX	RCB
RCB CULVERT	RCBC
REINFORCED CONCRETE PIPE	RCP
RCP CULVERT	RCPC
REINFORCED CONCRETE ARCH PIPE CULVERT	RCACP
GENERAL COMMENT	GI
FACILITY SPECIFIC COMMENT	SI

NOTES:

(1) "E" FACILITIES NOT FOLLOWED BY "P" FACILITIES ARE ADEQUATE AS IS.

(2) FLOW = NON-DAMAGING Q FOR EXISTING FACILITY
FLOW = DESIGN Q WITH FREEBOARD FOR PROPOSED FACILITY

FLOOD CONTROL FACILITIES INVENTORY

FIGURE F-24

James M. Montgomery
Consulting Engineers, Inc.
Las Vegas, Nevada

ID / River Mile	E / P	Facility Description	Facility Length (ft)	Flow (cfs)
BHHN		BOULDER HIGHWAY - HENDERSON		
0313	E	48" RCP		70
0497	E	7' X 7' RCB Culvert		525
C104		C-1 CHANNEL, BRANCH 04		
0076	E	9 Span Bridge 72'W 4'D		
0077	E	Earth Chnl 20'W 4'-6'D	1,200	1,918
0100	E	Culvert 5-3.5'W 2.5'D RCAP Oval	60	210
0101	E	Earth Chnl 20'W 4'-6'D	800	1,918
0116	E	Culvert 5-3.5'W 2.5'D RCAP Oval	60	210
0117	E	Earth Chnl 20'W 4'-6'D	800	1,918
0132	E	Culvert 5-3.5'W 2.5'D RCAP Oval	60	210
0133	E	Earth Chnl 20'W 4'-6'D 2:1SS	400	1,918
0141	E	Culvert 5-3.5'W 2.5'D RCAP Oval	60	210
C1CH		C-1 CHANNEL		
0365	E	Earth Chnl 18'W 8'D		4,077
0365	P1	Conc Chnl 20'W 9'D 1:1SS; with drops	2,500	5,010
0412	P1	Conc Chnl 20'W 9'D 1:1SS; with drops	3,700	5,010
0483	P1	Conc Chnl 20'W 8.5'D 1:1SS; with drops	1,900	4,150
0365	P1	Sloping Chnl Drop	1,163	5,010
0520	E	Culvert 18'W 7'D 1/2 ellipse		1,080
0520	P1	10: 6'W 6'D RCBC @ Boulder Hwy	200	3,280
0521	E	Earth Chnl 15'W 8'D 2:1SS		4,808
0521	P1	Conc Chnl 15'W 7'D 2:1SS	650	3,280
0533	E	Earth Chnl 10'W 15'D 1:1SS		9,377
0533	P1	Conc Chnl 15'W 7.5'D 1:1SS; with drops	1,300	2,660
0533	P1	Sloping Chnl Drop; 2-6' drops	176	2,660
0563	E	Culvert 15'W 7'D 1/2 ellipse		900
0563	P1	8: 6'W 6'D RCBC @ Horizon	100	2,660
0564	E	Earth Chnl 10'W 5'D 2:1SS		1,429
0564	P1	Conc Chnl 15'W 6.5'D 2:1SS	500	2,660
0578	E	Bridge 36'W 8.5'D		3,312
0578	P1	8: 6'W 6'D RCBC @ UPRR	120	2,660
0579	E	Earth Chnl 42'W 5'D		8,834
0579	P1	Conc Chnl 25'W 5'D 1:1SS	1,800	2,660
0611	E	Earth Chnl 35'W 8'D 2:1SS		8,834
0611	P1	Conc Chnl 25'W 4'D 2:1SS	750	1,130
0634	E	4: 10'W 5'D RCBC		1,800
0635	E	Earth Chnl 35'W 8'D 2:1SS		8,834
0635	P1	Conc Chnl 25'W 4'D 2:1SS	1,000	1,130
0656	E	NDOT Detention Basin		
0658	E	NDOT Detention Basin		
0660	P1	Conc. Chnl 5.5'D 6'W 2:1 SS	2,700	1,190
0707	P1	78" RCP	1,600	322
0737	P1	402 ac-ft Detention Basin		3,910 / 322
0737	P1	16,000 cfs PMF Spillway		16,000
0737	P1	1: 48" Outlet Pipe	154	322
0737	P1	6' Rock Levee	8,700	2,260
0749	P1	Conc. Chnl 7.5'D 10'W 2:1 SS	600	1,750
0760	P1	2: 8' X 10' RCB Storm Drain	1,300	1,750
0785	P1	Conc. Chnl 7.5'D 10'W 2:1 SS	2,000	1,750
0823	P1	48" RCP	2,000	184
0861	P1	48" RCP	5,600	184
0967	P1	247 ac-ft Detention Basin		2,260 / 184
0967	P1	22,600 cfs PMF Spillway		22,600
0967	P1	1: 36" Outlet Pipes	154	184
0997	P1	6' Rock Levee	2,900	2,260
C1DC		C-1 CHANNEL - DRAKE CHANNEL		
0000	P1	Conc. Chnl 5.5'D 10'W 2:1 SS	2,700	1,450
0051	P1	Conc. Chnl 6'D 10'W 2:1 SS	6,900	1,450
0182	P1	96" RCP	2,700	1,450
0233	P1	66" RCP	3,400	233
0297	P1	389 ac-ft Detention Basin		4,230 / 233
0297	P1	10,400 cfs PMF Spillway		10,400
0297	P1	1: 36" Outlet Pipe	229	233
0352	P1	Conc. Chnl 8.5'D 12'W 2:1 SS; with drops	3,400	4,150
0352	P1	Sloping Chnl Drop; 8-6' drops	750	4,150
0400	P1	9.5' Rock Levee	8,700	3,290
C1GW		C-1 CHANNEL - GREEN WAY		
0000	E	Conc Chnl 6'W 9.5'D 1:1SS		2,812
0027	E	2: 12'W 4'D RCBC		768
0032	E	Conc Chnl 15'W 4'D 1:1SS		1,083
0041	E	2: 12'W 4'D RCBC		768
0042	E	Conc Chnl 15.3'W 4.8'D 1:1SS		1,515
0050	E	2: 12'W 4'D RCBC		768
0051	E	Conc Chnl 17'W 4'D 1:1SS		1,219
0065	E	2: 12'W 4'D RCBC		768
0069	E	Earth Chnl 12'W 6'-9'D		1,455
0074	E	2: 12'W 4'D RCBC		220
0075	E	Earth Chnl 28'W 3'-8'D 2:1SS		784
0083	E	3: 9.5'W 6.5'D CMAP Culvert		1,140
C1IT		C-1 CHANNEL - ITHACA		
0246	P1	8.5' Rock Levee	13,000	2,610
0492	P1	271 ac-ft Detention Basin		2,390 / 408
0492	P1	23,900 cfs PMF Spillway		23,900
0492	P1	1: 48" Outlet Pipe	226	408
C1MA		C-1 CHANNEL, MAJOR		
0129	E	Culvert 36" RCP	60	60
0136	E	Culvert 36" CMP	60	60
0152	E	Culvert 36" CMP	60	60

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*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
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X      X  XXXXXXX   XXXXX           XXX
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:::                                   :::
:::  Full Microcomputer Implementation :::
:::              by                   :::
:::       Haestad Methods, Inc.       :::
:::                                   :::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

    1     ID  FILE = EQUEST.HC1
    2     ID
    3     ID  HENDERSON PROJECT 9219 AND 9304
    4     ID
    5     ID  EQUESTRIAN AND APPLOOSA STREET PROJECT
    6     ID  ULTIMATE DRAINAGE CONDITION
    7     ID  ALL FUTURE FACILITIES CONSTRUCTED, FULLY BUILT OUT
    8     ID
    9     ID  10 AND 100 YEAR STORM MODELS, 6 HOUR DURATION
   10     ID  5 MINUTE COMPUTATION INTERVAL
   11     ID  DARF OF 0.96 USED FOR TOTAL DRAINAGE AREA OF 1.392 SQ. MILES
   12     ID
          *DIAGRAM
   13     IT       5       0       0     300
   14     IO       4       0       0
   15     IN       5       0       0
   16     JR    PREC     .57     .98

   17     KK   C5CAbFULLY DEVELOPED
   18     KM  NAMED BY MPU
   19     BA    .930
   20     PC       0     .02    .057     .07    .087    .108    .124     .13     .13     .13
   21     PC     .13     .13     .13    .133    .140    .142    .148    .158    .172    .181
   22     PC    .190    .197    .199      .2    .201    .204    .214    .229    .241    .249
   23     PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
   24     PC    .499     .59    .710    .744    .781    .812    .819    .835    .851    .856
   25     PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
   26     PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
   27     PC    .998    .999     1.0
   28     PB    2.97
   29     LS       0      74
   30     UD     1.3

   31     KK     PT1INTERSECTION OF EQUST. AND MAGIC
   32     RK     700    .004    .016            TRAP     100       1

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   38     KK     PT1DRAIN ACROSS EQUESTRIAN
   39     KM  SHORT STREET ROUTE
   40     RK     100    .005    .016            TRAP     100       1

   41     KK   OFF23
   42     KM  ROUTE TO PT1
   43     BA    .061
   44     LS       0      81
   45     UD     .43
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  46      KK     PT1
  47      KM  ROUTE TO PT1 IN EQUESTRIAN
  48      RK     600    .004    .016            TRAP     100       1

  49      KK   OFF21
  50      KM  ROUTE TO PT1
  51      BA    .047
  52      LS       0      81
  53      UD    .350

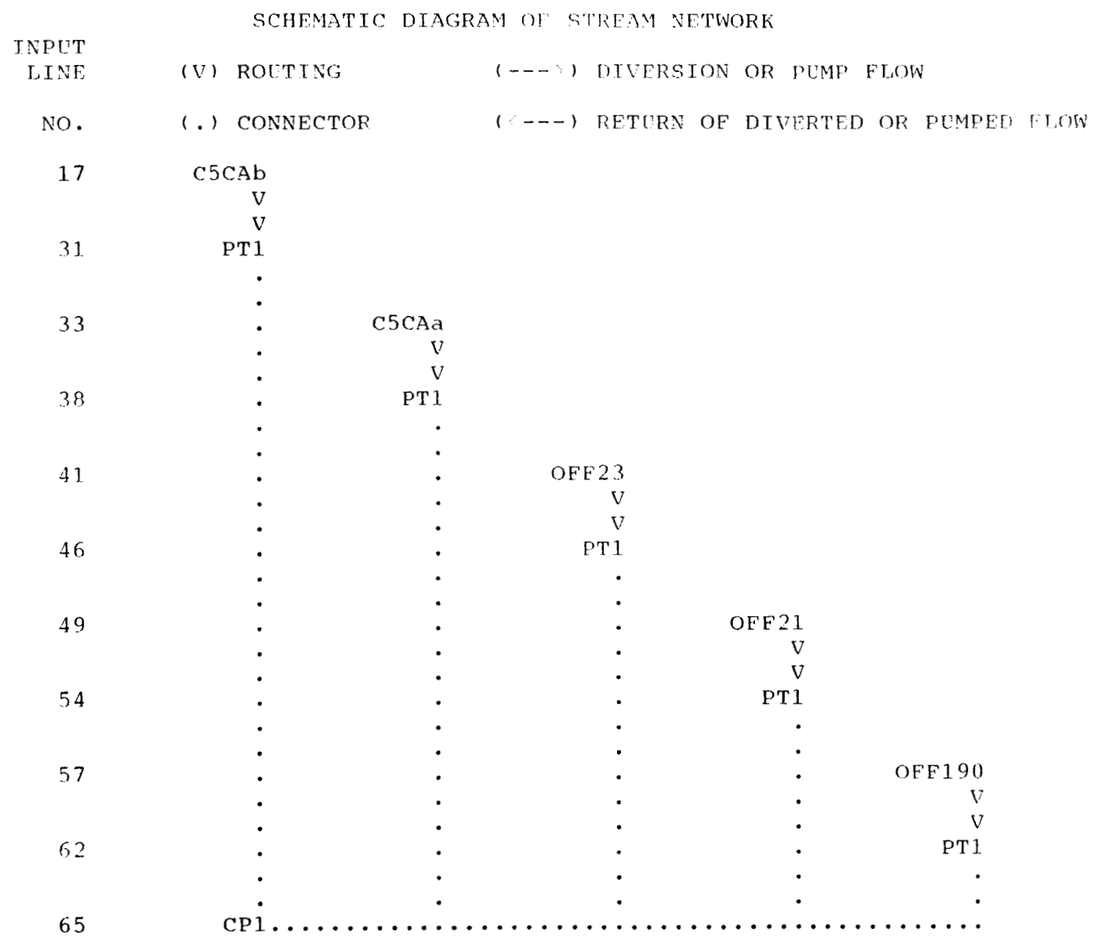
  54      KK     PT1
  55      KM  ROUTE FLOWS IN EQUEST.
  56      RK    1200    .005    .016            TRAP     100       1

  57      KK  OFF190
  58      KM  FULLY DEVELOPED BASIN
  59      BA    .009
  60      LS       0      89
  61      UD    .255

  62      KK     PT1
  63      KM  ROUTE TO PT1
  64      RK    2050    .005    .016            TRAP     100       1

  65      KK     CP1COMBINE HYDROGRAPHS AT PT1 (EQUESTRIAN AND MAGIC)
  66      HC       5
  67      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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

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					RATIO 1	RATIO 2
OPERATION	STATION	AREA	PLAN		.57	.98
HYDROGRAPH AT	C5CAb	.93	1	FLOW	52.	207.
				TIME	5.33	5.00
ROUTED TO	PT1	.93	1	FLOW	52.	207.
				TIME	5.42	5.00
HYDROGRAPH AT	C5CAa	.34	1	FLOW	140.	433.
				TIME	3.50	3.50
ROUTED TO	PT1	.34	1	FLOW	137.	429.
				TIME	3.50	3.50
HYDROGRAPH AT	OFF23	.06	1	FLOW	13.	41.
				TIME	3.92	3.92
ROUTED TO	PT1	.06	1	FLOW	13.	41.
				TIME	4.00	3.92
HYDROGRAPH AT	OFF21	.05	1	FLOW	12.	35.
				TIME	3.83	3.83
ROUTED TO	PT1	.05	1	FLOW	11.	35.
				TIME	3.92	3.83
HYDROGRAPH AT	OFF190	.01	1	FLOW	5.	11.
				TIME	3.67	3.67
ROUTED TO	PT1	.01	1	FLOW	5.	11.
				TIME	4.00	3.83
5 COMBINED AT	CP1	1.39	1	FLOW	138.	454.
				TIME	3.50	3.50

HEC1 S/N: 1330000004 HMVersion: 6.40 Data File: equest.hc1

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            SEPTEMBER 1990             *
*             VERSION 4.0               *
*                                       *
*  RUN DATE  12/10/1996  TIME  09:56:49 *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

FILE = EQUEST.HC1

HENDERSON PROJECT 9219 AND 9304

EQUESTRIAN AND APPLOOSA STREET PROJECT
ULTIMATE DRAINAGE CONDITION
ALL FUTURE FACILITIES CONSTRUCTED, FULLY BUILT OUT

10 AND 100 YEAR STORM MODELS, 6 HOUR DURATION
5 MINUTE COMPUTATION INTERVAL
DARF OF 0.96 USED FOR TOTAL DRAINAGE AREA OF 1.392 SQ. MILES

14 IO OUTPUT CONTROL VARIABLES

IPRNT	4	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		300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		0055	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 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

RATIOS OF PRECIPITATION
.57 .98

*** *** *** *

31 KK

****
*   *
* PT1   * INTERSECTION OF EQUST. AND MAGIC
*   *
****

HYDROGRAPH ROUTING DATA

32 RK

KINEMATIC WAVE STREAM ROUTING

L	700.	CHANNEL LENGTH
S	.0040	SLOPE
N	.016	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	100.00	BOTTOM WIDTH OR DIAMETER
Z	1.00	SIDE SLOPE
NDXMIN	2	MINIMUM NUMBER OF DX INTERVALS

***

*** *** *** *

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
 38 KK      *       PT1  *     DRAIN ACROSS EQUESTRIAN
            *            *
            **************
                        SHORT STREET ROUTE

                HYDROGRAPH ROUTING DATA

 40 RK            KINEMATIC WAVE STREAM ROUTING
                           L        100.  CHANNEL LENGTH
                           S       .0050  SLOPE
                           N        .016  CHANNEL ROUGHNESS COEFFICIENT
                          CA         .00  CONTRIBUTING AREA
                       SHAPE        TRAP  CHANNEL SHAPE
                          WD      100.00  BOTTOM WIDTH OR DIAMETER
                           Z        1.00  SIDE SLOPE
                      NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                                                                    ***

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
 41 KK      *     OFF23  *
            *            *
            **************
                        ROUTE TO PT1

                SUBBASIN RUNOFF DATA

 43 BA            SUBBASIN CHARACTERISTICS
                       TAREA         .06  SUBBASIN AREA

                  PRECIPITATION DATA

 28 PB                 STORM        2.97  BASIN TOTAL PRECIPITATION

 18 PI              INCREMENTAL PRECIPITATION PATTERN
                      .02       .04       .01       .02       .02       .02       .01       .00       .00       .00
                      .00       .00       .00       .01       .00       .01       .01       .01       .01       .01
                      .01       .00       .00       .00       .00       .01       .02       .01       .01       .00
                      .01       .01       .01       .00       .00       .01       .03       .03       .06       .09
                      .09       .12       .03       .04       .03       .01       .02       .02       .00       .00
                      .01       .01       .01       .02       .02       .01       .01       .02       .01       .01
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00

 44 LS            SCS LOSS RATE
                       STRTL         .47  INITIAL ABSTRACTION
                      CRVNBR       81.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 45 UD            SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .43  LAG

                                                                    ***
```

UNIT HYDROGRAPH
28 END-OF-PERIOD ORDINATES

5.	16.	33.	52.	61.	62.	56.	48.	36.	26.
19.	15.	11.	8.	6.	5.	3.	3.	2.	1.
1.	1.	1.	1.	0.	0.	0.	0.		

*** ***

46 KK

****
*   *
* PT1   *
*   *
****

ROUTE TO PT1 IN EQUESTRIAN

HYDROGRAPH ROUTING DATA

48 RK KINEMATIC WAVE STREAM ROUTING

L	600.	CHANNEL LENGTH
S	.0040	SLOPE
N	.016	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	100.00	BOTTOM WIDTH OR DIAMETER
Z	1.00	SIDE SLOPE
NDXMIN	2	MINIMUM NUMBER OF DX INTERVALS

***

***

*** ***

49 KK

****
*   *
* OFF21 *
*   *
****

ROUTE TO PT1

SUBBASIN RUNOFF DATA

51 BA SUBBASIN CHARACTERISTICS

TAREA	.05	SUBBASIN AREA

PRECIPITATION DATA

28 PB STORM 2.97 BASIN TOTAL PRECIPITATION

18 PI INCREMENTAL PRECIPITATION PATTERN

.02	.04	.01	.02	.02	.02	.01	.00	.00	.00
.00	.00	.00	.01	.00	.01	.01	.01	.01	.01
.01	.00	.00	.00	.00	.01	.02	.01	.01	.00
.01	.01	.01	.00	.00	.01	.03	.03	.06	.09
.09	.12	.03	.04	.03	.01	.02	.02	.00	.00
.01	.01	.01	.02	.02	.01	.01	.02	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

52 LS SCS LOSS RATE

STRTL	.47	INITIAL ABSTRACTION
CRVNBR	81.00	CURVE NUMBER

53 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .35 LAG

***

UNIT HYDROGRAPH
23 END-OF-PERIOD ORDINATES

6.	20.	42.	56.	58.	51.	40.	27.	19.	14.
10.	7.	5.	3.	2.	2.	1.	1.	1.	0.
0.	0.	0.							

*** ***

54 KK
****
* *
* PT1 *
* *
****

ROUTE FLOWS IN EQUEST.

HYDROGRAPH ROUTING DATA

56 RK KINEMATIC WAVE STREAM ROUTING

L	1200.	CHANNEL LENGTH
S	.0050	SLOPE
N	.016	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	100.00	BOTTOM WIDTH OR DIAMETER
Z	1.00	SIDE SLOPE
NDXMIN	2	MINIMUM NUMBER OF DX INTERVALS

***

*** ***

57 KK
****
* *
* OFF190 *
* *
****

FULLY DEVELOPED BASIN

SUBBASIN RUNOFF DATA

59 BA SUBBASIN CHARACTERISTICS
TAREA .01 SUBBASIN AREA

PRECIPITATION DATA

28 PB STORM 2.97 BASIN TOTAL PRECIPITATION

18 PI INCREMENTAL PRECIPITATION PATTERN

.02	.04	.01	.02	.02	.02	.01	.00	.00	.00
.00	.00	.00	.01	.00	.01	.01	.01	.01	.01
.01	.00	.00	.00	.00	.01	.02	.01	.01	.00
.01	.01	.01	.00	.00	.01	.03	.02		
.09	.12								

	.01	.01	.01	.02	.02	.01	.01	.02	.01	.01
	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	.00	.00								

60 LS SCS LOSS RATE

STRTL	.25	INITIAL ABSTRACTION
CRVNBR	89.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

61 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.25	LAG

***

UNIT HYDROGRAPH
17 END-OF-PERIOD ORDINATES

3.	9.	14.	14.	11.	7.	4.	3.	2.	1.
1.	0.	0.	0.	0.	0.	0.			

*** *** *** *

```
IDFILE = EQUES
ID
IDHENDERSON PR      9319 AND 9304
ID
IDEQUESTRIAN A      OSA STREET PROJECT
IDULTIMATE DR       CONDITION
IDALL FUTURE F      ES CONSTRUCTED, FULLY BUILT OUT
ID
ID10 AND 100 YE     ORM MODELS, 6 HOUR DURATION
ID5 MINUTE COM      ON INTERVAL
IDDARF OF 0.9       OR TOTAL DRAINAGE AREA OF 1.392 SQ. MILES
ID
*DIAGRAM
IT      5                0      300
IO      4                0
IN      5                0
JR  PREC        .       .98
KK C5CAbFULLY       OPED
KMNAMED BY MPU
BA   .930
PC      0       .       .057    .07     .087    .108    .124    .13     .13     .13
PC    .13       .       .13     .133    .140    .142    .148    .158    .172    .181
PC   .190       .       .199    .2      .201    .204    .214    .229    .241    .249
PC   .251       .       .270    .278    .281    .283    .295    .322    .352    .409
PC   .499       .       .710    .744    .781    .812    .819    .835    .851    .856
PC   .860       .       .876    .888    .910    .926    .937    .950    .970    .976
PC   .982       .       .987    .989    .990    .993    .993    .994    .995    .998
PC   .998       .       1.0
PB  2.97
LS      0       .
UD    1.3
KK    PT1INTERSE        OF EQUST. AND MAGIC
RK    700       .0      .016            TRAP    100     1

KK C5CAaFULLY F       OPED
KMNAME FROM MPU       DY
BA   .345
LS      0       8
UD .0707
KK    PT1DRAIN A      S EQUESTRIAN
KMSHORT STREET      E
RK    100       .00     .016            TRAP    100     1

KK OFF23
KMROUTE TO PT1
BA   .061
LS      0       81
UD    .43
KK    PT1
KMROUTE TO PT1 I      ESTRIAN
RK    600       .004    .16             TRAP    100     1

KK OFF21
KMROUTE TO PT1
BA   .047
LS      0       81
UD   .350
KK    PT1
```

```
RK  1200     .005     .016             TRAP      100        1

KKOFF190
KMFULLY DEVELOPED BASIN
BA   .009
LS      0       89
UD   .255
KK    PT1
KMROUTE TO PT1
RK  2050     .005     .016             TRAP      100        1
KK    CP1COMBINE HYDROGRAPHS AT PT1 (EQUESTRIAN AND MAGIC)
HC      5
ZZ
```

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= .57									
PT1	MANE	1.08	51.63	321.76	.22	5.00	51.56	325.00	.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1080E+02 EXCESS= .0000E+00 OUTFLOW= .1080E+02 BASIN STORAGE= .2910E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98									
PT1	MANE	.63	206.96	30	.85	5.00	206.82	300.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4226E+02 EXCESS= .0000E+00 OUTFLOW= .4226E+02 BASIN STORAGE= .4030E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .57									
PT1	MANE	.20	138.63	21	.39	5.00	137.20	210.00	.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7090E+01 EXCESS= .0000E+00 OUTFLOW= .7091E+01 BASIN STORAGE= .9890E-07 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98									
PT1	MANE	.22	429.83	210.23	1.18	5.00	429.19	210.00	1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2177E+02 EXCESS= .0000E+00 OUTFLOW= .2177E+02 BASIN STORAGE= .1378E-06 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .57									
PT1	MANE	1.56	13.40	239.11	.42	5.00	13.34	240.00	.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1365E+01 EXCESS= .0000E+00 OUTFLOW= .1365E+01 BASIN STORAGE= .1290E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98									
PT1	MANE	1.13	40.89	236.24	1.25	5.00	40.81	235.00	1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4051E+01 EXCESS= .0000E+00 OUTFLOW= .4053E+01 BASIN STORAGE= .1701E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .57									
PT1	MANE	3.08	11.51	235.34	.42	5.00	11.47	235.00	.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1052E+01 EXCESS= .0000E+00 OUTFLOW= .1055E+01 BASIN STORAGE= .7867E-04 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .98
PT1 MANE 2.03 35.01 232.41 1.25 5.00 34.79 230.00 1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3121E+01 EXCESS= .0000E+00 OUTFLOW= .3124E+01 BASIN STORAGE= .8194E-04 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .57
PT1 MANE 5.00 4.80 239.44 .80 5.00 4.76 240.00 .81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3741E+00 EXCESS= .0000E+00 OUTFLOW= .3859E+00 BASIN STORAGE= .2565E-03 PERCENT ERROR= -3.2

FOR PLAN = 1 RATIO= .98
PT1 MANE 5.00 11.09 230.90 1.86 5.00 10.71 230.00 1.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8732E+00 EXCESS= .0000E+00 OUTFLOW= .8916E+00 BASIN STORAGE= .2513E-03 PERCENT ERROR= -2.1

*** NORMAL END OF HEC-1 ***
NORMAL END OF HEC-1

Table 2

Concentration Point	Pre-Levee Q10/Q100	Existing Q10/Q100	Proposed Q10/Q100	Future Q10/Q100
A	-	102/289	59/98	97/193
B	261/771	123/370	94/236	126/314
C	271/812	133/394	103/266	140/349
D	-	110/379	89/384	121/387
E	114/318	2/45	28/182	19/147
F	-	1/21	44/210	28/164
G	-	44/191	44/191	28/144
H	-	44/174	44/174	44/174

Notes

1. Pre-Levee (Historic); flows estimated prior to levee. The values were obtained from Reference 9 then adjusted to account for the Wagon Wheel Interchange Improvements

2. Existing; existing current condition flows post levee.

3. Proposed; proposed condition flows post levee with flow diversion onto Appaloosa Road.

4. Future; future condition flows post levee with flow diversion off of Appaloosa Road.

5. Flows estimated to cross Boulder Highway = 48 cfs

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: **Foothills North No. 7C** Date: **31-May-96**

Location of Development: a) Descriptive **North of Colt Drive and along Chickasaw Drive**
b) Sect. **27** Twn. **22S** Rng. **63E**

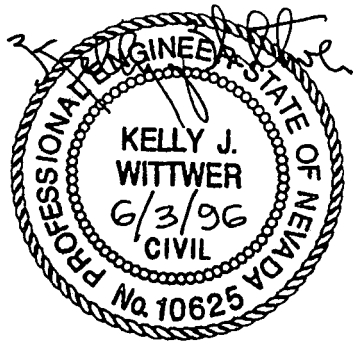
Name of Owner: **Lewis Homes of Nevada** Assessors Parcel No: **179-27-101-001,-002**

Contact Person- Name: **Michael G. Short** Telephone No: **(702) 258-0115**
Firm: **Pentacore Engineering Inc.**
Address: **6763 West Charleston Boulevard, Las Vegas, NV 89102**

Type of Land Development/Land Disturbance Process:

- ☐ Rezoning
- ☒ Subdivision Map
- ☐ Clearing and Grading Only
- ☐ Parcel Map
- ☐ Planned Unit Development
- ☐ Other (Please Specify Below)
- ☐ Large Parcel Map
- ☐ Building Permit

1. Total owned Land Area: At Site: **3.48 Acres** Being Developed/Disturbed: **3.48 Acres**
2. Is a Portion or all of the subject property in a designated FEMA Flood Hazard Area? (YES*) NO
3. Is the Property bordered or crossed by an existing of proposed Clark County Regional Flood Control District Master Planned Facility? YES* (NO)
4. Proposed type of development (Residential, Commercial, Etc.)? **Residential**
5. Approximate upstream land area which drains to the subject site? **147 Acres**
6. Has the site drainage been evaluated in the past? (YES) NO If Yes, please identify documentation: **Drainage Study for Henderson Foothills and Drainage Study for Foothills South30+/- Acres**
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: **Discharge will be onto Chickasaw Drive**
8. Briefly describe your proposed schedule for the subject project: **Within 12 Months**



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*Review and concurrence of the Clark County Regional Flood Control District is required

revision	date

Local Entity file No.

REFERENCE:

STANDARD FORM 1

1.0 GENERAL LOCATION AND DEVELOPMENT DESCRIPTION

1.1 Scope

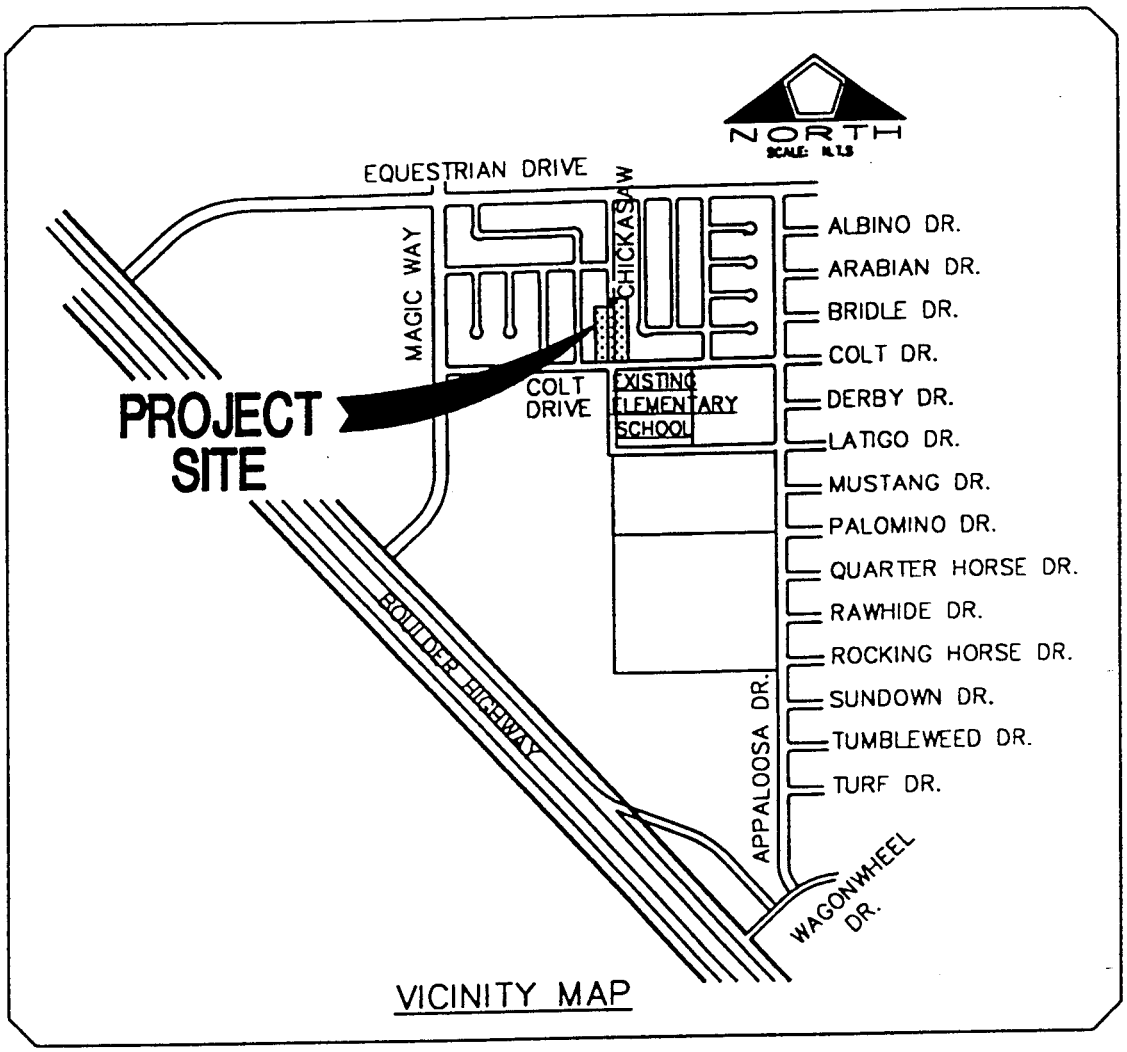
The purpose of this report is to provide detailed hydrologic and hydraulic analyses for the proposed development of Lewis Homes - Foothills North No. 7C. This report will address the historic, existing, proposed, and possible future conditions which affect the onsite and offsite drainage. The criteria set forth in the Clark County Regional Flood Control District "Hydrologic Criteria and Drainage Design Manual," hereafter referred to as the "Drainage Criteria Manual," (Ref. 7) has been used as the technical basis for this study.

1.2 Location

Lewis Homes - Foothills South No. 7C is located within the City of Henderson Clark County, Nevada. The site lies north of Colt Drive and along Chickasaw Drive. The site is adjacent to the existing Foothills North No. 7A and 7B (see Figure 1). The project is within a portion of Section 27, Township 22 South, Range 63 East, M.D.M. The site is part of the Overall Foothills North Residential Development

1.3 Description of Project

The project site consists of 18 lots on approximately 3.48 acres giving it a density of approximately 5 lots per acre. The development of the site will include half street improvements to Colt Drive and full street improvements to Chickasaw Drive.



VICINITY MAP

LEWIS HOMES OF NEVADA
FOOTHILLS NORTH NO. 7C

FIGURE 1
VICINITY MAP

PENTACORE
CIVIL ENGINEERING • LAND SURVEYING • PLANNING
CONSTRUCTION MANAGEMENT • ADA CONSULTING
6763 WEST CHARLESTON BOULEVARD
LAS VEGAS, NEVADA 89102 (702)258-0115

2.0 DRAINAGE BASIN DESCRIPTION

2.1 Offsite Drainage Description

For conditions other than historic this report it is assumes the Regional Flood Control Master Planed Rock Levee (C1DC Equestrian Berm) along Foothills Drive is in place. The rock levee extends from Boulder Highway to Equestrian Drive (see Figure 2). The rock levee diverts a significant portions of the offsite flows which historically have impacted the subject site. This report considers three post detention basin offsite drainage conditions. First, the Existing Offsite Drainage Condition, assumes the upstream contributing basins bounded by the levee and Boulder Highway are in their current conditions and the existing diversion channel constructed south of Lewis Home's Foothills South remains in place. The second, Proposed Offsite Drainage Condition, removes the existing diversion channel constructed with Foothills South allowing a significant portion of flows to continue down Appaloosa Road. Both the existing and proposed land use of the offsite contributing basins currently tends to be low density single family residences and vacant desert. The existing and proposed drainage patterns predominately travel from the southeast to the north. The third offsite drainage condition (Future Offsite Drainage Condition), considers that a portion of undeveloped desert south of Foothills South site is developed as single family residential homes (see Figure 6 Basin O2/O2F). Also, it is assumed that the future development south of Foothills South will collect some offsite flows and divert those flows northwest to the existing drainage easement along Foothills South No. 13.

In addition to the above described offsite basins, there is a large offsite watershed extending south of Boulder Highway. Boulder Highway diverts a majority of the flow from this watershed away from the proposed project site and only a small portion of these flows will pass through existing culverts. Improvements to the Boulder Highway and the Wagon Wheel interchange have effectively reduced the 100-year flow from the southwest watershed to only 48 cfs.

2.2 Onsite Drainage Description

The onsite drainage patterns for the subject site are from the south to the north. The site is surrounded by existing development. The site has been rough graded but intentionally held from further development pending the construction of the Equestrian Detention Basin and Berm.

2.3 FEMA Flood Hazard Zone

The Special Flood Hazard Areas for Clark County, Nevada is outlined in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps dated August 16, 1995. Upon reviewing Community Panel No. 320003 C 2620 D (see Figure 3) the subject site was found to be within a designated Special Flood Hazard Zone it is assumed after approval of this report a CLOMAR/LOMAR-F will be requested.

2.4 Regional Flood Control Master plan Update

The proposed development of this site is in compliance with the Clark County Regional Flood Control District Master Plan (Ref. 5). There are no regional flood control master planned facilities that cross or border this site. However, the site is dependent on the installation of the Regional Flood Control Facility C1DC Rock Levee.

2.5 Previous Drainage Studies

The subject site in the existing and proposed conditions have been analyzed as an onsite basin contributing to the Henderson Foothills Study (Ref. 9). In addition a portion of the offsite basins have been previously analyzed in the Drainage Study for Foothills South 30 +/- Acres (Ref. 10). The analysis used in both the above studies has been used extensively for this study. A drainage study was prepared for the I-515 Wagon Wheel interchange (Ref. 8) and the Highway 95/Foothills Drive grade separation (Ref. 11). These reports have been utilized in determine the flows which pass under Boulder Highway.

3.0 PROPOSED DRAINAGE FACILITIES

3.1 General Description

The project site is to be developed into single family lots of approximately 6,000 square feet in size. The proposed grading of the site will route the onsite storm runoff into Chickasaw Drive. The onsite flows will then be conveyed to Equestrian Drive. The proposed lots fronting Chickasaw Drive will be graded with a small stem wall adjacent to Chickasaw Drive. The stem wall will prevent excessive erosion of the adjacent lots. In addition offsite improvements south of Foothills South will be required. The improvements will include a small diversion along Appaloosa Drive as a result of improvements constructed with Appaloosa Drive preventing flows east of Appaloosa Drive from entering the existing diversion channel (see Figure 4). Flows west of Appaloosa Drive will continue north towards and through the existing drainage easement east of Foothills South. The flows within the easement will continue to Chickasaw Drive where they will then proceed as surface flow within the street section.

The analysis of this project has been intentionally extended upstream of this site. The purpose of the extended analysis was to determine if the development of this site or future upstream development would have significant additional and/or adverse impacts to the downstream properties. The pre-levee, the existing, the proposed, and the estimated future conditions have been summarized in Table 2. A comparison of flows for all four conditions show that the proposed and future improvements as describe will have no greater adverse impact than the historic flow (Pre-Levee) conditions.

3.2 Compliance with Regulations and Adopted Plans

Hydraulic calculations including street capacity calculations, easement calculations and flow split calculations are included in the Appendix. The hydraulic capacities of the proposed structures are in compliance with the Drainage Criteria Manual. It should be noted, Chickasaw Drive pre-levee, as currently existing, as currently proposed, and as estimated in the future will not meet the minimum requirements of the Drainage Criteria Manual. It is assumed if further upstream development occurs south of Wagon Wheel Drive, future detention maybe required to reduce flows on Chickasaw Drive and Appaloosa Road. It should be understood, the excessive flows found on Chickasaw Drive are not the result of the subject proposed development, or diversions caused by the subject proposed development.

3.3 Hydrologic Criteria

The watershed was modeled using the generalized storm network computation capabilities of the U.S. Army Corps of Engineer's HEC-1 Flood Hydrograph computer model (Ref. 4). The HEC-1 computer program has a wide range of capabilities in modeling gaged and ungaged watersheds, with most of the latest techniques for simulating precipitation, evaporation surface impoundment, flood routing, flow diversions and splits. Since the study watershed is ungaged, the analysis used to model runoff incorporated the Soil Conservation Service (SCS) unit hydrograph method to develop a hypothetical flood hydrograph (Ref. 2).

The Drainage Criteria Manual was used to establish the point precipitation values, rainfall distribution (SDN 3). The NOAA precipitation values were then adjusted by the recommended correction factors to develop point rainfall depths for storm events that best simulate the hydrologic area. The point precipitation values are shown in Table 1 for the six-hour duration storm event. The six-hour storm has been selected in accordance with the Drainage Criteria Manual.

TABLE 1

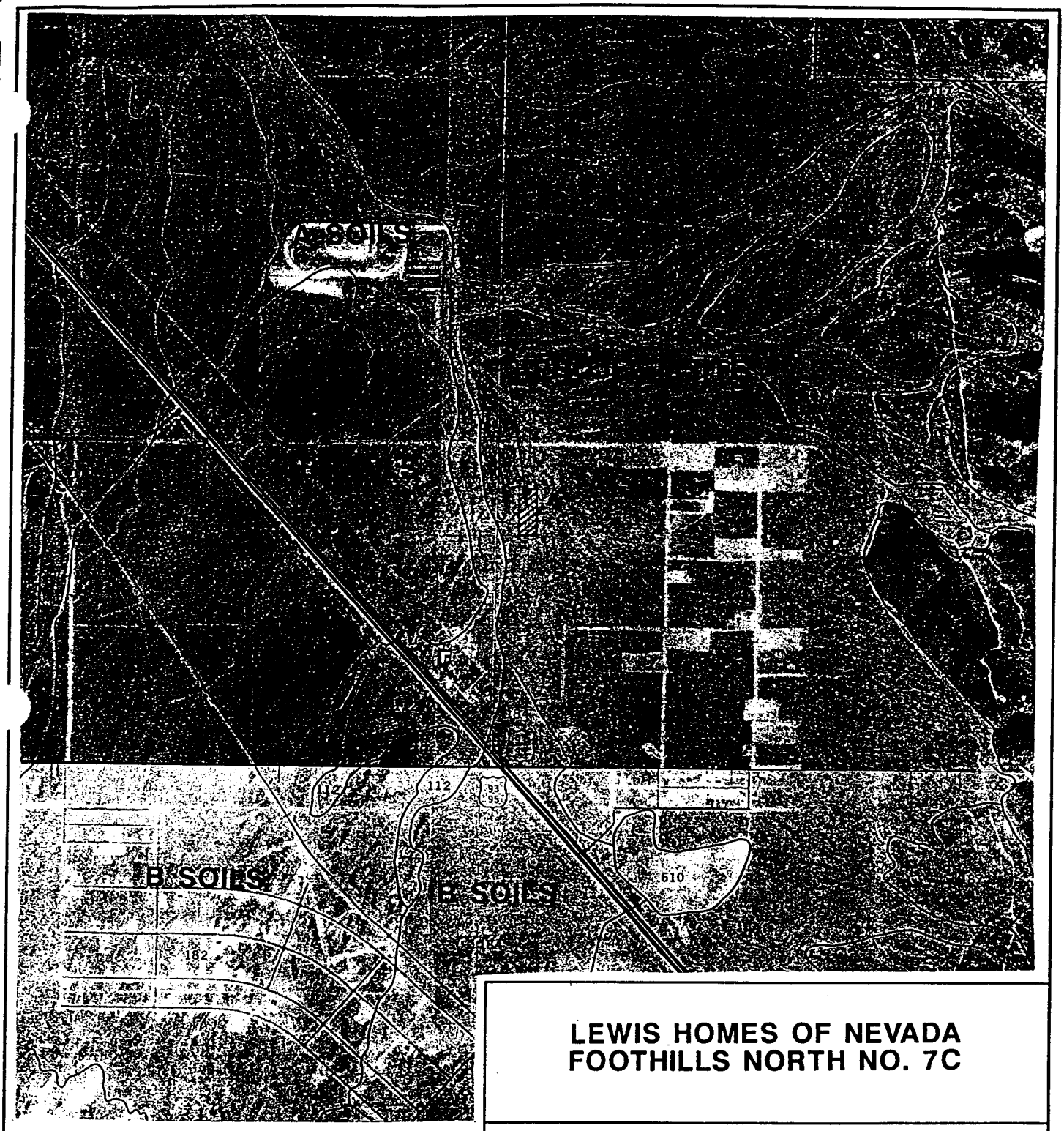
Point Precipitation Values

	Inches (6-Hour Duration)	
	10-Year	100-Year
Unadjusted NOAA Values	1.60	2.40
Clark County Correction Factors	1.24	1.43
Adjusted Precipitation Values	1.98	3.43

The drainage basins were determined with the use of U.S. Geological Survey 7-1/2 minute quad map, 400 scale aerial photos, field investigation and a 40 scale onsite topographic map. A planimeter was used to determine the basin areas. The existing, proposed, and future drainage basins are shown on Figure 2, Figure 4 and Figure 6 respectively.

The curve numbers were developed based on vegetation, soils group information, land use, and antecedent moisture conditions (AMC II) in accordance with the standard methods of the Soil Conservation Services (SCS). The curve numbers were determined from the curve number tables included in the Appendix. Curve number calculations are also included in the Appendix.

The soils information was obtained from the SCS Soils Survey of the Las Vegas Valley Area (Ref. 3.) This Survey delineates families of soil types and the hydrologic soil group of each family. Figure 5 shows the project location and watershed on the Soil Map of the area. An examination of this map shows "A" and "B" type soils.



LEWIS HOMES OF NEVADA
FOOTHILLS NORTH NO. 7C

FIGURE 5
SOILS MAP

NORTH

2000 1000 0 2000

SCALE: 1" = 2000'

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The time between a brief heavy rain and the maximum runoff rate is called lag time. Lag can be estimated from historical hydrographs or it can be estimated from specific watershed characteristics such as watershed length, slope and flow retardance. Based on studies of many storm events for a range of watershed conditions, the following empirical relationship between lag (L) and time of concentration (Tc) was derived:

$$L = 0.6Tc$$

$$Tc = \frac{Lws}{3{,}600V} + Ti$$

where: **Lws** = Hydraulic length
V = Average Velocity
Ti = Initial flow time

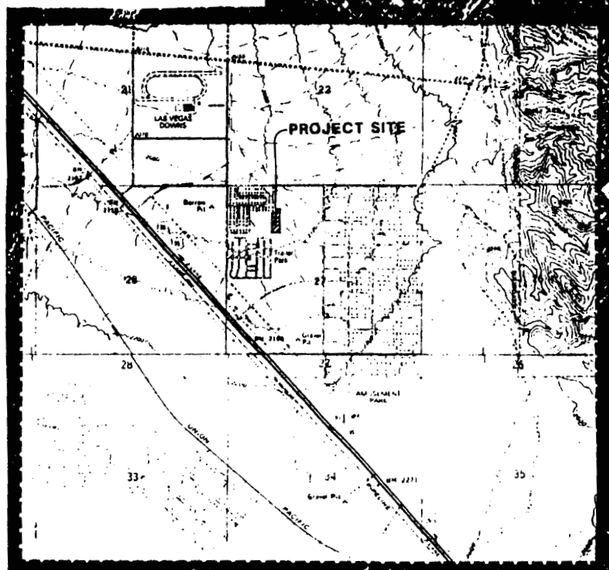
Average velocities for estimating travel time for surface flow were used to develop a time of concentration (Ref. 2). The overland flow velocity chart is included in the Appendix. To determine initial flow times, the equation $Ti = 1.8(1.1\text{-}K)L^{1/2}/S^{1/3}$ was used as outlined in the Criteria Manual.

3.4 Facility Design Calculations

The existing drainage easement south of Foothills South and the street cross section of Appaloosa Road provide the majority of the offsite storm water conveyance for this site. The flows generated onsite are collected by Chickasaw Drive street section. The onsite flows combine with the offsite flows on Chickasaw for a worst case future flow depth of 0.96 with V*D product of 9.11. The worst case proposed flow depth for Appaloosa Road is .91 with a V*D product of 4.68 which is an increase over existing post detention basin flows; however, significantly less than the historic flows. The Hydraulic Calculations for the streets and berm section are based on Manning's Equation and have been included in the Appendix. Hydraulic calculations for Chickasaw Drive and Appaloosa Road have been summarized and can be found in the Appendix. All finished floors have been designed to at least twice the depth of flow above the flow line.

NORTH

400 200 0 400
SCALE: 1" = 400'



STORM FLOW SUMMARY
EXISTING CONDITIONS

BASIN	AREA (ACRES)	Q10 (CFS)	Q100 (CFS)
01	163.9	44	175
02	53.8	11	50
03	47.0	22	71
04	13.7	7	24
05	9.3	12	27
06	21.0	11	34
07	67.3	1	21
08	109.2	1	21
09	128.2	1	23
10	41.3	0	9
11	13.2	7	22
12	19.2	10	33
13	10.4	2	9
E1	13.9	7	24

LEGEND

- E1 — DRAINAGE BASIN IDENTIFICATION
- DRAINAGE BASIN BOUNDARY
- A — CONCENTRATION POINT
- FLOW DIRECTION

STORM FLOW SUMMARY
EXISTING CONDITIONS

CONCENTRATION POINT	Q10 (CFS)	Q100 (CFS)
A	102	289
B	123	370
C	133	394
D	110	379
E	2	45
F	1	21
G	44	191
H	44	174

DATE: 04/29/91
DRAWN BY: GR
DESIGNED BY: MCC
CHECKED BY:

RECOMMENDED

DATE

P.E.

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LEWIS HOMES OF NEVADA

FOOTHILLS NORTH /C

SITE/OFFSITE EXISTING CONDITIONS

STORM FLOW SUMMARY PROPOSED CONDITIONS

BASIN	AREA (ACRES)	Q10 (CFS)	Q100 (CFS)
E	63.9	44	174
D	53.8	11	50
C	47.0	22	71
B	13.7	7	24
A	9.3	12	27
13	17.0	11	34
12	6.3	1	21
11	109.2	1	21
10	128.2	1	23
9	4.1.3	0	9
8	13.2	7	22
7	19.2	10	33
6	10.4	2	9
5	13.9	7	24

LEGEND

- BASIN DESIGNATION
- SUB-BASIN BOUNDARY
- CONCENTRATION POINT
- FLOW DIRECTION

STORM FLOW SUMMARY PROPOSED CONDITIONS

CONCENTRATION POINT	Q10 (CFS)	Q100 (CFS)
A	59	98
B	94	236
C	103	266
D	89	384
E	38	89
F	44	210
G	44	191
H	44	174

DATE
P.E.#
RECOMMENDED:
DATE:
DRAWN BY:
DESIGNED BY:
CHECKED BY:
JOB NO.:

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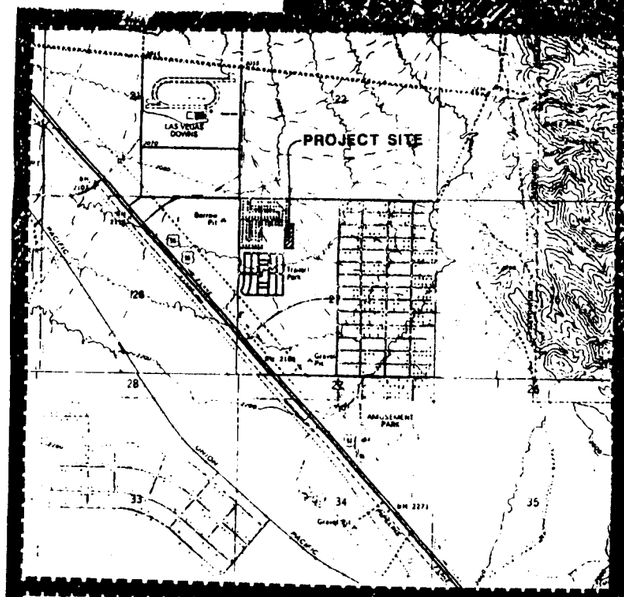
...HILLS NORTH, AZ

PROPOSED CONDITIONS

NORTH

400 200 0 400

SCALE: 1" = 400'



STORM FLOW SUMMARY FUTURE CONDITIONS

BASIN	AREA (ACRES)	Q10 (CFS)	Q100 (CFS)
01	163.9	44	174
02F	53.8	38	104
03	47.0	22	71
04	13.7	7	24
05	9.3	12	27
06	21.0	11	34
07	67.5	1	21
08	109.2	1	21
09	128.2	1	23
10	41.3	0	9
11	13.2	7	22
12	19.2	10	33
13	10.4	2	9
P1	13.9	7	24

LEGEND

- P1 — DRAINAGE BASIN IDENTIFICATION
- DRAINAGE BASIN BOUNDARY
- A — CONCENTRATION POINT
- FLOW DIRECTION

STORM FLOW SUMMARY FUTURE CONDITIONS

CONCENTRATION POINT	Q10 (CFS)	Q100 (CFS)
A	97	193
B	126	314
C	140	349
D	121	387
E	19	147
F	28	164
G	28	144
H	44	174

PROJECT SITE

EXISTING CHANNEL

UNKNOWN STREET

RECOMMENDED:

P.E. DATE

DATE: 04/29/96
DRAWN BY: GS
DESIGNED BY: MCS
CHECKED BY:
JOB NO.: 0030.0364

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LEWIS HOMES OF NEVADA

FOOTHILLS NORTH 7C

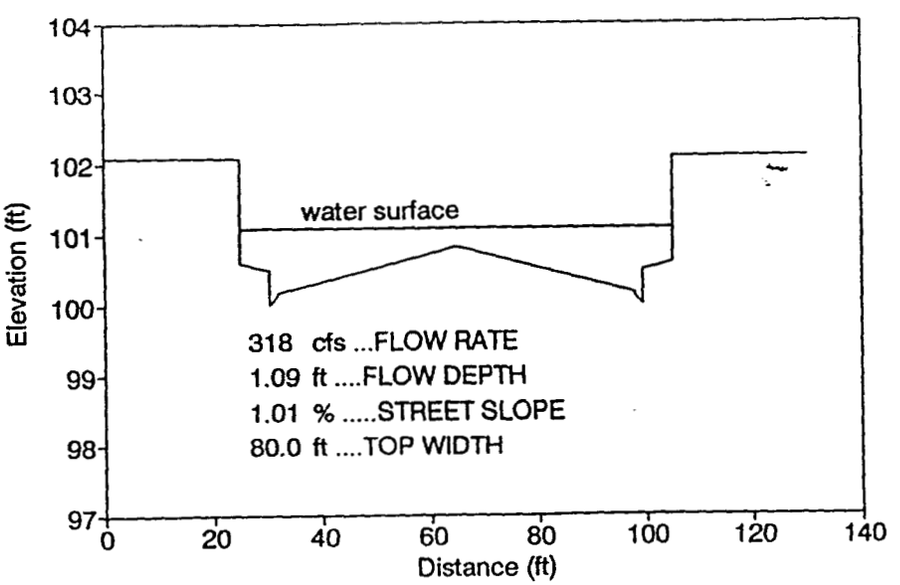
ONSITE/OFFSITE FUTURE CONDITIONS DRAINAGE MAP

STREET FLOWS

APPALOOSA NORTH OF CP F HISTORIC

Input variables:			**Output variables:**		
Flow depth, d	1.09	ft	Capacity at d	318.0	cfs
Road width	70.0	ft	Velocity	6.6	fps
Crown height	0.83	ft	Top width	80.0	ft
Street slope	1.01	%			
Sidewalk width	5.0	ft	SECTION:		
Curb height	6	in	Cross Slope	2.0	%
Median width	0.0	ft	Gutter Depression	2.0	in
Rt back of walk	100.0	%	Depth - Velocity Product	7.19	
Lt back of walk	100.0	%	Manning's n	0.016	

APPALOOSA NORTH OF CP F HISTORIC

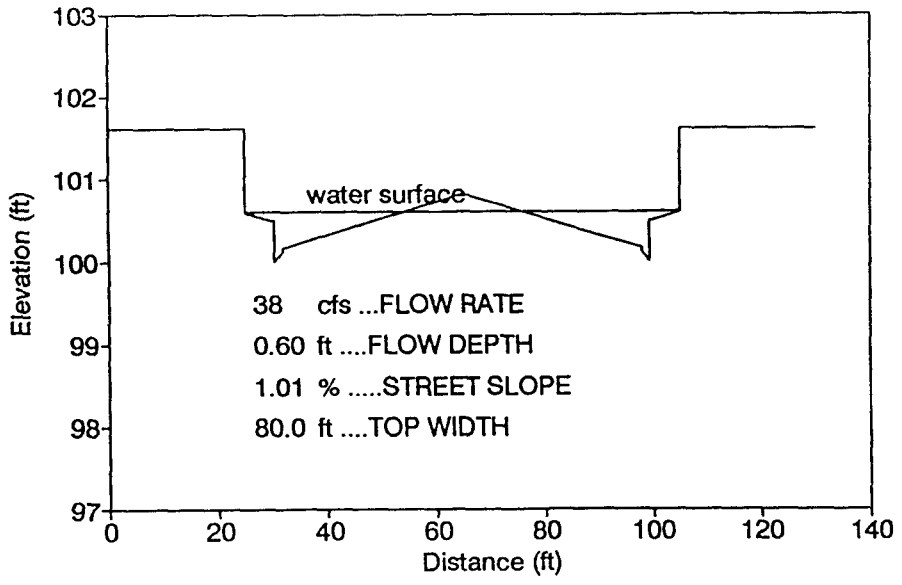


STREET FLOWS

APPALOOSA NORTH OF CP F EXISTING

Input variables:			**Output variables:**		
Flow depth, d	0.60	ft	Capacity at d	38.0	cfs
Road width	70.0	ft	Velocity	3.2	fps
Crown height	0.83	ft	Top width	80.0	ft
Street slope	1.01	%			
Sidewalk width	5.0	ft	SECTION:		
Curb height	6	in	Cross Slope	2.0	%
Median width	0.0	ft	Gutter Depression	2.0	in
Rt back of walk	100.0	%	Depth - Velocity Product	1.94	
Lt back of walk	100.0	%	Manning's n	0.016	

APPALOOSA NORTH OF CP F EXISTING

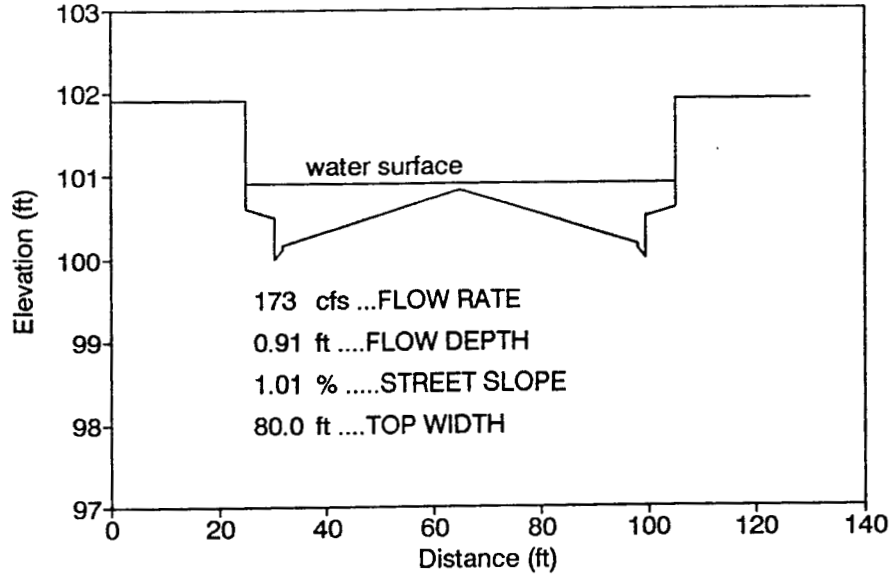


STREET FLOWS

APPALOOSA NORTH OF CP F PROPOSED

Input variables:			**Output variables:**		
Flow depth, d	0.91	ft	Capacity at d	173.0	cfs
Road width	70.0	ft	Velocity	5.2	fps
Crown height	0.83	ft	Top width	80.0	ft
Street slope	1.01	%			
Sidewalk width	5.0	ft	SECTION:		
Curb height	6	in	Cross Slope	2.0	%
Median width	0.0	ft	Gutter Depression	2.0	in
Rt back of walk	100.0	%	Depth - Velocity Product	4.68	
Lt back of walk	100.0	%	Manning's n	0.016	

APPALOOSA NORTH OF CP F PROPOSED

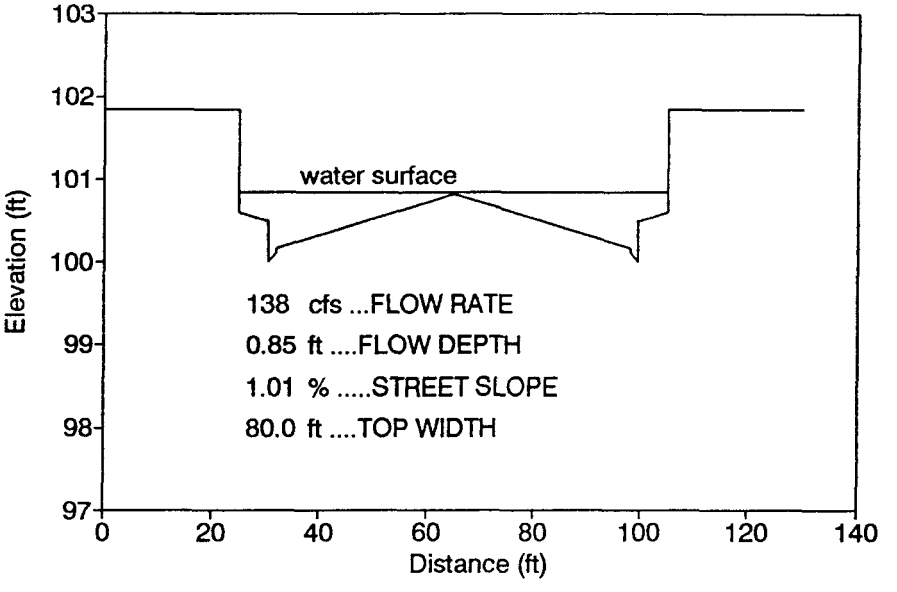


STREET FLOWS

APPALOOSA NORTH OF CP F FUTURE

Input variables:			**Output variables:**		
Flow depth, d	0.85	ft	Capacity at d	138.0	cfs
Road width	70.0	ft	Velocity	4.7	fps
Crown height	0.83	ft	Top width	80.0	ft
Street slope	1.01	%			
Sidewalk width	5.0	ft	SECTION:		
Curb height	6	in	Cross Slope	2.0	%
Median width	0.0	ft	Gutter Depression	2.0	in
Rt back of walk	100.0	%	Depth - Velocity Product	4.03	
Lt back of walk	100.0	%	Manning's n	0.016	

APPALOOSA NORTH OF CP F FUTURE

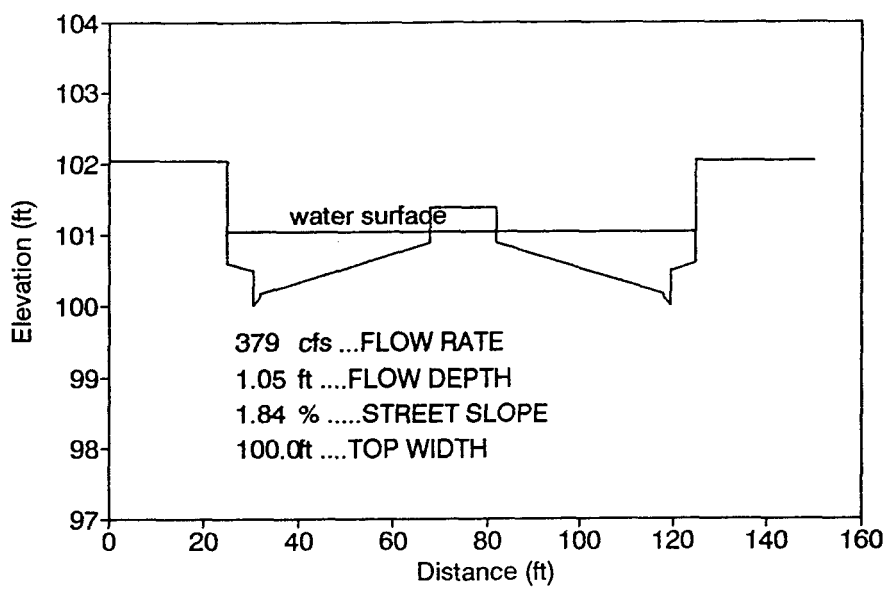


STREET FLOWS

EQUESTRIAN DRIVE @ CP D EXISTING

Input variables:			**Output variables:**		
Flow depth, d	1.05	ft	Capacity at d	379.0	cfs
Road width	90.0	ft	Velocity	8.2	fps
Crown height	0.89	ft	Top width	100.0	ft
Street slope	1.84	%			
Sidewalk width	5.0	ft	SECTION:		
Curb height	6	in	Cross Slope	2.0	%
Median width	14.0	ft	Gutter Depression	2.0	in
Rt back of walk	100.0	%	Depth - Velocity Product	8.63	
Lt back of walk	100.0	%	Manning's n	0.016	

EQUESTRIAN DRIVE @ CP D EXISTING

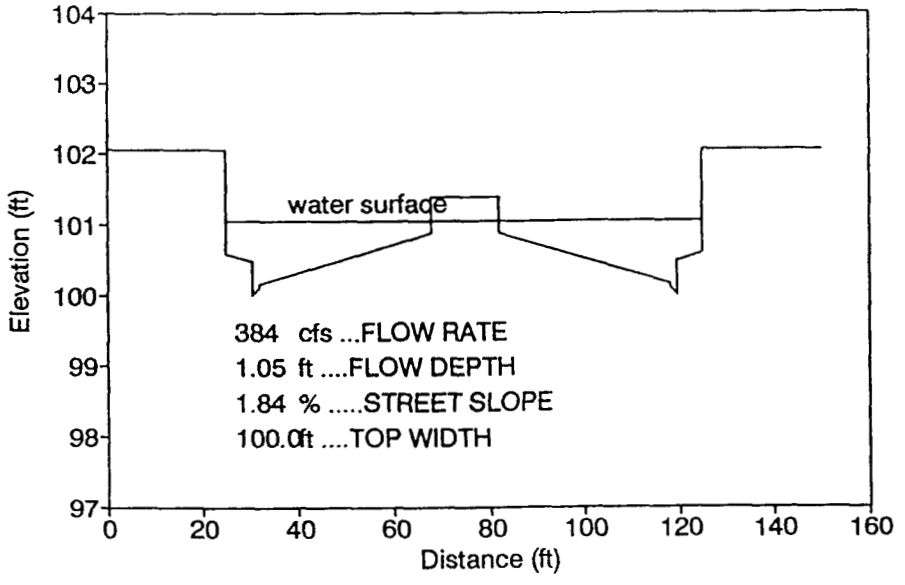


STREET FLOWS

EQUESTRIAN DRIVE @ CP D PROPOSED

Input variables:			**Output variables:**		
Flow depth, d	1.05	ft	Capacity at d	384.0	cfs
Road width	90.0	ft	Velocity	8.3	fps
Crown height	0.89	ft	Top width	100.0	ft
Street slope	1.84	%			
Sidewalk width	5.0	ft	SECTION:		
Curb height	6	in	Cross Slope	2.0	%
Median width	14.0	ft	Gutter Depression	2.0	in
Rt back of walk	100.0	%	Depth - Velocity Product	8.71	
Lt back of walk	100.0	%	Manning's n	0.016	

EQUESTRIAN DRIVE @ CP D PROPOSED

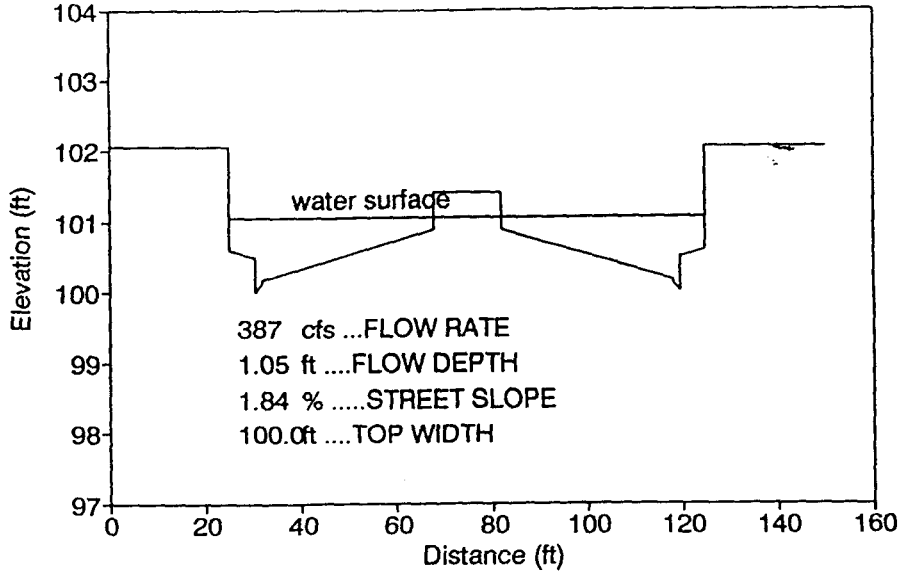


STREET FLOWS

EQUESTRIAN DRIVE @ CP D FUTURE

Input variables:			**Output variables:**		
Flow depth, d	1.05	ft	Capacity at d	387.0	cfs
Road width	90.0	ft	Velocity	8.3	fps
Crown height	0.89	ft	Top width	100.0	ft
Street slope	1.84	%			
Sidewalk width	5.0	ft	SECTION:		
Curb height	6	in	Cross Slope	2.0	%
Median width	14.0	ft	Gutter Depression	2.0	in
Rt back of walk	100.0	%	Depth - Velocity Product	8.76	
Lt back of walk	100.0	%	Manning's n	0.016	

EQUESTRIAN DRIVE @ CP D FUTURE

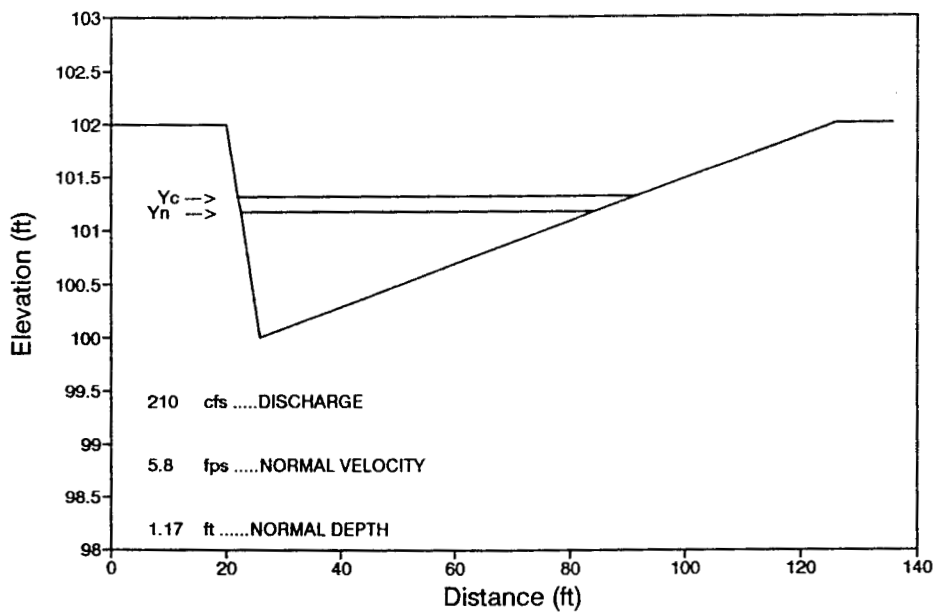


TRAPEZOIDAL CHANNEL

APPALOOSA BERM SECTION

Input variables:			**Output variables:**		
Discharge	210	cfs	Normal depth	1.17	ft
Channel slope	0.0182	ft/ft	Normal velocity	5.82	fps
Manning's n	0.024		Froude number	1.34	
Bottom width	0	ft	Critical depth	1.31	ft
Left side slope	3	H:1	Critical velocity	4.60	fps
Right side slope	50	H:1	Critical slope	0.0097	ft/ft

APPALOOSA BERM SECTION



DRAINAGE STUDY INFORMATION FORM

Name of Development: **SUE MORROW ELEMENTARY SCHOOL** Date: **SEPTEMBER 1996**

Location of Development: a) Descriptive **ELEMENTARY SCHOOL**

b) Sect. **21** Twn. **22S** Rng. **63E**

Name of Owner: **CLARK COUNTY SCHOOL DISTRICT** Assessors Parcel No: **179-21-601-005**

Contact Person Name: **Todd Gammill** Telephone No: **(702) 263-7275**

Firm: **Post, Buckley, Schuh & Jernigan, Inc.**

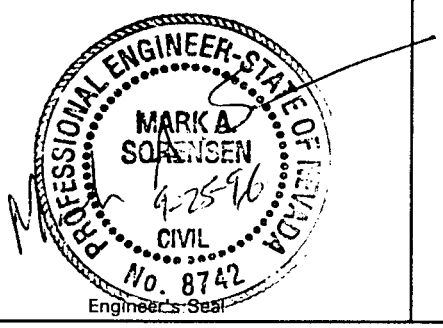
Address: **901 N. Green Valley Parkway Henderson, Nevada 89014**

Type of Land Development/Land Disturbance Process:

- [ ] Rezoning
- [ ] Parcel Map
- [ ] Large Parcel Map
- [X] Subdivision Map
- [ ] Planned Unit Development
- [ ] Building Permit
- [ ] Clearing and Grading Only
- [ ] Other (Please specify below)

1. Total Owned Land Area: At Site: **10 +/- Acres** Being Developed/Disturbed: **10 +/- Acres**
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? [YES*] NO
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? [YES*] NO
4. Proposed type of development (Residential, Commercial, Etc.)? **SCHOOL**
5. Approximate upstream land area which drains to the subject site? **13 +/- mi^2**
6. Has the site drainage been evaluated in the past? [YES] NO

   If yes, please identify documentation: **Conceptual Drainage for Racetrack by PBS&J (1994)**
   Revised Conceptual Drainage Study for the Downs and the Amendment to the Magic Way Plan and Profile by PBS&J (1996)
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
   Blue Lantern Drive (east) and WAPA power easement (north)
8. Briefly describe your proposed schedule for the subject project:
   ASAP



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

- Review and concurrence of the Clark County Regional Flood Control District is required.

Local Entity File No.

Revision	Date

PBS&J Job Number: 51303.00

STANDARD FORM 1

III. OFFSITE DRAINAGE CONDITION HYDROLOGIC ANALYSIS

A. Offsite Drainage Conditions

The offsite drainage conditions for the site have been analyzed in several studies. The study specifically referenced to quantify the offsite flow rate in the temporary channel which traverses the site from south to north (*Revised Conceptual Drainage Study for the Downs and the Amendment to the Magic Way Plan and Profile*) quantified a 100-year peak flow rate at the intersection of Magic Way and the WAPA easement of approximately 2200 cfs. This total flow was derived from two separate offsite areas as described below.

1) The *Conceptual Drainage Study for Racetrack* (PBS&J, 1994) quantified a 100-year peak flow rate of approximately 1415 cfs at the intersection of Magic Way and Equestrian Drive south of the site. This flow rate includes offsite areas southwest of the site extending south of I-515, to approximately the Mission Hills Detention Basin berm (**Figure 4a** shows the entire offsite basin with existing conditions near the site and **Figure 4b** shows developed conditions near the site, as excerpted from the study). The offsite basins and overtopping calculations for Boulder Highway included in the study were rechecked for this study and concurred with. At the intersection of Magic Way and Equestrian Drive, approximately 690 cfs was calculated to weir into the Equestrian Detention Basin with the remaining 725 cfs continuing north on Magic Way. At the intersection of Magic Way and Greyhound Lane, approximately 275 cfs from Greyhound Lane combines with the northerly flow in Magic Way (total of approximately 1000 cfs). It is assumed that, in the existing condition, that this flow is conveyed northwest at this intersection into the 400 foot wide temporary drainage swale which traverses the proposed school site from north to south.

2) The *Design Memorandum for the Equestrian Detention Basin* (Poggemeyer Design Group, 1994) quantified offsite flow rates that impact the current Equestrian Detention Basin site. The predesign report stated that upstream Basin C4C as shown in **Figure 5** (as excerpted from the predesign) is planned to be intercepted by a future CCRFCD Detention Basin (Eastern C-1 Detention Basin) which will be located at the fan apex. Until the construction of this upper detention basin, the predesign report determined that approximately 1200 cfs may impact the Equestrian Detention Basin from Basin C4C. The detention basin was not sized to accept this flow, and it is assumed to overtop the spillway, cross the Magic Way right-of-way and be conveyed to the north in the 400 foot wide temporary drainage swale which traverses the proposed school site.

PROJECT SITE

ON-1 ON-2 ON-3

OFF-1 OFF-2A OFF-2B OFF-2C OFF-3 OFF-4 OFF-5 OFF-6 OFF-7 OFF-8 OFF-9 OFF-10 OFF-11 OFF-12 OFF-13 OFF-14 OFF-15 OFF-16 OFF-17 OFF-18 OFF-19 OFF-20 OFF-21 OFF-22 OFF-23 OFF-24

C5CAa C5CAb C5CB C5DC C5D* C5E* C5F* C5C

* RUNOFF CONTRIBUTED FROM THESE SUBBASINS IS CAPTURED BY THE EQUESTRIAN DETENTION BASIN

EXISTING DRAINAGE CONDITIONS STORM FLOW SUMMARY

Offsite Subbasin ID	Area (mi^2)	Q_{100} (cfs)
Southern Watershed		
OFF-1	.11	108
OFF-2A	.11	67
OFF-2B	.11	66
OFF-2C	.08	46
OFF-3	.14	173
OFF-4	.09	103
OFF-5	.05	40
OFF-6	.03	29
OFF-7	.09	106
OFF-8	.11	94
OFF-9	.15	119
OFF-10	.41	284
OFF-11	.20	214
OFF-12	.07	52
OFF-13	.56	656
OFF-14	.31	116
OFF-15	.34	382
OFF-16	.11	156
OFF-17	.07	58
OFF-18	.03	26
OFF-19	.07	71
OFF-20	.04	39
OFF-21	.05	32
OFF-22	.04	29
OFF-23	.07	38
OFF-24	.04	28
C5CAa	.34	130
Eastern Watershed		
C5CAb	.93	98
C5CB	.21	23
C5DC	1.00	286
C5D	1.66	1214
C5E	1.57	905
C5F	1.34	937

Onsite Subbasin ID	Area (mi^2)	Q_{100} (cfs)
ON-1	.04	13
ON-2	.07	61
ON-3	.06	29

Combination Point	Q_{100} (cfs)
1	747
2	397
3	549
4	3111
5	4474
6	4503
7	136
8	160
9	62
10	298
11	317

Culvert Location/ Size/Type	Assumed HW/D	Q_{100} (cfs)
(A) 36" RCP	1.3	50
(B) 18" CMP	3.0	16
(C) 56" x 36" CMAP	1.4	86
(D) 18" CMP	2.7	15
(E) 24" CMP	2.0	25
(F) 30" CMP	2.2	50

Durch Engineering

by | Scale

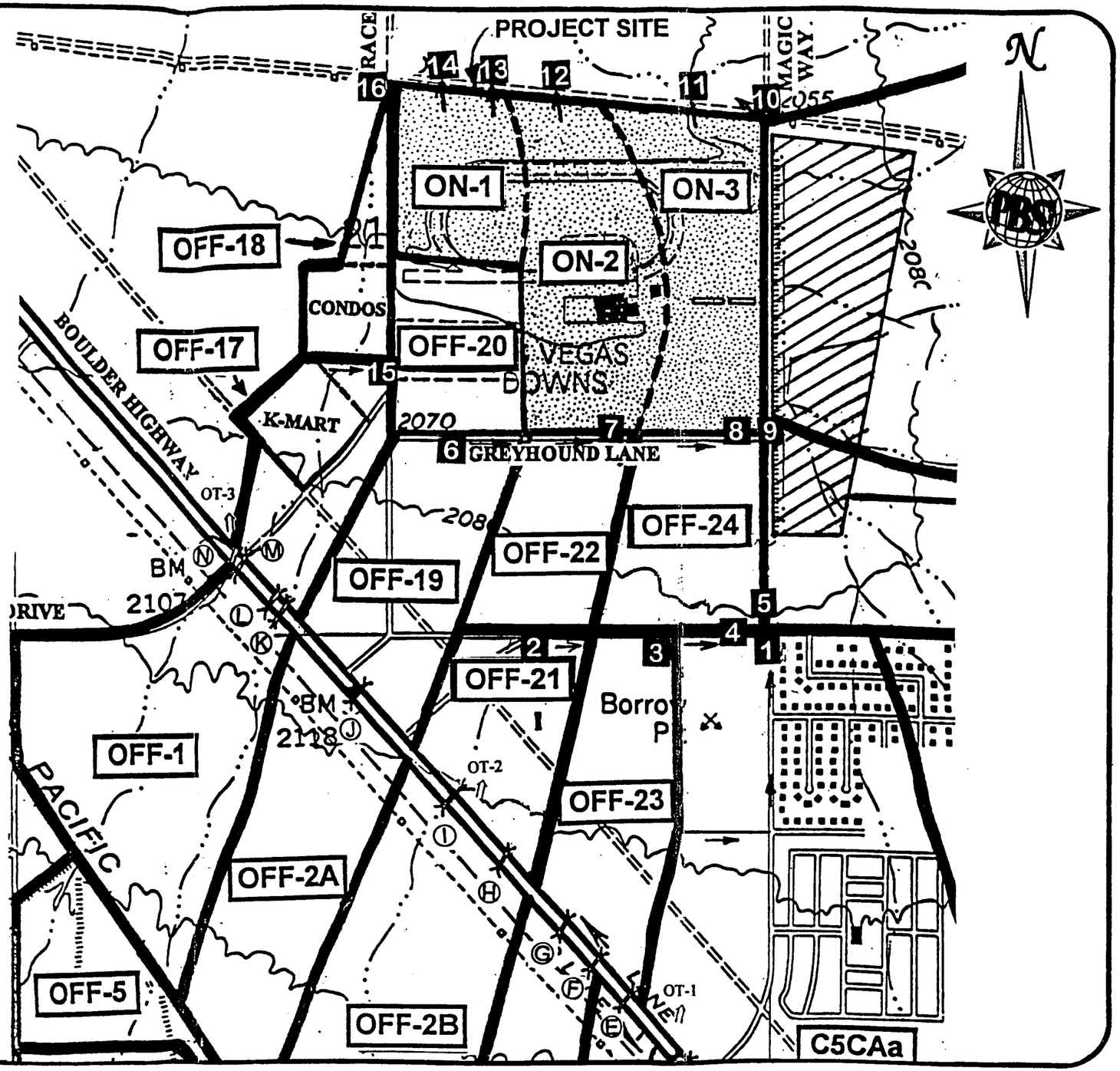
PROPOSED DRAINAGE CONDITIONS STORM FLOW SUMMARY

Offsite Subbasin ID*	Area (mi^2)	Q_{100} (cfs)
OFF-19	.07	119
OFF-20	.04	73
OFF-21	.05	54
OFF-22	.04	50
OFF-23	.06	65
OFF-24	.05	58
C5CAa	.35	236

* *Only those offsite subbasins that experienced increased storm runoff under proposed drainage conditions are summarized. See Figure 1 for the 100-year peak runoff rates for those subbasins not listed here.*

Onsite Subbasin ID	Area (mi^2)	Q_{100} (cfs)
ON-1	.04	49
ON-2	.07	78
ON-3	.06	65

Combination Point	Q_{100} (cfs)	Combination Point	Q_{100} (cfs)
1	839	9	1661
2	404	10	1653
3	185	11	65
4	576	12	78
5	1415	13	71
6	181	14	49
7	230	15	298
8	273	16	317



800 400 0 800 1600 2400

APPROX. SCALE : 1" = 800'

PROPOSED CONDITION DRAINAGE MAP

POST, BUCKLEY, SCHUH & JERNIGAN

ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

FIGURE 4b

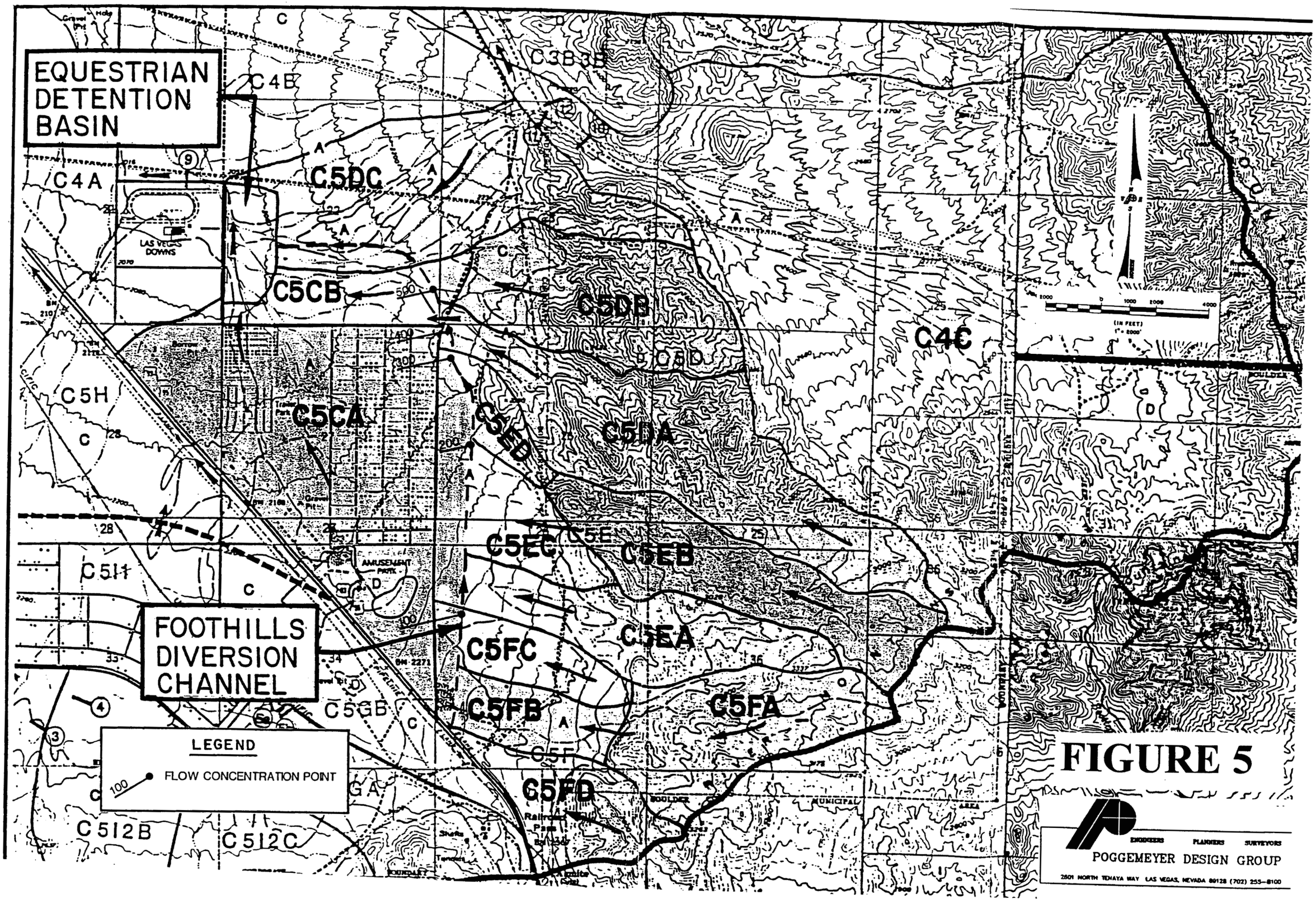


FIGURE 5

ENGINEERS PLANNERS SURVEYORS
POGGEMEYER DESIGN GROUP
2501 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

- *CONCEPTUAL HYDROLOGY STUDY FOR RACE TRACK* BY PBS&J

PROPOSED DRAINAGE CONDITIONS

Under proposed drainage conditions, the site is assumed to be fully developed. Although future drainage conditions are difficult to accurately predict, it was assumed in this scenario that full development of upstream subbasins OFF-17 through OFF-24 and subbasin C5CAa had occurred.

A summary of proposed drainage condition storm flows is included on **Figure 3**. A slight redelineation of subbasins OFF-21 through OFF-24 was required to more accurately depict likely future flow drainage patterns.

Magic Way

As a result of the proposed drainage condition HEC-1 analysis included in **Appendix III**, combined peak 100-year storm runoff within Magic Way at its intersection with Equestrian Way is estimated to be 1415 cfs (CP-5). When combined with the 273 cfs runoff discharged into the Greyhound Lane right-of-way (**CP-8**), a total of 1661 cfs expected to flow adjacent to the project site within the full-street improvements to Magic Way (**CP-8**). Routing of the flow to **CP-10** at the northeast corner of the site reduces its magnitude to 1653 cfs.

The CCRFCD Master Plan Update (CCRFCD, 1991) depicts Magic Way upstream of Equestrian Drive as a "secondary" flood control facility. The preliminary design of the Equestrian Detention Basin does not appear to accept runoff from Magic Way as represented in the MPU, therefore, it is assumed that the Magic Way right-of-way will function as a secondary facility to the northeast corner of the project site. The 1661 cfs flow will be conveyed within the Magic Way right-of-way adjacent to the site at a depth of 2.3 feet and a velocity of 9.5 fps. The resulting depth-to-velocity product (DV) is 22 ft^2/s (see street flow calculations in **Appendix II**). The proposed trapezoidal channel within the 140-foot power easement (**Figure 2**) will likely capture To protect structures adjacent to Magic Way, floodwalls will be constructed to a height 18-inches above the 100-year water surface elevation in Magic Way.

Greyhound Lane

Estimated 100-year peak storm runoff of 230 cfs is discharged into the 80-foot right-of-way of Greyhound Lane at CP-7. This flow will be conveyed within the street at a depth of 1.1 feet and a velocity of 4.4 fps. The resulting DV of

EXISTING DRAINAGE CONDITIONS

Under existing drainage conditions, peak major storm runoff discharged into the Magic Way right-of-way results in approximately 793 cfs at combination point 1, **CP-1** (**Figure 1**). Runoff at **CP-2** (397 cfs) conveys east along the existing levee and combines with storm flows from subbasin OFF-23 at CP-3 to total 549 cfs. When **CP-1** is combined with **CP-3** and routed within Magic Way to the northeast corner of the Racetrack site, the resulting peak 100-year flow rate at **CP-4** is 1326 cfs.

Combined storm runoff at **CP-5** (136 cfs) discharges into a drainage swale that directs flows around the circumference of the existing Triple-J Bingo Hall site and continues north adjacent to the Racetrack Road right-of-way, daylighting near the northeast corner of the site.

Peak major storm runoff of 298 cfs at **CP-9** is conveyed north within the existing half-street of Racetrack Road and combines with runoff contributed from subbasin OFF-18 for a total of 317 cfs at **CP-10**. It should be noted that a portion of the runoff from **CP-9** will be captured by the existing trapezoidal channel adjacent to the west side of the Racetrack Road right-of-way south of Sausalito Road and conveyed north within the 5' x 6' reinforce concrete box (RCB) constructed for the existing Country Hills Condominium site (see **Figure 2**).

The combined 100-year peak storm runoff rate generated by subbasins OFF-22 and ON-2 totals 62 cfs at **CP-7**. Combined peak major storm runoff of 56 cfs is contributed from subbasins OFF-24 and ON-3.

The existing drainage condition HEC-1 analysis is included in Appendix II of this report.

This report is intended to serve as the Addendum to the Conceptual Drainage Study for the Racetrack Development prepared by PBS&J, Inc. This study addresses comments received from the City of Henderson (COH) in a memorandum dated March 12, 1994. Comments contained in the letter included:

Comment #1: **Final approval of this study by the City of Henderson will be contingent upon approval by the Clark County Regional Flood Control District.**

Response: Noted.

Comment #2: **Since a portion of the site is within Zone A according to the Flood Insurance Rate Map for the City of Henderson, a Letter of Map Revision will be required prior to issuance of certificates of occupancy for this project.**

Response: Noted.

Comment #3: **Approval of this study is contingent upon completion of the Equestrian Detention Basin. This basin may not be completed for several years.**

Response: Noted. In the interim, technical drainage studies will be submitted for those portions of the site that can be developed prior to construction of the detention basin (i.e., west of the large wash traversing the site).

Comment #4: **The study should address the impact of the Nevada Department of Transportation drainage facilities being constructed as part of the freeway.**

Response: A revised hydrologic analysis has been performed to provide an estimate of the magnitude of the 100-year storm runoff that: a) discharges through existing culverts traversing beneath the Boulder Highway and, b) overtops the Boulder Highway. The offsite watershed has been redelineated to account for storm runoff from drainage subbasins not previously expected to contribute runoff to the project site. The included Existing Condition Drainage Map (**Figure 1**) summarizes resulting major storm flow rates at points of interest. It should be noted that the proposed Equestrian Detention Basin will capture all storm runoff generated within subbasins C5CAb, C5CB, C5DC, C5D, C5E, and C5F.

APPENDIX V

MISCELLANEOUS EXCERPTS AND INFORMATION

Record of: **Meeting**

Date: August, 15 1996

Location: Clark County Regional Flood Control District

Project: Sue Morrow Elementary School, Race Track, the Downs, Heritage
PBS&J Reference Nos: 51303, 51629, 51911, & 51871

Subject: Equestrian Detention Basin

Prepared by: Mark A. Sorensen, PBS&J

Attendees: Kevin Eubanks, CCRFCD
Steve Roberts, CCRFCD
Shelly Cobau, CCRFCD
Curt Chandler, COH
Mark Sorensen, PBS&J
Todd Gammill, PBS&J

Distribution: Attendees
Vern Harkins, PBS&J
Project Files

PBSJ

This meeting was held to discuss flows discharging from and by-passing the Equestrian Detention Basin and the impacts of those flows on the projects listed above. It was noted that there are two separate flows which are impacting properties downstream of the detention basin.

A flow of 1,200 cfs had been calculated by Dr. French as the proportionate share of flow which will impact the detention basin during a 100-year storm from the alluvial fan northeast of the basin. As this flow will eventually be captured by the proposed East C-1 Detention Basin, it was not considered in the Poggemeyer design for the Equestrian Detention Basin. It was assumed that the 1200 cfs would be discharged over the spillways during the 100-year storm.

The other flow of concern is that which concentrates at the intersection of Magic Way and Equestrian Drive just upstream of the detention basin. An inlet system was included in the detention basin design at this location, however, it appears that a significant flow would by-pass this inlet during a 100-year storm.

As these two flows have significant impacts to the projects listed above (especially the school) as well as other down stream properties, COH and CCRFCD have expressed an interest in first confirming and then mitigating the flows, if possible.

In the meeting it was decided that the 1200 cfs alluvial fan flow hydrology would not be re-checked at this time but that PBS&J would route the alluvial fan flow through the basin in HEC-1 to determine actual spillway discharge. Note that a preliminary calculation by PBS&J indicated no attenuation of the peak spillway discharge but a different method of producing the in-flow hydrograph will be checked. It is expected that PBS&J will complete this run in about a week.

If a large spillway discharge is confirmed for the 100-year storm then CCRFCD and COH have indicated that they will explore the possibility of mitigating this flow until the upstream detention basin is built. Possible mitigation methods discussed include increasing the storage of the Equestrian Basin by an increase in basin excavation or installation of temporary "batter boards" on the spillway. Also, discussed was allowing the spillway to discharge during the 100-year storm but collecting that flow before it crosses Magic way and directing it north to the proposed linear park/drainage channel along the existing power line easement between the school and the Downs. While this would not eliminate impacts to all downstream properties it would greatly benefit the school site and portions of Race Track. Methods of accomplishing this include a temporary berm along east side of Magic Way to the power line easement or day-lighting the existing energy dissipation channel (included as part of the Equestrian Detention Basin spillway) across Magic Way to the power line easement. Both of these proposals could involve problems with utilities and access on Magic Way (note that the existing detention basin low flow outfall already limits access on Magic Way). It was not determined in this meeting how the design, funding, and construction for any of these solutions would be handled or how the schedule for a solution would impact the schedule for adjacent developments such as the school.

In the meeting it was decided that Poggemeyer and/or VTN (VTN prepared the C-1 channel hydrologic analysis which was used as the basis of design for the Equestrian Detention) would be requested to review the flows impacting the intersection of Magic Way and Equestrian Drive and the adequacy of the existing inlet structure. It should be noted that examination of the HEC-1 analysis prepared by Nybo Engineers for the Downs and Wellington Manor indicates a flow of about 860 cfs at that location (with some of the flow from west of Boulder Highway). Nybo indicates that "culvert capacities for Boulder Highway were provided to us by the City's consultant for the Equestrian Detention Basin." However, PBS&J's review of the HEC-1 runs in the Pre-design Report for the Equestrian Detention Basin by Poggemeyer appears to indicate only a flow of 699 cfs at the intersection. This flow is generated from Basin C5CA which is entirely east of Boulder Highway. Therefore, in a study prepared for the Race Track, PBS&J reanalyzed the intersection of Magic Way and Equestrian Drive, including flows overtopping Boulder Highway. A 100-year peak flow of 1,415 cfs was determined. In a subsequent update to the Downs, PBS&J determined that of the 1,415 cfs about 700 cfs would not be collected by the inlet structure being constructed at the intersection as part of the Equestrian Detention Basin.

Should Poggemeyer and/or VTN confirm that a large flow reaches the intersection of Magic Way and Equestrian Drive and that a large portion of that flow will by-pass the existing inlet then CCRFCD and COH have indicated that they will explore the possibility of collecting this flow. This may require extensive re-design (warping) of the intersection to increase weir flow into the inlet structure or construction of an extensive storm drain system. The capacity of the existing inlet structure and whether or not the additional flow will be adequately retained in the detention basin will need to be checked (regarding the timing of hydrographs, etc.). If either check shows a deficiency then corrective measures could be substantial. As with the 1,200 cfs spillway flow, design, funding and scheduling issues for collection of the flows on Magic Way were not addressed in this meeting.

It is expected that another meeting will be held with the COH and CCRFCD, within a week or so, after the flows have been checked to discuss possible solutions. A meeting with affected property owners discussing scheduling and design impacts will likely be held soon after that meeting.

jj

September 6, 1996

Curt Chandler
City of Henderson Department of Public Works
240 Water St. Henderson, Nevada 89015

RE: Equestrian Detention Basin as it relates to the Sue Morrow Elementary School, Race Track, the Downs, and Heritage
PBS&J Reference Nos. 51303, 51629, 51911, & 51871

Dear Curt:

Pursuant to our meeting of August 15, 1996 PBS&J performed additional hydrologic and hydraulic analysis of the Equestrian Detention Basin. Specifically PBS&J confirmed that the stage-volume-discharge relationship included in the design HEC-1 for the basin closely matched the final detention basin design drawings and then added an inflow hydrograph for the alluvial fan northeast of the basin to the design HEC-1 for the basin. The inflow hydrograph for the fan was created from the total hydrograph for the fan by two separate methods. Both methods modeled a peak flow into the basin from the fan of 1200 cfs (about half of the total fan flow based on previous fan analysis by others) but with different percentages of the total volume of the fan flow. Unfortunately neither method showed any attenuation of the peak flow from the fan and instead showed a peak flow over the spillway about equal to the added inflow.

Additionally, PBS&J analyzed the effect of adding temporary batter-boards on the existing spillway to retain the added fan flow. PBS&J determined that batter-boards would have to be about 2.2 feet high (with no freeboard) to eliminate spillway flow for the 100-year storm. However, boards of this height eliminate the effectiveness of the emergency spillway in conveying the PMF (the top of detention basin berm is 6.5 feet above the top of spillway and most of this is needed for the PMF). In order to function as hoped the batter-boards would need to be relied on to hold over two feet of water but to fail for any flow depth a foot or two above this. This does not appear feasible.

The analysis indicated that the increase in detention basin storage required to retain the 100-year fan flow is about 90 acre-feet. Obviously this could be achieved by additional basin excavation as well as the batter-boards, however design and funding issues would be problematic. In any event the issue of spillway flow occurring during a 100-year storm is unresolved as it relates to the design of the subject projects (especially the school).

To date PBS&J is assuming that the issue of spillway over-topping will be resolved relative to the school design. It is assumed that if the fan flows cannot be retained by the basin then the

spillway discharge will be conveyed in a roadside ditch on the **east** side of Magic Way or perhaps the existing energy dissipater channel built with the spillway could be used. In either case day-lighting across Magic Way to the power line easement could be difficult and design, funding, and scheduling of the channel is undecided. If yourself or the Clark County Regional Flood Control District (CCRFCD) have opinions in this regard (including if you feel that PBS&J should proceed with design of a roadside ditch the east side of Magic Way) please contact us as soon as possible.

Based on your conversations with Poggemeyer and VTN it does not appear that the potential of large flows from west of Boulder Highway by-passing the detention basin inlet system at the intersection of Magic Way and Equestrian Drive were addressed in the design or pre-design. It appears to PBS&J that a flow of 699 cfs is included in the VTN HEC-1 run for this area. Some of this flow would be collected by the basin but it does not appear to account for significant culvert and over-topping flow across Boulder Highway in the general vicinity of Magic Way. PBS&J calculated a 100-year flow at the intersection of Magic and Equestrian of 1415 cfs based on modification of a previous analysis by Nybo Engineers. Of this the PBS&J analysis indicates about 700 cfs would bypass the basin inlet. A double-check of this analysis by PBS&J indicates no flaws in the peak flow determination while the flow calculated to bypass the basin may be a little high because of the lack of curb at the inlet. Even so the inlet system is limited by the box culvert capacity. PBS&J welcomes a re-look at these calculations by Poggemeyer, VTN, CCRFCD or yourself. However, assuming the calculations are generally accepted as valid the problems of detention basin by-pass will obviously remain unresolved. To date PBS&J is assuming a channel will need to be included in the school design to accommodate the flows. Again, if yourself or the CCRFCD have any opinions in this matter (including if you feel that an improved inlet system should be designed at Magic and Equestrian) please contact us as soon as possible.

Sincerely,

Post, Buckley, Schuh & Jernigan, Inc.

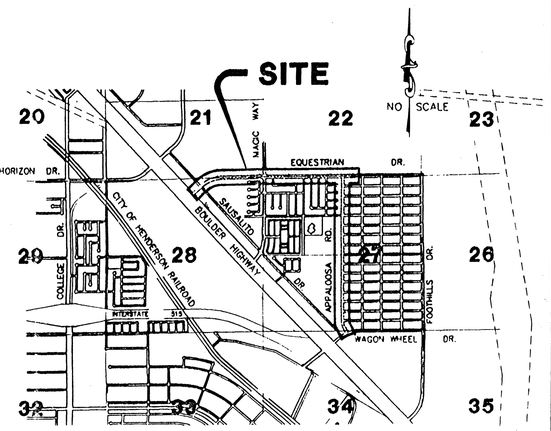
Mark A. Sorensen, P.E.
Project Manager

cc Kevin Eubanks P.E., CCRFCD
Vern Harkins P.E., PBS&J

EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS
CONTRACT No. 96-97•04

FUNDED BY THE
REGIONAL TRANSPORTATION COMMISSION
OF CLARK COUNTY

LOCATION MAP



Call before you Dig.
1-800-227-2600
UNDERGROUND SERVICE (USA)

REVISIONS

No.	DESCRIPTION	BY	DATE	APPROVAL
A	ADDED SEWER, SHTS. 6,7,8, 10 THRU 15, 23, 24	S.G.	6-5-97	

CITY OF HENDERSON
CLARK COUNTY, NEVADA
DEPARTMENT OF PUBLIC WORKS

MAYOR
JAMES B. GIBSON

CITY COUNCIL
ARTHUR A. HAFEN
JACK CLARK
AMANDA M. CYPHERS
DAVID A. WOOD

CITY MANAGER
PHILIP D. SPEIGHT

DIRECTOR OF PUBLIC WORKS
MARK T. CALHOUN

INDEX OF SHEETS

No.	DESCRIPTION
1.	COVER, SIGNATURE, & LOCATION SHEET
2.	HORIZONTAL CONTROL PLAN
3.	EQUESTRIAN DR. – STA. 3+00.00 TO STA. 9+95.00
4.	EQUESTRIAN DR. – STA. 9+95.00 TO STA. 19+00.00
5.	EQUESTRIAN DR. – STA. 19+00.00 TO STA. 29+00.00
6.	EQUESTRIAN DR. – STA. 29+00.00 TO STA. 39+00.00
7.	EQUESTRIAN DR. – STA. 39+00.00 TO STA. 48+00.00
8.	EQUESTRIAN DR. – STA. 48+00.00 TO STA. 58+00.00
9.	EQUESTRIAN DR. – STA. 58+00.00 TO STA. 66+00.00
10.	APPALOOSA RD. – STA. 0+00.00 TO STA. 8+00.00
11.	APPALOOSA RD. – STA. 8+00.00 TO STA. 18+00.00
12.	APPALOOSA RD. – STA. 18+00.00 TO STA. 28+00.00
13.	APPALOOSA RD. – STA. 28+00.00 TO STA. 38+00.00
14.	APPALOOSA RD. – STA. 38+00.00 TO STA. 48+00.00
15.	APPALOOSA RD. – STA. 48+00.00 TO STA. 54+11.36
16.	EQUESTRIAN DR. – STRIPING AND SIGNAGE
17.	EQUESTRIAN DR. – STRIPING AND SIGNAGE
18.	EQUESTRIAN DR. / APPALOOSA RD. – STRIPING & SIGNAGE
19.	APPALOOSA RD. – STRIPING AND SIGNAGE
20.	APPALOOSA RD. – STRIPING AND SIGNAGE
21.	TRAFFIC SIGNAL – BOULDER HWY./ EQUESTRIAN DR.
22.	MISC. DETAILS
23.	OFFSITE SEWER PLAN
24.	OFFSITE SEWER PROFILE

APPROVAL

TITLE	APPROVED	DATE
DIRECTOR OF PUBLIC WORKS	Mark T. Calhoun	8-7-97
FLOOD CONTROL COORDINATOR	Curt Meador	4-17-97
UTILITY SERVICES MANAGER	Michael A. Maine for Les	4.17.97
ENGINEERING SERVICES MANAGER	Darrin Gale	4/17/97
SURVEY / RIGHT OF WAY		4.17.97
NEW DEVELOPMENT	Jean Vas	4-17-97
FIRE PROTECTION	Allen Hudson for JEM	4/17/97

AGENCY APPROVAL

AGENCY	NO SERVICE	REVIEWED BY	DATE
R.T.C. DIRECTOR			8/6/97
N.D.O.T. DIST. ENGINEER	See Traffic Permit 58-97		4/24/97
NEVADA POWER CO.			4/28/97
SPRINT			4/14/97
SOUTHWEST GAS CORP.			4/16/97
B.M.I.			

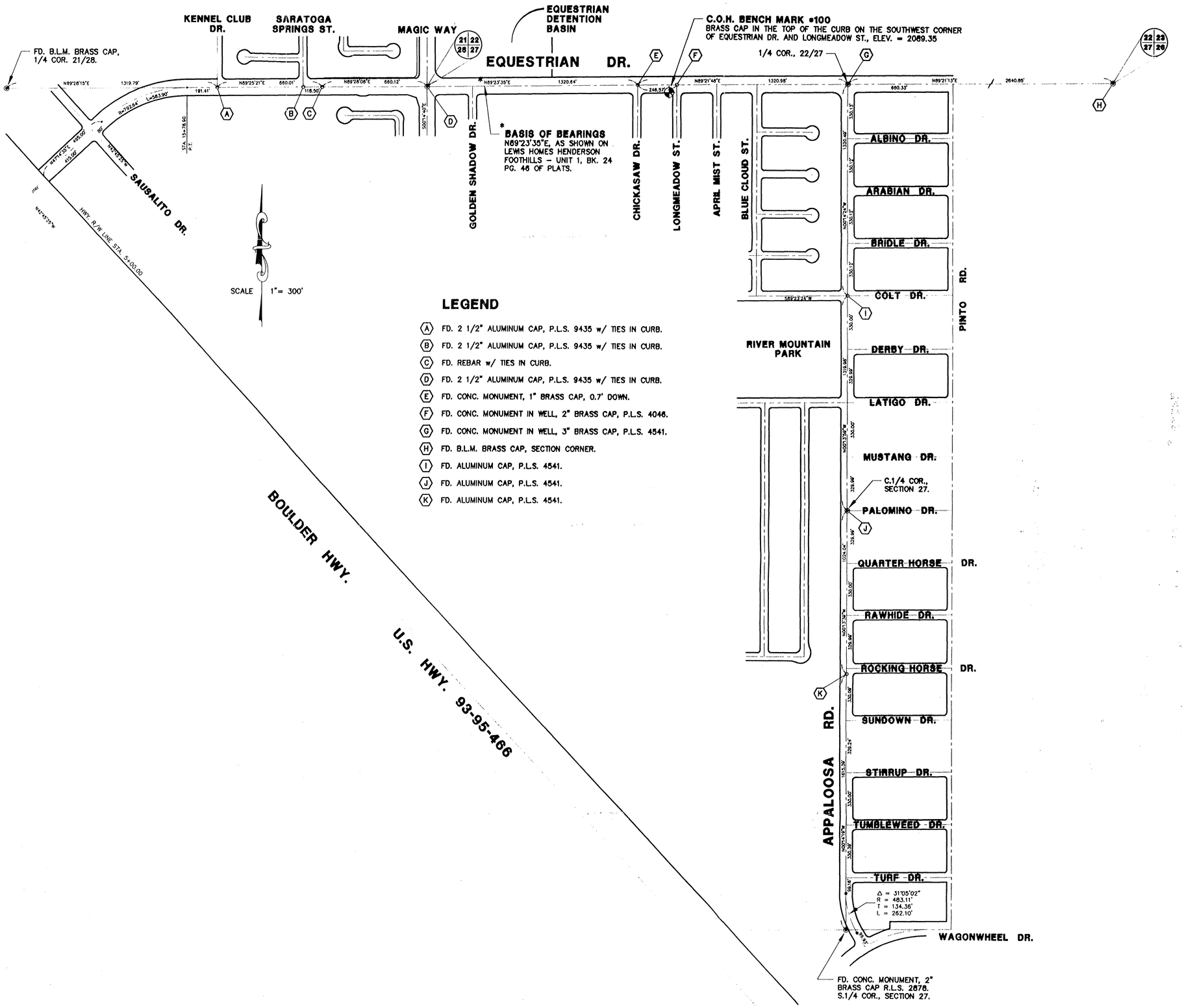
EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS
CONTRACT No. 96-97•04

PROJECT No. 9219 9304

DATE : JULY, 1996

DRAWING No.
04709

SHEET No. 1



LEGEND

- (A) FD. 2 1/2" ALUMINUM CAP, P.L.S. 9435 w/ TIES IN CURB.
- (B) FD. 2 1/2" ALUMINUM CAP, P.L.S. 9435 w/ TIES IN CURB.
- (C) FD. REBAR w/ TIES IN CURB.
- (D) FD. 2 1/2" ALUMINUM CAP, P.L.S. 9435 w/ TIES IN CURB.
- (E) FD. CONC. MONUMENT, 1" BRASS CAP, 0.7' DOWN.
- (F) FD. CONC. MONUMENT IN WELL, 2" BRASS CAP, P.L.S. 4046.
- (G) FD. CONC. MONUMENT IN WELL, 3" BRASS CAP, P.L.S. 4541.
- (H) FD. B.L.M. BRASS CAP, SECTION CORNER.
- (I) FD. ALUMINUM CAP, P.L.S. 4541.
- (J) FD. ALUMINUM CAP, P.L.S. 4541.
- (K) FD. ALUMINUM CAP, P.L.S. 4541.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE MOST RECENT EDITION OF DESIGN AND CONSTRUCTION STANDARDS OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST REVISION, AND THE UNIFORM STD. DWGS. CLARK COUNTY AREA, LATEST REVISION, AS ADOPTED BY THE CITY OF HENDERSON.
2. 48 HOURS PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL CONTACT

CITY OF HENDERSON	PHONE	(702) 565-2106
NEVADA POWER COMPANY	PHONE	1-800-227-2600
CENTRAL TELEPHONE COMPANY	PHONE	1-800-227-2600
SOUTHWEST GAS CORPORATION	PHONE	1-800-227-2600
COMMUNITY CABLE T.V.	PHONE	1-800-227-2600

3. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM INFORMATION RECEIVED FROM THE APPLICABLE UTILITY CO'S. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN, OR NOT IN THE LOCATION SHOWN ON THE DRAWINGS. CONTRACTOR TO VERIFY THE EXACT LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITY REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE UNIFORM STANDARD SPECIFICATIONS, THE CONTRACTOR SHALL USE EXTREME CAUTION WORKING OVER OR NEAR EXISTING GAS MAINS.
4. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING IMPROVEMENTS, WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTORS OPERATIONS SHALL BE REPAIRED OR RECONSTRUCTED AT THE CONTRACTORS EXPENSE TO THE SATISFACTION OF THE ENGINEER.
5. THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALLS, FENCES, SIGNS, STRUCTURES, LIGHTS, OR ANY EXISTING IMPROVEMENTS OUTSIDE OF STREET RIGHT-OF-WAY, EXCEPT WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OR BY THE ENGINEER.
6. TREES, SHRUBS, LAWNS, WALLS, FENCES, SIGNS, STRUCTURES, LIGHTS AND OTHER EXISTING IMPROVEMENTS WITHIN STREET RIGHT-OF-WAY SHALL BE REMOVED WHERE SHOWN ON THE CONTRACT DRAWINGS, AND AS REQUIRED BY THE ENGINEER.
7. REPLACEMENT, RELOCATION OR RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING SPRINKLER SYSTEMS, LAWNS, FENCES, WALLS, SIGNS, STEPS, SIDEWALKS, DRIVEWAYS, LAWN LIGHTS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE AS REQUIRED BY THE ENGINEER.
8. THE CONTRACTOR SHALL BACK FILL AND FINE GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE ENGINEER, WHERE EXISTING LAWNS ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS, THE CONTRACTOR SHALL RE-SEED AND/OR SOD THE AFFECTED AREA TO A CONDITION EQUAL TO, OR BETTER THAN EXISTED PRIOR TO CONSTRUCTION.
9. ALL BARRICADING AND TEMPORARY TRAFFIC CONTROL DEVICES OR METHODS USED DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "NEVADA TRAFFIC CONTROL MANUAL," 1985, PUBLISHED BY THE STATE OF NEVADA DEPARTMENT OF HIGHWAYS, EXCEPT AS OTHERWISE PROVIDED IN THE CONTRACT SPECIFICATIONS OR AS REQUIRED BY THE ENGINEER.
10. AT THE TIME OF PRE-CONSTRUCTION CONFERENCE, THE CONTRACTOR SHALL FURNISH, FOR APPROVAL, A TRAFFIC BARRICADING PLAN AND THE METHOD OF MAINTAINING PUBLIC CONVEYANCE AND SAFETY THROUGHOUT THE CONSTRUCTION AREA. TRAFFIC BARRICADING PLANS SHALL COMPLY WITH APPLICABLE PORTIONS OF SECTIONS 624 AND 625 OF THE STANDARD SPECIFICATIONS. THE TRAFFIC CONTROL MANUAL AND APPLICABLE CITY ORDINANCES.
11. REMOVAL OR RELOCATION OF POWER POLES, TELEPHONE POLES, JOINTLY-OWNED POLES, AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS REQUIRED TO BE CONSTRUCTED UNDER THIS CONTRACT, SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE UTILITY COMPANY. SEE PARAGRAPH 105.6 OF THE STANDARD SPECIFICATIONS.
12. UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL WATER SERVICES AND METERS WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL EXISTING SANITARY, WATER AND STORM SEWER MANHOLES TO THE FINAL FINISH GRADES IN ACCORDANCE WITH SECTION 609 OF THE "STANDARD SPECIFICATIONS", AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THE CONTRACT DRAWINGS. THE VERTICAL ADJUSTMENTS OF ALL WATER VALVE BOXES SHALL BE IN ACCORDANCE WITH THE DETAILS SHOWN ON THE CONTRACT DRAWINGS. SEE PARAGRAPH 105.06 OF STANDARD SPECIFICATIONS.
14. THE CENTRAL TELEPHONE COMPANY SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL TELEPHONE COMPANY MANHOLES TO THE FINAL FINISH GRADES AS SHOWN ON THE CONTRACT DRAWINGS.
15. THE SOUTHWEST GAS CORPORATION SHALL BE RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL GAS LINES AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS. SEE PARAGRAPH 105.06 OF STANDARD SPECIFICATIONS.
16. ALL EXISTING TRAFFIC SIGNS TO BE REMOVED SHALL BE SALVAGED BY THE CONTRACTOR AND DELIVERED TO THE CITY OF HENDERSON UNLESS OTHERWISE SHOWN OR REQUIRED IN THE SPECIFICATIONS.
17. EXACT LOCATION OF ALL SAW CUTS SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
18. WHERE SHOWN ON THE DRAWING(S), THE CONTRACTOR SHALL ABANDON THE EXISTING FIRE HYDRANT(S) BY REMOVING BOTH THE UPPER AND LOWER BARRELS OF THE FIRE HYDRANT SO THAT NO PORTION OF THE REMAINING FIRE HYDRANT ASSEMBLY IS CLOSER THAN TWO(2) FEET TO THE EXISTING GRADE. THE EXISTING HYDRANT SHALL BE DELIVERED TO THE CITY. THE EXISTING VALVE SHALL BE ABANDONED IN A CLOSED POSITION AND A MINIMUM OF THE TOP 12" OF THE VALVE BOX REMOVED. THE REMAINING PORTION OF THE VALVE BOX SHALL BE FILLED WITH CONCRETE HAVING A COMPRESSIVE STRENGTH OF AT LEAST 2,000 PSI. THE LATERAL SHALL BE CUT AND CAPPED WHERE INDICATED. WHERE A JOINT OR COUPLING IN THE EXISTING PIPE IS UNCOVERED AT THE CUT AND A CONCRETE THRUST BLOCK SHALL BE INSTALLED AT ALL CUT AND CAP LOCATIONS IN ACCORDANCE WITH THE PROVISIONS OF THE DISTRICT'S STANDARD PLATE NO. 5.

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS

EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

HORIZONTAL CONTROL PLAN

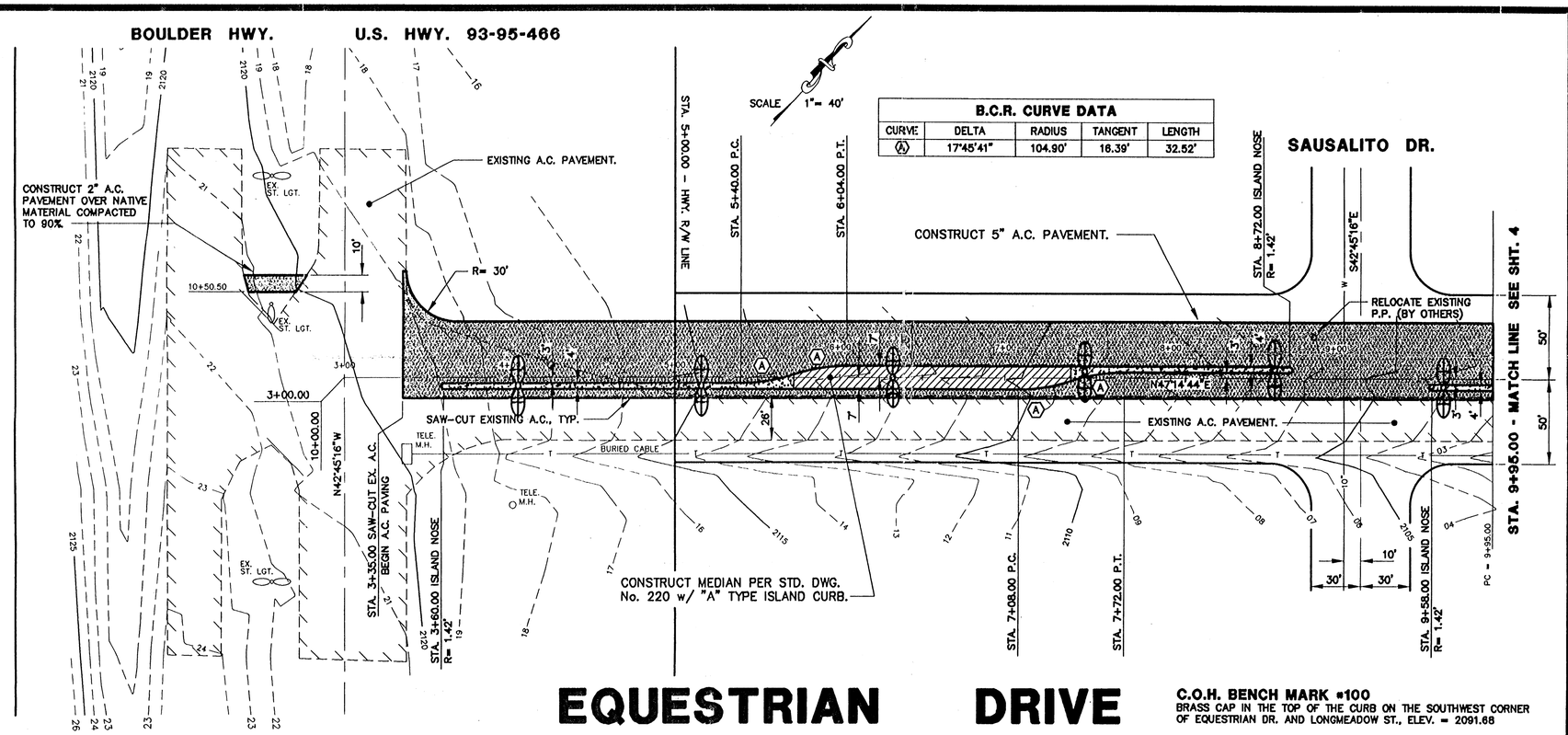
SCALE	DSGN.: R.A.M.	DWG. FILE	SHT. NO.	TOTAL SHTS.
1"= 300'	DRWN.: J.C.	EQ-02	2	24
PROJ No. 9219/9304	CK'D.:	DATE 7/96		

APPROVAL

ROBERT A. MURNANE 8/7/96

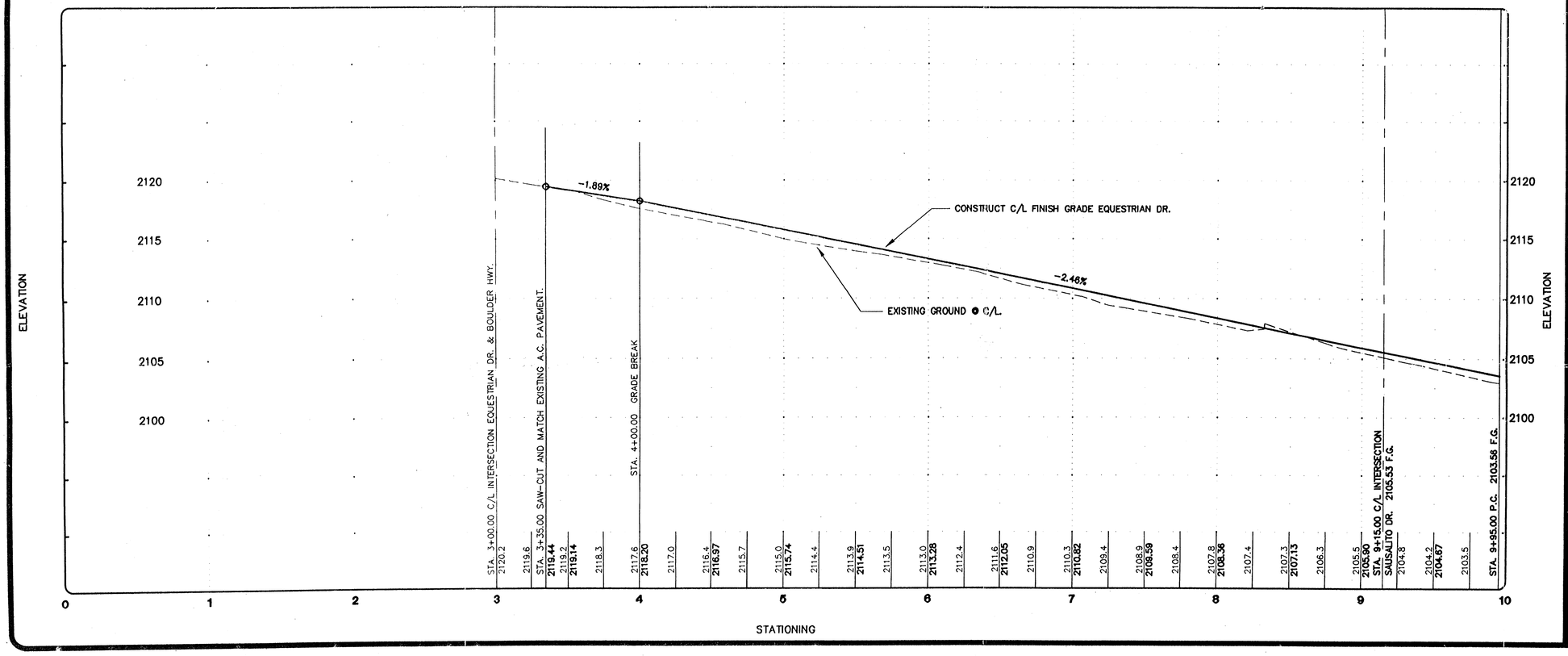
KEVIN L. HILL

DWG. NO. 04709



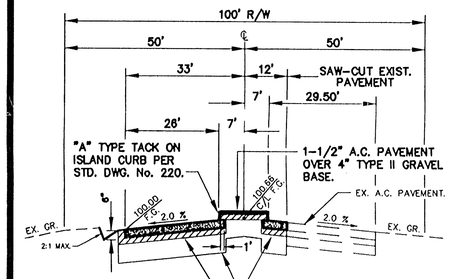
EQUESTRIAN DRIVE

C.O.H. BENCH MARK #100
BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DR. AND LONGMEADOW ST., ELEV. = 2091.68



QUANTITIES THIS SHEET

5" A.C. PAVEMENT	3,120 SQ. YDS.
2" A.C. PAVEMENT	37 SQ. YDS.
4" TYPE II GRAVEL BASE	3,270 SQ. YDS.
"A" TYPE ISLAND CURB	1,119 LIN. FT.
4" CONC. (MEDIAN ISLAND)	1,200 SQ. FT.
1-1/2" A.C. PAVEMENT	228 SQ. YDS.
A.C. PAVEMENT REMOVAL	526 SQ. YDS.
DOUBLE MAST 250W HPS LUMINAIRE ASS'Y.	6 EACH



TYP. STREET SECTION - EQUESTRIAN
STA. 3+35.00 TO STA. 17+72.31
NO SCALE

REFERENCE MAP

HORIZON DR. (EAST) APPROACH -- DWG. No. 01402
10" WATER LINE -- DWG. No. 01493

ENGINEERS SEAL
REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
ROBERT A. MURNANE No. 9850
9/1/97

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
IT'S THE LAW
1-800-227-2600
UNDERGROUND SERVICE (USA)
Call before you Dig.

FILE NAME : EQ-03.DWG
FORMAT : ADCADD, R-12, c3
PROJECT No. 9219 & 9304
CONTRACT No. 98-97*04

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPROVAL

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

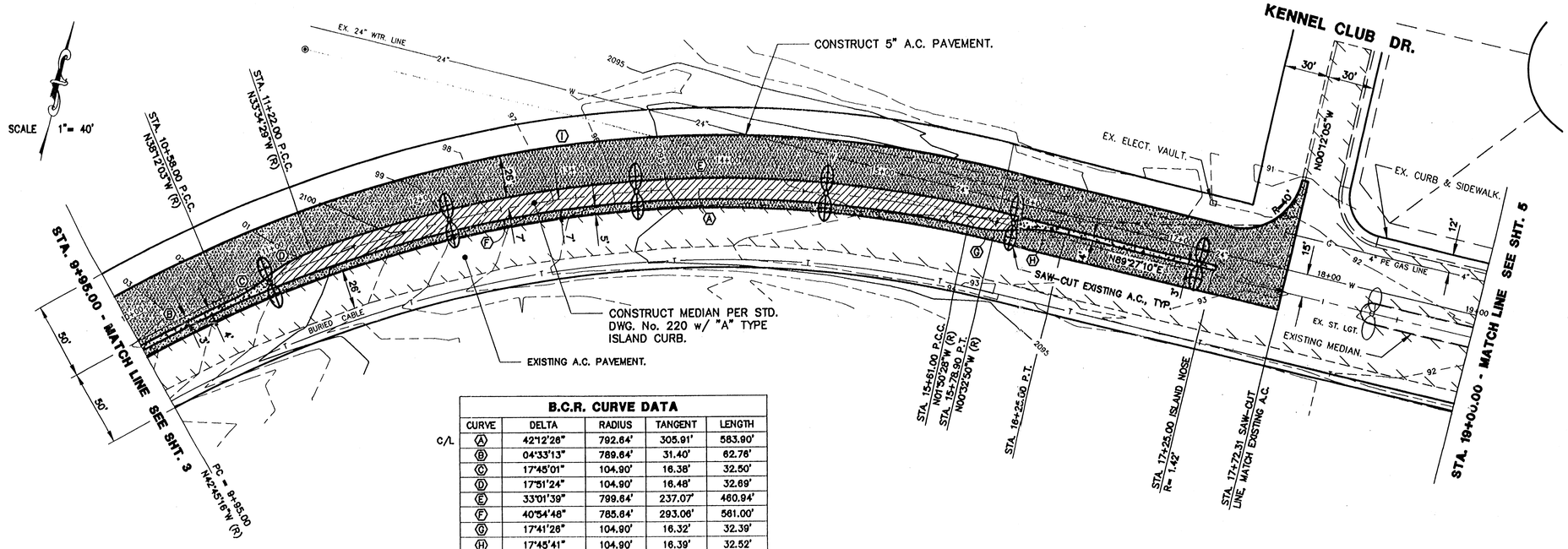
STA. 3+00.00 TO STA. 9+95.00

SCALE					
HOR : 1"= 40'	DSGN : R.A.M.	DWG. FILE EQ-03	SHT. NO. 3	TOTAL SHTS. 24
VERT : 1"= 5'	DRWN : J.C.	DATE 7/96		
	CK'D :			

APPROVAL
ROBERT A. MURNANE 9/7/97
KEVIN L. HILL

DWG. NO. 04709

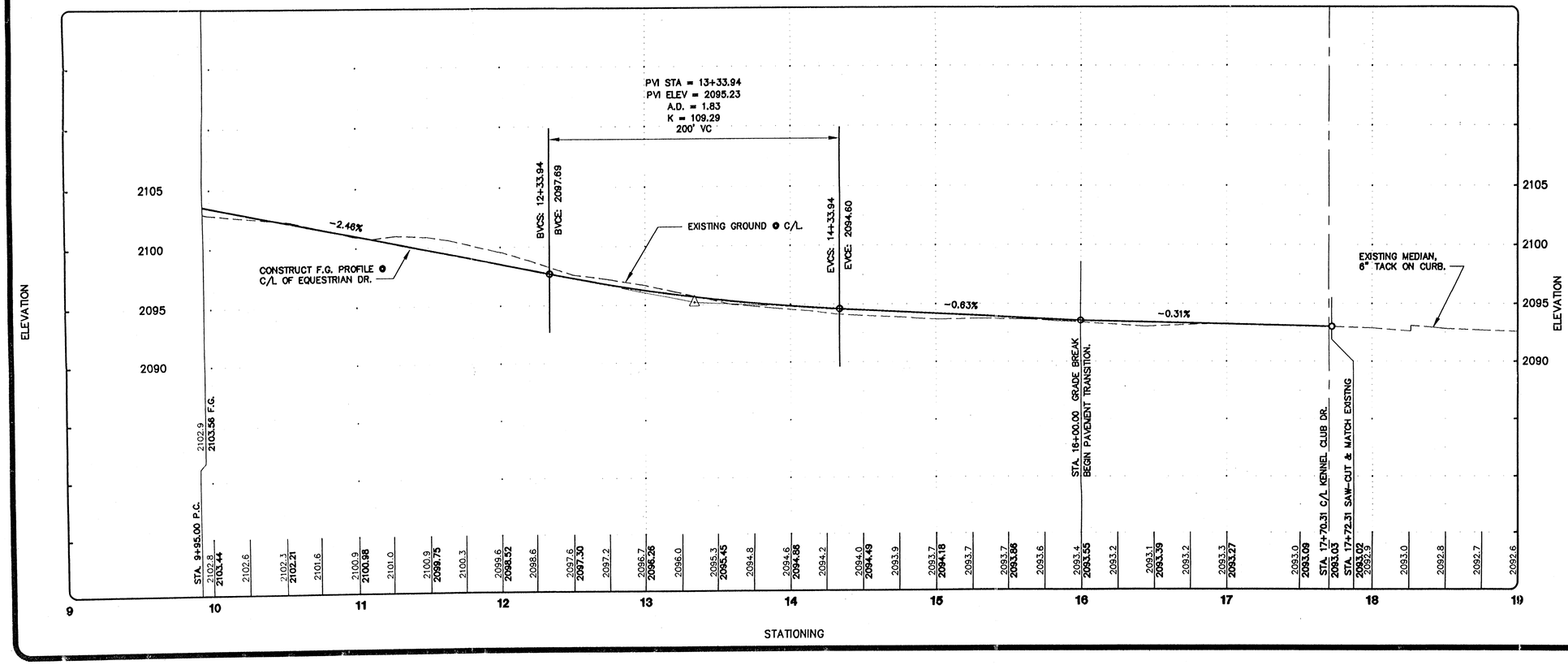
C:\DRAW\eq-03 Wed Aug 06 15:49:12 1997



B.C.R. CURVE DATA					
C/L	CURVE	DELTA	RADIUS	TANGENT	LENGTH
	Ⓐ	42°12'26"	792.64'	305.91'	583.90'
	Ⓑ	04°33'13"	789.64'	31.40'	62.76'
	Ⓒ	17°45'01"	104.90'	16.38'	32.50'
	Ⓓ	17°51'24"	104.90'	16.48'	32.69'
	Ⓔ	33°01'39"	799.64'	237.07'	460.94'
	Ⓕ	40°54'48"	785.64'	293.06'	561.00'
	Ⓖ	17°41'28"	104.90'	16.32'	32.39'
	Ⓗ	17°45'41"	104.90'	16.39'	32.52'
	Ⓘ	42°12'26"	825.64'	318.65'	608.21'

EQUESTRIAN DRIVE

C.O.H. BENCH MARK #100
BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DR. AND LONGMEADOW ST., ELEV. = 2091.68



QUANTITIES THIS SHEET

5" A.C. PAVEMENT	3,100 SQ. YDS.
4" TYPE II GRAVEL BASE	3,283 SQ. YDS.
"A" TYPE ISLAND CURB	1,468 LIN. FT.
4" CONC. (MEDIAN ISLAND)	751 SQ. FT.
1-1/2" A.C. PAVEMENT	706 SQ. YDS.
A.C. PAVEMENT REMOVAL	911 SQ. YDS.
DOUBLE MAST 250W HPS LUMINAIRE ASS'Y.	6 EACH

REFERENCE MAP

WELLINGTON MANOR -- DWG. No. 04194
HORIZON DR. (EAST) APPROACH -- DWG. No. 01402

ENGINEERS SEAL — REGISTERED PROFESSIONAL ENGINEER — STATE OF NEVADA — No. 9880 — ROBERT MURNANE (VOID) — 8/7/97

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
IT'S THE LAW
1-800-227-2600
UNDERGROUND SERVICE (USA)
Call before you Dig.

FILE NAME : EQ-04.DWG — PROJECT No. 9219 & 9304
FORMAT : ADCADD, R-12, c3 — CONTRACT No. 98-97*04

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPROVAL

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

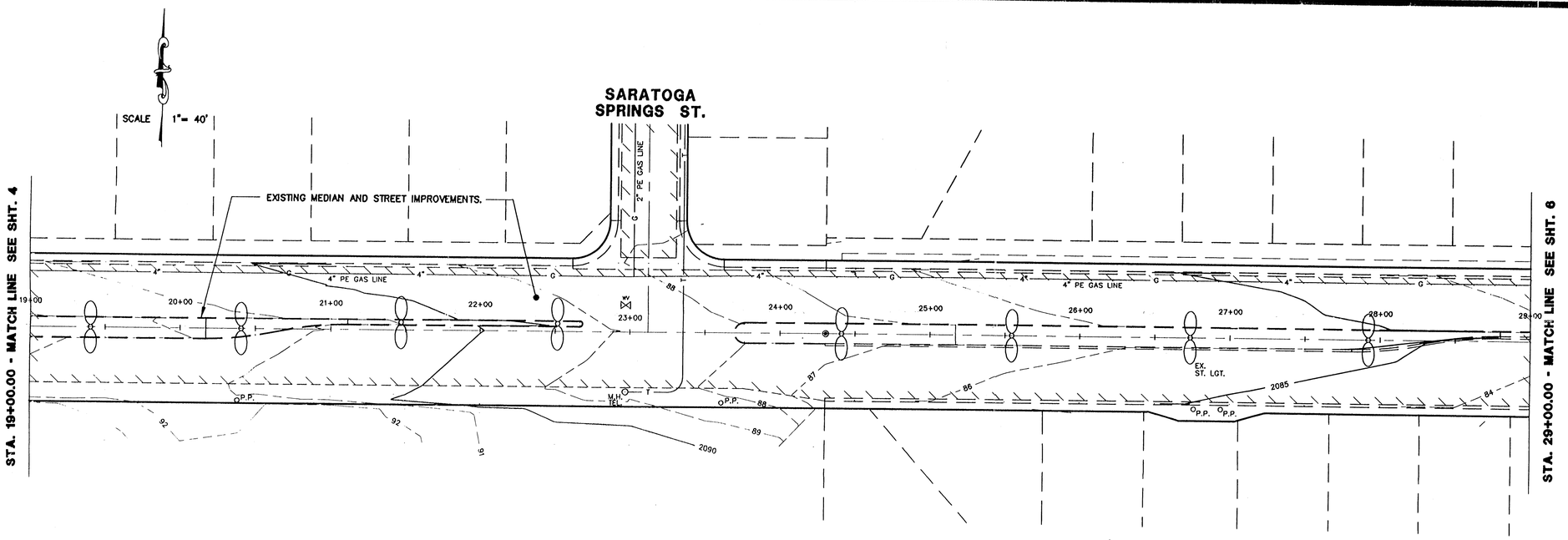
STA. 9+95.00 TO STA. 19+00.00

SCALE			DWG. FILE	SHT. NO.	TOTAL SHTS.
HOR : 1"= 40'	DSGN : R.A.M.		EQ-04	4	24
VERT : 1"= 5'	DRWN : J.C.		DATE 7/96		
	CK'D :				

APPROVAL
ROBERT A. MURNANE 8/7/97
KEVIN L. HILL

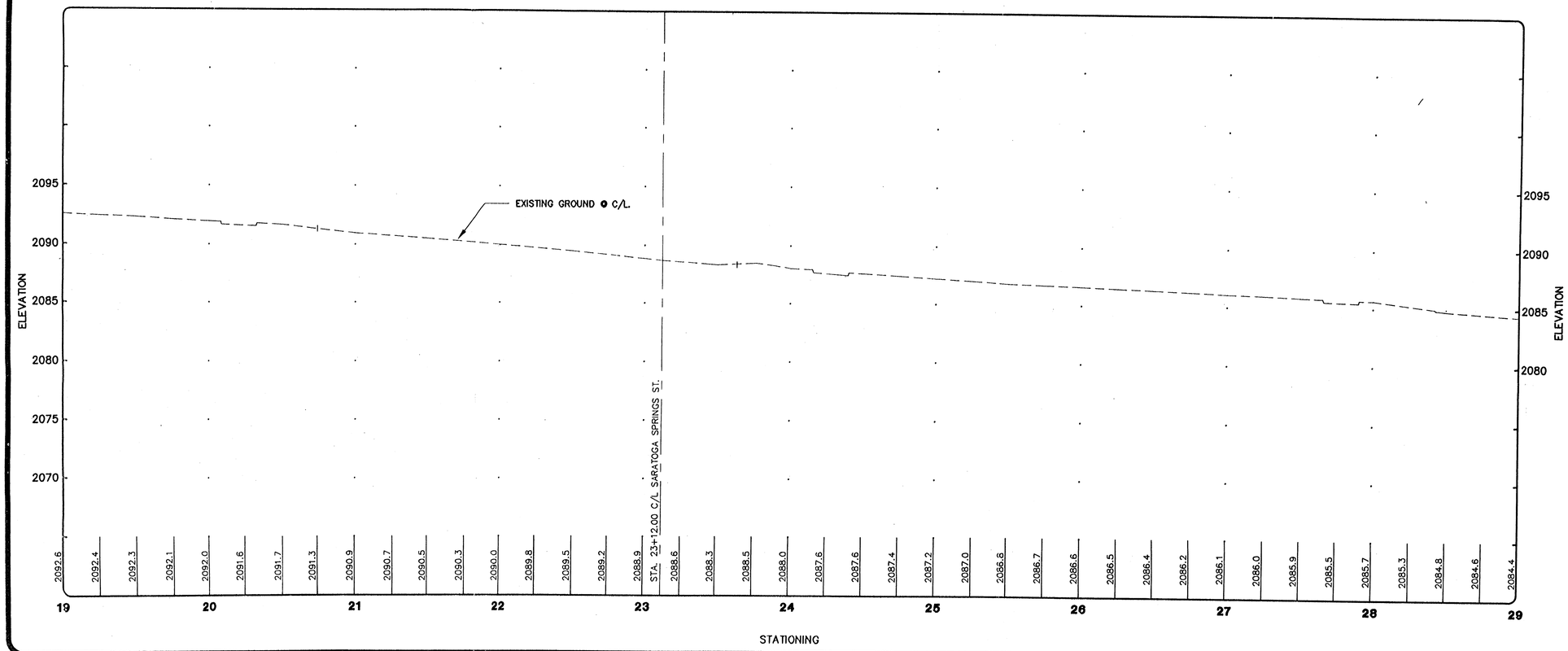
DWG. NO. 04709

C:\DRAW\eq-04 Wed Aug 06 16:55:12 1997



EQUESTRIAN DRIVE

C.O.H. BENCH MARK #100
BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DR. AND LONGMEADOW ST., ELEV. = 2091.68



QUANTITIES THIS SHEET

REFERENCE MAP

MAGIC CANYON HOMES UNIT 3 -- DWG. No. 03761
WELLINGTON MANOR -- DWG. No. 04194

ENGINEERS SEAL

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
IT'S THE LAW
1-800-227-2600
UNDERGROUND SERVICE (USA)
Call before you Dig.

FILE NAME : EQ-05.DWG
FORMAT : ADCADD, R-12, c3
PROJECT No. 9219 & 9304
CONTRACT No. 96-97*04

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPROVAL

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

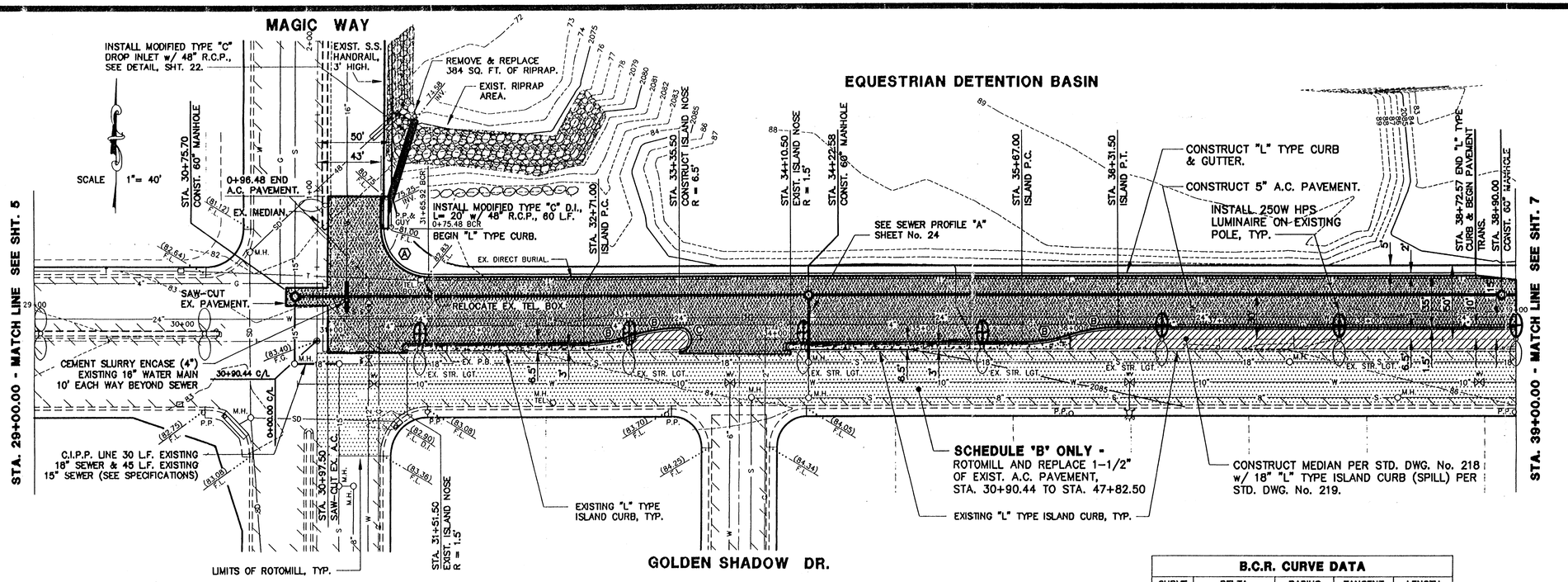
STA. 19+00.00 TO STA. 29+00.00

SCALE			DWG. FILE	SHT. NO.	TOTAL SHTS.
HOR : 1"= 40'	DSGN : ---		EQ-05	5	24
VERT : 1"= 5'	DRWN : J.C.		DATE 7/96		
	CK'D : ---				

APPROVAL
ROBERT A. MURNANE 8/7/97
KEVIN L. HILL

DWG. NO. 04709

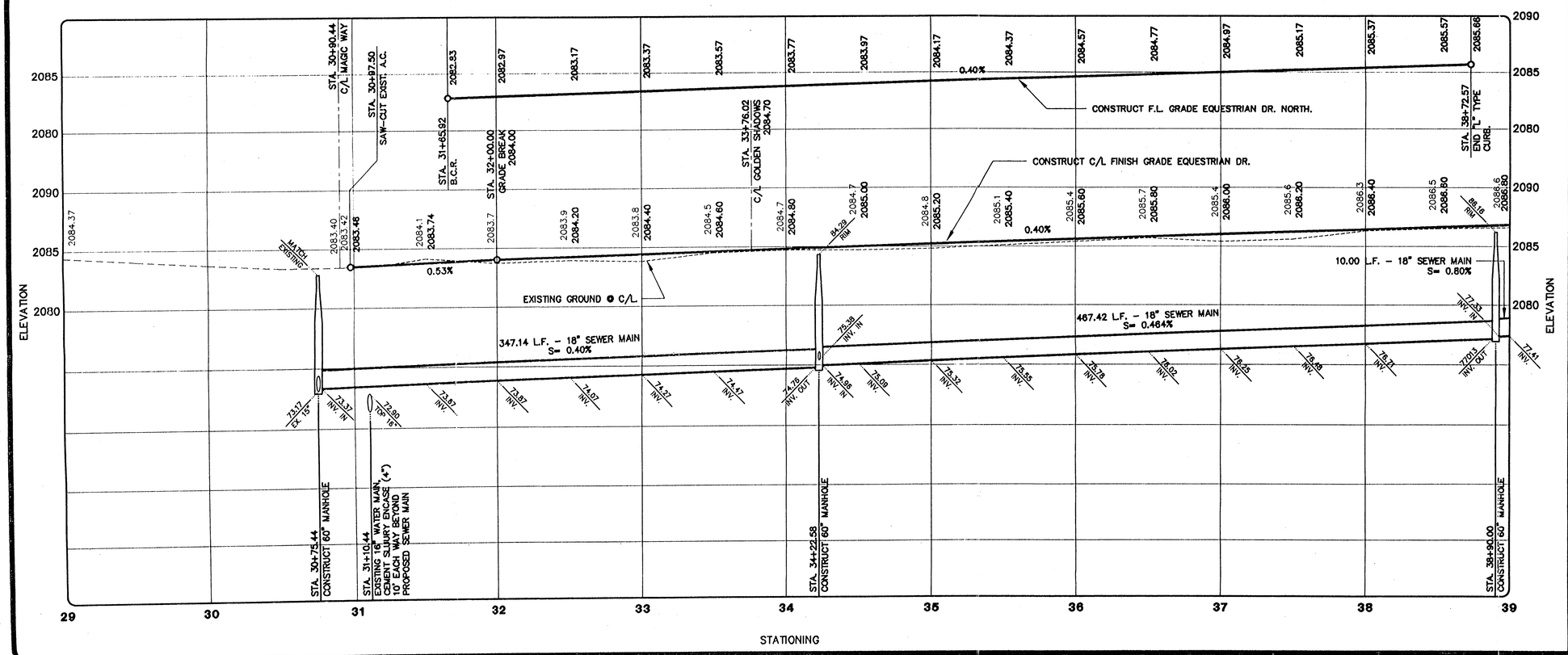
C:\DRAW\eq-05 Wed Aug 06 16:56:26 1997



C.O.H. BENCH MARK #100
BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DR. AND LONGMEADOW ST., ELEV. = 2091.68

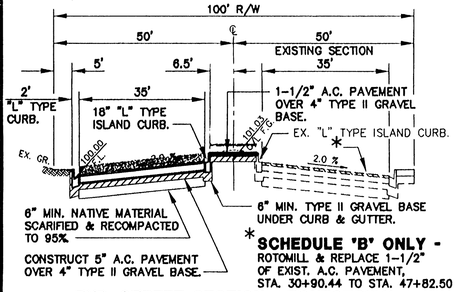
EQUESTRIAN DRIVE

B.C.R. CURVE DATA				
CURVE	DELTA	RADIUS	TANGENT	LENGTH
Ⓐ	90°22'03"	30.00'	30.19'	47.32'
Ⓑ	17°37'31"	106.51'	16.51'	32.76'
Ⓒ	180°00'00"	6.50	----	20.42'



QUANTITIES THIS SHEET

5" A.C. PAVEMENT	3,997 SQ. YDS.
4" TYPE II GRAVEL BASE	3,977 SQ. YDS.
24" "L" TYPE CURB	755 LIN. FT.
"L" TYPE ISLAND CURB	697 LIN. FT.
4" CONC. (MEDIAN ISLAND)	1,134 SQ. FT.
1-1/2" A.C. PAVEMENT	477 SQ. YDS.
A.C. PAVEMENT REMOVAL	209 SQ. YDS.
250W HPS LUMINAIRE w/MASTARM	6 EA.
MODIFIED TYPE "C" DROP INLET (L= 20')	1 EA.
48" R.C.P., CLASS 3	60 LIN. FT.
* ADJUST WATER VALVE	2 EA.
* ROTOMILL & REPLACE EX. A.C. (1-1/2")	3,312 SQ. YDS.
18" SEWER MAIN	824.56 LIN. FT.
8" SEWER MAIN	45 LIN. FT.
60" MANHOLE	3 EA.
4" CEMENT SLURRY ENCASEMENT (18" WATER)	12 LIN. FT.
C.I.P.P. LINE EXISTING 15" SEWER MAIN	45 LIN. FT.
C.I.P.P. LINE EXISTING 18" SEWER MAIN	30 LIN. FT.
ABANDON EXISTING SEWER MAIN	1 LUMP SUM



TYP. STREET SECTION - EQUESTRIAN
STA. 31+51.50 TO STA. 38+72.57
NO SCALE

REFERENCE MAP

HENDERSON FOOTHILLS UNIT 1 -- DWG. No. 02179
MAGIC CANYON HOMES UNIT 3 -- DWG. No. 03761
EAST INTERCEPTOR SEWER -- DWG. No. 01229
24" WATER MAIN (P-2B TO R-8) -- DWG. No. 02696

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA ROBERT A. MURNANE No. 9680 CIVIL
ENGINEERS SEAL
8/1/97

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
IT'S THE LAW 1-800-227-2600 UNDERGROUND SERVICE (USA)
Call before you Dig.

FILE NAME : EQ-06.DWG
FORMAT : ADCADD, R-12, c3
PROJECT No. 9219 & 9304
CONTRACT No. 96-97*04

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPROVAL

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

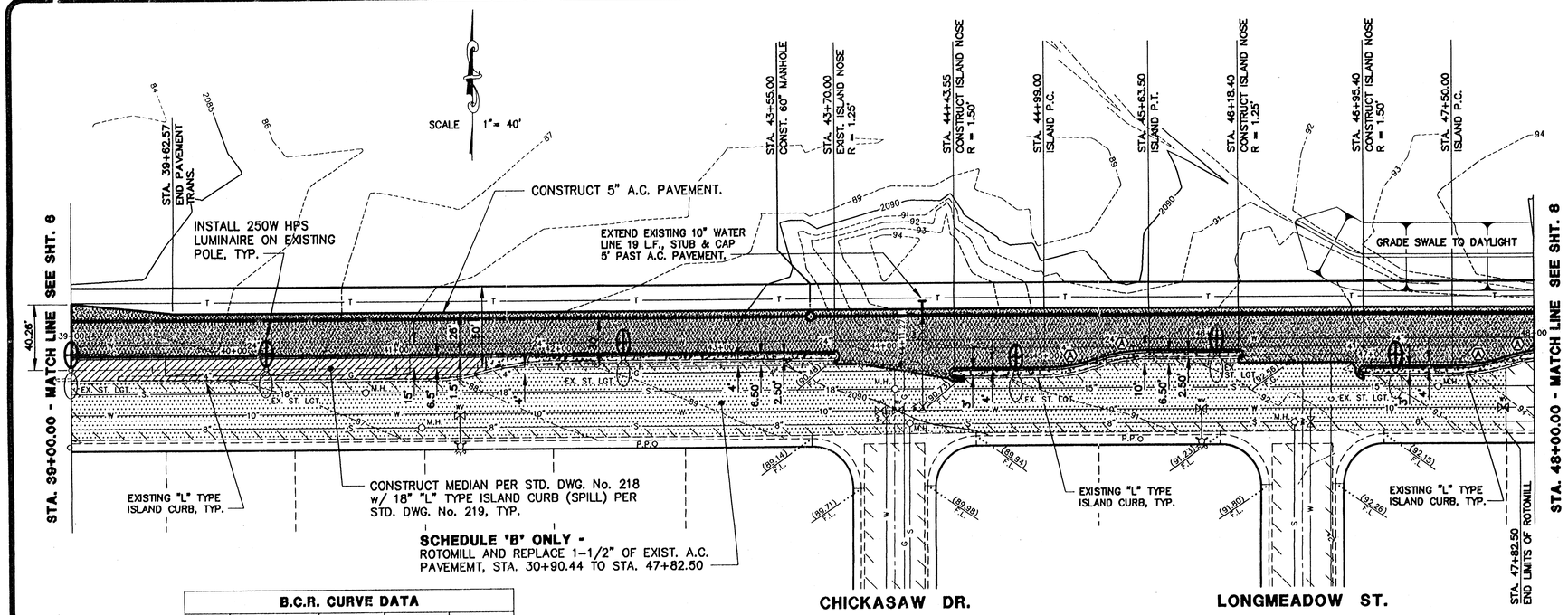
EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

STA. 29+00.00 TO STA. 39+00.00

SCALE		DWG. FILE	SHT. NO.	TOTAL SHTS.
HOR : 1"= 40'	DSGN : R.A.M.	EQ-05	6	24
VERT : 1"= 5'	DRWN : J.C.	DATE 7/96		
	CK'D :			

APPROVAL
ROBERT A. MURNANE 8/1/97
KEVIN L. HILL
DWG. NO. 04709

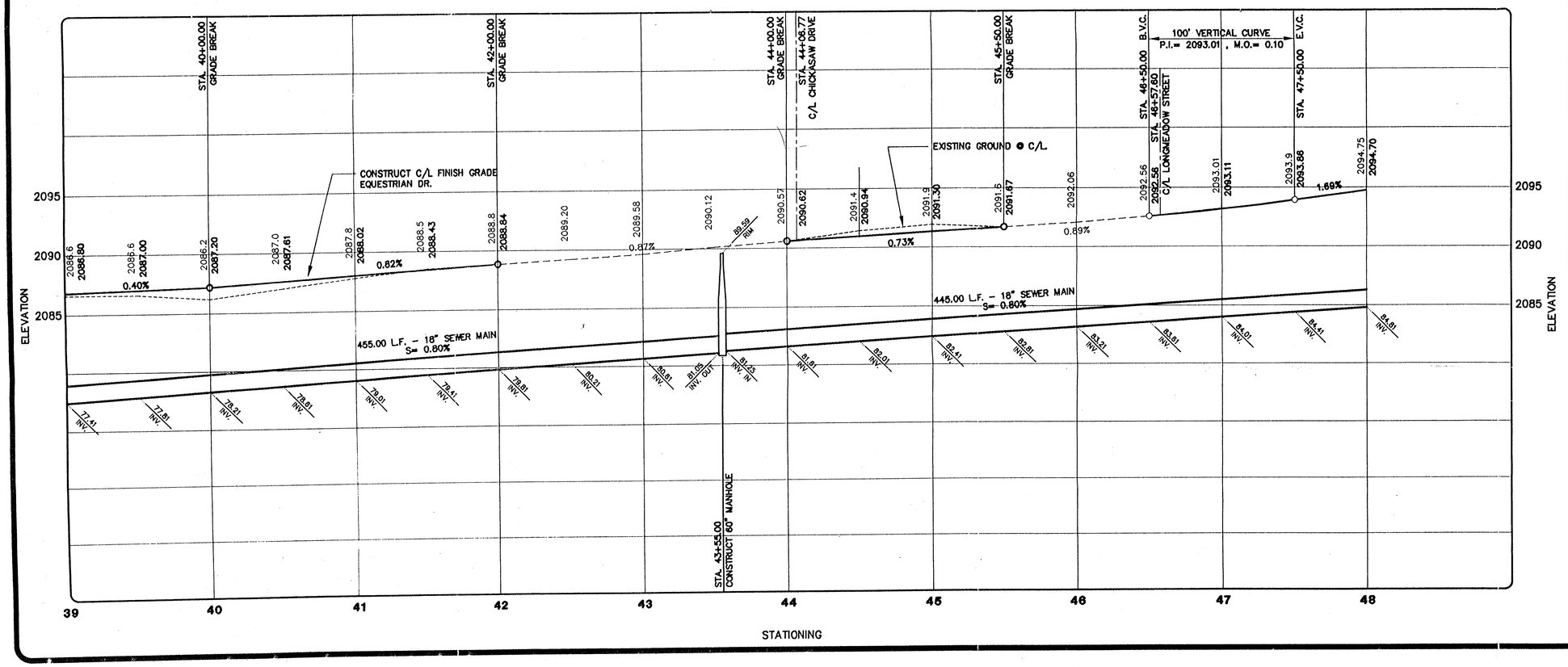
c:\DRAWING-06 Thu Aug 07 08:46:21 1997



B.C.R. CURVE DATA				
CURVE	DELTA	RADIUS	TANGENT	LENGTH
Ⓐ	18°29'31"	101.68'	16.55'	32.82'

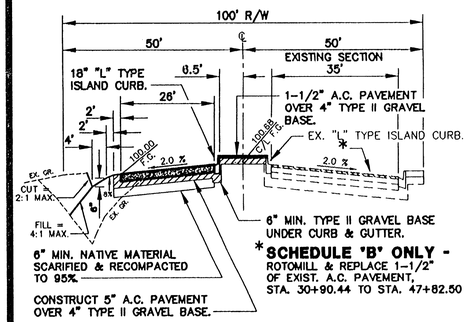
EQUESTRIAN DRIVE

C.O.H. BENCH MARK #100
BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DR. AND LONGMEADOW ST., ELEV. = 2091.68



QUANTITIES THIS SHEET

5" A.C. PAVEMENT	2,989 SQ. YDS.
4" TYPE II GRAVEL BASE	3,189 SQ. YDS.
"L" TYPE ISLAND CURB	768 LIN. FT.
1-1/2" A.C. PAVEMENT	363 SQ. YDS.
A.C. PAVEMENT REMOVAL	59 SQ. YDS.
4" CONC. (MEDIAN ISLAND)	1,449 SQ. FT.
250W HPS LUMINAIRE w/MASTARM	6 EA.
10" WATER LINE	19 LIN. FT.
ADJUST WATER VALVE	1 EA.
* ROTOMILL & REPLACE EX. A.C. (1-1/2")	3,833 SQ. YDS.
18" SEWER MAIN	900 LIN. FT.
60" MANHOLE	1 EA.
ABANDON EXISTING SEWER MAIN	1 LUMP SUM



TYP. STREET SECTION - EQUESTRIAN
STA. 38+72.57 TO STA. 51+72.50
NO SCALE

REFERENCE MAP

HENDERSON FOOTHILLS UNIT 1 -- DWG. No. 02179
HENDERSON FOOTHILLS UNIT 3 -- DWG. No. 02187
HENDERSON FOOTHILLS UNIT 5 -- DWG. No. 02557
EAST INTERCEPTOR SEWER -- DWG. No. 01229
24" WATER MAIN (P-2B TO R-8) -- DWG. No. 02696

REGISTERED PROFESSIONAL ENGINEER - STATE OF NEVADA No. 9880 ROBERT A. MURNANE CIVIL 8/7/97
ENGINEERS SEAL

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
IT'S THE LAW 1-800-227-2600 UNDERGROUND SERVICE (USA)
Call before you Dig.

FILE NAME : EQ-07.DWG PROJECT No. 9219 & 9304
FORMAT : ADCADD, R-12, c3 CONTRACT No. 96-97*04

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPROVAL

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

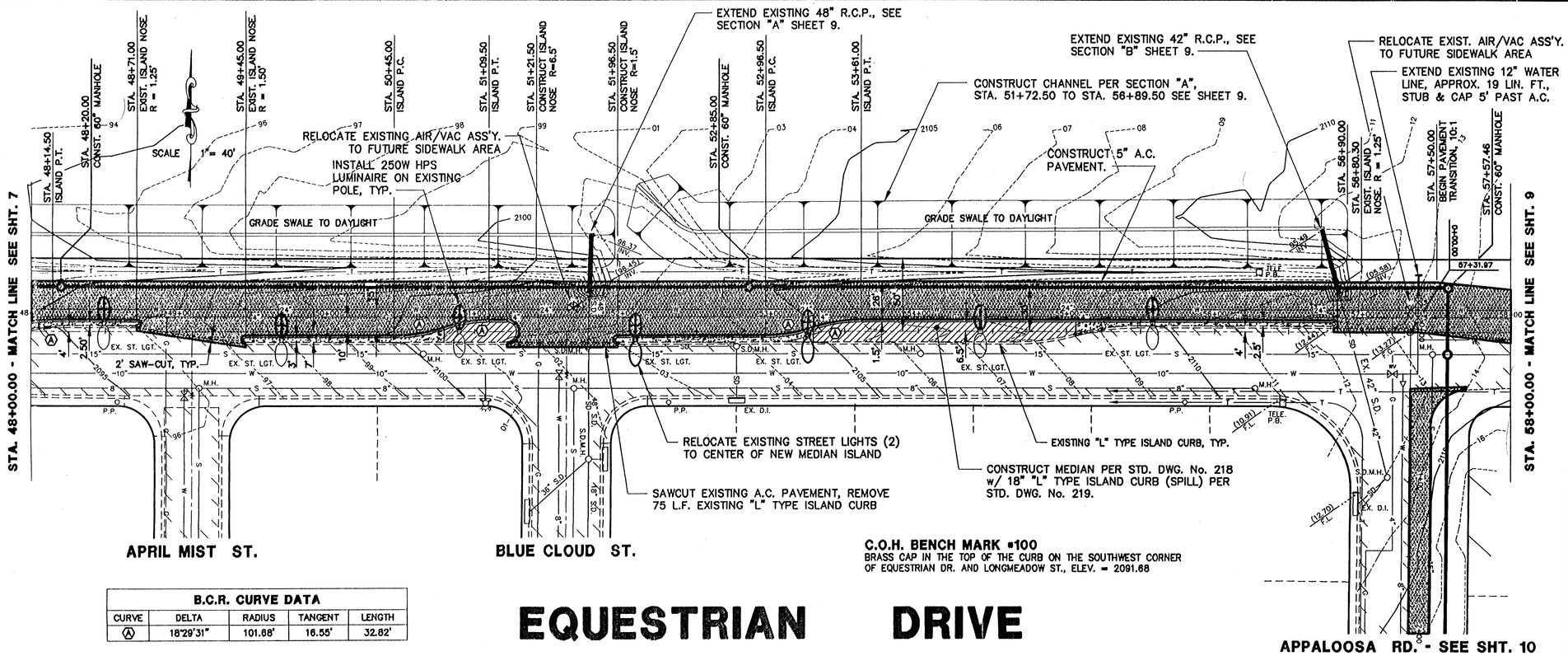
EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

STA. 39+00.00 TO STA. 48+00.00

SCALE		DSGN : R.A.M.	DWG. FILE	SHT. NO.	TOTAL SHTS.
HOR : 1"= 40'		DRWN : J.C.	EQ-07	7	24
VERT : 1"= 5'		CK'D :	DATE 7/96		

APPROVAL
ROBERT A. MURNANE 8/7/97
KEVIN L. HILL
DWG. NO. 04709

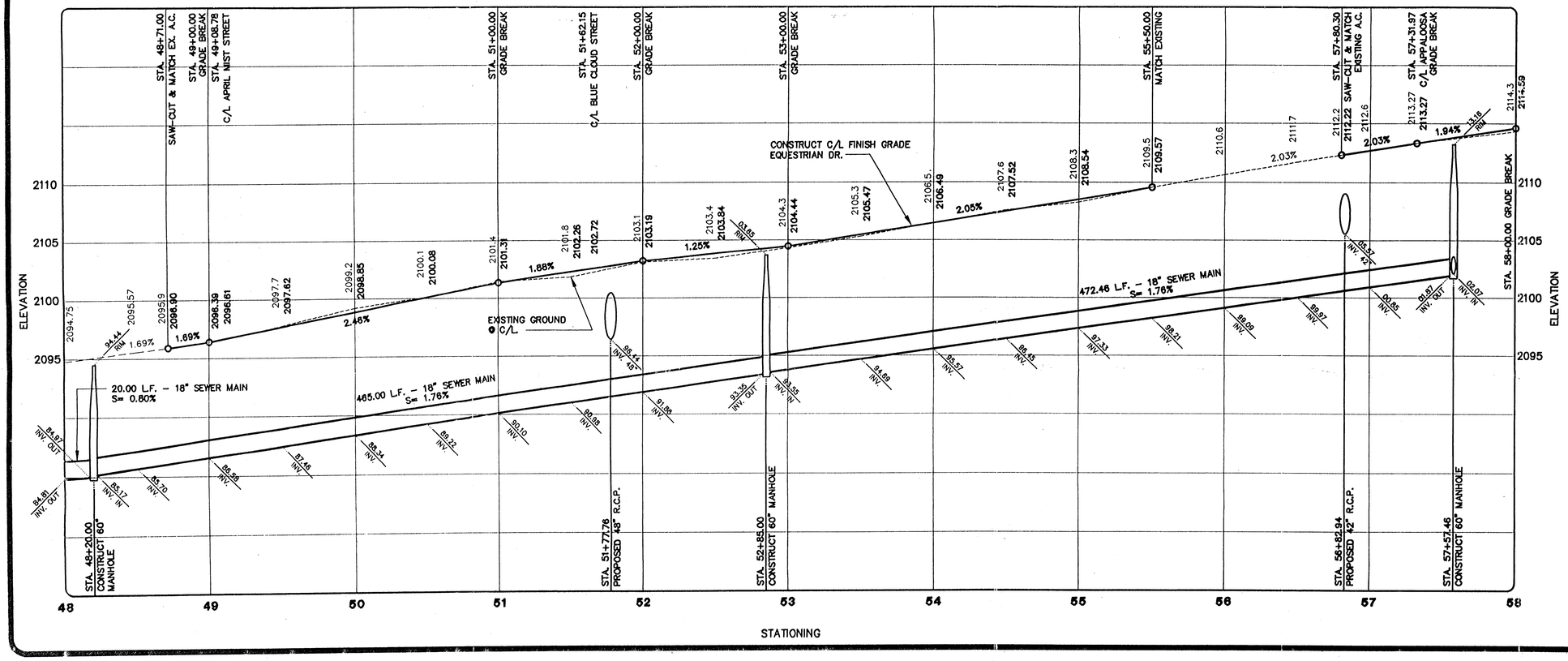
C:\DRAWING-DITCH Wed Aug 06 17:04:10 1997



C.O.H. BENCH MARK #100
BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DR. AND LONGMEADOW ST., ELEV. = 2091.68

B.C.R. CURVE DATA				
CURVE	DELTA	RADIUS	TANGENT	LENGTH
Ⓐ	18°29'31"	101.88'	16.55'	32.82'

EQUESTRIAN DRIVE



QUANTITIES THIS SHEET

5" A.C. PAVEMENT	3,561 SQ. YDS.
4" TYPE II GRAVEL BASE	3,784 SQ. YDS.
"L" TYPE ISLAND CURB	796 LIN. FT.
1-1/2" A.C. PAVEMENT	317 SQ. YDS.
A.C. PAVEMENT REMOVAL	63 SQ. YDS.
4" CONC (MEDIAN ISLAND)	1,623 SQ. FT.
48" R.C.P., (CLASS 3)	40 LIN. FT.
42" R.C.P., (CLASS 3)	45 LIN. FT.
12" WATER LINE	19 LIN. FT.
ADJUST WATER VALVE	5 EA.
REMOVE EXISTING "L" TYPE ISLAND CURB	75 LIN. FT.
250W HPS LUMINAIRE w/MASTARM	7 EA.
RELOCATE EXISTING STREET LIGHT	2 EA.
18" SEWER MAIN	957.46 LIN. FT.
60" MANHOLE	3 EA.
ABANDON EXISTING SEWER MAIN	1 LUMP SUM

REFERENCE MAP

HENDERSON FOOTHILLS NORTH UNIT 6 -- DWG. No. 03723
HENDERSON FOOTHILLS NORTH UNIT 6-A -- DWG. No. 03722
EAST INTERCEPTOR SEWER -- DWG. No. 01229
24" WATER MAIN (P-2B TO R-8) -- DWG. No. 02696

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA ROBERT A. MURNANE No. 9680 CIVIL
8/25/97
ENGINEERS SEAL

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
IT'S THE LAW 1-800-227-2600 UNDERGROUND SERVICE (USA)
Call before you Dig.

FILE NAME : EQ-08.DWG
PROJECT No. 9219 & 9304
FORMAT : ADCADD, R-12, c3
CONTRACT No. 98-97*04

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPROVAL
1.	RELOCATE AIR/VAC ASSEMBLIES	S.G.	8/25/97	8/25/97

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

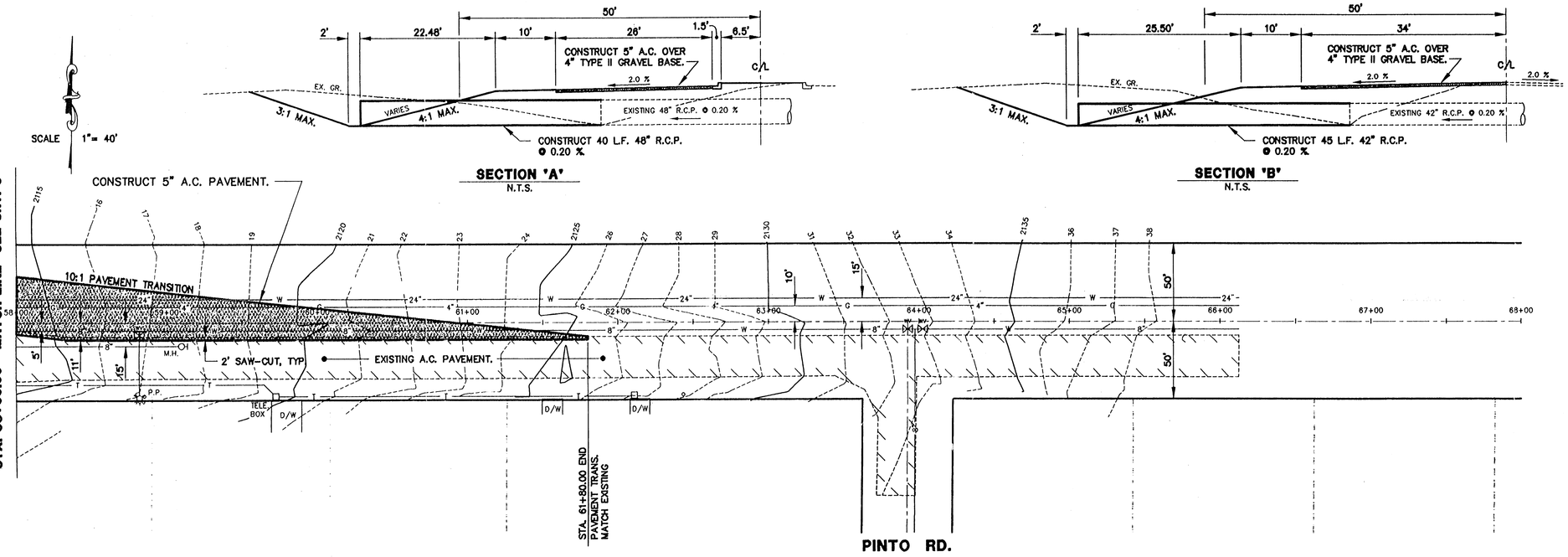
STA. 48+00.00 TO STA. 58+00.00

SCALE		DWG. FILE	SHT. NO.	TOTAL SHTS.
HOR : 1"= 40'	DSGN : R.A.M.	EQ-08	8	24
VERT : 1"= 5'	DRWN : J.C.	DATE 7/96		
	CK'D :			

APPROVAL
ROBERT A. MURNANE
KEVIN L. HILL
DWG. NO. 04709

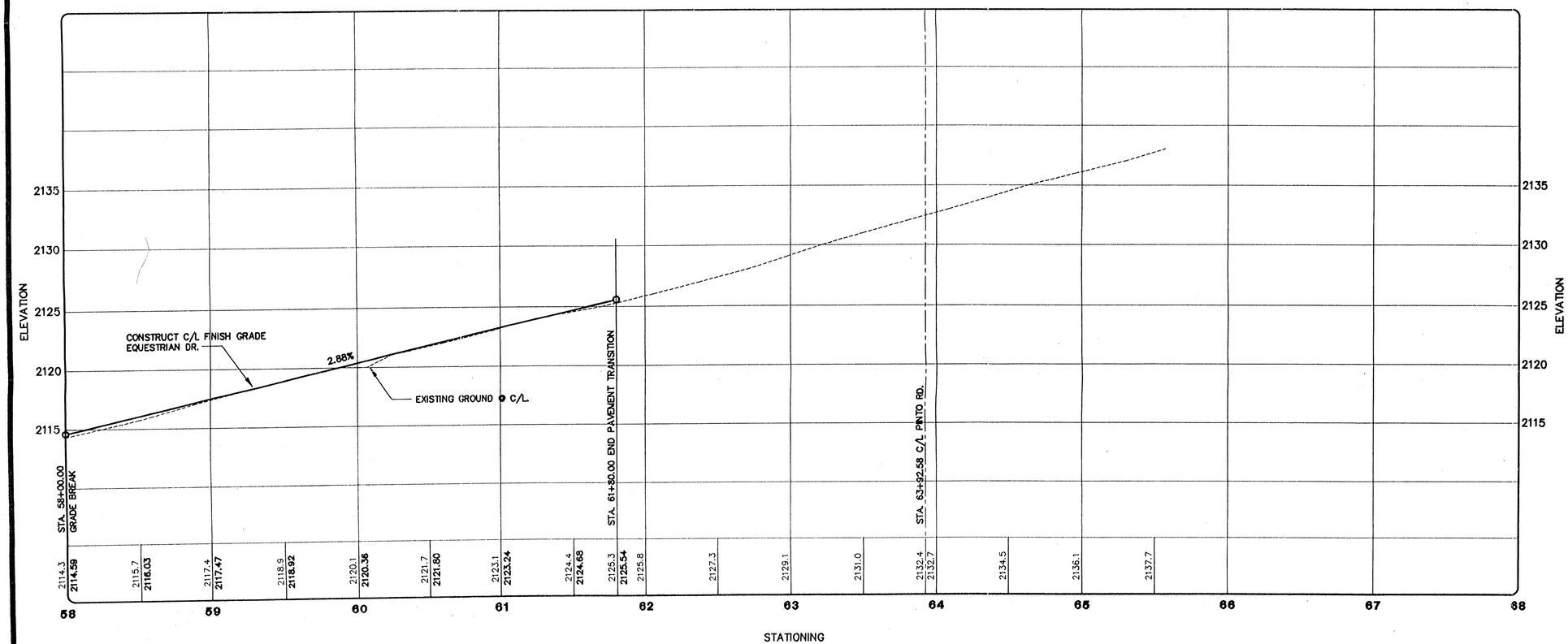
c:\DRAWING-DITCH Mon Aug 25 08:51:01 1997

ADDENDUM 1



EQUESTRIAN DRIVE

C.O.H. BENCH MARK #100
BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DR. AND LONGMEADOW ST., ELEV. = 2091.68



QUANTITIES THIS SHEET

5" A.C. PAVEMENT	880 SQ. YDS.
4" TYPE II GRAVEL BASE	985 SQ. YDS.
A.C. PAVEMENT REMOVAL	85 SQ. YDS.
ADJUST WATER VALVE	1 EA.

REFERENCE MAP

24" WATER MAIN (P-28 TO R-8) -- DWG. No. 02898
EQUESTRIAN DR. SEWER EXT. -- DWG. No. 02095

ROBERT A. MURNANE No. 9880 STATE OF NEVADA CIVIL
8/7/97
ENGINEERS SEAL

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY
IT'S THE LAW 1-800-227-2600 UNDERGROUND SERVICE (USA)
Call before you Dig.

FILE NAME : EQ-09.DWG
FORMAT : ADCADD, R-12, c3
PROJECT No. 9219 & 9304
CONTRACT No. 96-97*04

REVISIONS

NO.	DESCRIPTION	BY	DATE	APPROVAL

CITY OF HENDERSON, NEVADA
DEPARTMENT OF PUBLIC WORKS
ENGINEERING SERVICES DIVISION

EQUESTRIAN / APPALOOSA ROAD IMPROVEMENTS

STA. 58+00.00 TO STA. 66+00.00

SCALE		DSGN : R.A.M.	DWG. FILE EQ-09	SHT. NO. 9	TOTAL SHTS. 24
HOR : 1"= 40'		DRWN : J.C.	DATE 7/96		
VERT : 1"= 5'		CK'D :			

APPROVAL
ROBERT A. MURNANE 8/7/97
KEVIN L. HILL
DWG. NO. 04709

C:\DRAW\eq-09 Wed Aug 06 17:08:01 1997

TECHNICAL DRAINAGE STUDY

LETTER OF MAP REVISION
FOR
EQUESTRIAN DETENTION BASIN

PDG PROJECT #1002005

BOOK 6
RECORD DRAWINGS

PREPARED FOR:
THE CITY OF HENDERSON
DRAFT
DECEMBER 18, 1998
PREPARED BY:

POGGEMEYER DESIGN GROUP, INC.
ENGINEERS – PLANNERS – SURVEYORS – LANDSCAPE ARCHITECTS
2601 NORTH TENAYA WAY
LAS VEGAS, NEVADA 89128
(702) 255-8100 FAX (702) 255-8375
pdg-lv@pdg-lv.com

APPENDIX P

EQUESTRIAN DETENTION BASIN

RECORD DRAWINGS

DEPARTMENT OF PUBLIC WORKS

Mayor:
ROBERT GROESBECK

Councilmen:
JACK CLARK
ANDY HAFEN
AMANDA CYPHERS
DAVID WOOD

City Manager:
PHILIP SPEIGHT

Director of Public Works:
MARK T. CALHOUN, P.E.

EQUESTRIAN DETENTION BASIN

CONTRACT NO. 95 - 96 * 02

APPROVALS

Mark T. Calhoun — 12-11-95
Mark T. Calhoun, P.E. No. 6585 — Date
Director of Public Works
City of Henderson

Kurt R. Segler — 12-11-95
Kurt R. Segler — Date
Utility Services Manager
City of Henderson

Gale W. Fraser II — 12/4/95
Clark County Regional Flood Control District — Date
Gale W. Fraser II, P.E. – General Manager/Chief Engineer

10-20-95
Sprint Central Telephone Company — Date

10/23/95
Nevada Power Company — Date

10-23-95
Southwest Gas Company — Date

Prime Cable Company — Date

ENGINEERS PLANNERS SURVEYORS
POGGEMEYER DESIGN GROUP
2601 NORTH TENAYA WAY, LAS VEGAS, NEVADA 89128 (702) 255-8100

FUNDED BY:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

STAMP

OCT. 12, 1995

RECORD DRAWING

FILENAME: 184C-CA2.DWG

GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION AND THE UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, LATEST EDITION.
2. APPLICATION FOR INSPECTION BY THE CITY OF HENDERSON PUBLIC WORKS SHALL BE MADE BY THE CONTRACTOR AT LEAST 24 HOURS BEFORE THE INSPECTION SERVICES WILL BE REQUIRED, 565-2136 OR 565-2140.
3. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE PROSECUTED TO COMPLETION WITHOUT DELAY SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
4. THE CONTRACTOR SHALL TAKE ALL NECESSARY AND PROPER PRECAUTIONS TO PROTECT ADJACENT PROPERTIES FROM ANY AND ALL DAMAGE THAT MAY OCCUR FROM STORM WATER RUNOFF AND/OR DEPOSITION OF DEBRIS RESULTING FROM ANY AND ALL WORK IN CONNECTION WITH CONTRUCTION OF THIS PROJECT.
5. PRIOR TO FINAL ACCEPTANCE, A CERTIFIED LEGIBLE AS-BUILT DRAWING MUST BE SUBMITTED TO THE CITY OF HENDERSON. AS-BUILT MUST SHOW ALL CHANGES AND FIELD LOCATIONS. IN THE ABSENCE OF CHANGES, A COPY OF APPROVED DRAWINGS WILL BE REQUIRED STATING "INSTALLED AS PER DRAWINGS" AND CERTIFIED AS SUCH BY THE CONTRACTOR.
6. EXISTING UTILITIES ARE LOCATED ON PLANS FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR THE PROTECTION OF UTILITIES NOT SHOWN ON THE PLANS OR NOT IN THE LOCATION SHOWN ON THE PLANS. THIS INCLUDES ALL SERVICE LATERALS OF ANY KIND.
7. THE CONTRACTOR IS ADVISED TO BECOME FAMILIAR WITH THE SUBSURFACE NATURE OF THE SOILS LOCATED WITHIN THE PROJECT LIMITS. A GEOTECHNICAL STUDY, PREPARED BY:

   ENGINEER KLEINFELDER, INC., LAS VEGAS, NV
   DATE: JANUARY 19, 1995
   JOB NUMBER 31-128834-001

   WHICH IS ON FILE AT THE OFFICE OF KLIENFELDER, INC., WHERE IT CAN BE REVIEWED. BIDDERS SHALL MAKE THEIR OWN INTERPRETATIONS OF THE DATA CONTAINED IN SAID REPORT UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS OR SPECIFICATIONS. THE CONTRACTOR SHALL NOT BE RELIEVED OF LIABILITY UNDER THE CONTRACT FOR ANY LOSS SUSTAINED AS A RESULT OF VARIANCES BETWEEN CONDITIONS INDICATED AND THE ACTUAL CONDITIONS ENCOUNTERED DURING THE PROGRESS OF THE WORK.
8. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING PUBLIC STREETS IMMEDIATELY AFTER THE FIRST GRADING WORK IS ACCOMPLISHED AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "NEVADA TRAFFIC CONTROL MANUAL" - CURRENT EDITION AND TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" - CURRENT EDITION AND BE APPROVED BY THE CITY OF HENDERSON BEFORE CONSTRUCTION BEGINS.
9. PROTECTION AND REPLACEMENT OF SURVEY MONUMENTS OR PROPERTY STAKES NOT DELINEATED ON THE CONTRACT DRAWINGS SHALL BE THE CONTRACTOR'S RESPONSIBILITY. REPLACEMENT OF SURVEY MONUMENTS OR PROPERTY STAKES SHALL BE DONE TO THE CITY OF HENDERSON SURVEY SECTIONS SATISFACTION.
10. AFFECTED UTILITY COMPANIES SHALL BE NOTIFIED AT LEAST (2) WORKING DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
11. CALL BEFORE YOU DIG, 1-800-227-2600.
12. MODIFICATIONS TO EXISTING UTILITIES SHALL CONFORM TO THE OWNER'S UTILITY STANDARDS AND SPECIFICATIONS.
13. THE CONTRACTOR SHALL TAKE REASONABLE MEASURES TO PROTECT EXISTING IMPROVEMENTS FROM DAMAGE AND ALL SUCH IMPROVEMENTS DAMAGED BY THE CONTRACTOR'S OPERATION SHALL BE REPAIRED OR RECONSTRUCTED TO THE ENGINEERS SATISFACTION AT THE EXPENSE OF THE CONTRACTOR.

A. GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL EXAMINE THE DRAWINGS AND SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES HE MAY FIND BEFORE PROCEEDING WITH THE WORK.
2. ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH ANY WORK SO INVOLVED.
3. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL SITE CONDITIONS AND DIMENSIONS. HE SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND INFORMATION SHOWN ON THE DRAWINGS BEFORE PROCEEDING WITH THE WORK.
4. THE CONTRACTOR SHALL SUPERVISE AND DIRECT HIS WORK AND HE SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES.
5. SPECIFIC NOTES AND DETAILS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE THE NOTES, DRAWINGS, AND/OR SPECIFICATIONS DIFFER, THE MORE STRINGENT REQUIREMENT SHALL APPLY.
6. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND FEES REQUIRED FOR CONSTRUCTION.

B. CONCRETE

1. CONCRETE USED IN THE WORK SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 3000 PSI AT AGE 28 DAYS.
2. ALL CONCRETE SHALL BE STONE CONCRETE UTILIZING AGGREGATE CONFORMING TO ASTM C33.
3. CEMENT SHALL BE TYPE V CONFORMING TO ASTM C150
4. ALL CONCRETE MIXES SHALL BE DESIGNED BY AN ASTM CERTIFIED INDEPENDENT TESTING LABORATORY WHO SHALL SUBMIT COPIES OF THE DESIGN FOR APPROVAL AND SHALL IN ADDITION SUBMIT COPIES OF 7 AND 28 DAY CYLINDER TEST RESULTS TO THE ENGINEER AND THE PUBLIC WORKS DEPARTMENT, AND OBTAIN APPROVAL PRIOR TO USE.
5. BEFORE CONCRETE IS PLACED THE CONTRACTOR SHALL COORDINATE AND VERIFY WITH ALL TRADES TO INSURE THE PROPER PLACEMENT OF ALL OPENINGS, SLEEVES, INSERTS, DEPRESSIONS, ETC RELATING TO THE WORK.
6. MINIMUM CONCRETE COVER OVER REINFORCING STEEL SHALL BE AS FOLLOWS : (UNLESS OTHERWISE NOTED)

   A. CONCRETE AGAINST EARTH (UNFORMED) 3"
   B. CONCRETE AGAINST EARTH (FORMED) 2"

7. CONCRETE SHALL NOT BE FREELY DROPPED MORE THAN 3 FEET.
8. CONSTRUCTION OR COLD JOINTS OTHER THAN THOSE SHOWN ON THE PLANS SHALL NOT BE MADE WITHOUT PRIOR APPROVAL BY THE ENGINEER. REINFORCEMENT MAY BE SPLICED TO FACILITATE HANDLING AND PLACEMENT SUBJECT TO THE APPROVAL OF THE ENGINEER.
9. ALL CONCRETE SHALL BE PLACED WITH A SLUMP NOT TO EXCEED 4".
10. AN INITIAL CURING OF CONCRETE SHALL IMMEDIATELY FOLLOW THE FINISHING OPERATION. THE CONCRETE SHALL BE KEPT CONTINUOUSLY MOIST OVERNIGHT BY USE OF ANY OF THE FOLLOWING :

    A. PONDING OR CONTINUOUS SPRINKLING
    B. ABSORPTIVE MAT OR FABRIC KEPT CONTINUOUSLY WET
    C. CURING COMPOUNDS APPLIED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE CURING COMPOUND MANUFACTURER

11. IMMEDIATELY FOLLOWING THE INITIAL CURING AND BEFORE THE CONCRETE HAS DRIED, ADDITIONAL CURING SHALL BE ACCOMPLISHED FOR 7 CUMULATIVE DAYS BY:

    A. CONTINUING THE METHOD USED FOR THE INITIAL CURING
    B. WATERPROOF PAPER
    C. OTHER MOISTURE-RETAINING COVERINGS AS APPROVED

12. ALL CORNERS OF FORMED SURFACES SHALL BE CHAMFERED 3/4" UNLESS SHOWN OTHERWISE.

C. REINFORCING STEEL

1. REINFORCING STEEL SHALL BE NEW STOCK, DEFORMED BARS CONFORMING TO ASTM A615, GRADE 40 (MINIMUM) UNLESS NOTED OTHERWISE. GRADE 60 BARS ARE ALLOWED.
2. ALL BARS SHALL BE FREE OF RUST, GREASE, MILL SCALE, OR ANY MATERIAL WHICH MIGHT AFFECT ITS BOND TO CONCRETE.
3. BENDING, PLACING, SPACING, CONCRETE PROTECTIVE COVER, SPLICING, AND ALL OTHER DETAILS OF REINFORCEMENT SHALL CONFORM TO THE "BUILDING CODE REQUIREMENT FOR REINFORCED CONCRETE" A.C.I.318-LATEST EDITION,CHAPTER 7 AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" A.C.I. 315-LATEST EDITION.
4. ALL TESTING OF REINFORCING STEEL SHALL BE AS REQUIRED BY LOCAL BUILDING CODE.

D. SITE GRADING

1. ALL GRADING SHALL BE COMPLETED IN FULL CONFORMANCE WITH THE RECOMMENDATIONS OF THE SOILS ENGINEERING REPORT PREPARED BY KLIENFELDER INC., 6850 S. PARADISE ROAD, LAS VEGAS, NEVADA, 89119-3735, (702) 736-2936 FOR POGGEMEYER DESIGN GROUP DATED JAN 19, 1995, PROJECT NUMBER 31-128834-001
2. THE CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO ABATE FUGITIVE DUST FROM BECOMING AIRBORNE, INCLUDING ANY VISIBLE PLUME OF DUST EXTENDING 200 YARDS FROM POINT OF ORIGIN OR BEYOND THE NEAREST PROPERTY LINE WHICHEVER IS LESS, AS A RESULT OF CONSTRUCTION ACTIVITIES. REASONABLE PRECAUTIONS INCLUDE, BUT ARE NOT LIMITED TO, SPRINKLING, COMPACTING, SEALING AND SWEEPING.

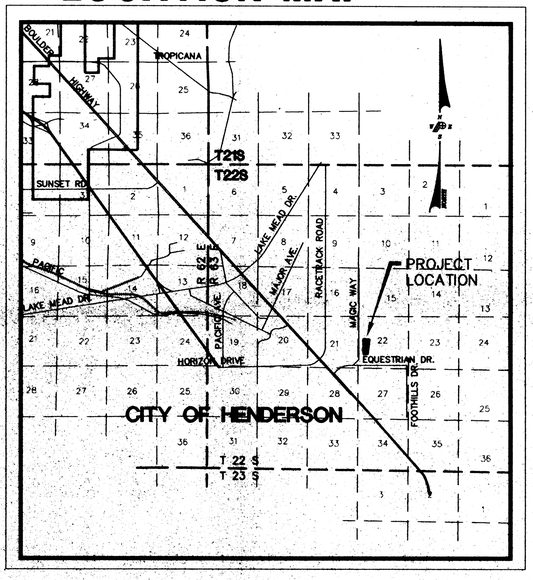
E. DEWATERING

1. THE CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR REMOVING EXCESSIVE GROUNDWATER, SURFACE WATER AND MISCELLANEOUS WATER WHICH IMPEDES THE EXECUTION OF THE CONTRACT.

LEGEND

- DETAIL/SECTION IDENTIFICATION LETTER OR NUMBER
- SHEET DETAIL IS SHOWN
- M.H. EXISTING MANHOLE
- F.H. EXISTING FIRE HYDRANT
- EXISTING SIGN
- P.P. EXISTING POWER POLE
- W EXISTING WATER LINE
- G EXISTING GAS LINE
- E EXISTING ELECTRICAL LINE
- SS EXISTING SANITARY SEWER LINE
- SD EXISTING STORM DRAIN LINE
- XX EXISTING CONTOUR
- EXISTING CHAIN-LINK FENCE
- (+XX) EXISTING ELEVATION
- EDGE OF EXISTING PAVEMENT
- M.H. PROPOSED MANHOLE
- XXXX PROPOSED CONTOUR
- PROPOSED SIGN
- W PROPOSED WATER LINE
- SD PROPOSED STORM DRAIN LINE
- PROPOSED CHAIN LINK FENCE
- XX.XX NEW ELEVATION
- R/W RIGHT OF WAY LINE
- CENTERLINE
- PROPERTY LINE

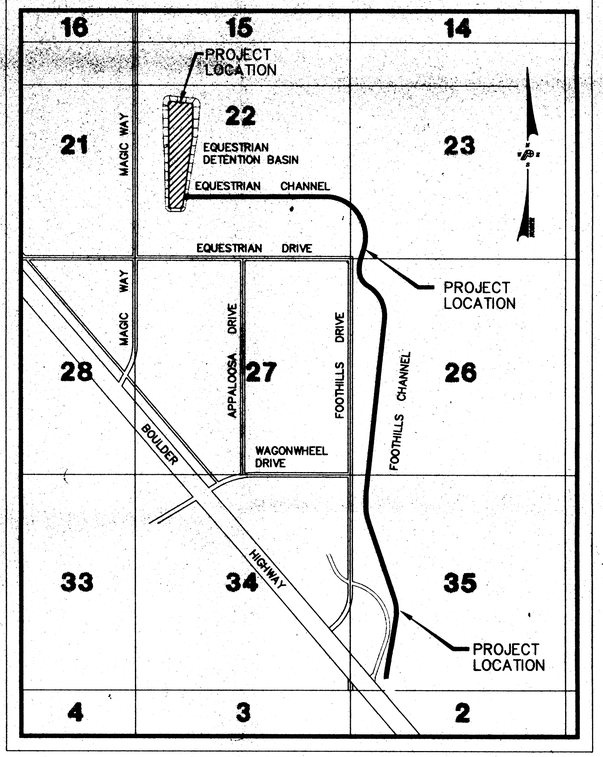
LOCATION MAP



SHEET INDEX

CA-1 COVER SHEET
CA-2 NOTES
CA-3 PROJECT KEYMAP (ESTIMATED QUANTITIES)
CA-4 CONTROL PLAN
CA-5 DRAINAGE BASIN MAP
CA-6 BASIN CHARACTERISTICS
CA-7 BASIN CHARACTERISTICS
CG-1 DETENTION BASIN GRADING PLAN
CG-2 DETENTION BASIN GRADING PLAN
CG-3 DETENTION BASIN GRADING PLAN
CG-4 DETENTION BASIN GRADING PLAN
CG-5 DETENTION BASIN GRADING PLAN
CG-6 DETENTION BASIN GRADING PLAN
CG-7 DETENTION BASIN GRADING PLAN
CG-8 DETENTION BASIN GRADING PLAN
CG-9 OUTFALL STRUCTURE P & P (1"=40')
CH-1 EQUESTRIAN DRIVE CHANNEL P & P (1"=40')
CH-2 EQUESTRIAN DRIVE CHANNEL P & P (1"=40')
CH-3 EQUESTRIAN DRIVE CHANNEL P & P (1"=40')
CH-4 EQUESTRIAN DRIVE CHANNEL P & P (1"=40')
CH-5 EQUESTRIAN DRIVE CHANNEL P & P (1"=40')
CI-1 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-2 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-3 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-4 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-5 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-6 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-7 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-8 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-9 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CI-10 FOOTHILLS DRIVE CHANNEL P & P (1"=40')
CN-1 EQUESTRIAN DRIVE CHANNEL CROSS SECTIONS AND DETAILS
CN-2 FOOTHILLS DRIVE CHANNEL CROSS SECTIONS AND DETAILS
CN-3 BASIN BERM CROSS SECTIONS/SCHEDULE
CN-4 BASIN SPILLWAY CROSS SECTIONS/SCHEDULE
CO-1 OUTLET STRUCTURE PLAN AND SECTIONS
CO-2 OUTLET STRUCTURE DETAILS
CO-3 STILLING WELL AND DETAILS
CO-4 MAGIC WAY INLET SECTION & DETAIL
CO-5 STILLING WELL INLET DETAILS
CO-6 PARTIAL SPILLWAY PLANS & DETAILS
CO-7 SPILLWAY DETAILS
CO-8 MAGIC WAY INLET PROFILE AND DETAILS
CO-9 SAINT ANTHONY FALLS STILLING BASIN DETAILS
CO-10 MISCELLANEOUS DETAILS
CO-11 MISCELLANEOUS DETAILS
CG-1 HYDROSEED AND WATER FOR 6 MOS. PER C.O.
(SEE SHTS. CG-2 THRU CG-4, CG-7 & 8, CH-1 THRU 5, CI-1 THRU CI-10)

VICINITY MAP



WATER NOTES

1. CONTRACTOR TO PROVIDE THRUST BLOCKS AS REQUIRED.
2. ALL LINES TO BE PRESSURE TESTED ACCORDING TO AWWA STANDARDS AND CHLORINATED TO STANDARD DWG. #518 PRIOR TO USE AND FINAL ACCEPTANCE.
3. ALL FLANGED FITTINGS TO BE COATED WITH EC-224 AND WRAPPED WITH 10 MIL THICK POLYETHYLENE.
4. NO OTHER UTILITY LINES MAY BE PLACED IN THE SAME TRENCH WITH WATERLINES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL MATERIAL SPILLED ON EXISTING ROADWAYS ON DAILY BASIS.
6. ANY CONFLICT WITH EXISTING UTILITIES SHALL BE IMMEDIATELY CALLED TO THE ATTENTION OF THE ENGINEER.
7. CONTRACTOR SHALL PROVIDE APPURTENANCES TO PERFORM PRESSURE TESTS AND DISINFECTION AS REQUIRED BY THE CITY ENGINEER.

Call before you Dig. 1-800-227-2600

DATE	REVISION

ANY INFORMATION OR DATA ON THIS DRAWING IS NOT INTENDED TO BE SUITABLE FOR REUSE BY ANY PERSON, FIRM, CORPORATION, OR ANY OTHERS ON EXTENSIONS OF THIS PROJECT OR ON ANY OTHER PROJECT. ANY REUSE, WITHOUT WRITTEN VERIFICATION OR ADAPTATION BY THE ENGINEER FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO THE ENGINEER.

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

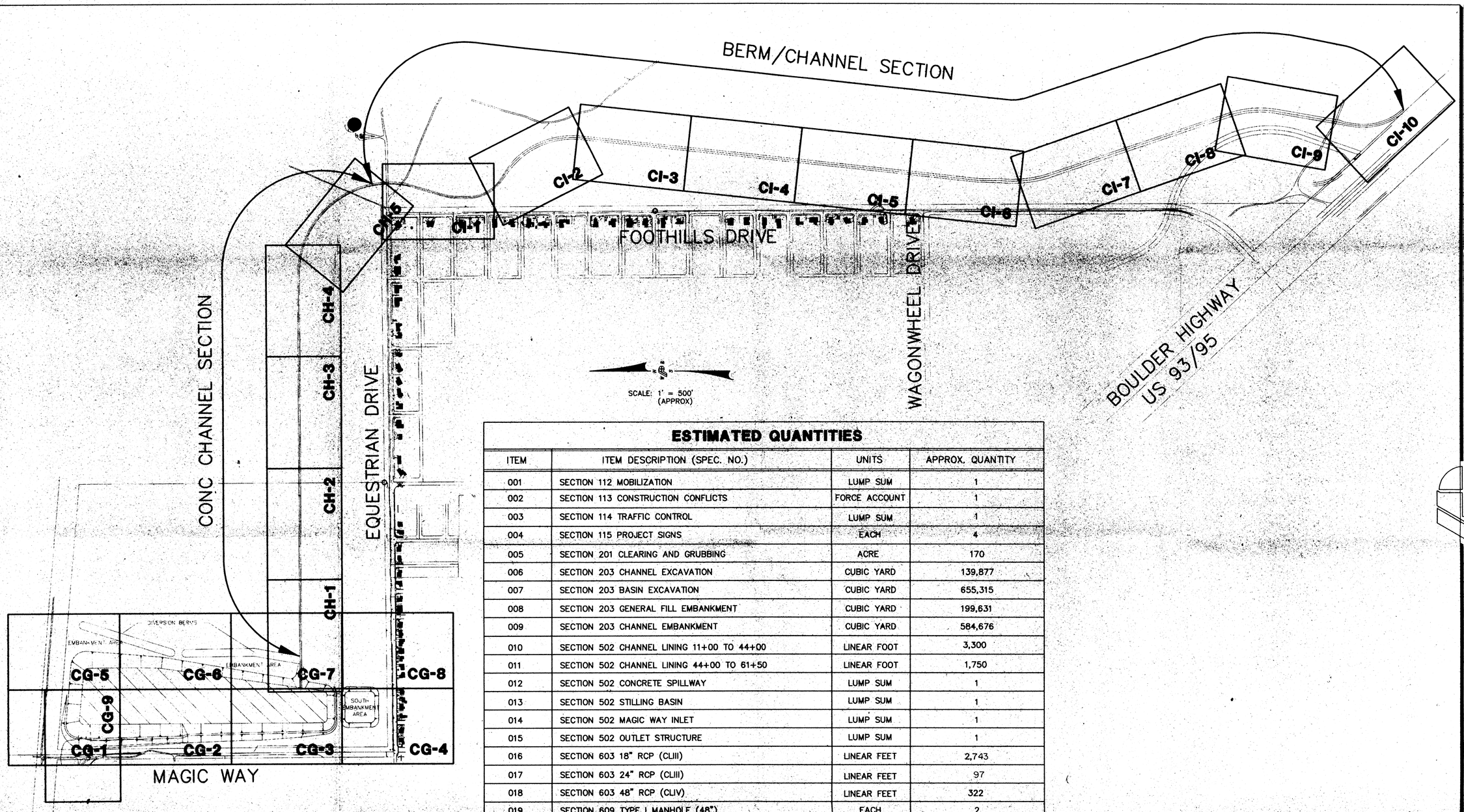
PROFESSIONAL ENGINEER STATE OF NEVADA No. 9525 CIVIL

EQUESTRIAN DETENTION BASIN

NOTES

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH/DRF
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CA-2
OF	

RECORD DRAWINGS



ESTIMATED QUANTITIES

ITEM	ITEM DESCRIPTION (SPEC. NO.)	UNITS	APPROX. QUANTITY
001	SECTION 112 MOBILIZATION	LUMP SUM	1
002	SECTION 113 CONSTRUCTION CONFLICTS	FORCE ACCOUNT	1
003	SECTION 114 TRAFFIC CONTROL	LUMP SUM	1
004	SECTION 115 PROJECT SIGNS	EACH	4
005	SECTION 201 CLEARING AND GRUBBING	ACRE	170
006	SECTION 203 CHANNEL EXCAVATION	CUBIC YARD	139,877
007	SECTION 203 BASIN EXCAVATION	CUBIC YARD	655,315
008	SECTION 203 GENERAL FILL EMBANKMENT	CUBIC YARD	199,631
009	SECTION 203 CHANNEL EMBANKMENT	CUBIC YARD	584,676
010	SECTION 502 CHANNEL LINING 11+00 TO 44+00	LINEAR FOOT	3,300
011	SECTION 502 CHANNEL LINING 44+00 TO 61+50	LINEAR FOOT	1,750
012	SECTION 502 CONCRETE SPILLWAY	LUMP SUM	1
013	SECTION 502 STILLING BASIN	LUMP SUM	1
014	SECTION 502 MAGIC WAY INLET	LUMP SUM	1
015	SECTION 502 OUTLET STRUCTURE	LUMP SUM	1
016	SECTION 603 18" RCP (CLIII)	LINEAR FEET	2,743
017	SECTION 603 24" RCP (CLIII)	LINEAR FEET	97
018	SECTION 603 48" RCP (CLIV)	LINEAR FEET	322
019	SECTION 609 TYPE I MANHOLE (48")	EACH	2
020	SECTION 609 TYPE I MANHOLE (60")	EACH	1
021	SECTION 609 TYPE IA MANHOLE (48")	EACH	1
022	SECTION 609 TYPE II MANHOLE	EACH	4
023	SECTION 610 RIP RAP	CUBIC YARD	5,908
024	SECTION 610 GROUTED RIP RAP	CUBIC YARD	267
025	SECTION 616 VEHICLE BARRICADE FENCE (ROCK)	LINEAR FOOT	3,730
026	SECTION 616 CHAIN LINK FENCE	LINEAR FOOT	12,015
027	SECTION 627 PERMANENT SIGNS	LUMP SUM	1
028	SECTION 629 RELOCATE 20" STEEL WATER LINE	LINEAR FEET	60
029	SECTION 670 USGS STILLING WELL	LUMP SUM	1
030	POST CONSTRUCTION DUST PALLIATIVE	LUMP SUM	1
031	HAUL (EXCESS MATERIAL)	YD. PER MILE	10,885

[redacted]

DATE	REVISION

ANY INFORMATION OR DATA ON THIS DRAWING IS NOT INTENDED TO BE SUITABLE FOR REUSE BY ANY PARTY ON ANOTHER PROJECT OR FOR ENLARGEMENTS OR MODIFICATIONS OF THE PROJECT FOR ANY USE ON THE PROJECT FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO THE ENGINEER.

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

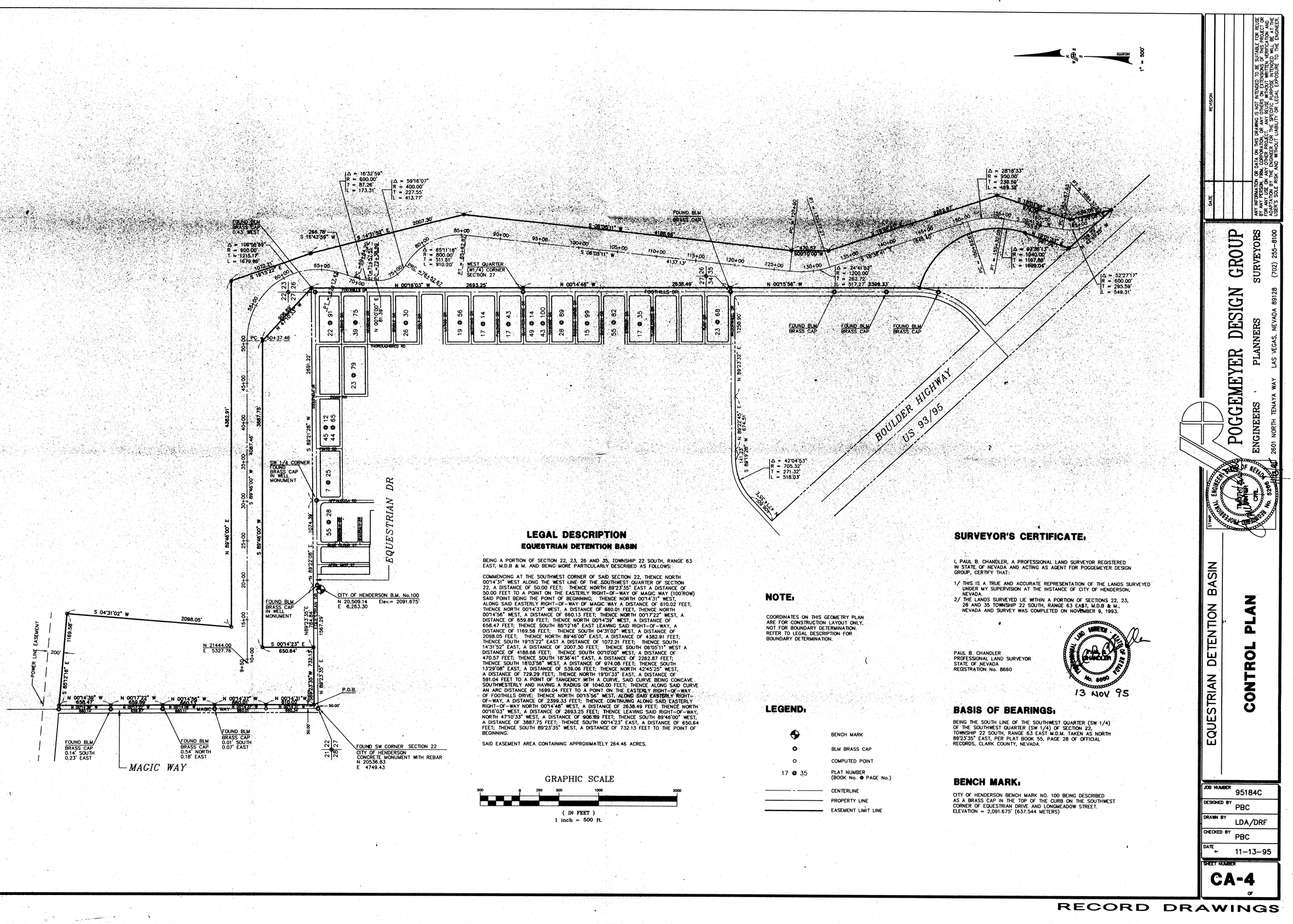
EQUESTRIAN DETENTION BASIN

PROJECT KEYMAP (ESTIMATED QUANTITIES)

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CA-3 OF

RECORD DRAWINGS

FILENAME: 184C-CA4.DWG



LEGAL DESCRIPTION

EQUESTRIAN DETENTION BASIN

BEING A PORTION OF SECTION 22, 23, 26 AND 35, TOWNSHIP 22 SOUTH, RANGE 63 EAST, M.D.B & M. AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 22, THENCE NORTH 00°14'31" WEST ALONG THE WEST LINE OF THE SOUTHWEST QUARTER OF SECTION 22, A DISTANCE OF 50.00 FEET; THENCE NORTH 89°23'35" EAST A DISTANCE OF 50.00 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF MAGIC WAY (100'ROW) SAID POINT BEING THE POINT OF BEGINNING; THENCE NORTH 00°14'31" WEST, ALONG SAID EASTERLY RIGHT-OF-WAY OF MAGIC WAY A DISTANCE OF 610.02 FEET; THENCE NORTH 00°14'37" WEST, A DISTANCE OF 660.01 FEET, THENCE NORTH 00°14'56" WEST, A DISTANCE OF 660.13 FEET; THENCE NORTH 00°17'22" WEST, A DISTANCE OF 659.89 FEET; THENCE NORTH 00°14'39" WEST, A DISTANCE OF 658.47 FEET; THENCE SOUTH 85°12'16" EAST LEAVING SAID RIGHT-OF-WAY, A DISTANCE OF 1169.58 FEET; THENCE SOUTH 04°31'02" WEST, A DISTANCE OF 2098.05 FEET; THENCE NORTH 89°46'00" EAST, A DISTANCE OF 4382.91 FEET; THENCE SOUTH 19°15'22" EAST A DISTANCE OF 1072.21 FEET; THENCE SOUTH 14°31'52" EAST, A DISTANCE OF 2007.30 FEET; THENCE SOUTH 06°05'11" WEST A DISTANCE OF 4188.66 FEET; THENCE SOUTH 00°10'00" WEST, A DISTANCE OF 470.57 FEET; THENCE SOUTH 18°36'41" EAST, A DISTANCE OF 2262.87 FEET; THENCE SOUTH 18°03'56" WEST, A DISTANCE OF 974.08 FEET; THENCE SOUTH 13°29'08" EAST, A DISTANCE OF 539.06 FEET; THENCE NORTH 42°45'25" WEST, A DISTANCE OF 729.29 FEET; THENCE NORTH 19°01'33" EAST, A DISTANCE OF 591.04 FEET TO A POINT OF TANGENCY WITH A CURVE, SAID CURVE BEING CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 1040.00 FEET; THENCE ALONG SAID CURVE AN ARC DISTANCE OF 1699.04 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF FOOTHILLS DRIVE; THENCE NORTH 00°15'56" WEST, ALONG SAID EASTERLY RIGHT-OF-WAY, A DISTANCE OF 2399.33 FEET; THENCE CONTINUING ALONG SAID EASTERLY RIGHT-OF-WAY NORTH 00°14'48" WEST, A DISTANCE OF 2638.49 FEET; THENCE NORTH 00°16'03" WEST, A DISTANCE OF 2693.25 FEET; THENCE LEAVING SAID RIGHT-OF-WAY, NORTH 47°10'33" WEST, A DISTANCE OF 906.89 FEET; THENCE SOUTH 89°46'00" WEST, A DISTANCE OF 3887.75 FEET; THENCE SOUTH 00°14'23" EAST, A DISTANCE OF 650.64 FEET; THENCE SOUTH 89°23'35" WEST, A DISTANCE OF 732.13 FEET TO THE POINT OF BEGINNING.

SAID EASEMENT AREA CONTAINING APPROXIMATELY 264.46 ACRES.

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

NOTE:

COORDINATES ON THIS GEOMETRY PLAN ARE FOR CONSTRUCTION LAYOUT ONLY. NOT FOR BOUNDARY DETERMINATION. REFER TO LEGAL DESCRIPTION FOR BOUNDARY DETERMINATION.

LEGEND:

- BENCH MARK
- BLM BRASS CAP
- COMPUTED POINT
- 17 @ 35 — PLAT NUMBER (BOOK No. @ PAGE No.)
- CENTERLINE
- PROPERTY LINE
- EASEMENT LIMIT LINE

SURVEYOR'S CERTIFICATE:

I, PAUL B. CHANDLER, A PROFESSIONAL LAND SURVEYOR REGISTERED IN STATE OF NEVADA AND ACTING AS AGENT FOR POGGEMEYER DESIGN GROUP, CERTIFY THAT:

1/ THIS IS A TRUE AND ACCURATE REPRESENTATION OF THE LANDS SURVEYED UNDER MY SUPERVISION AT THE INSTANCE OF CITY OF HENDERSON, NEVADA.
2/ THE LANDS SURVEYED LIE WITHIN A PORTION OF SECTIONS 22, 23, 26 AND 35 TOWNSHIP 22 SOUTH, RANGE 63 EAST, M.D.B & M., NEVADA AND SURVEY WAS COMPLETED ON NOVEMBER 9, 1993.

PAUL B. CHANDLER
PROFESSIONAL LAND SURVEYOR
STATE OF NEVADA
REGISTRATION No. 8660

13 NOV 95

BASIS OF BEARINGS:

BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 22, TOWNSHIP 22 SOUTH, RANGE 63 EAST M.D.M. TAKEN AS NORTH 89°23'35" EAST, PER PLAT BOOK 55, PAGE 28 OF OFFICIAL RECORDS, CLARK COUNTY, NEVADA.

BENCH MARK:

CITY OF HENDERSON BENCH MARK NO. 100 BEING DESCRIBED AS A BRASS CAP IN THE TOP OF THE CURB ON THE SOUTHWEST CORNER OF EQUESTRIAN DRIVE AND LONGMEADOW STREET. ELEVATION = 2,091.675' (637.544 METERS)

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS · PLANNERS SURVEYORS
2801 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

EQUESTRIAN DETENTION BASIN

CONTROL PLAN

JOB NUMBER	95184C
DESIGNED BY	PBC
DRAWN BY	LDA/DRF
CHECKED BY	PBC
DATE	11-13-95
SHEET NUMBER	CA-4
OF	

RECORD DRAWINGS

FILENAME: 184-CASL98

R. 63 E.
R. 63½ E.
R. 63½ E.
R. 64 E.

T. 22 S.
T. 23 S.

LIMIT OF 100-YEAR DRAINAGE BASIN

C5FA
C5FB
C5FC
C5FD
C5EA
C5EB
C5EC
C5ED
C5DA
C5DB
C5DC
C5CB
C5CA
C4C

SCALE: 1"=2000'

GRAPHIC SCALE

2000 0 1000 2000 4000 6000

(IN FEET)
1 inch = 2000ft.

LEGEND

- 100 YEAR DRAINAGE BASIN BOUNDARY
- EQUESTRIAN FLOOD CONTROL FACILITIES
- SUB-BASIN BOUNDARY
- C4C — SUB-BASIN AREA DESIGNATION
- PROBABLE MAXIMUM FLOOD (PMF) AREA

HYDROLOGIC BASIN SUB-AREA	SIZE (SQ. MILE)	LAG TIME (HOURS)
C5FA	0.52	0.20
C5FB	0.20	0.35
C5FC	0.19	0.30
C5FD	0.32	0.29
C5EA	0.48	0.62
C5EB	0.60	0.64
C5EC	0.22	0.25
C5ED	0.10	0.17
C5DA	1.00	0.40
C5DB	0.66	0.52
C5DC	0.98	0.69
C5CB	0.21	0.49
C5CA	1.67	0.28
C4C	5.53	0.89

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2501 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

EQUESTRIAN DETENTION BASIN

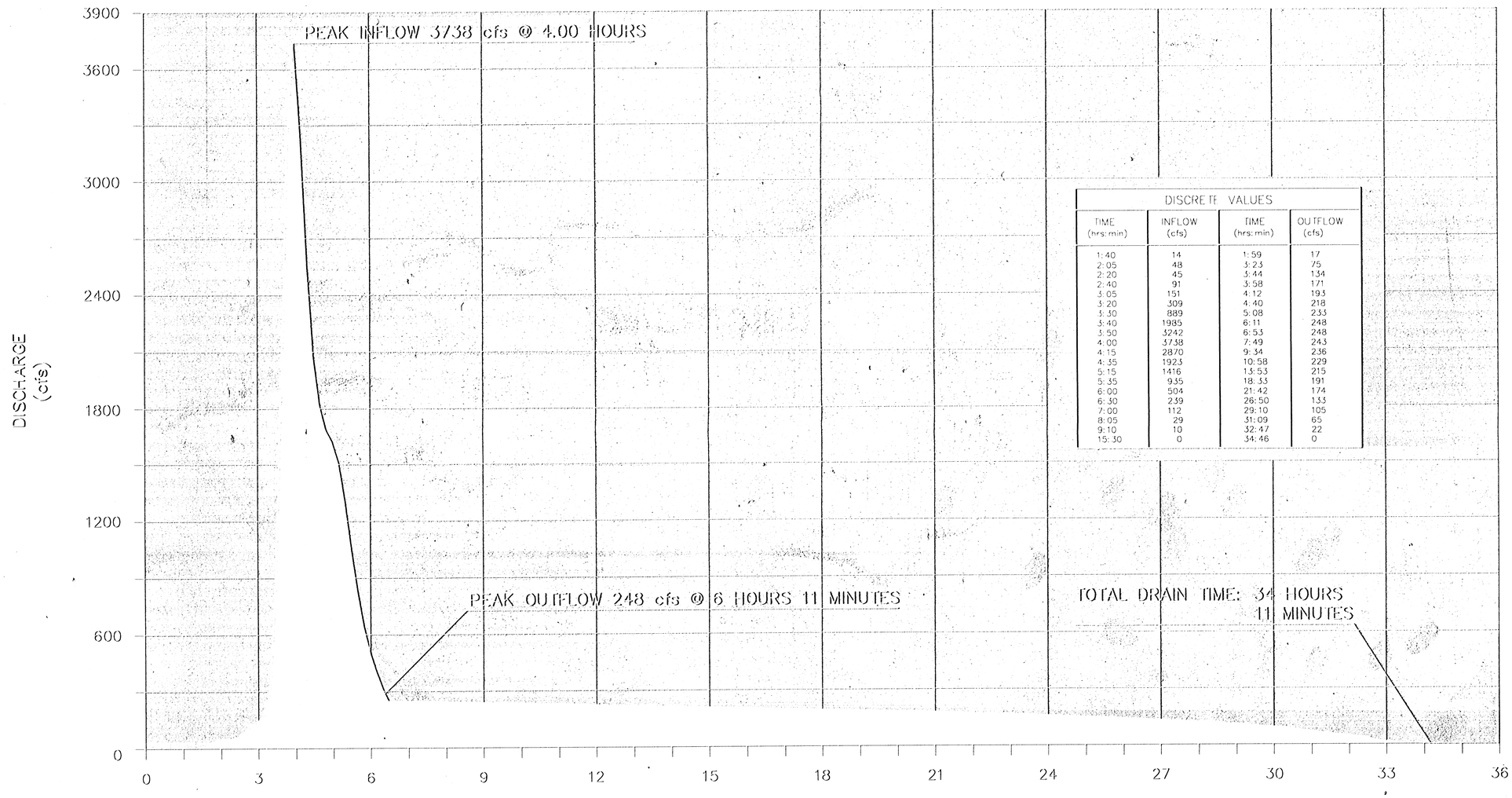
DRAINAGE BASIN MAP

JOB NUMBER	95184C
DESIGNED BY	SJN/JJD
DRAWN BY	RCP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CA-5

RECORD DRAWINGS

FILENAME: 1840-CA-2.DWG

INFLOW-OUTFLOW HYDROGRAPHS



DISCRETE VALUES

TIME (hrs:min)	INFLOW (cfs)	TIME (hrs:min)	OUTFLOW (cfs)
1:40	14	1:59	17
2:05	48	3:23	75
2:20	45	3:44	134
2:40	91	3:58	171
3:05	151	4:12	193
3:20	309	4:40	218
3:30	889	5:08	233
3:40	1985	6:11	248
3:50	3242	6:53	248
4:00	3738	7:49	243
4:15	2870	9:34	236
4:35	1923	10:58	229
5:15	1416	13:53	215
5:35	935	18:33	191
6:00	504	21:42	174
6:30	239	26:50	133
7:00	112	29:10	105
8:05	29	31:09	65
9:10	10	32:47	22
15:30	0	34:46	0

SCALE:
HORIZONTAL: 1" = 1.5 HOURS
VERTICAL: 1" = 300 CFS

NOTES:

1. INFLOW HYDROGRAPH COMPILED FROM 5 MINUTE COMPUTATIONAL INTERVALS
2. OUTFLOW HYDROGRAPH COMPILED FROM 7 MINUTE COMPUTATIONAL INTERVAL
3. OUTFLOW CURVE IS BASED UPON CLEARWATER FLOW FROM BASIN VOLUMES MODIFIED BY PROPORTIONAL DISTRIBUTION OF 42 ACRE-FEET OF SEDIMENT STORAGE

REVISION

DATE	

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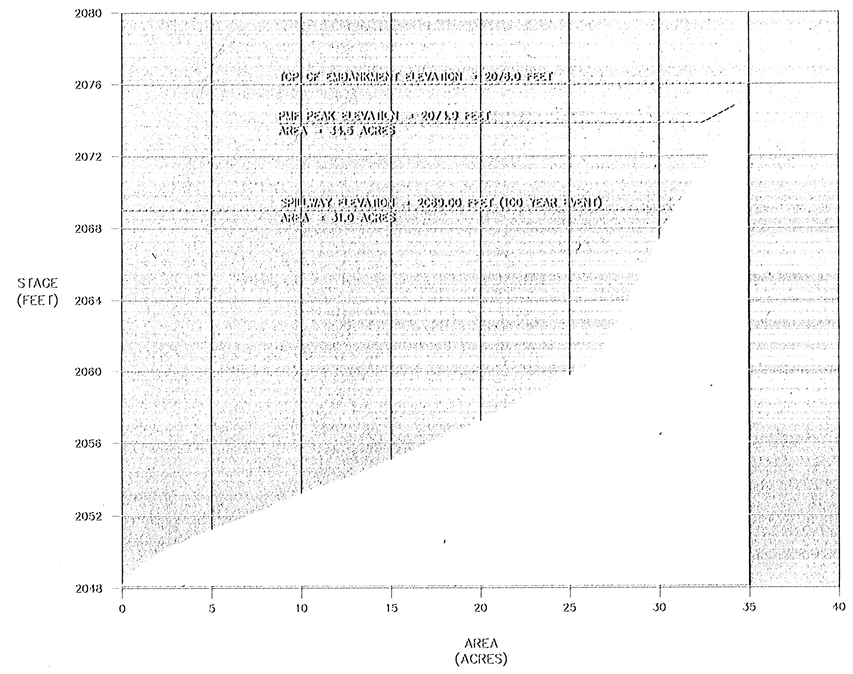
POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2801 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

EQUESTRIAN DETENTION BASIN
BASIN CHARACTERISTICS
INFLOW - OUTFLOW HYDROGRAPHS

JOB NUMBER	95184C
DESIGNED BY	JJD
DRAWN BY	DRF
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CA-3 OF

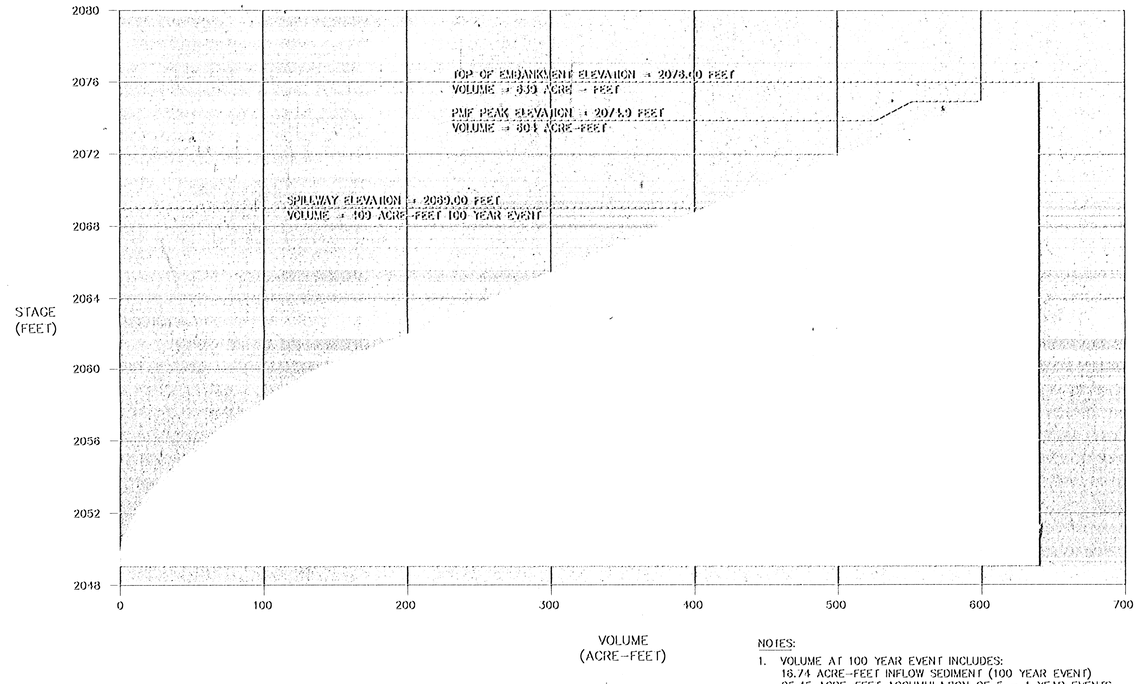
RECORD DRAWING

FILENAME 1840-CA7.DWG



SCALE:
HORIZONTAL: 1" = 4 ACRES
VERTICAL: 1" = 4 FEET

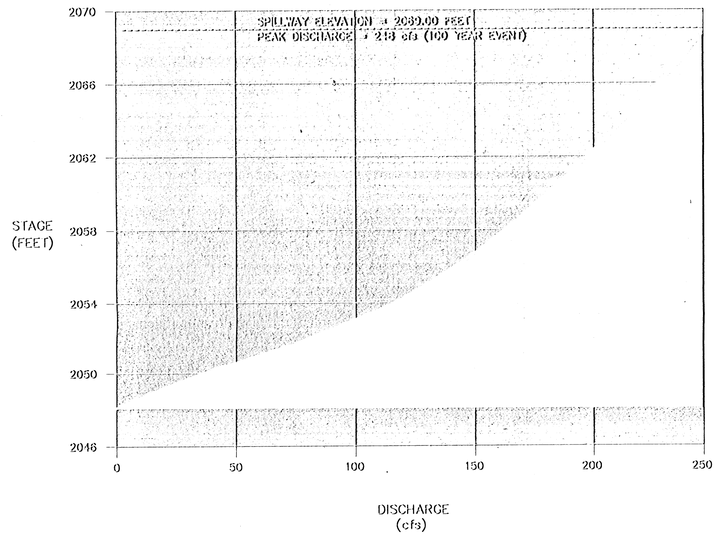
STAGE – AREA CURVE



SCALE:
HORIZONTAL: 1" = 50 ACRE – FEET
VERTICAL: 1" = 4 FEET

STAGE – VOLUME CURVE

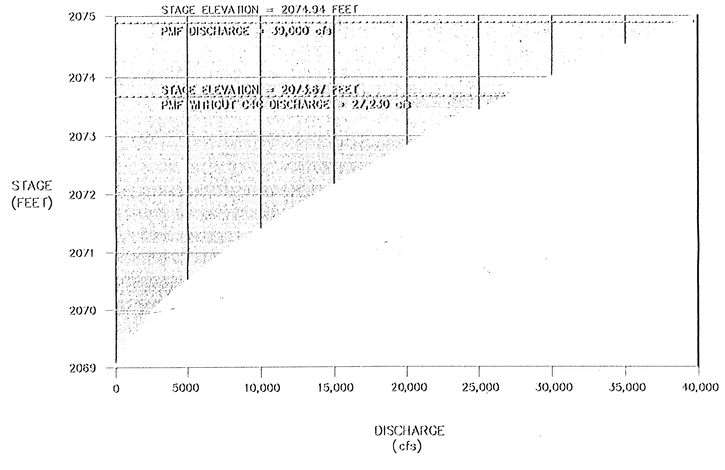
NOTES:
1. VOLUME AT 100 YEAR EVENT INCLUDES:
   16.74 ACRE–FEET INFLOW SEDIMENT (100 YEAR EVENT)
   25.45 ACRE–FEET ACCUMULATION OF 5 – 1 YEAR EVENTS
   .367 ACRE–FEET CLEAR WATER STORAGE
2. PMF PEAK INCLUDES DRAINAGE BASIN C4C. PEAK PMF WITHOUT C4C; STAGE = 2073.5 FEET WITH STORAGE VOLUME OF 554 ACRE–FEET.



STAGE – DISCHARGE CURVE (100 YEAR EVENT)
LOW LEVEL OUTLET (48 INCH RCP)

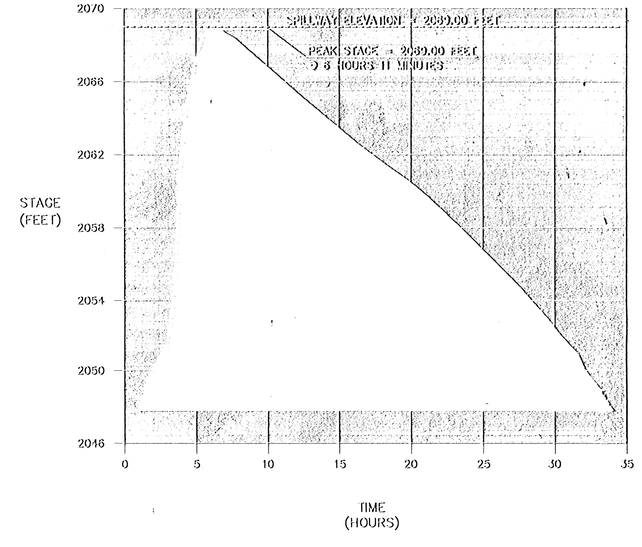
SCALE:
HORIZONTAL: 1" = 50 CUBIC FEET PER SECOND
VERTICAL: 1" = 4 FEET

NOTE:
STAGE AT PEAK IS BASED UPON CLEAR WATER FLOWS WITH BASIN VOLUMES MODIFIED BY PROPORTIONAL DISTRIBUTION OF 42 ACRE–FEET OF SEDIMENT STORAGE.



SPILLWAY RATING CURVE
STAGE DISCHARGE – CURVE

SCALE:
HORIZONTAL: 1" = 5000 CUBIC FEET PER SECOND
VERTICAL: 1" = 1 FOOT



LOW LEVEL OUTLET (48 INCH RCP)

SCALE:
HORIZONTAL: 1" = 5 HOURS
VERTICAL: 1" = 4 FEET

NOTE:
STAGE AT PEAK IS BASED UPON CLEAR WATER FLOWS WITH BASIN VOLUMES MODIFIED BY PROPORTIONAL DISTRIBUTION OF 42 ACRE–FEET OF SEDIMENT STORAGE.

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

TIMOTHY J. PETERSON — CIVIL — No. 9787 — STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER

EQUESTRIAN DETENTION BASIN
BASIN CHARACTERISTICS
STAGE: STORAGE, DISCHARGE, TIME, SPILLWAY RATING CURVE

JOB NUMBER	951184C
DESIGNED BY	JJD
DRAWN BY	JJD
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CA-7 OF

RECORD DRAWINGS

FILENAME: 184C-BI(PP-CR1)

N 24,100

E 5,300

N 23,100

SEE SHEET CG-5

SEE SHEET CG-5

SEE SHEET CG-2

SEE SHEET CG-2

E 4,500

VEHICLE BARRIER BOULDERS

STA 41+00.00

200' WESTERN AREA POWER ASSOC EASEMENT

STA 40+90.20' RT
CONC DEPTH GAUGE

STA 40+17.98' RT
BEEHIVE INLET

STA 40+25 67.00' RT
BEEHIVE INLET

STA 40+02.30' RT
STILLING WELL

OUTLET/
INLET

STRUCTURE
3' RIP RAP
STA 37+48.10

LIMITS OF
DISTURBED
AREA

12' GRADED
ACCESS ROAD

HYDRAULICALLY
DESIGNED AREA

Δ = 102°32'10"
R = 152.00'
T = 201.98'
L = 289.91'

STALL SIGN
DETAIL

DOWNSTREAM SPILLWAY FACE

STILLING BASIN FLOOR
0.40%

MAGIC WAY

S 00°14'39"E 658.47'

N00°17'22"W 77.38'

SEE DETAIL
FOR FENCE

12' GRADED
ACCESS ROAD

117 LF ~ 18" RCP ~ S=0.0040

400 LF ~ 18" RCP ~ S=0.0050

N00°14'39"W 680.14'

STA 12+58, OFFSET 20' LT
60" TYPE I MH PER USD No 403
RIM = 2064.00
IE = 2047.03 (18" IN, MAGIC WAY)
IE = 2047.03 (18" IN, SPILLWAY)
IE = 2046.92 (24" OUT)

STA 15+75, OFFSET 20' LT
48" TYPE 1A SDMH PER USD No 403
RIM = 2054.50
IE = 2047.80 (IN)
IE = 2042.80 (OUT)

EX POWER POLE (TYP)
W/ OH ELEC & TEL

EXISTING MH
SHIFT STRUCTURE TO
ACCOMADATE MH

EASEMENT POB

SEE SHEET CG-9 FOR
IMPROVEMENTS IN
THIS AREA

DRAINAGE
EASEMENT

S00°14'39"E 101.64'

N75°16'34"W 154.17'

N68°07'40"W 178.35'

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

GREEN BACKGROUND
WHITE LETTERING
3" LETTERS CENTERED ON SIGN
5/8" WHITE BORDER

EQUESTRAIN
DETENTION
BASIN

24"

16"

7' MIN

POST MOUNTED SIGN
4 EA. - EQ. - BASIN
EQUESTRIAN CHANNEL - FENCE MOUNTED
4 EA. - EQ. - CHANNEL

POST MOUNTED
FENCE SIGN

NO SCALE

1 / CG1

MAGIC WAY

KEY MAP

REVISION

DATE

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POGGEMEYER DESIGN GROUP

ENGINEERS PLANNERS SURVEYORS

2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

EQUESTRIAN DETENTION BASIN

DETENTION BASIN GRADING PLAN

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP/BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CG-1
OF	

RECORD DRAWINGS

FILENAME: 1840-B1(PP=CG2)

N 23,100

N 22,100

E 5,300

E 4,500

SEE SHEET CG-1

SEE SHEET CG-6

SEE SHEET CG-6

SEE SHEET CG-3

SEE SHEET CG-1

SEE SHEET CG-3

N 23000 E 4600

N 22200 E 4600

N 23000 E 5200

N 22200 E 5200

2065

2051

2052

2054

2055

2060

2070

2075

2057

2058

2059

STA 27+45.28

2052.59 FG

2052.84 FG

2051.58 FG

2051.45 FG

2057.45 FG

2057.70 FG

2056.50 TOP WALL

2058.50 TOP WALL

2059.00 CREST

2058.50 FG

2056.50 FG

CN-4/2

CN-3/1

CO-6/2

CO11/2

2:1

8:1

2.5:1

4:1 (TYP)

4:1 (TYP)

4:1 (TYP)

15'

24'

SPILLWAY CREST (ELEV = 2069.00)

UPSTREAM SPILLWAY APRON

DOWNSTREAM SPILLWAY FACE

STILLING BASIN FLOOR

0.40%

32+00

31+00

30+00

29+00

27+00

26+00 2076.00 ELEV TOP OF BERM

25+00

24+00

23+00

N11°16'49"W

51.42'

N01°12'56"E

N 22100.00 E 4901.85

N 22100.00 E 4694.81

N00°17'22"W

582.51'

400 LF ~ 18" RCP ~ S=0.0050

N00°17'22"W

50' R/W

18+00

19+00

20+00

S00°17'22"E

583.06'

21+00

22+00

23+00

N00°15'49"W

N00°14'56"W

417.50'

24+00

25+00

S00°14'56"E

416.95'

26+00

27+00

N00°14'56"W

STA 17+75, OFFSET 20' LT
TYPE II MH PER USD No 405
RIM = 2054.50
IE = 2049.70 (IN)
IE = 2049.60 (OUT)

STA 21+75, OFFSET 20' LT
TYPE II MH PER USD No 405
RIM = 2056.63
IE = 2051.80 (IN)
IE = 2051.70 (OUT)

STA 25+75, OFFSET 20' LT
TYPE II MH PER USD No 405
RIM = 56.48
IE = 53.73 (IN)
IE = 53.63 (OUT)

MAGIC WAY

2 VEHICLE BARRIER BOULDERS

EX POWER POLE (TYP) W/ OH ELEC & TEL

EX 8" SS

EX 12" SS

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

KEY MAP

CG-5 CG-6 CG-7 CG-8
CG-1 CG-2 CG-3 CG-4
MAGIC WAY

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. PHILLIPS No. 5258 CIVIL

EQUESTRIAN DETENTION BASIN

DETENTION BASIN GRADING PLAN

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP/BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CG-2
OF	

RECORD DRAWINGS

FILENAME: 184C-B1(PP=CG3)

N 22,100

N 21,100

E 5,300

E 4,500

SEE SHEET CG-2

SEE SHEET CG-7

SEE SHEET CG-4

SEE SHEET CG-2

SEE SHEET CG-4

N 22000 E 5200

N 21300 E 5000

N 22000 E 4600

N 21300 E 4600

2059.50 FG
N 21360.79
E 5,300.00

RIP-RAP SLOPE PROTECTION

2092.00 FG
N 21176.18
E 5,300.00

6' CHAIN LINK FENCE PER USD NO 252

N44°46'00"E 35.36'

2059.50 FG
N 21212.70
E 5152.43

N 21214.17
E 5146.83

2059.50 FG
N 21216.35
E 5141.24

N40°09'57"E

194.04'

℄ 12' GRADED ACCESS ROAD
6" TYPE II AGG BASE

STA 15+00.00

2060.00 FG
N 21105.71
E 4959.84

N 22100.00
E 4894.81

2076.00 ELEV TOP OF BERM

HYDROSEED AREA

N 21100.00
E 4873.97

STA 13+00
12' GRADED ACCESS ROAD
6" TYPE II AGG BASE

VEHICLE BARRIER BOULDERS

N00°12'56"E

N00°14'56"W 242.63'

N00°14'37"W 660.01'

N00°14'31"W 97.37'

STA 13+00
ACCESS GATE
62 LF

400 LF ~ 18" RCP ~ S=0.0050

400 LF ~ 18" RCP ~ S=0.0105

400 LF ~ 18" RCP ~ S=0.0058

S00°14'56"E 243.16'

S00°14'31"E 96.84'

50' R/W

30' R/W

STA 29+75, OFFSET 20' LT
TYPE II MH PER USD No. 405
RIM = 2060.75
IE = 2056.00 (IN)
IE = 2055.90 (OUT)

EX DBL 30"x19" RCP SD TO BE REMOVED/REPLACED BY OTHERS

EX POWER POLE (TYP) W/ OH ELEC & TEL

STA 33+75, OFFSET 20' LT
48" TYPE I SDMH PER USD No 403
RIM = 2067.50
IE = 2060.30 (IN)
IE = 2060.20 (OUT)

MAGIC WAY

GREYHOUND LANE

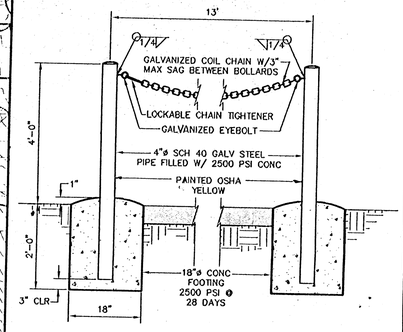
UNDEVELOPED

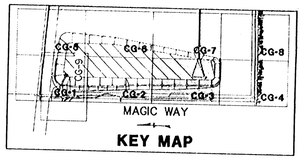
WELLINGTON MANOR SUBDIVISION
(UNDER CONSTRUCTION)

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

ACCESS GATE 1
NO SCALE





KEY MAP

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. POGGEMEYER CIVIL No. 9248

EQUESTRIAN DETENTION BASIN

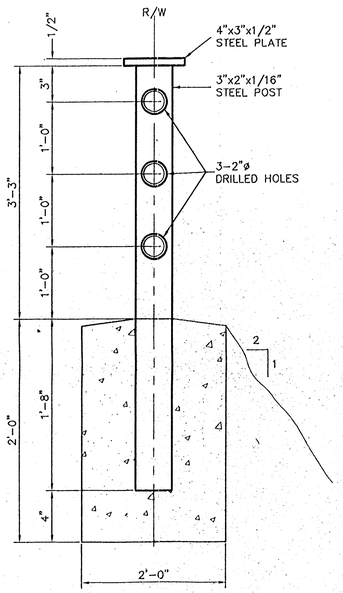
DETENTION BASIN GRADING PLAN

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP/BKP
CHECKED BY	TEP
DATE	11-13-95

SHEET NUMBER
CG-3
OF

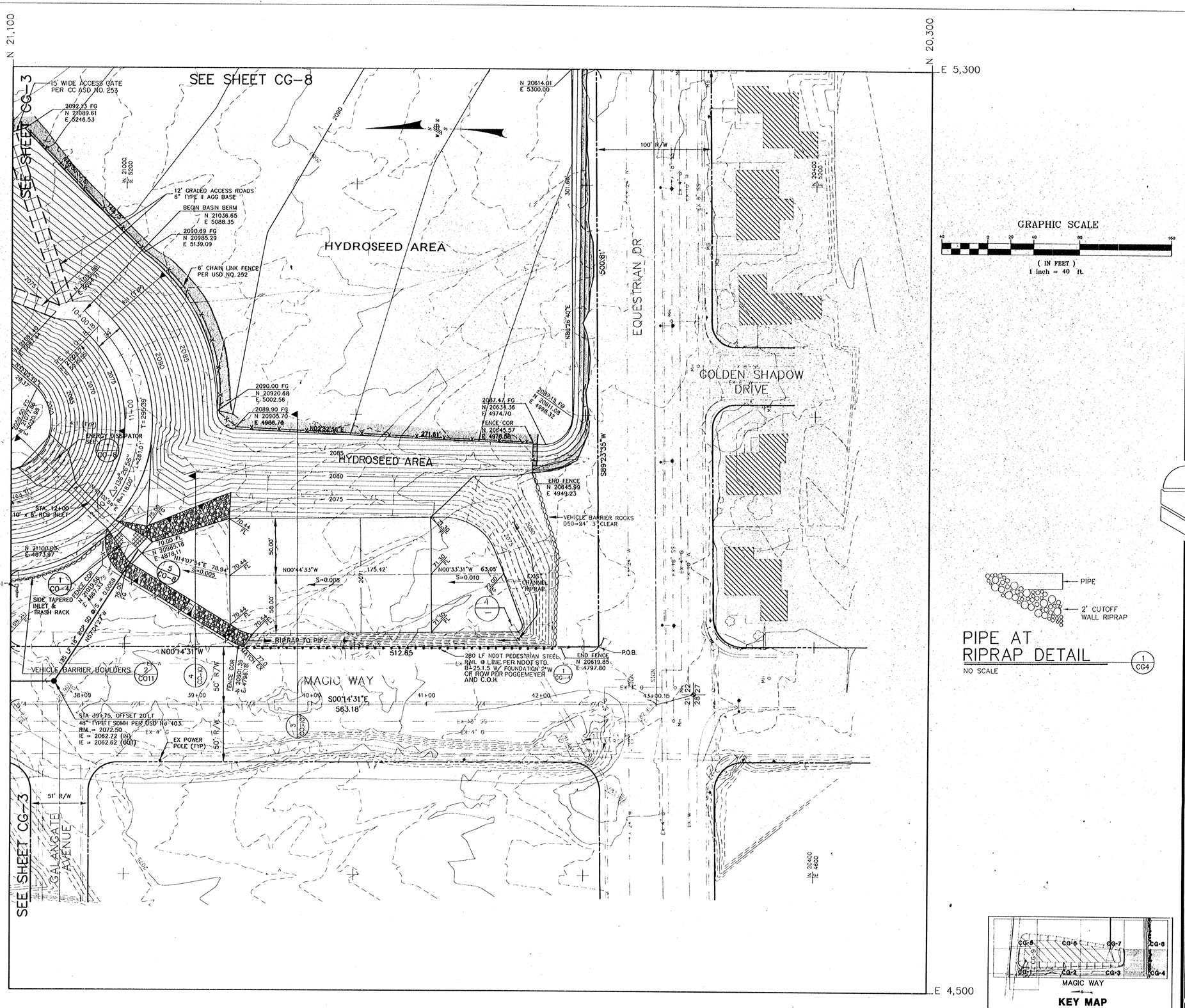
RECORD DRAWINGS

FILENAME: 1840-S1(PP=CG4)



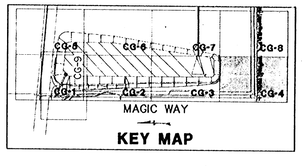
PEDESTRIAN RAIL FOUNDATION (1)

NO SCALE



PIPE AT RIPRAP DETAIL (1 CG4)

NO SCALE



KEY MAP

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

TIMOTHY E. PETERSEN — STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — CIVIL — No. 9281

EQUESTRIAN DETENTION BASIN

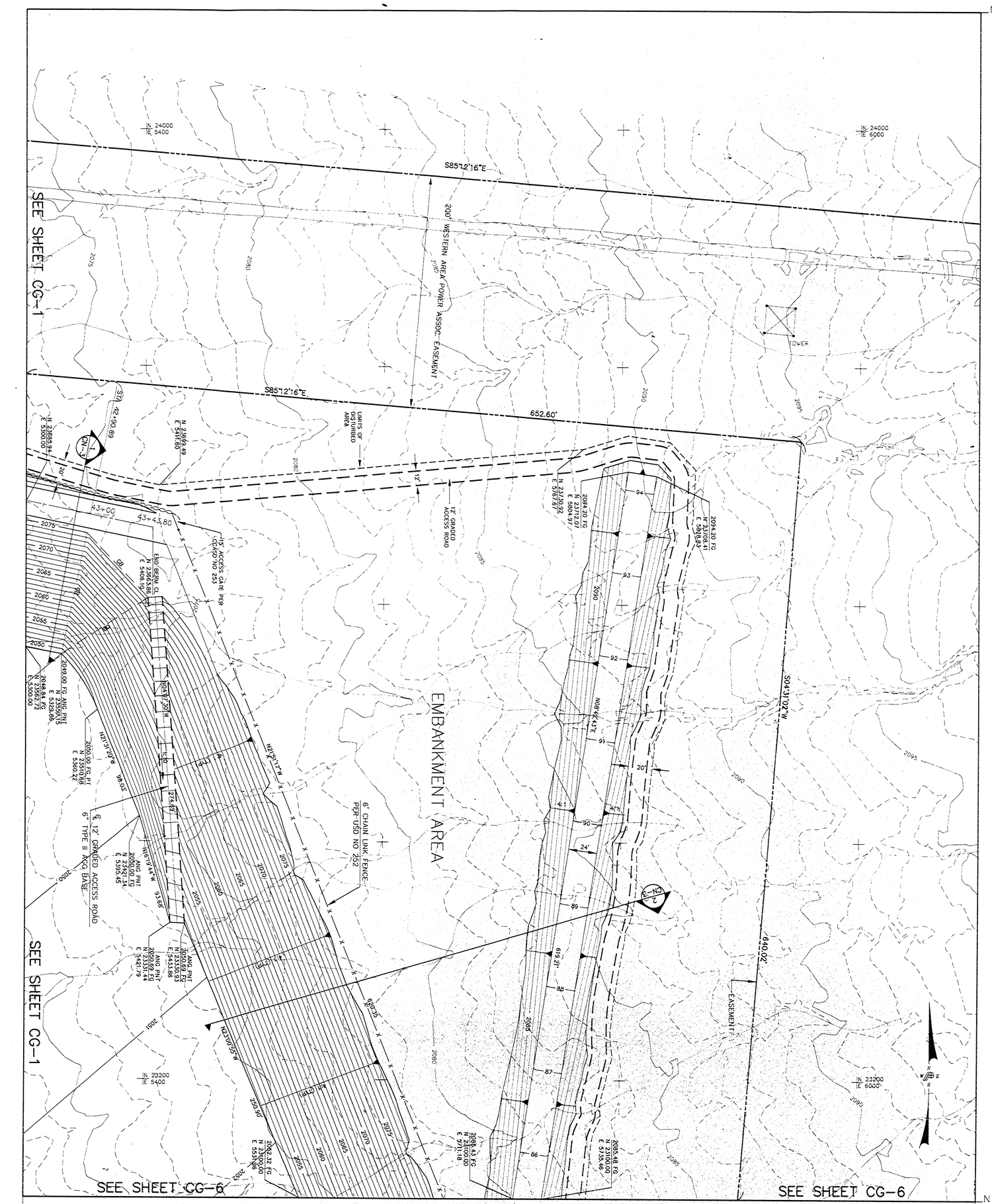
DETENTION BASIN GRADING PLAN

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP/BKP
CHECKED BY	TEP
DATE	11-13-95

SHEET NUMBER **CG-4** OF

RECORD DRAWINGS

FILENAME: 184C-B1(PP=CGS)



KEY MAP

EQUESTRIAN DETENTION BASIN

DETENTION BASIN GRADING PLAN

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

DATE	REVISION

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JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP/BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CG-5

RECORD DRAWINGS

PLOT DATE: 11-13-95 PLOTTED BY: RICK PLOT SCALE: 1.000 PLOT ROTATION: 0.00 FILENAME: 1845-B1(PP=CG6)

N 23,100

N 22,100

E 6,100

E 5,300

SEE SHEET CG-5

SEE SHEET CG-7

SEE SHEET CG-2

SEE SHEET CG-2

155'

"A"

"B"

NOTE:
"A" VARIES 15' AT TOP TO 0' AT BOTTOM
"B" VARIES 8" AT TOP TO 0" AT BOTTOM

RIP-RAP BLANKET SECTION (1)
NO SCALE

EASEMENT LINE

S04°31'02"W 1003.11'

2085.48 FG
N 23100.00
E 5735.46

LIMIT OF DISTURBED AREA

2080.00 FG
N 22718.18
E 5678.88

2080.00 FG
N 22721.82
E 5653.14

120'

LEAN CONC CUTOFF-WALL

HEAVY RIPRAP

HEAVY RIPRAP

CG-3

2080.00 FG
N 22690.49
E 5666.83

2080.00 FG
N 22586.49
E 5643.17

2083.39 FG
N 22100.00
E 5749.74

12' GRADED ACCESS ROAD

CG-2

2085.43 FG
N 23100.00
E 5711.18

FENCE ANG PNT
N 23050.39
E 5672.80

6' CHAIN LINK FENCE
PER USD NO-252

N08°42'43"E 382.61'

END FENCE
N 22728.78
E 5633.92

N21°51'17"W 53.45'

S08°53'35"W 123.95'

CG-6

BEGIN FENCE
N 22577.47
E 5624.67

RIP-RAP SLOPE PROTECTION

N09°35'39"W 493.39'

2083.37 FG
N 22100.00
E 5725.40

EMBANKMENT AREA

6' CHAIN LINK FENCE
PER USD NO-252

N03°34'01"E 339.74'

FENCE ANG PNT
N 22238.39
E 5603.53

N 22100.00
E 5563.00

N18°19'53"E 144.20'

N03°30'36"E 732.57'

2052.74 FG PC
N 23041.38
E 5556.86

2053.04 FG PT
N 22986.16
E 5584.03

N23°00'55"W 63.69'

2052.32 FG
N 23100.00
E 5531.96

2056.95 FG PC
N 22264.96
E 5519.78

Δ = 10°43'29"
R = 115.00'
T = 10.79'
L = 21.53'

2057.00 FG PT
N 22243.43
E 5516.46

N14°14'05"E 148.28'

2057.50 FG
N 22100.00
E 5480.00

N 23000
E 6000

N 22200
E 6000

N 23000
E 5400

N 22200
E 5400

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch. = 40 ft.

KEY MAP
CG-5 CG-6 CG-7 CG-8 CG-9 CG-1 CG-2 CG-3 CG-4
MAGIC WAY

REVISION	DATE

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POGGEMEYER DESIGN GROUP
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2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. PATTON CIVIL No. 9986

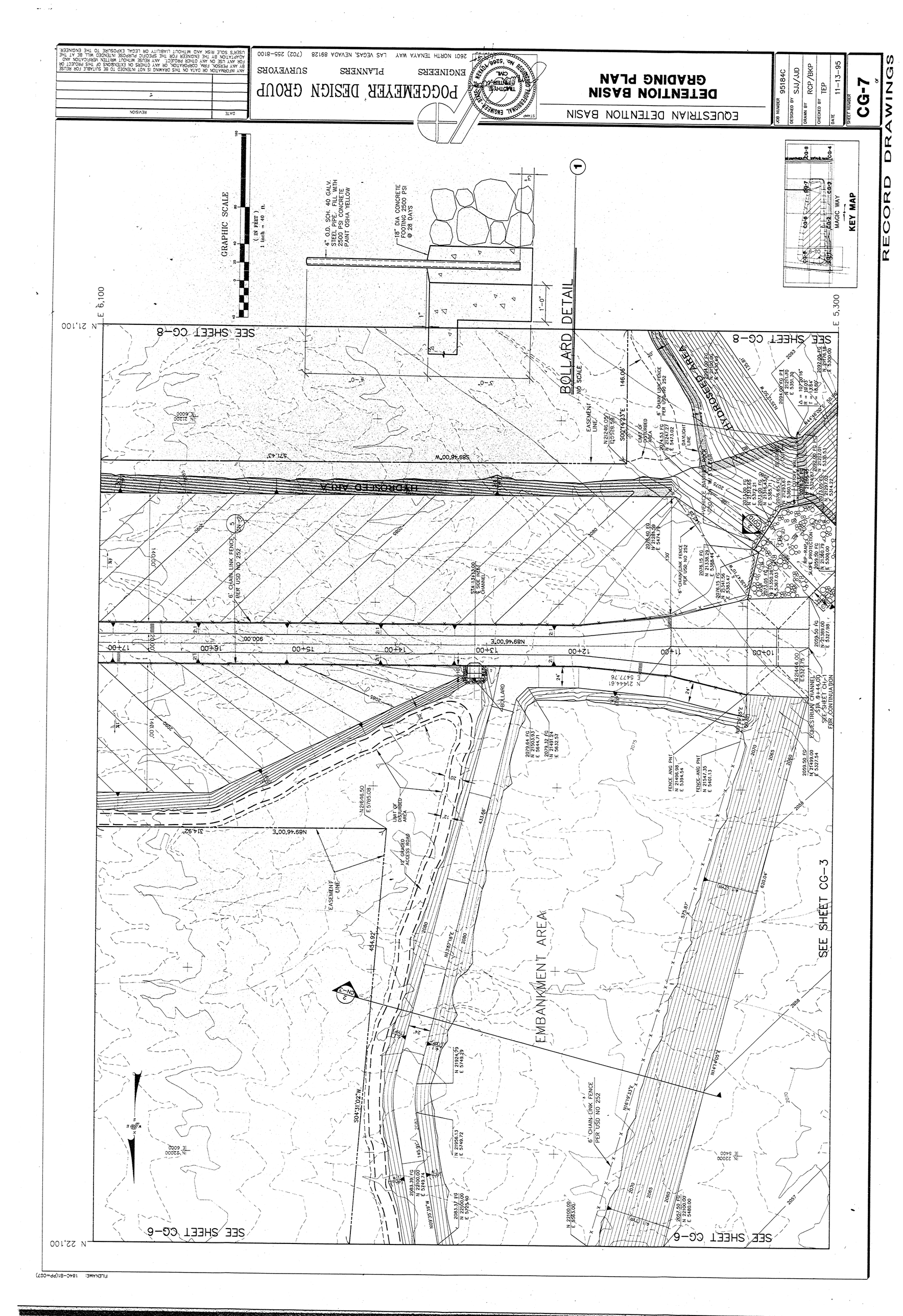
EQUESTRIAN DETENTION BASIN

DETENTION BASIN GRADING PLAN

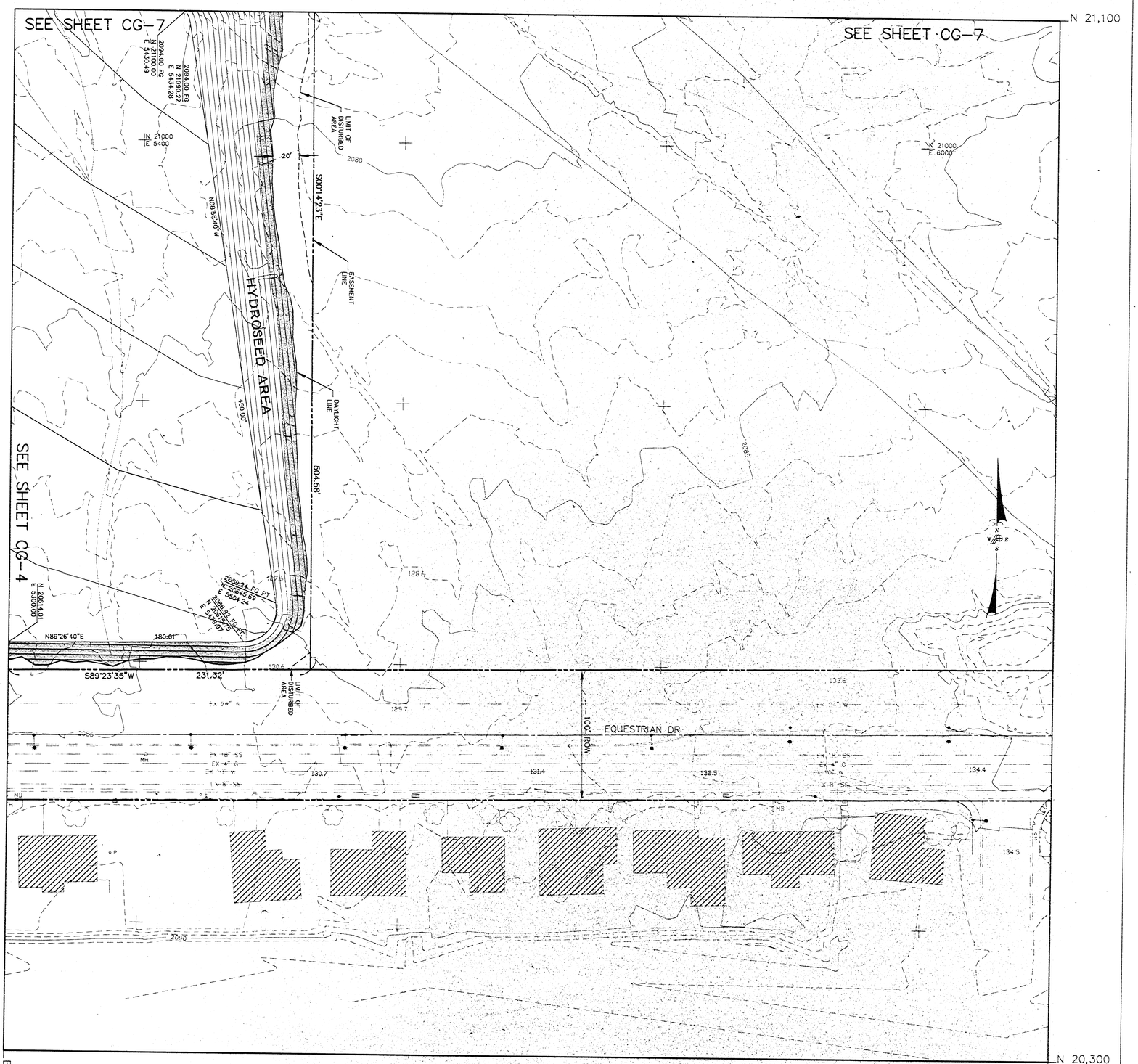
JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP/BKP
CHECKED BY	TEP
DATE	11-13-95

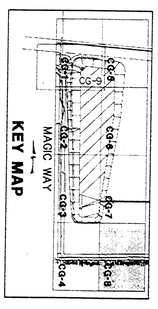
SHEET NUMBER
CG-6
OF

RECORD DRAWINGS


EQUESTRIAN DETENTION BASIN
DETENTION BASIN GRADING PLAN
POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 285-8100
JOB NUMBER 95184C
DESIGNED BY SJJ/JJD
DRAWN BY RCP/BKP
CHECKED BY TEP
DATE 11-13-95
SHEET NUMBER CG-7
RECORD DRAWINGS
GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
4" O.D. SCH. 40 GALV. STEEL PIPE FILLED WITH 2500 PSI CONCRETE PAINT OSHA YELLOW
18" DIA CONCRETE FOOTING 2500 PSI @ 28 DAYS
BOLLARD DETAIL
NO SCALE
KEY MAP
MAGIC WAY
HYDROSEED AREA
EMBANKMENT AREA
SEE SHEET CG-8
SEE SHEET CG-3
SEE SHEET CG-6
6' CHAIN LINK FENCE PER USD NO 252
14' GRADED ACCESS ROAD
EASEMENT LINE
LIMIT OF DISTURBED AREA
EQUESTRIAN CHANNEL STA 9+44.00
N 21547.35 E 5401.13
N 21499.00 E 5327.54
N 22100.00 E 5393.00
N 22100.00 E 5493.00
N 21024.79 E 5948.39
N 21956.13 E 5948.12
N 21956.13 E 5725.40
N 21216.50 E 5765.08
N 21444.61 E 5327.76
N 21477.76 E 5327.98
N 21389.00 E 5327.98
N 21360.79 E 5328.00
N 21138.29 E 5388.44
N 21141.29 E 5383.47
N 21247.23 E 5473.02
N 21247.23 E 5473.285
N 21216.50 E 5565.08
N 21216.50 E 5565.08
N 21216.50 E 5765.08
N 21216.50 E 5765.08
N 21216.50 E 5765

FILENAME: 1840-B1(PP=CG8)





RECORD DRAWINGS

EQUESTRIAN DETENTION BASIN

DETENTION BASIN GRADING PLAN

SHEET NUMBER: CG-8 OF

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP/BKP
CHECKED BY	TEP
DATE	11-13-95

STANDARD PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY E. POGGEMEYER No. 5268 CIVIL

POGGEMEYER DESIGN GROUP

ENGINEERS PLANNERS SURVEYORS

2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

DATE	REVISION

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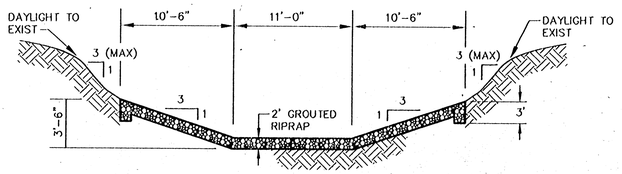
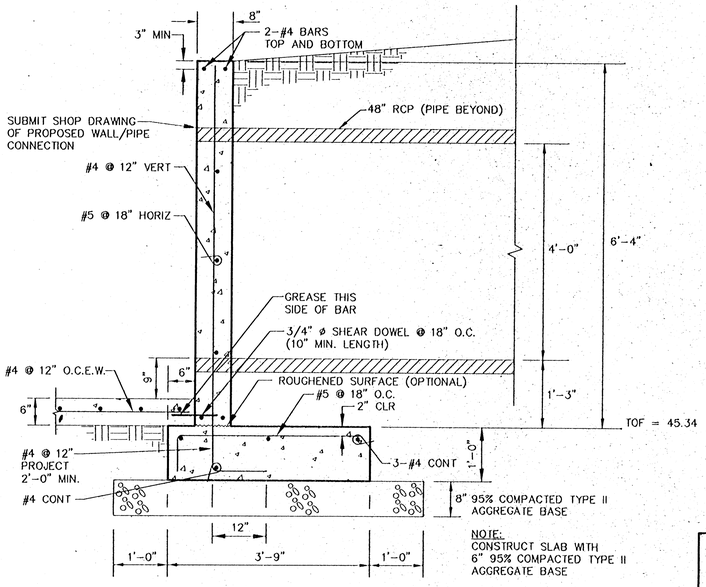
FILENAME: 1340-B1 (PP=CG9)



OUTLET CHANNEL DETAIL (1)

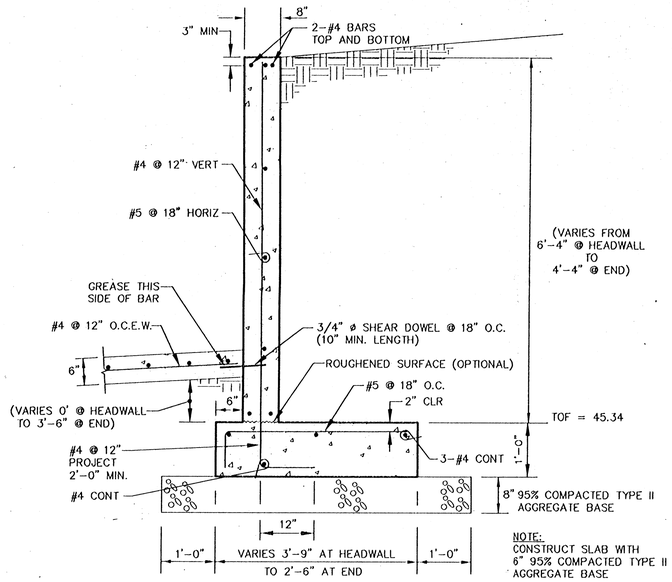
NO SCALE



NOTE:
CONSTRUCT SLAB WITH 6" 95% COMPACTED TYPE II AGGREGATE BASE

TEMPORARY HEADWALL SECTION (2)

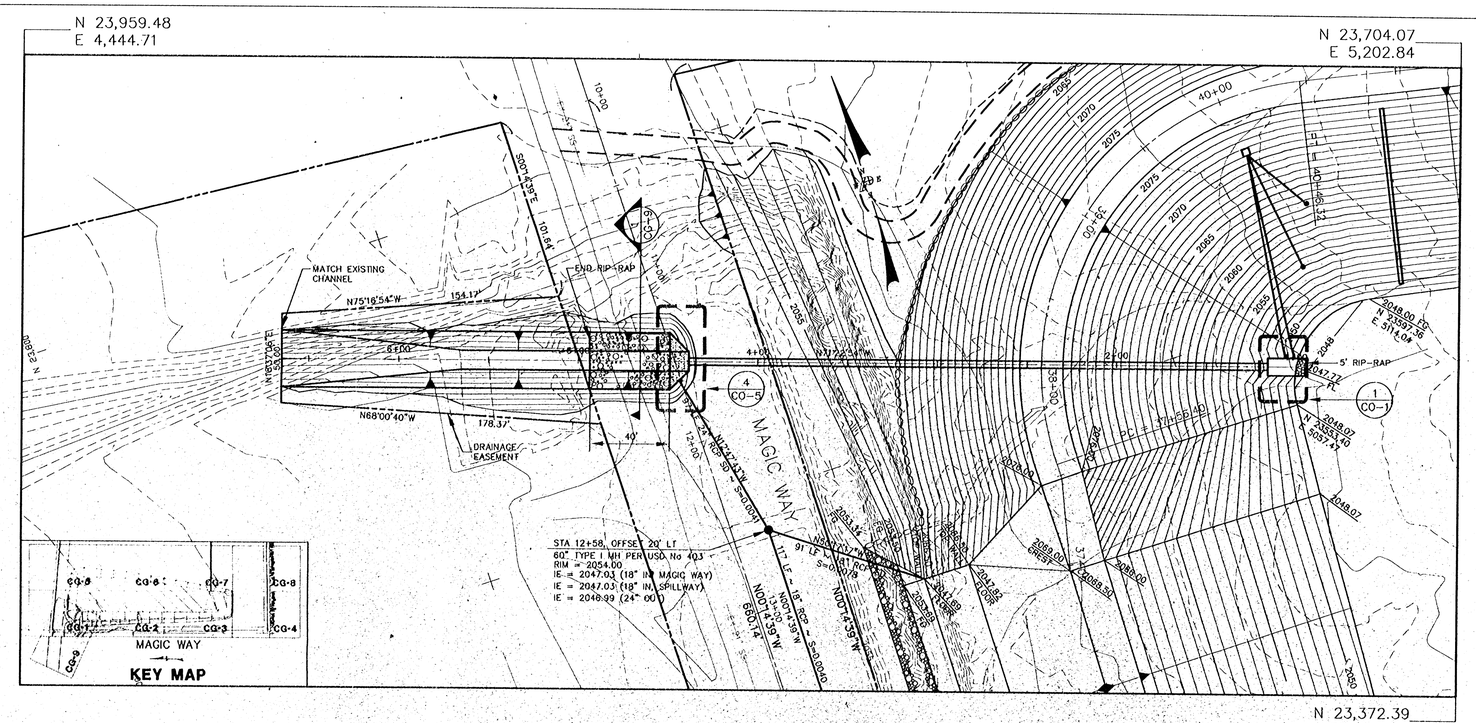
NO SCALE



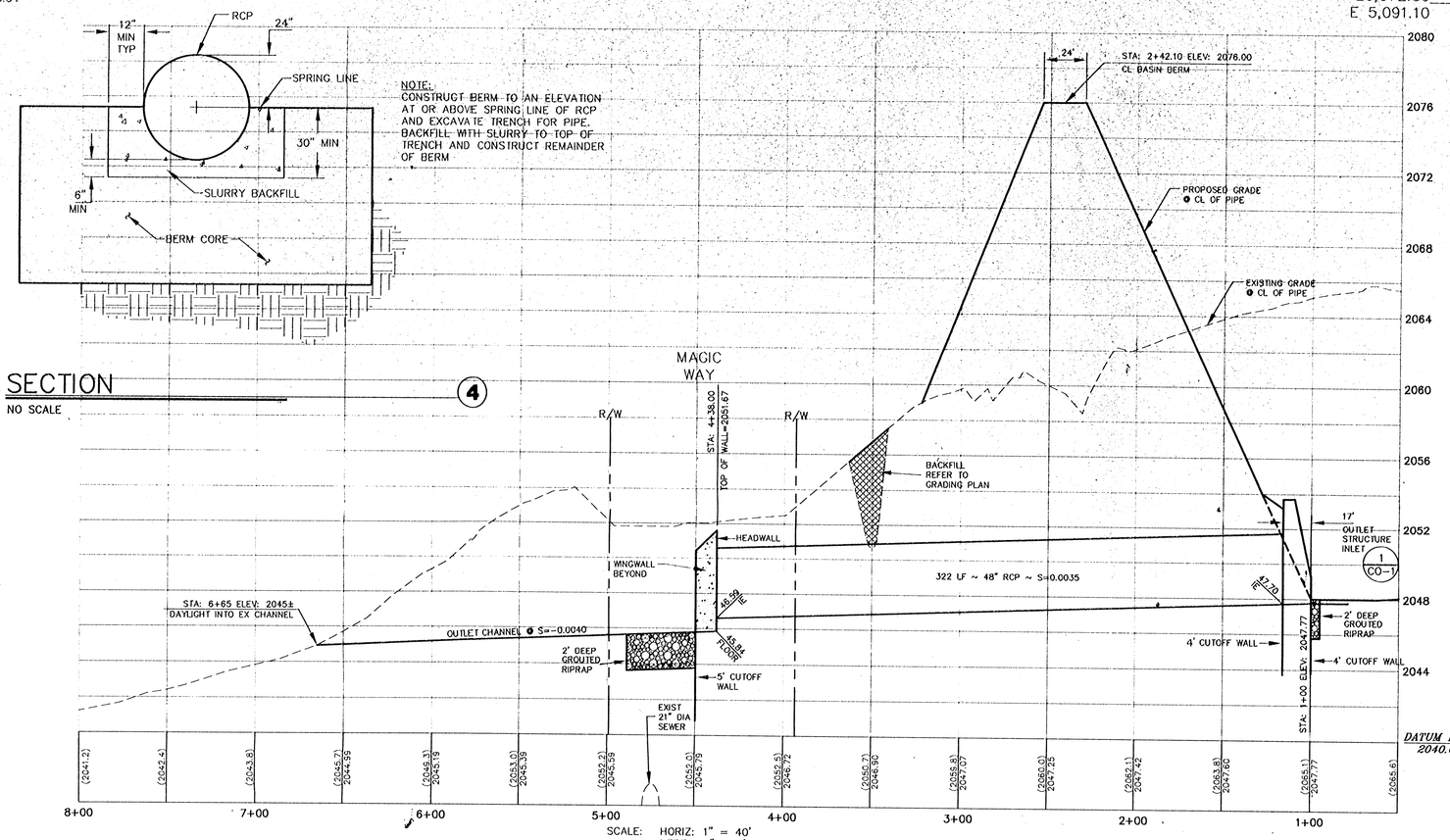
NOTE:
CONSTRUCT SLAB WITH 6" 95% COMPACTED TYPE II AGGREGATE BASE

TEMPORARY WINGWALL SECTION (3)

NO SCALE



KEY MAP



SECTION (4)

NO SCALE

SCALE: HORIZ: 1" = 40'
VERT: 1" = 4'

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. POSTER CIVIL No. 5965

EQUESTRIAN DETENSION BASIN

OUTFALL STRUCTURE PLAN & PROFILE

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP/DRF
CHECKED BY	TEP
DATE	12-12-95
SHEET NUMBER	CG-9
OF	

RECORD DRAWINGS

FILENAME: 184C-B2(PP+CH1)

MATCHLINE STA. 9+44

SEE SHEET CG-7

N 21620
E 5900

N 21444.61
E 5477.76

6 CN-1 11+30

8' WIDE GATE PER USD NO. 253

10+00

SAF STILLING BASIN CHUTE

11+00

12+00

13+00

14+00

15+00

16+00

17+00

18+00

19+00

N89°46'00"E

1056.00'

20.00'

140.00'

2.4%

2.4%

2.31%

EASEMENT LINE

LIMIT OF DISTURBED AREA

1 CN-1

2090

2095

12' GRADED ACCESS ROAD

N 21600
E 6400

2080

2085

1 CG-7 BOLLARD

6' CHAIN LINK FENCE PER USD NO 252

HEAVY RIPRAP, 3' THICK

6' WIDE GATE PER USD NO. 253

17+00

6 CN-1

N 21448.27
E 6377.75

MATCHLINE STA. 20+00

SEE SHEET CG-2

N 21400
E 5400

1 CO-9

HEAVY RIPRAP, 3' THICK REFER TO CG-7 FOR GRADING OF THIS AREA

6 CN-1 11+00

SEE SHEET GC-1 FOR FENCE MOUNTED CHANNEL SIGNS 1 GC-1

8' WIDE GATE PER USD NO. 253

6' CHAIN LINK FENCE PER USD NO. 252

6 CN-1 18+70

6' WIDE GATE PER USD NO. 253

N 21400
E 6400

2075

2090

2085

2080

HYDROSEED AREA

LIMIT OF DISTURBED AREA

EASEMENT LINE

LIMIT OF DISTURBED AREA

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

PROPOSED GRADE @ CHANNEL ℄ 2060.07
PROPOSED TOP OF BERM ℄ 2061.68

2055.69 2075.69
2064.69 2075.69
2066.69 2075.69
2070.85 2076.85
2072.00 2076.00
2073.15 2079.15
2074.31 2080.31
2075.46 2081.46
2076.62 2082.62
2077.77 2083.77
2078.92 2084.92
2080.08 2086.08
2081.23 2087.23
2082.38 2088.39
2083.54 2083.54
2084.69 2090.69
2085.85 2091.85
2087.00 2093.00
2088.15 2094.15
2089.31 2095.31
2090.46 2096.46

2100
2096
2092
2088
2084
2080
2076
2072
2068
2064

2108
2104
2100
2096
2092
2088
2084
2080
2076
2072

EGL

SAF STILLING BASIN
REFER TO SHT CO-9
FOR DETAILS

DETENTION BASIN

PROPOSED TOP OF BERM
RIGHT AND LEFT ℄

EXISTING GRADE
@ CENTERLINE

Q = 3175 cfs

HGL

CHANNEL FLOWLINE
@ CENTERLINE

STA: 11+00
ELEV: 2075.69

STA: 11+00
ELEV: 2069.69

STA: 20+00
ELEV: 2096.46

STA: 20+00
ELEV: 2090.46

IDENTICAL POINT

11 CO-7

CONSTRUCTION JOINT PER 3 CN-1

TYP. CUTOFF WALL ON CHANNEL FLOOR. DETAIL 7 CN-1

INDICATES EXPANSION JT. FOR CHANNEL WALLS TO BE PLACED AT SAME LOCATIONS (TYP. ALL SHEETS). SEE DETAIL 7 CN-1

CUTOFF WALL

CUTOFF WALL SEE DETAIL 7 CN-1

DATUM ELEV 2060.00

5' CUTOFF WALL 4 CN-2

4 CO-9

5 CO-9

EL=2059.69

80.44 FG

59.52 FG

(2072.41) EXISTING GRADE AT ℄

(2071.61)

(2072.4)

(2072.7)

(2073.3)

(2076.5)

(2077.0)

(2078.2)

(2078.8)

(2080.1)

(2080.3)

(2082.1)

(2081.6)

(2083.5)

(2084.2)

(2085.1)

(2086.5)

(2087.9)

(2088.2)

(2090.9)

(2091.8)

(2093.0)

9+00
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00

KEY MAP

CH-1 CH-2 CH-3 CH-4 CH-5 CH-6 CH-7

EQUESTRIAN DRIVE

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REVISION	DATE

POGGEMEYER DESIGN GROUP

ENGINEERS PLANNERS SURVEYORS

2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. POGGEMEYER No. 5248 CIVIL

EQUESTRIAN DETENTION BASIN

EQUESTRIAN DRIVE CHANNEL PLAN & PROFILE STA 9+44 TO 20+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP
CHECKED BY	TEP
DATE	11-13-95

SHEET NUMBER CH-1 OF

RECORD DRAWINGS

FILENAME: 184C-S2(P+C+2)

REVISION	DATE

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POGGEMEYER DESIGN GROUP

ENGINEERS PLANNERS SURVEYORS

2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

ENGINEER STATE OF NEVADA — REGISTERED PROFESSIONAL — TIMOTHY E. POGGEMEYER — No. 5969 — CIVIL

EQUESTRIAN DETENTION BASIN

EQUESTRIAN DRIVE CHANNEL PLAN & PROFILE STA 20+00 TO 31+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CH-2
OF	

RECORD DRAWINGS

FILENAME: 184C-B2(PP-CH3)

MATCHLINE STA 31+00
SEE SHEET CH-2

MATCHLINE STA 42+00
SEE SHEET CH-4

N 21600
E 7600

N 21452.75
E 7471.74

N 21400
E 7600

N 21800
E 8600

N 21457.23
E 8677.73

N 21400
E 8600

EASEMENT LINE

LIMIT OF DISTURBED AREA

12' GRADED ACCESS ROAD

6' WIDE GATE PER USD NO. 253

6' CHAIN LINK FENCE PER USD NO 252

N89°46'00"E

1100.00'

20.00'

140.00'

2.4%

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

HYDROSEED AREA

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

PROPOSED GRADE AT ℄ OF CHANNEL
TOP OF BERM ℄

EGL

PROPOSED TOP OF BERM

HGL

EXISTING GRADE @ CENTERLINE

CHANNEL FLOWLINE @ CENTERLINE

Q= 3175 cfs

2.31%

STA: 31+00
ELEV: 2121.84

STA: 31+00
ELEV: 2115.84

STA: 42+00
ELEV: 2147.22

STA: 42+00
ELEV: 2141.22

IDENTICAL POINT

TYP.

DATUM ELEV
2112.00

EXISTING GRADE AT ℄

KEY MAP

CH-1 CH-2 CH-3 CH-4

EQUESTRIAN DRIVE

DETAIL REFERENCES: 6/CN-1, 7/CN-1

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. PAGE CIVIL No. 5288

EQUESTRIAN DETENTION BASIN

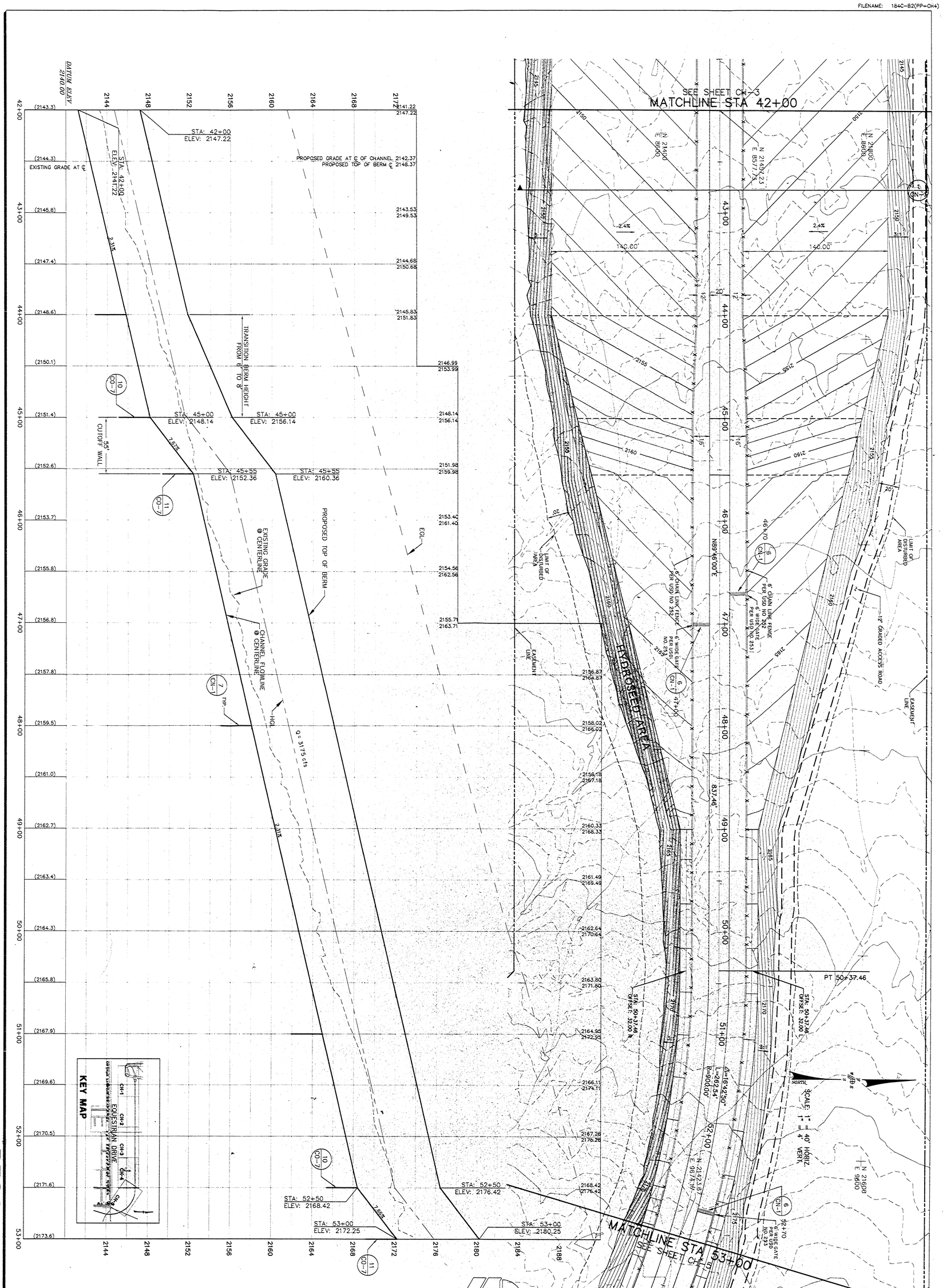
EQUESTRIAN DRIVE CHANNEL PLAN & PROFILE STA 31+00 TO 42+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	RCP
CHECKED BY	TEP
DATE	11-13-95

SHEET NUMBER
CH-3
OF

RECORD DRAWINGS

FILENAME: 184C-B2(PP-CH4)



RECORD DRAWINGS

CH-4
SHEET NUMBER

DATE 11-13-95
CHECKED BY TEP
DRAWN BY RCP
DESIGNED BY SJJ/JJD
JOB NUMBER 9518AC

EQUESTRIAN DETENTION BASIN

EQUESTRIAN DRIVE CHANNEL PLAN & PROFILE STA 42+00 TO 53+00

STATE OF NEVADA PROFESSIONAL ENGINEER TIMOTHY A. PORTER CIVIL No. 12266

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

DATE	REVISION

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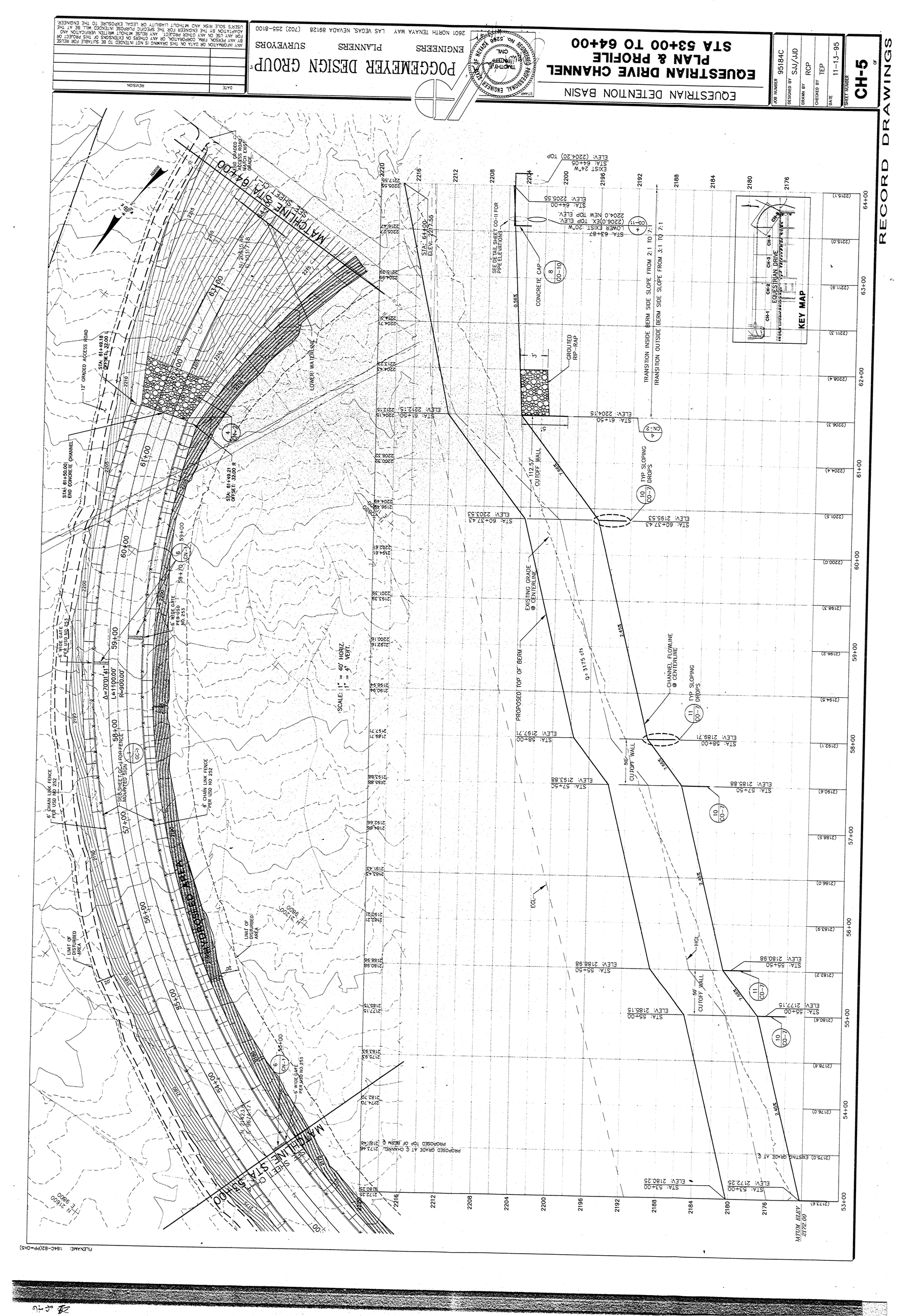
EQUESTRIAN DETENTION BASIN
EQUESTRIAN DRIVE
PLAN & PROFILE
STA 53+00 TO 64+00
POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100
JOB NUMBER 95184C
DESIGNED BY SJJ/JJD
DRAWN BY RCP
CHECKED BY TEP
DATE 11-13-95
SHEET NUMBER CH-5
RECORD DRAWINGS
KEY MAP
MATCHLINE STA 64+00 SEE SHEET CH-4
MATCHLINE STA 53+00 SEE SHEET CH-6
PROPOSED TOP OF BERM
EXISTING GRADE @ CENTERLINE
CHANNEL FLOWLINE @ CENTERLINE
CUTOFF WALL
TYP SLOPING DROPS
TRANSITION INSIDE BERM SIDE SLOPE FROM 2:1 TO 7:1
TRANSITION OUTSIDE BERM SIDE SLOPE FROM 3:1 TO 7:1
CONCRETE CAP
GROUTED RIP-RAP
LOWER WATERLINE
12' GRADED ACCESS ROAD
6' CHAIN LINK FENCE PER USD NO 252
6' WIDE GATE PER USD NO 253
SCALE: 1" = 40' HORIZ. 1" = 4' VERT.
LIMIT OF DISTURBED AREA
EOC
HGL
MATCH BEAV. 2172.00

FILENAME: 184C-83(PPmC1)

SEE SHEET CH-5

MATCHLINE STA 64+00

STA 64+10.00 END ALL BERM SIDE SLOPE TRANSITIONS

EQUESTRIAN DRIVE CL

STA 64+30.00 BEGIN ALL BERM SIDE SLOPE TRANSITIONS

LOWER WATERLINE

INSTALL CHANNEL DEPTH GAUGE (2/CN-2)

20615.36 10317.18

R = 900.00' L = 317.42' Δ = 20°12'28"

Δ = 16°25'33" R = 300.00' L = 86.00'

R=675.00' L=192.27' Δ = 17°59'16"

BERM ℄ PRC STA: 64+67.10 OFFSET: 95.43 R

BERM ℄ STA: 65+00 OFFSET 91.50' R INSTALL SEDIMENT MONUMENT (3/CN-2)

BERM ℄ ℄ MATCHLINE STA: 64+00.00 OFFSET: 94.26 R INSTALL SEDIMENT MONUMENT (3/CN-2)

BERM ℄ PT STA: 67+00.20 OFFSET: 76.23 R

STA 67+17.42 CHANNEL ℄ PT

STA 67+51 END INSIDE BERM SIDE SLOPE TRANSITION

LIMIT OF DISTURBED AREA

N 20200 E 10400

N 20400 E 10100

2210 FOOTHILLS DRIVE R/W

FOOTHILLS DR

N16°42'59"E 266.78'

N12°01'23"E 300.72'

R=652.00' L=171.16' Δ = 15°02'27"

BERM ℄ PC STA: 70+00.00 OFFSET: 52.00 R INSTALL SEDIMENT MONUMENT (3/CN-2)

HYDROSEED AREA

STA 69+84.20 CHANNEL ℄ PC STA 70+00.00 END ACT CHANNEL BERM SIDE SLOPE TRANSITIONS (1/CN-2)

STA 71+00.00 BEGIN OUTSIDE BERM SIDE SLOPE TRANSITION

STA 71+50.00 END OUTSIDE BERM SIDE SLOPE TRANSITION

STA 71+57.51 CHANNEL ℄ PT

DAYLIGHT LINE

STA 72+38.89 CHANNEL ℄ PC

FILL AREA

STA 73+00.00 BEGIN OUTSIDE BERM SIDE SLOPE TRANSITION

STA 73+50.00 END OUTSIDE BERM SIDE SLOPE TRANSITION

STA 74+50.00 END BERM HEIGHT TRANSITION

MATCHLINE STA 76+00 SEE SHEET CH-6

N00°10'00"E 81.39'

R=400.00' L=261.11' Δ = 37°24'03"

N16°57'30"W 114.92'

R=464.00' L=58.00' Δ = 07°09'43"

BERM ℄ PT STA: 71+57.51 OFFSET: 52.00 R

BERM ℄ PC STA: 72+38.89 OFFSET: 52.00 R

BERM ℄ PT STA: 73+50.00 OFFSET: 52.00 R

BERM ℄ ANGLE PT STA: 74+50.00 OFFSET: 64.00 R

BERM ℄ STA: 74+25.00 OFFSET 52.60 R INSTALL SEDIMENT MONUMENT (3/CN-2)

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

PROPOSED GRADE @ CHANNEL ℄ 2205.83 2217.44
PROPOSED TOP OF BERM ℄ 2206.10 2217.70
2206.38 2217.96
2206.65 2218.22
2206.93 2218.48
2207.20 2218.74
2207.48 2219.05
2207.75 2219.44
2208.03 2219.80
2208.30 2220.15
2208.58 2220.50
2208.85 2220.85
2209.13 2221.13
2209.40 2221.40
2206.68 2220.68
2208.95 2222.95
2210.23 2222.23
2210.50 2222.50
2210.78 2222.78
2211.05 2223.06
2211.33 2223.33

STA: 64+00 ELEV: 2217.55

STA: 64+30

STA: 64+00 ELEV: 2205.55

STA: 70+00 ELEV: 2220.85

STA: 73+50 ELEV: 2222.78

STA: 75+00 ELEV: 2227.61

STA: 74+50 ELEV: 2227.33

STA: 75+00 ELEV: 2211.60

TOP OF BERM

EGL

HGL

Q = 1605 cfs

Q = 1605 cfs → Q = 1588 cfs

EXISTING GRADE @ CENTERLINE

TRANSITION BERM HEIGHT FROM 12' TO 16'

TRANSITION OUTSIDE BERM SIDE SLOPE 3:1 TO 2.5:1

TRANSITION OUTSIDE BERM SIDE SLOPE 2.5:1 TO 3:1

TRANSITION BERM SIDE SLOPES FROM 7:1 TO 3:1

STA 64+10
TRANSITION INSIDE BERM SIDE SLOPE FROM 2:1 TO 7:1
TRANSITION OUTSIDE BERM SIDE SLOPE FROM 3:1 TO 7:1

TRANSITION INSIDE BERM SIDE SLOPE FROM 7:1 TO 4:1

0.55%

CHANNEL FLOWLINE @ CENTERLINE

CONCRETE CAP (8/CO-10)

STA: 63+87 LOWER EXIST. 20"W. (2206.0)EX. TOP ELEV. 2204.0 NEW TOP ELEV.

EXIST. 24"W. STA: 64+05 ELEV: (2204.20) TOP

(4/CO-11)

DATUM ELEV 2198.00

(2215.1) (2216.4) (2215.9) (2218.1) (2218.5) (2216.1) (2218.3) (2218.3) (2218.2) (2217.8) (2218.2) (2216.8) (2216.6) (2215.8) (2215.8) (2214.3) (2214.5) (2213.8) (2213.6) (2213.1) (2214.4) (2213.8)

63+50 64+00 65+00 66+00 67+00 68+00 69+00 70+00 71+00 72+00 73+00 74+00 75+00

KEY MAP

FOOTHILLS DRIVE

CI-1 CI-2 CI-3 CI-4 CI-5 CI-6 CI-7 CI-8 CI-9 CI-10

BOULDER HIGHWAY US 93/95

DATE	REVISION

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PLANNERS SURVEYORS
ENGINEERS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY E. PAGE CIVIL No. 9845

EQUESTRIAN DETENSION BASIN

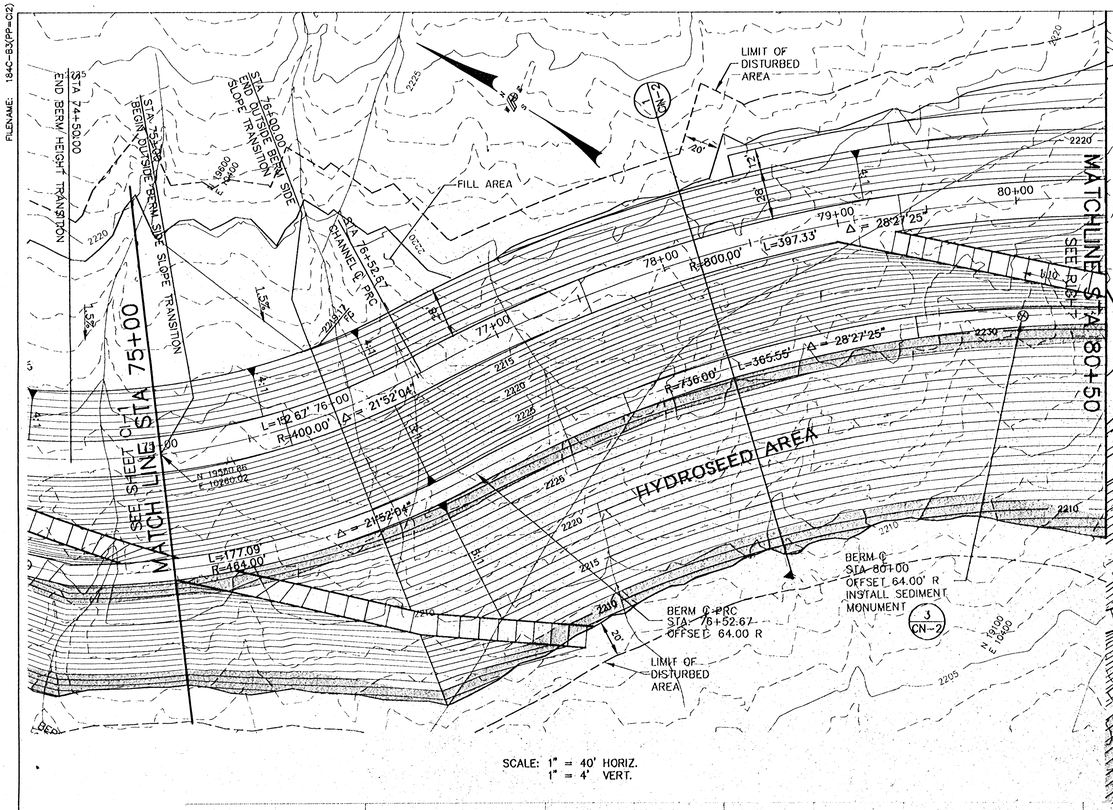
FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 64+00 TO STA 75+00

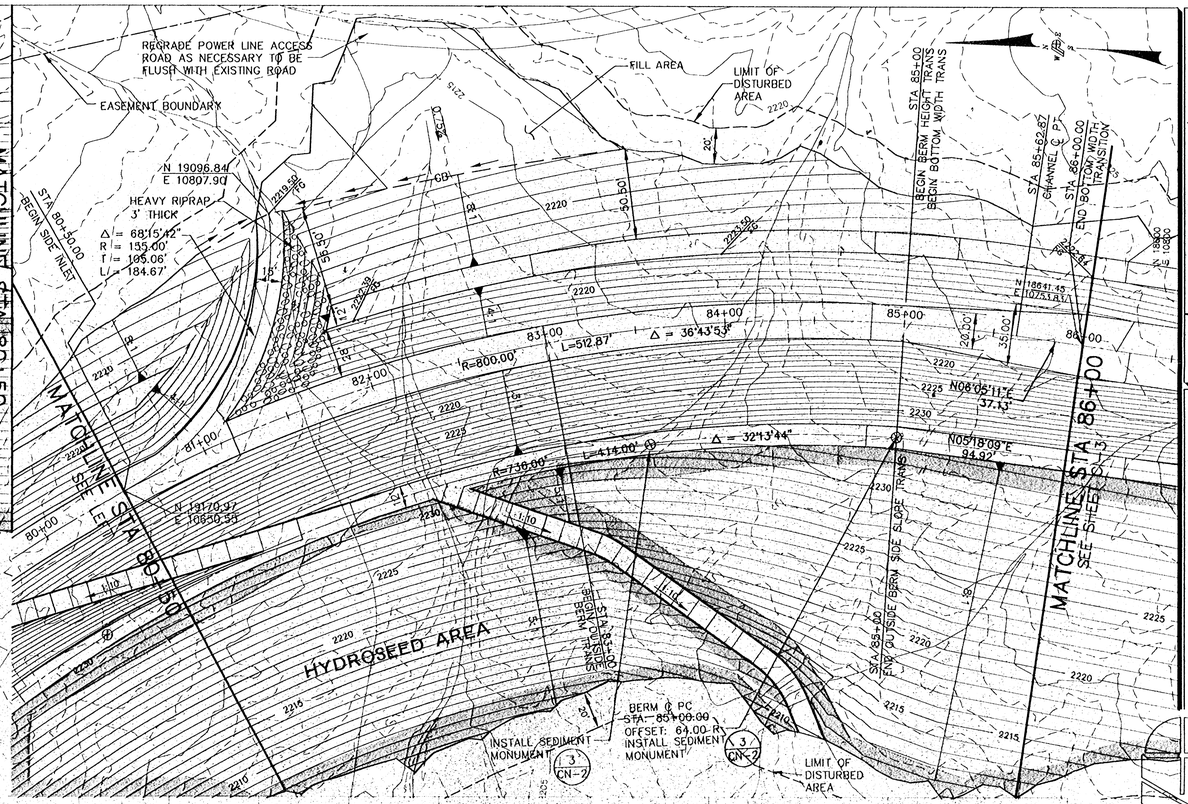
JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95

SHEET NUMBER CI-1 of

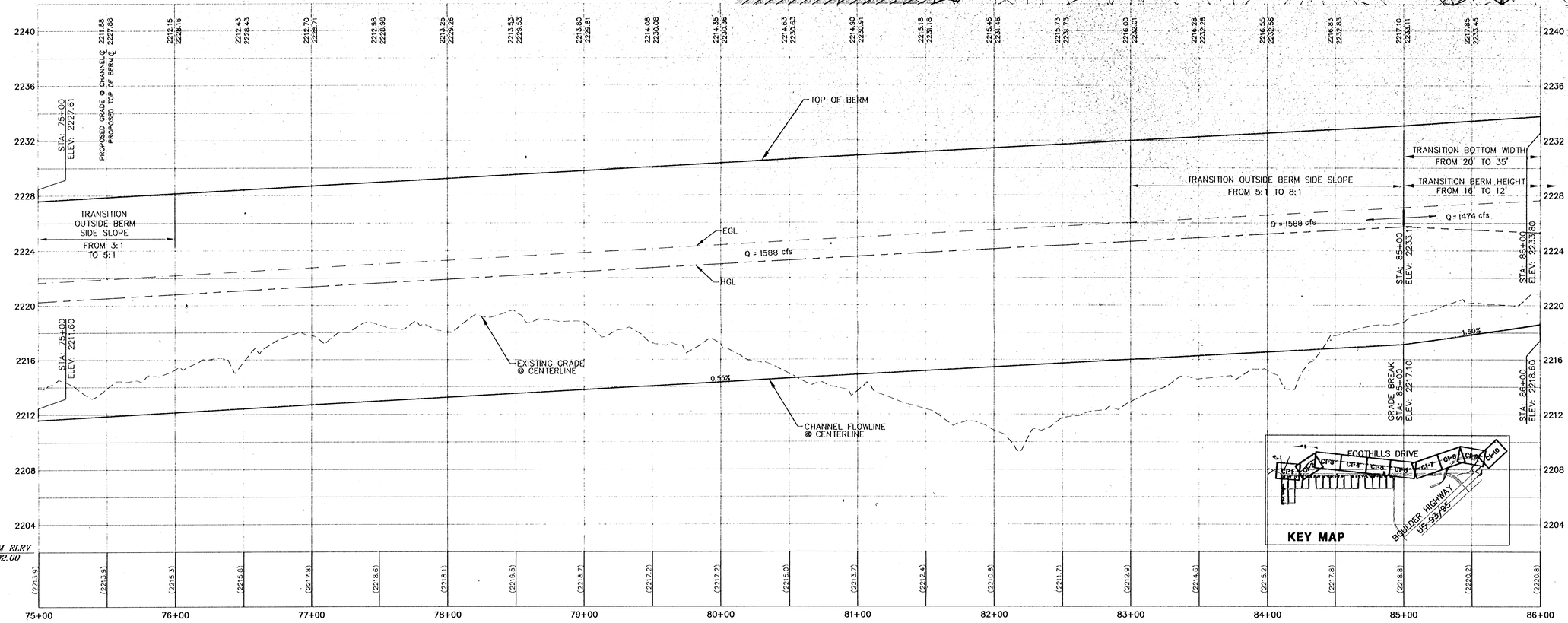
RECORD DRAWINGS

FILENAME: 184C-BX(PP=C02)





SCALE: 1" = 40' HORIZ.
1" = 4' VERT.



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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA
TIMOTHY E. PAGE
No. 5268
REGISTERED PROFESSIONAL ENGINEER
CIVIL
STAMP

EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 75+00 TO STA 86+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CI-2 OF

RECORD DRAWINGS

FILENAME: 184C-B3(PP-013)

STA 86+00
END BOTTOM WIDTH TRANS

FILL AREA

LIMIT OF DISTURBED AREA

MATCHLINE STA 86+00
SEE SHEET CI-2

MATCHLINE STA 97+00
SEE SHEET CI-4

N 18641.85
E 10753.83

N 17547.85
E 10637.20

N06°05'11"E
1100.00'

N05°18'09"E
400.04'

N06°05'11"E
700.00'

HYDROSEED AREA

STA 90+00
END BERM HEIGHT TRANS

BERM @ ANGLE PT
STA: 90+00.00
OFFSET: 89.50'R
INSTALL SEDIMENT MONUMENT (3 / CN-2)

LIMIT OF DISTURBED AREA

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

PROPOSED GRADE @ CHANNEL ℄
PROPOSED TOP OF BERM ℄

STA: 86+00
ELEV: 2233.81

STA: 86+00
ELEV: 2218.60

STA: 90+00
ELEV: 2236.60

STA: 97+00
ELEV: 2247.10

STA: 97+00
ELEV: 2235.10

TOP OF BERM

EGL

Q = 1474 cfs

HGL

EXISTING GRADE @ CENTERLINE

TRANSITION BERM HEIGHT FROM 16' TO 12'

1.50%

CHANNEL FLOWLINE @ CENTERLINE

DATUM ELEV
2212.00

(2220.8) (2222.2) (2221.7) (2225.0) (2224.8) (2226.3) (2225.2) (2225.6) (2228.1) (2228.6) (2229.3) (2229.1) (2230.4) (2230.4) (2231.9) (2233.2) (2233.7) (2235.4) (2236.3) (2237.8) (2238.4) (2238.7) (2241.6)

86+00 87+00 88+00 89+00 90+00 91+00 92+00 93+00 94+00 95+00 96+00 97+00

KEY MAP
FOOTHILLS DRIVE
BOULDER HIGHWAY
US 93/95

REVISION	DATE

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ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY E. POGGEMEYER No. 5263 CIVIL

EQUESTRIAN DETENTION BASIN

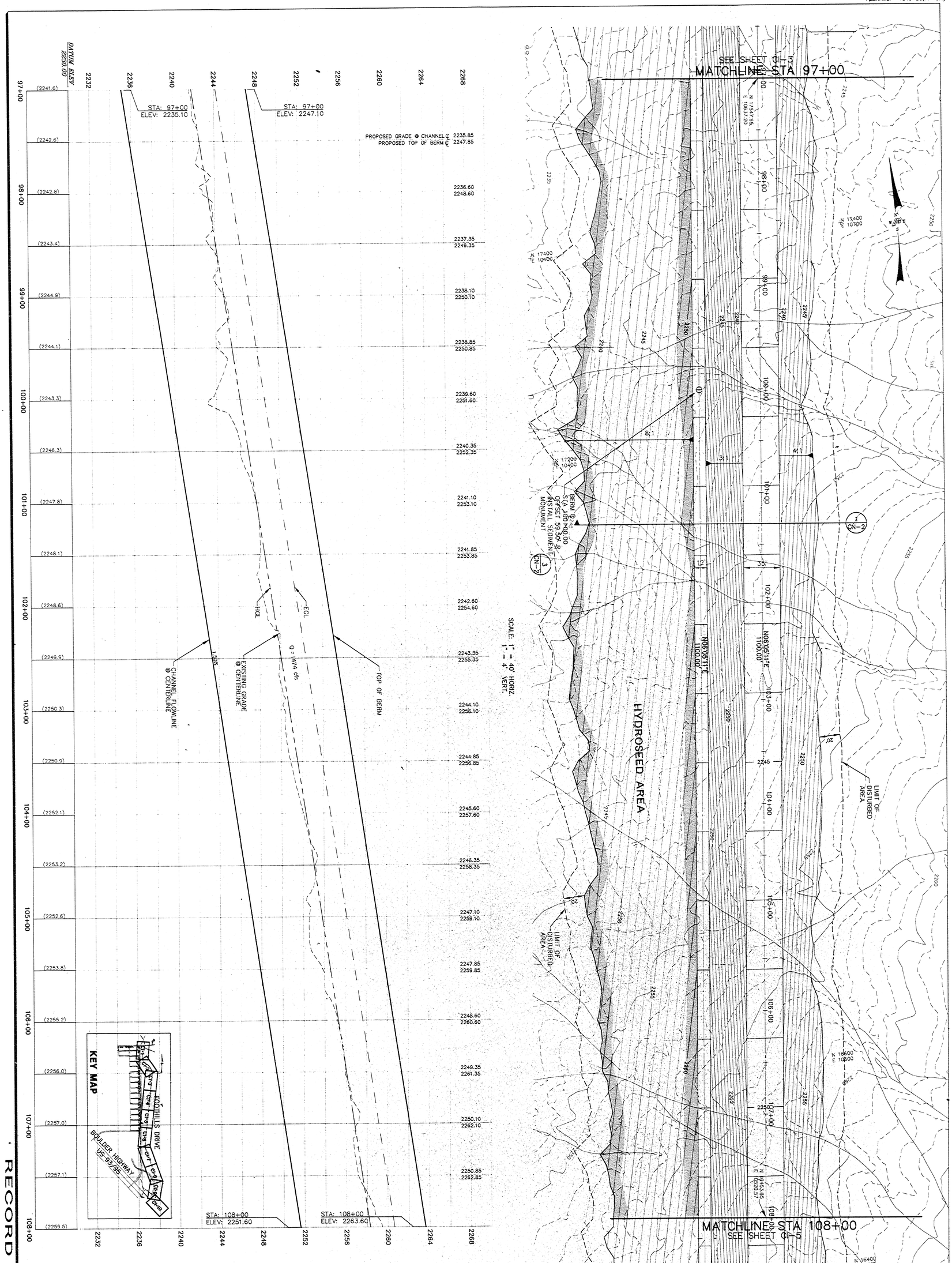
FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 86+00 TO STA 97+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95

SHEET NUMBER CI-3 OF

RECORD DRAWINGS

FILENAME: 184C-B3(PP=C14)



RECORD DRAWINGS

EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 97+00 TO STA 108+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	C1-4
OF	

STATE OF NEVADA — PROFESSIONAL ENGINEER — TIMOTHY E. PINTER — CIVIL — No. 5268 — EXPIRES 6-30-97

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

DATE	REVISION

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FILENAME: 184C-B3(PP=CI5)

SEE SHEET CI-7
MATCHLINE STA 108+00

SEE SHEET CI-6
MATCHLINE STA 119+00

SEC 23
SEC 26

N 16400 E 10600
N 16200 E 10600
N 16000 E 10600
N 15800 E 10600
N 15580.05 E 10603.94
N 16453.85 E 10520.57

LIMIT OF DISTURBED AREA

HYDROSEED AREA

N06°05'11"E 1100.00'

BERM ℄
STA 110+00.00
OFFSET 59.50' R
INSTALL SEDIMENT MONUMENT
3 / CN-2

1 / CN-2

LIMIT OF DISTURBED AREA

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

PROPOSED GRADE @ CHANNEL ℄
PROPOSED TOP OF BERM ℄

TOP OF BERM

EGL

HGL

Q = 1474 cfs

EXISTING GRADE @ CENTERLINE

CHANNEL FLOWLINE @ CENTERLINE

1.50%

STA: 108+00
ELEV: 2263.60

STA: 108+00
ELEV: 2251.60

STA: 119+00
ELEV: 2280.10

STA: 119+00
ELEV: 2268.10

DATUM ELEV. 2248.00

KEY MAP
FOOTHILLS DRIVE
CI-1 CI-2 CI-3 CI-4 CI-5 CI-6 CI-7 CI-8 CI-9 CHP
BOULDER HIGHWAY
US 93/95

REVISION	DATE

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ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — TIMOTHY E. POWELL — CIVIL — No. 5289

EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 108+00 TO STA 119+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CI-5 OF

RECORD DRAWINGS

FILENAME: 1840-BX(PP-06)

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

MATCHLINE STA 119+00
SEE SHEET C-1-S

MATCHLINE STA 130+00
SEE SHEET C-1-S

LIMIT OF DISTURBED AREA

BEGIN CHANNEL TRANSITION, BERM ℄ ANGLE PNT, BEGIN INSIDE BERM SIDE SLOPE TRANSITION
STA 125+00.00

END CHANNEL TRANSITION / BERM ℄ PC, END INSIDE BERM SIDE SLOPE TRANSITION
STA 127+00.00

N 15360.95
E 10403.14

N 14385.59
E 10323.73

N06°05'11"E
800.00'

N06°05'11"E
600.00'

N 07°58'52" E
200.11'

Δ = 24°41'52"
L=300.00'
R=1200.00'

R=1266.00' L=316.60' Δ = 24°41'52"

HYDROSEED AREA

SECTION LINE

BERM ℄
STA 120+00.00
OFFSET 59.50' R
INSTALL SEDIMENT MONUMENT

BERM ℄ ANGLE PNT.
STA 125+00.00
OFFSET 59.50' R

BERM ℄ PC
STA 127+00.00
OFFSET 66.00' R

FOOTHILLS DRIVE R/W

LIMIT OF DISTURBED AREA

SEC 23
SEC 26

PROPOSED GRADE ℄ CHANNEL ℄
PROPOSED TOP OF BERM ℄

STA: 119+00
ELEV: 2280.10

STA: 119+00
ELEV: 2268.10

TOP OF BERM

TRANSITION INSIDE BERM SIDE SLOPE FROM 3:1 TO 5:1

EXISTING GRADE @ CENTERLINE

EGL

Q = 1474 cfs

HGL

CHANNEL FLOWLINE @ CENTERLINE

2.40%

1.50%

STA 127+06.92
HORIZ ANGLE PT

STA: 130+00
ELEV: 2299.45

STA: 130+00
ELEV: 2287.45

KEY MAP

FOOTHILLS DRIVE

BOULDER HIGHWAY
US 93/95

DATUM ELEV
2262.00

2268.85 2280.85	2269.60 2281.60	2270.35 2282.35	2271.10 2283.10	2271.85 2283.85	2272.60 2284.60	2273.35 2285.35	2274.10 2286.10	2274.85 2286.85	2275.60 2287.60	2276.35 2288.35	2277.10 2289.10	2277.85 2289.85	2278.60 2290.60	2279.35 2291.35	2280.10 2292.10	2281.33 2293.33	2282.55 2294.55	2283.78 2295.78	2285.00 2297.00	2286.23 2298.23		
(2272.4)	(2273.3)	(2272.6)	(2275.7)	(2276.1)	(2276.8)	(2275.0)	(2279.4)	(2281.2)	(2281.8)	(2283.0)	(2285.9)	(2287.1)	(2285.8)	(2288.4)	(2289.1)	(2289.8)	(2289.4)	(2290.7)	(2291.0)	(2291.8)	(2293.2)	(2293.1)	
119+00	120+00	121+00	122+00	123+00	124+00	125+00	126+00	127+00	128+00	129+00	130+00											

2300 2296 2292 2288 2284 2280 2276 2272 2268 2264

REVISION	DATE

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ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA — TIMOTHY E. PETERSEN — No. 5269 — REGISTERED PROFESSIONAL ENGINEER — CIVIL

EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 119+00 TO STA 130+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CI-6
OF	

RECORD DRAWINGS

FILENAME: 184C-B3(PP=07)

MATCHLINE STA 130+00
SEE SHEET CI-6

MATCHLINE STA 141+00
SEE SHEET CI-8

STA 132+17.27
CHANNEL ℄ PT
BERM ℄ PT

BERM ℄
STA 130+00.00 OFFSET 65.50' R
INSTALL SEDIMENT MONUMENT
3 CN-2
N 14200
E 10100

BERM ℄
STA 140+00.00
OFFSET 65.50' R
INSTALL SEDIMENT MONUMENT
3 CN-2

N 14265.39
E 10324.73

N 13277.78
E 10656.82

130+00
131+00 L=217.27' R=1200.00'
132+00
133+00
134+00
135+00
136+00
N90°00'00"E 882.73'
137+00
138+00
139+00
140+00
141+00

R=1266.00' L=229.22' Δ=24°41'52"

N90°00'00"W 882.73'

40'
20'
5:1
8:1
3:1

LIMIT OF DISTURBED AREA

HYDROSEED AREA

FOOTHILLS DR.
RIGHT OF WAY

BERM ℄ P.T.
STA 132+17.27
OFFSET: 66.00'

LIMIT OF DISTURBED AREA

2326
2324
2320
2316
2312
2308
2304
2300
2296
2292
2288

PROPOSED GRADE ℄ CHANNEL ℄
PROPOSED TOP OF BERM ℄

TOP OF BERM

EXISTING GRADE ℄ CENTERLINE

EGL

HGL

Q = 1474 cfs

Q = 1236 cfs

2.45%

CHANNEL FLOWLINE ℄ CENTERLINE

STA: 130+00
ELEV: 2299.45

STA: 130+00
ELEV: 2287.45

STA: 141+00
ELEV: 2326.40

STA: 141+00
ELEV: 2314.40

DATUM ELEV
2284.00

(2283.7)	(2283.8)	(2284.9)	(2284.9)	(2286.1)	(2286.1)	(2300.2)	(2301.2)	(2301.4)	(2304.0)	(2304.7)	(2304.8)	(2306.1)	(2306.9)	(2308.2)	(2309.3)	(2311.0)	(2311.6)	(2313.7)	(2315.5)	(2316.7)	(2316.6)	(2320.0)
130+00	131+00	132+00	133+00	134+00	135+00	136+00	137+00	138+00	139+00	140+00	141+00											

FOOTHILLS DRIVE
CP-1 CP-2 CP-3 CP-4 CP-5 CP-6 CP-7 CP-8 CP-9 CP-10
BOULDER HIGHWAY US 93/95
KEY MAP

DATE	REVISION

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ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STAMP: PROFESSIONAL ENGINEER STATE OF NEVADA REGISTERED No. 5969 TIMOTHY E. POGGEMEYER CIVIL

EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL
PLAN & PROFILE
STA 130+00 TO STA 141+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CI-7 OF

RECORD DRAWINGS

FILENAME: 1840-B3(PP=08)

MATCHLINE STA 141+00
SEE SHEET CI-7

MATCHLINE STA 152+00
SEE SHEET CI-9

LIMIT OF DISTURBED AREA

N18°36'41"W 962.67'

HYDROSEED AREA

BERM ℄ STA 145+00.00 OFFSET 65.50' R INSTALL SEDIMENT MONUMENT (3 / CN-2)

BERM ℄ STA 150+00.00 OFFSET 80.00' R INSTALL SEDIMENT MONUMENT (3 / CN-2)

BERM ℄ PC STA 150+62.67 OFFSET 66.00

STA 150+62.67 CHANNEL ℄ PC BERM ℄ PC

Δ = 28°18'33" L=137.33' R=950.00'

Δ = 28°18'33" R=884.00' L=127.79'

N 12172.59 E 10990.34

N 13217.78 E 10858.88

RIGHT OF WAY

LIMIT OF DISTURBED AREA

20'

4:1

5:1

8:1

2%

141+00 142+00 143+00 144+00 145+00 146+00 147+00 148+00 149+00 150+00 151+00 152+00

SCALE: 1" = 40' HORIZ.
1" = 4' VERT.

PROPOSED GRADE ℄ CHANNEL ℄ / PROPOSED TOP OF BERM ℄

2315.63 / 2326.40 | 2316.85 / 2328.85 | 2318.08 / 2330.08 | 2319.30 / 2331.30 | 2320.53 / 2332.53 | 2321.75 / 2333.75 | 2322.98 / 2334.98 | 2324.20 / 2336.20 | 2325.43 / 2337.43 | 2326.65 / 2338.65 | 2327.88 / 2339.88 | 2329.10 / 2341.10 | 2330.33 / 2342.33 | 2331.55 / 2343.55 | 2332.78 / 2344.78 | 2334.00 / 2346.00 | 2335.23 / 2347.23 | 2336.45 / 2348.45 | 2337.68 / 2349.68 | 2338.90 / 2350.90 | 2340.13 / 2352.13

TOP OF BERM

EXISTING GRADE ℄ CENTERLINE

EGL

HGL

CHANNEL FLOWLINE ℄ CENTERLINE

2.45%

Q = 1236 cfs

Q = 1091 cfs

STA: 141+00 ELEV: 2326.40

STA: 141+00 ELEV: 2314.40

STA: 152+00 ELEV: 2353.35

STA: 152+00 ELEV: 2341.35

DATUM ELEV 2314.00

2352 2348 2344 2340 2336 2332 2328 2324 2320 2316

(2320.0) (2320.1) (2320.6) (2323.7) (2327.0) (2328.5) (2330.2) (2330.0) (2331.5) (2330.8) (2333.6) (2333.2) (2337.1) (2339.7) (2340.5) (2343.8) (2344.5) (2346.4) (2346.7) (2349.7) (2351.8) (2352.6)

141+00 142+00 143+00 144+00 145+00 146+00 147+00 148+00 149+00 150+00 151+00 152+00

KEY MAP

EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 141+00 TO STA 152+00

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CI-8

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STAMP: TIMOTHY E. PAGE, STATE OF NEVADA, REGISTERED PROFESSIONAL ENGINEER, CIVIL, No. 5269

NO.	DATE	REVISION

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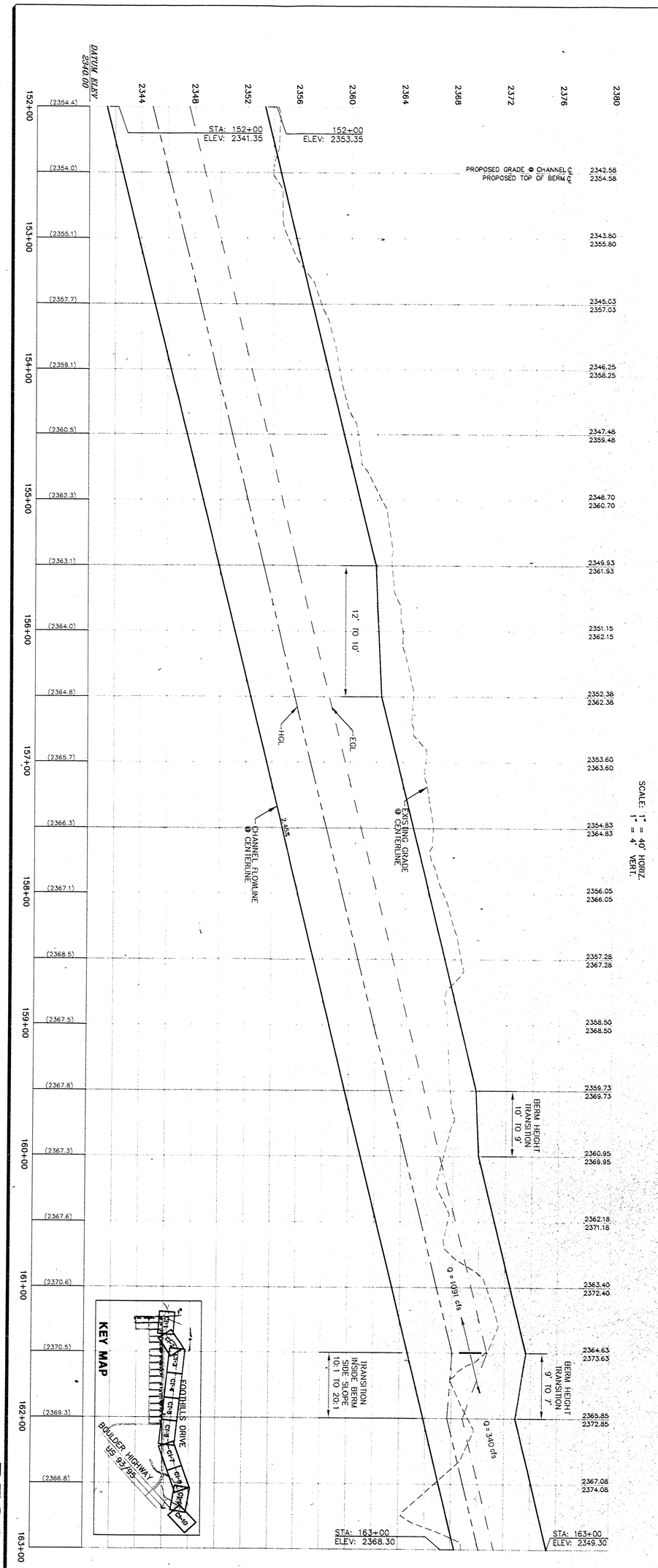
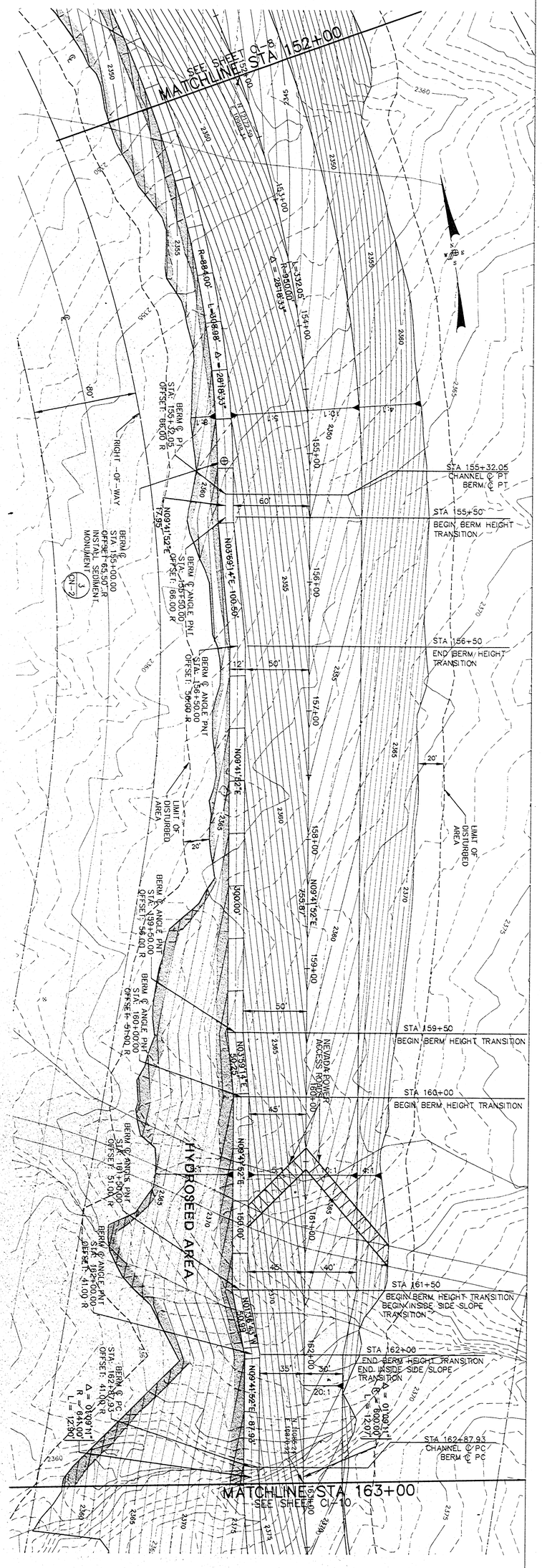
RECORD DRAWINGS

FILENAME: 184C-83(PP=CI9)





RECORD DRAWINGS

EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 152+00 TO STA 161+00

STREET NUMBER CI-9 OF

DATE 11-13-95

CHECKED BY TEP

DRAWN BY BKP

DESIGNED BY SJJ/JJD

JOB NUMBER 95184C

STAMP: PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY E. POGGEMEYER CIVIL No. 5266

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

DATE	REVISION

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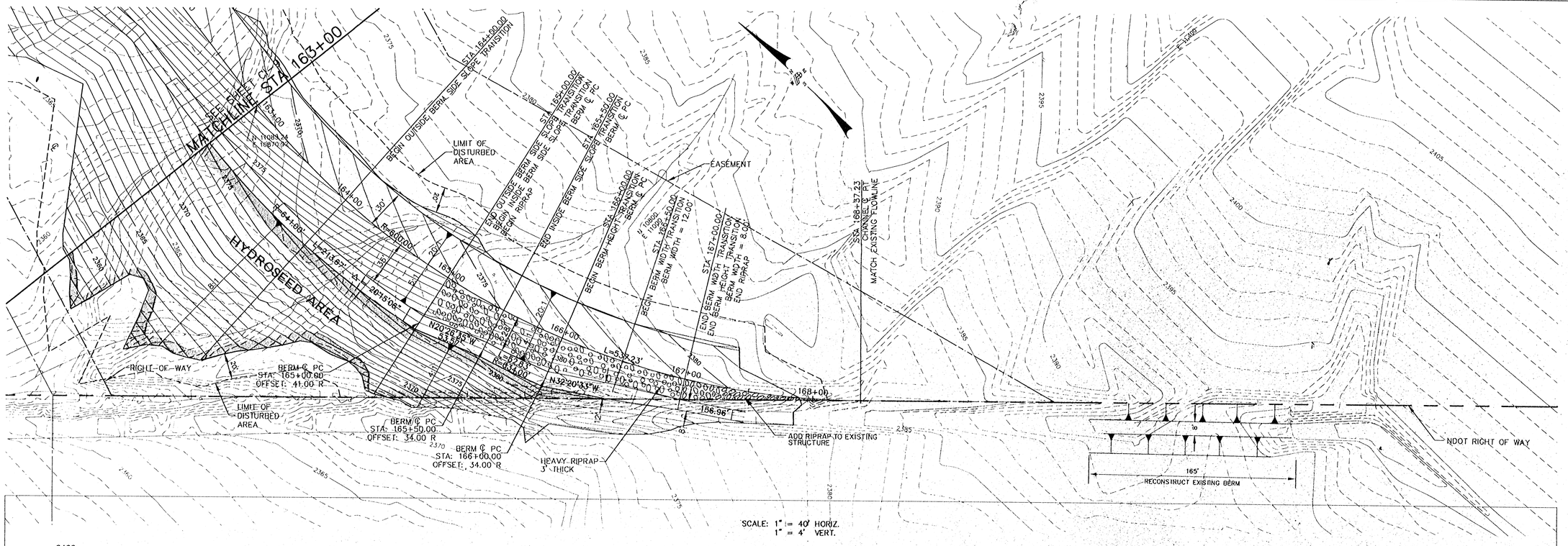

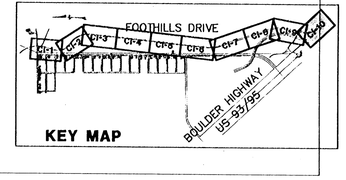

DATE	REVISION
1.	
2.	
3.	
4.	

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. PETERSEN No. 5748 CIVIL

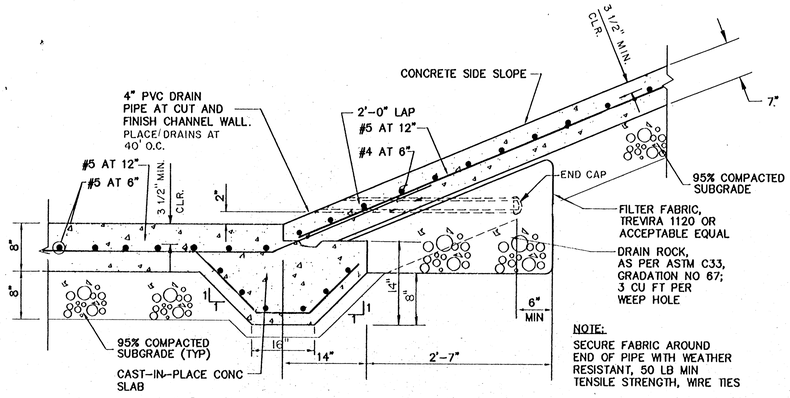
EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL PLAN & PROFILE STA 161+00 TO END

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	BKP
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CI-10
OF	

RECORD DRAWINGS

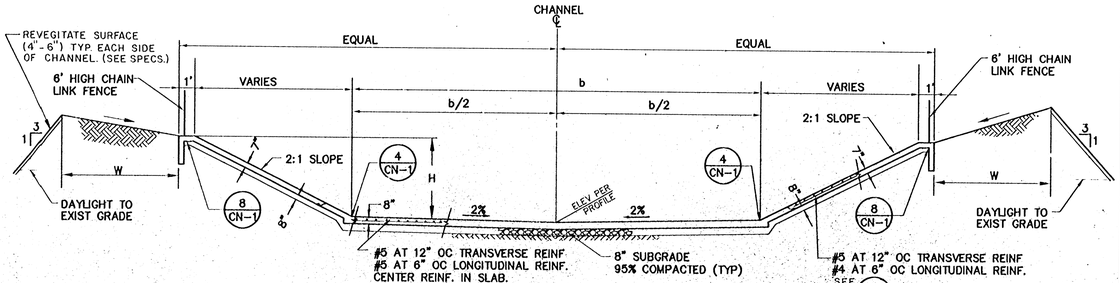
FILENAME: 1842-CN1.DWG



NOTE:
SECURE FABRIC AROUND END OF PIPE WITH WEATHER RESISTANT, 50 LB MIN TENSILE STRENGTH, WIRE TIES

DETAIL '4

SCALE: 1" = 1'-0"

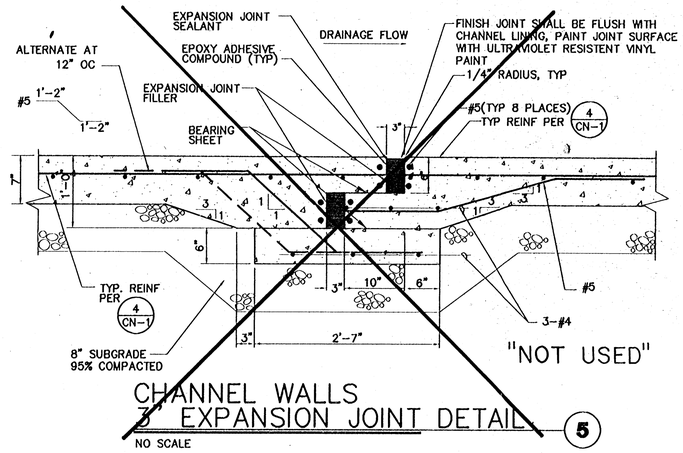


NOTE:
LONGITUDINAL STEEL SHALL BE PLACED ON TOP OF TRANSVERSE STEEL. SEE 4 CN-1

STA	b	H	W
11+00	40.0'	6.0'	SEE PLAN
11+00 TO 12+00	TRANSITION	6.0'	SEE PLAN
12+00 TO 18+00	20.0'	6.0'	SEE PLAN
16+00 TO 45+00	20.0'	6.0'	140.0'
45+00 TO 49+00	20.0'	TRANSITION	TRANSITION
49+00 TO 50+00	20.0'	8.0'	TRANSITION
50+00 TO 61+50	20.0'	8.0'	12.0'

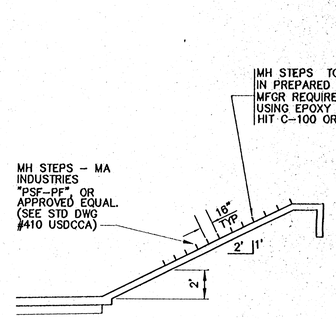
CHANNEL CROSS SECTION 1

NO SCALE



CHANNEL WALLS 5' EXPANSION JOINT DETAIL 5

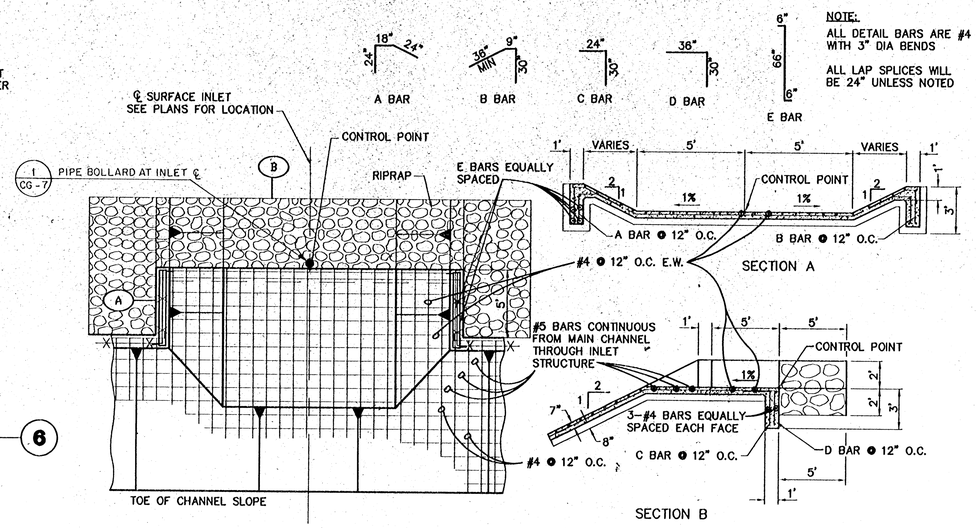
NO SCALE



NOTE:
PROVIDE 3'-0" WIDE YELLOW REFLECTIVE PAINT STRIPE CENTERED ON STEPS FROM CHANNEL BOTTOM TO CHANNEL TOP

STEP DETAIL 6

NO SCALE

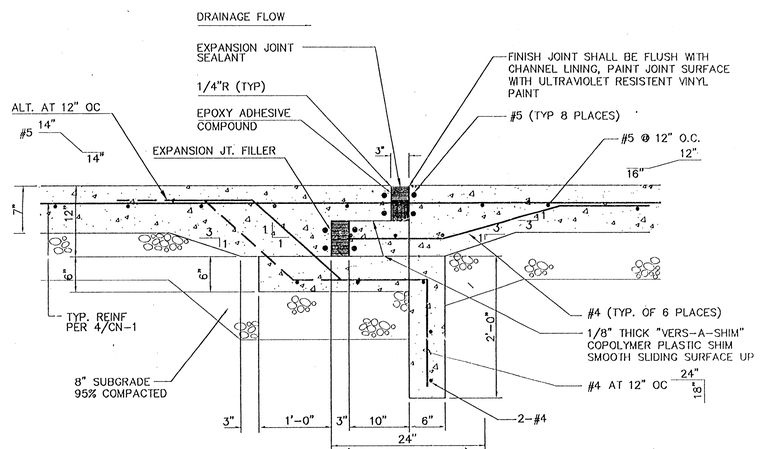


SURFACE INLET DETAIL 2

NO SCALE

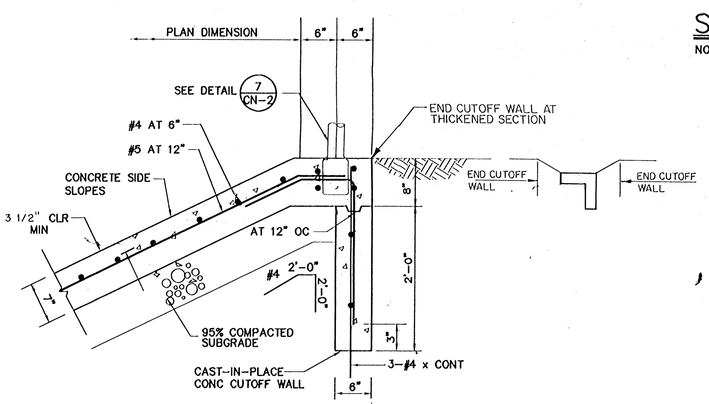
NOTE:
ALL DETAIL BARS ARE #4 WITH 3" DIA BENDS

ALL LAP SPLICES WILL BE 24" UNLESS NOTED



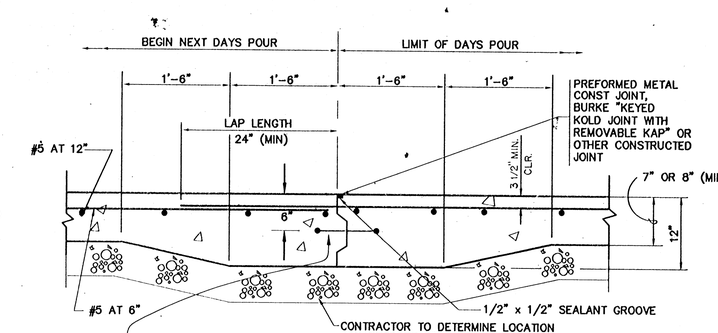
CUT OFF WALL/ EXPANSION JOINT DETAIL 7

NO SCALE



TYP TURN DOWN WALL DETAIL 8

SCALE: 1" = 1'-0"



TYP. CONSTRUCTION JOINT 3

NO SCALE

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

EQUESTRIAN DETENTION BASIN

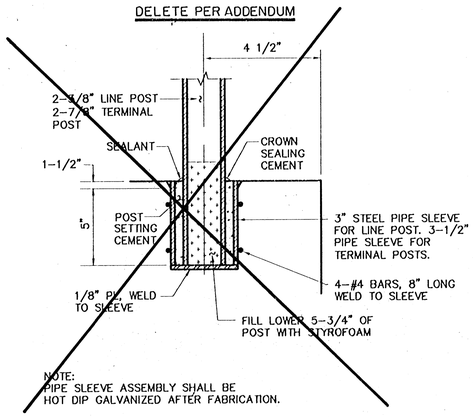
EQUESTRIAN DRIVE CHANNEL CROSS SECTIONS AND DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CN-1 OF

RECORD DRAWINGS

FILENAME: 184C-CN2.DWG

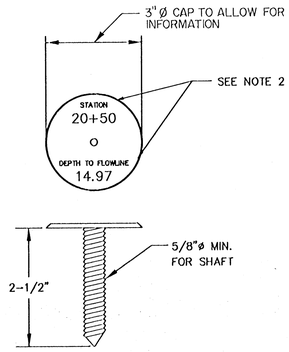
DELETE PER ADDENDUM



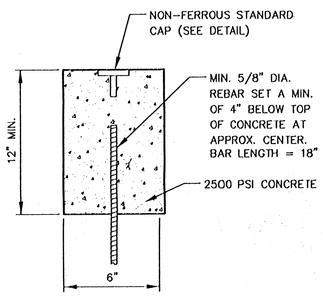
NOTE:
PIPE SLEEVE ASSEMBLY SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.

FENCE BASE DETAIL (5)

NO SCALE



STANDARD CAP



MONUMENT

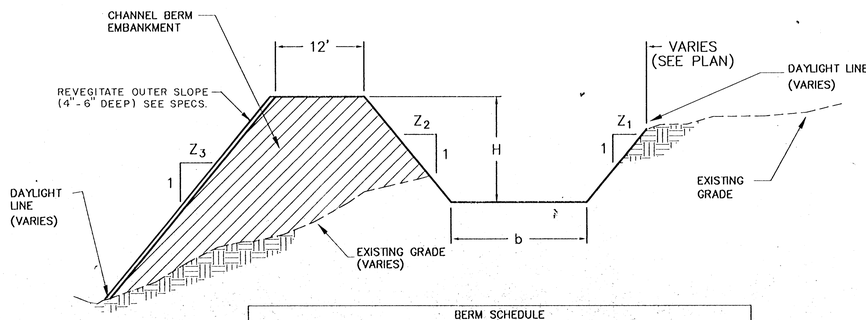
NOTES:

1. NON-FERROUS CAP TO BE MADE FROM CAST VIRGIN METAL IN ONE PIECE, FREE FROM CASTING IMPERFECTIONS, WITH CORRUGATED SHAFT.
2. THE WORDS "STATION" AND "DEPTH TO FLOWLINE" SHALL BE STAMPED ON EACH SEDIMENTATION MONUMENT AS SHOWN.
3. THE STATION OF EACH MONUMENT SHALL BE STAMPED ON THE CAP. STATION TO THE NEAREST ONE FOOT WITH A "+" SYMBOL BETWEEN THE HUNDREDS AND TENS OF FEET.
4. DEPTH TO FLOWLINE SHALL BE STAMPED ON THE CAP TO THE NEAREST HUNDREDTH FOOT.
5. CAP SHALL BE LOCATED ON TOP OF BERM AT THE BERM'S CENTERLINE

CHANNEL STATION	DEPTH TO FLOWLINE	OFFSET TO CHANNEL℄	CHANNEL STATION	DEPTH TO FLOWLINE	OFFSET TO CHANNEL℄
64+00	12.00'	94.00'	100+00	12.00'	59.50'
65+00	12.00'	91.50'	110+00	12.00'	59.50'
70+00	12.00'	52.00'	120+00	12.00'	59.50'
74+25	16.00'	58.50'	130+00	12.00'	65.50'
80+00	16.00'	64.00'	140+00	12.00'	65.50'
83+50	16.00'	64.00'	145+00	12.00'	65.50'
85+00	16.00'	64.00'	150+00	12.00'	65.50'
90+00	12.00'	59.50'	155+00	12.00'	65.50'

SEDIMENT MONUMENT (3)

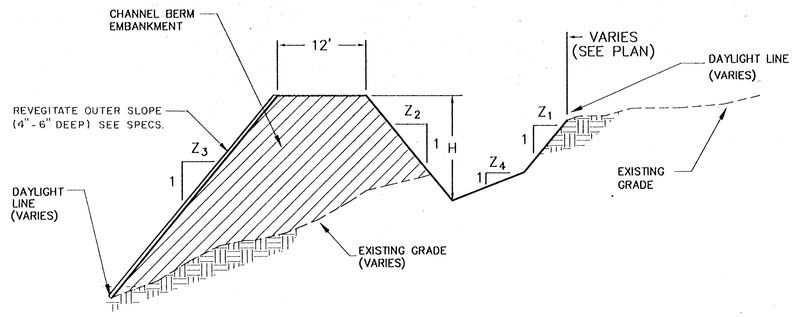
NO SCALE



BERM SCHEDULE					
STA	b	H	Z_1	Z_2	Z_3
61+50	20.0'	8.0'	2.0	2.0	3.0
61+50 TO 64+10	20.0'	TRANSITION	TRANSITION	TRANSITION	TRANSITION
64+10 TO 64+30	20.0'	12.0'	7.0	7.0	7.0
64+30 TO 67+41	20.0'	12.0'	TRANSITION	TRANSITION	TRANSITION
67+41 TO 70+00	20.0'	12.0'	4.0	TRANSITION	TRANSITION
70+00 TO 71+00	20.0'	12.0'	4.0	3.0	3.0
71+00 TO 71+50	20.0'	12.0'	4.0	3.0	TRANSITION
71+50 TO 73+00	20.0'	12.0'	4.0	3.0	2.5
73+00 TO 73+50	20.0'	12.0'	4.0	3.0	TRANSITION
73+50 TO 74+50	20.0'	TRANSITION	4.0	3.0	3.0
75+00 TO 76+00	20.0'	16.0'	4.0	3.0	TRANSITION
76+00 TO 83+00	20.0'	16.0'	4.0	3.0	5.0
83+00 TO 85+00	20.0'	16.0'	4.0	3.0	TRANSITION
85+00 TO 86+00	TRANSITION	TRANSITION	4.0	3.0	8.0
86+00 TO 90+00	35.0	TRANSITION	4.0	3.0	8.0
90+00 TO 125+00	35.0'	12.0'	4.0	3.0	8.0

CHANNEL CROSS SECTION (STA 61+50 TO 125+00) (1)

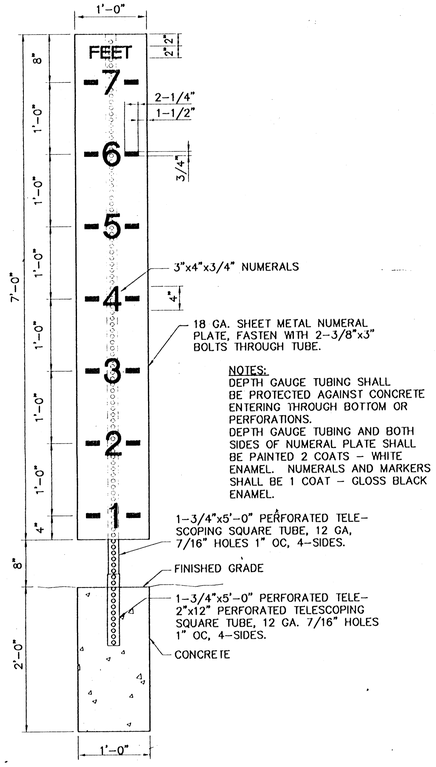
NO SCALE



BERM SCHEDULE						
STA	H	Z_1	Z_2	Z_3	Z_4	
125+00 TO 127+00	12.0'	4.0	TRANSITION	8.0	TRANSITION	
127+00 TO 155+50	12.0'	4.0	5.0	8.0	10.0	
155+50 TO 156+50	TRANSITION	4.0	5.0	8.0	10.0	
156+50 TO 159+50	10.0'	4.0	5.0	8.0	10.0	
159+50 TO 160+00	TRANSITION	4.0	5.0	8.0	10.0	
160+00 TO 161+50	9.0'	4.0	5.0	8.0	10.0	
161+50 TO 162+00	TRANSITION	4.0	5.0	8.0	TRANSITION	
162+00 TO 164+00	7.0'	4.0	5.0	8.0	20.0	
164+00 TO 165+00	7.0'	4.0	5.0	TRANSITION	20.0	
165+00 TO 165+50	7.0'	4.0	TRANSITION	4.0	20.0	
165+50 TO 166+00	7.0'	4.0	4.0	4.0	20.0	
166+00 TO 167+00	TRANSITION	4.0	4.0	4.0	20.0	
167+00	4.0'					
167+00 TO END	MATCH INTO EXISTING					

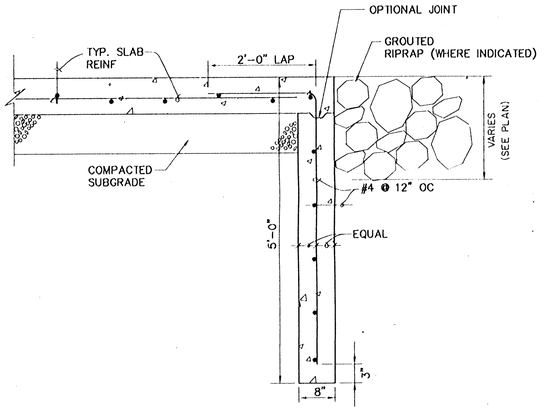
CHANNEL CROSS SECTION (STA 125+00 TO END) (2)

NO SCALE



DEPTH GAUGE (6)

NO SCALE



ENDWALL DETAIL (4)

NO SCALE

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA No. 9826 TIMOTHY E. POGGEMEYER CIVIL

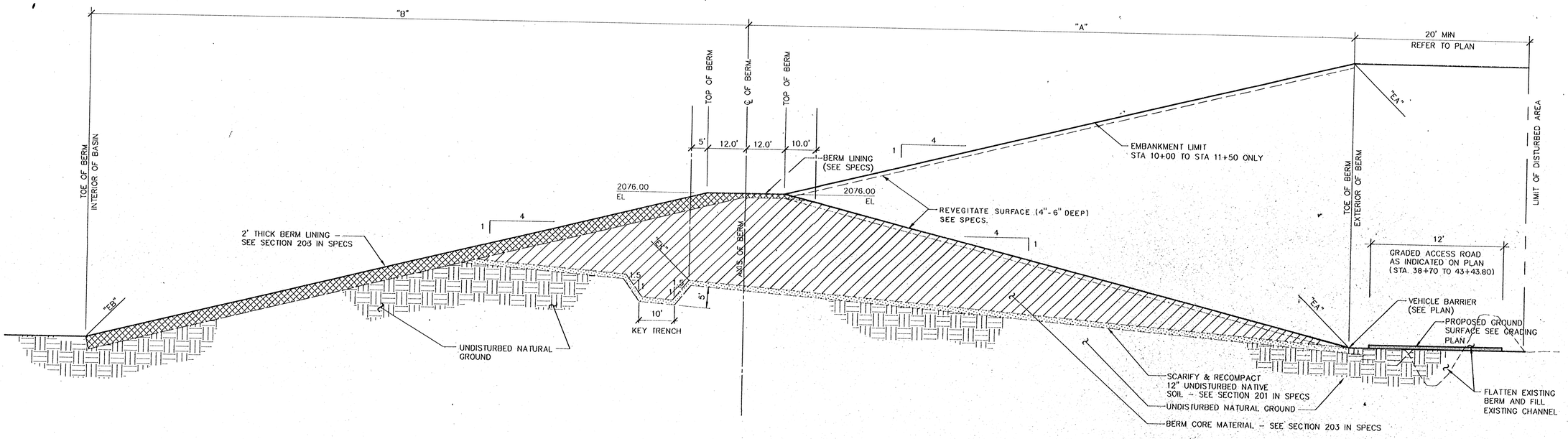
EQUESTRIAN DETENTION BASIN

FOOTHILLS DRIVE CHANNEL CROSS SECTIONS AND DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CN-2 OF

RECORD DRAWINGS

FILENAME: 184C-CN3.DWG



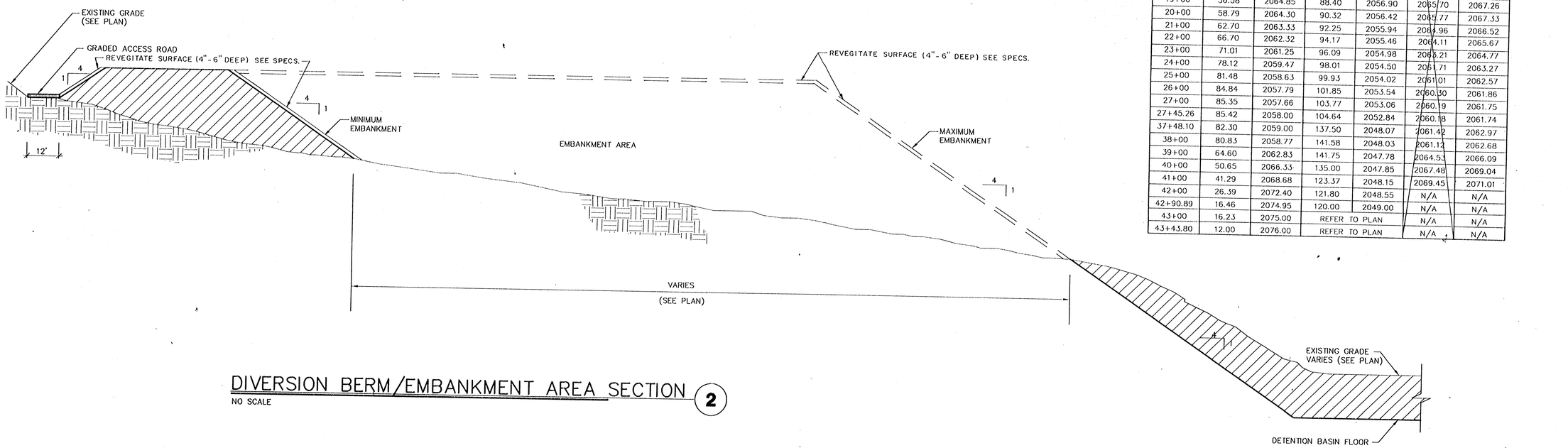
BERM CROSS SECTION

NO SCALE

(1)

DETENTION BASIN - BERM SCHEDULE

STATION	"A"	"EA"	"B"	"EB"	"ET"	"EK"
10+00	72.16	2090.69	78.00	2059.50	N/A	N/A
10+18.18	73.88	2090.64	77.84	2059.54	N/A	N/A
11+00	68.88	2090.22	77.48	2059.63	N/A	N/A
12+00	N/A	N/A	76.60	2060.00	N/A	N/A
12+99.20	N/A	N/A	76.80	2059.80	N/A	N/A
13+00	N/A	N/A	76.80	2059.80	N/A	N/A
14+00	21.18	2073.70	78.80	2059.30	N/A	N/A
15+00	32.40	2070.90	80.72	2059.82	2069.22	2070.78
16+00	39.20	2069.20	82.64	2058.34	2067.97	2069.53
17+00	45.20	2067.70	84.56	2057.86	2067.18	2067.74
18+00	51.20	2066.20	86.48	2057.38	2066.29	2067.85
19+00	56.58	2064.85	88.40	2056.90	2065.70	2067.26
20+00	58.79	2064.30	90.32	2056.42	2065.77	2067.33
21+00	62.70	2063.33	92.25	2055.94	2064.96	2066.52
22+00	66.70	2062.32	94.17	2055.46	2064.11	2065.67
23+00	71.01	2061.25	96.09	2054.98	2063.21	2064.77
24+00	78.12	2059.47	98.01	2054.50	2063.71	2063.27
25+00	81.48	2058.63	99.93	2054.02	2061.01	2062.57
26+00	84.84	2057.79	101.85	2053.54	2060.30	2061.86
27+00	85.35	2057.66	103.77	2053.06	2060.19	2061.75
27+45.26	85.42	2058.00	104.64	2052.84	2060.18	2061.74
37+48.10	82.30	2059.00	137.50	2048.07	2061.42	2062.97
38+00	80.83	2058.77	141.58	2048.03	2061.12	2062.68
39+00	64.60	2062.83	141.75	2047.78	2064.53	2066.09
40+00	50.65	2066.33	135.00	2047.85	2067.48	2069.04
41+00	41.29	2068.68	123.37	2048.15	2069.45	2071.01
42+00	26.39	2072.40	121.80	2048.55	N/A	N/A
42+90.89	16.46	2074.95	120.00	2049.00	N/A	N/A
43+00	16.23	2075.00	REFER TO PLAN		N/A	N/A
43+43.80	12.00	2076.00	REFER TO PLAN		N/A	N/A



DIVERSION BERM/EMBANKMENT AREA SECTION

NO SCALE

(2)

DATE	REVISION

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POGGEMEYER DESIGN GROUP
PLANNERS SURVEYORS
ENGINEERS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. PEPPLES No. 5262 CIVIL

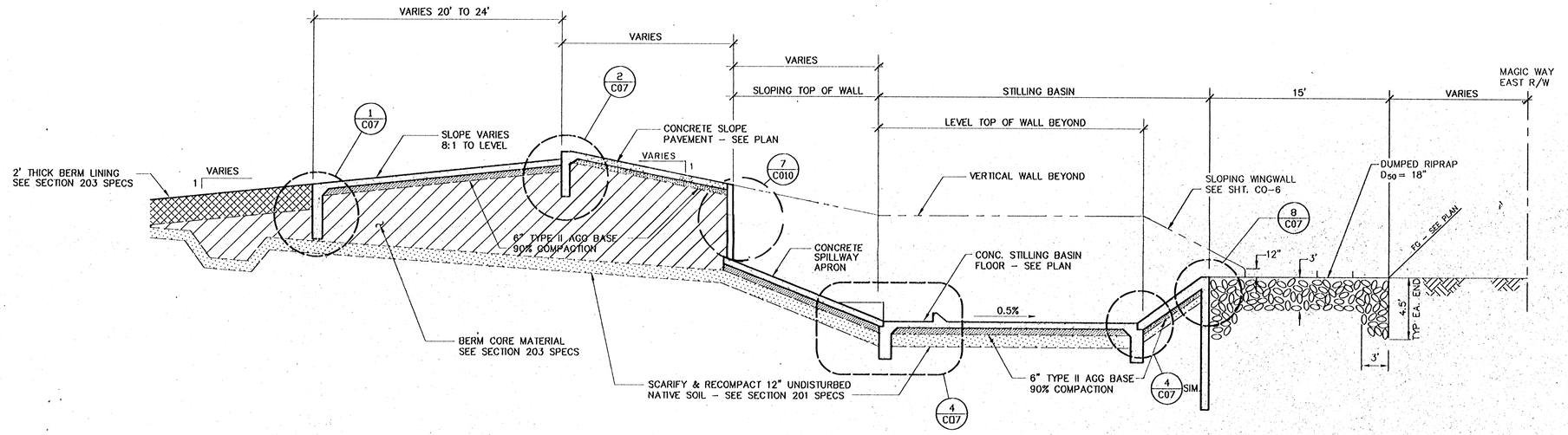
EQUESTRIAN DETENTION BASIN

BASIN BERM CROSS SECTIONS / SCHEDULE

JOB NUMBER	95184C
DESIGNED BY	SJJ/JDD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CN-3
OF	

RECORD DRAWINGS

FILENAME: 1170N-4.DWG

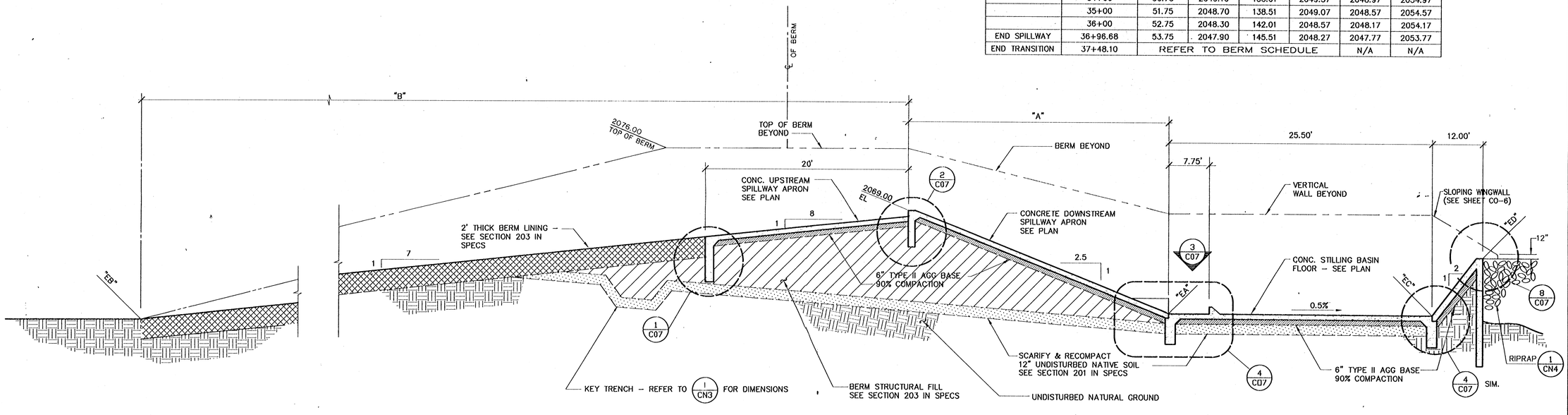


SPILLWAY TRANSITION CROSS SECTION

NO SCALE

1

DETENTION BASIN SPILLWAY SCHEDULE							
	STATION	"A"	"EA"	"B"	"EB"	"EC"	"ED"
BEGIN TRANSITION	27+45.26	REFER TO BERM SCHEDULE				N/A	N/A
BEGIN SPILLWAY	27+96.68	44.75	2051.50	113.87	2052.59	2051.37	2057.37
	28+00	44.78	2051.49	114.01	2052.57	2051.36	2057.36
	29+00	45.75	2051.10	117.51	2052.07	2050.97	2056.97
	30+00	46.75	2050.70	121.01	2051.57	2050.57	2056.57
	31+00	47.75	2050.30	124.51	2051.07	2050.17	2056.17
	32+00	48.75	2049.90	128.01	2050.57	2049.77	2055.77
	33+00	49.75	2049.50	131.51	2050.07	2049.37	2055.37
	34+00	50.75	2049.10	135.01	2049.57	2048.97	2054.97
	35+00	51.75	2048.70	138.51	2049.07	2048.57	2054.57
	36+00	52.75	2048.30	142.01	2048.57	2048.17	2054.17
END SPILLWAY	36+96.68	53.75	2047.90	145.51	2048.27	2047.77	2053.77
END TRANSITION	37+48.10	REFER TO BERM SCHEDULE				N/A	N/A



SPILLWAY CROSS SECTION

NO SCALE

2

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

EQUESTRIAN DETENTION BASIN

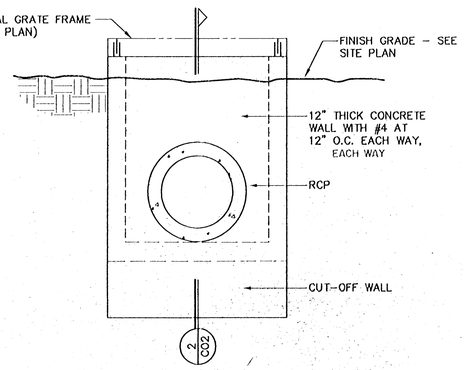
BASIN SPILLWAY CROSS SECTIONS / SCHEDULE

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95

SHEET NUMBER **CN-4** OF

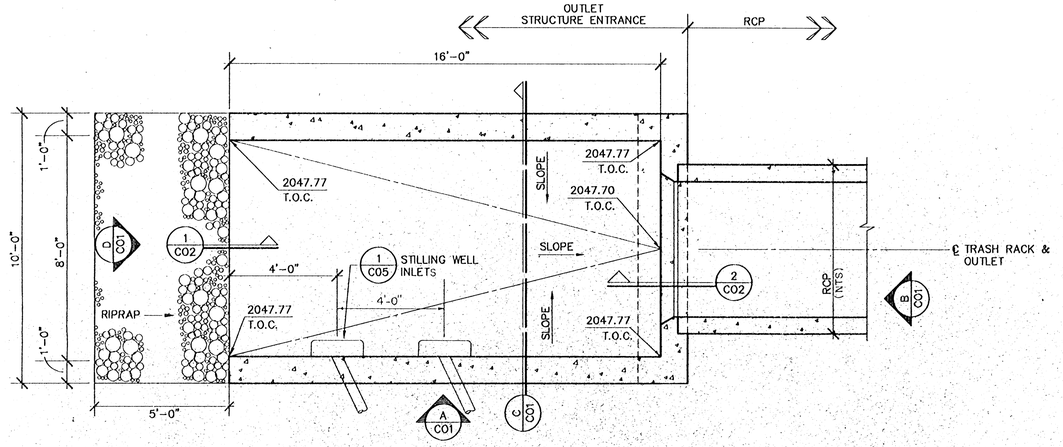
RECORD DRAWINGS

FILENAME: 184C-CO1.DWG



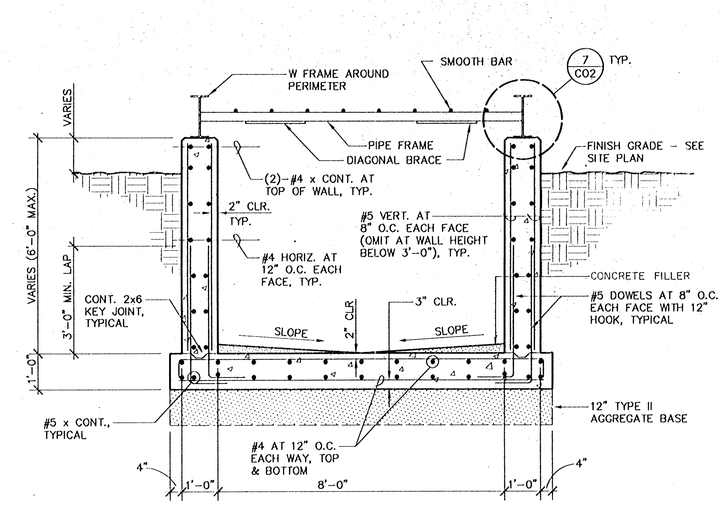
REAR ELEVATION AT RCP — B

NO SCALE



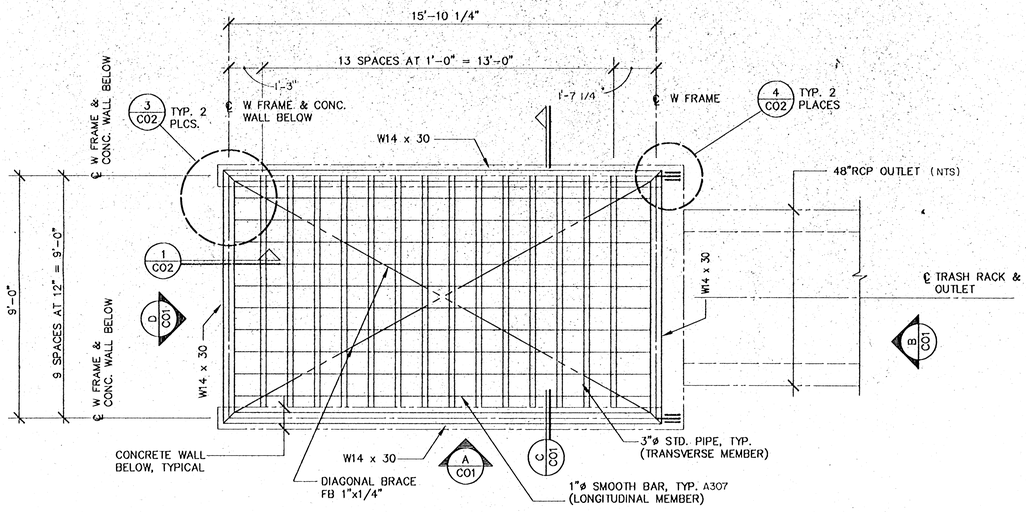
SLAB PLAN – OUTLET STRUCTURE — 1

SCALE: 3/8" = 1'-0"



SECTION – TRASH RACK & OUTLET STRUCTURE — C

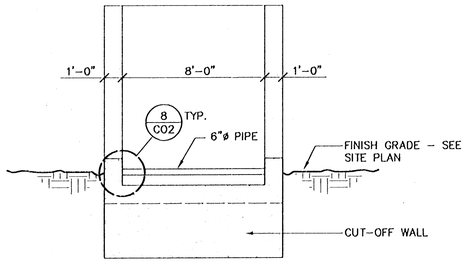
NO SCALE



NOTE: ALL GRATE MEMBERS TO BE A36 STEEL (MIN)

GRATE FRAME PLAN – TRASH RACK (ALIGNED VIEW) — 2

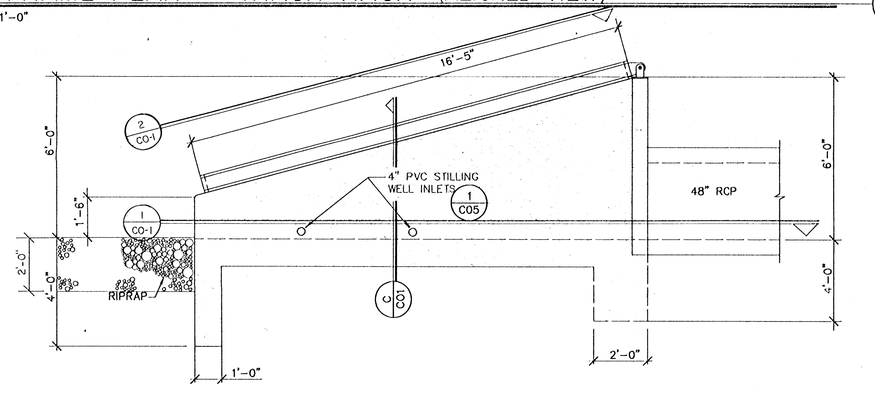
SCALE: 3/8" = 1'-0"



NOTE: METAL GRATE FRAMING NOT SHOWN FOR CLARITY

FRONT ELEVATION — D

NO SCALE



NOTE:
ALL METAL ASSEMBLIES FOR TRASH RACK/OUTLET STRUCTURE SHALL BE HOT DIPPED GALVANIZED, PER SECTION 715 OF SPECS.

SIDE ELEVATION – OUTLET STRUCTURE — A

SCALE: 3/8" = 1'-0"

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STAMP: REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY E. PETER No. 5268 CIVIL

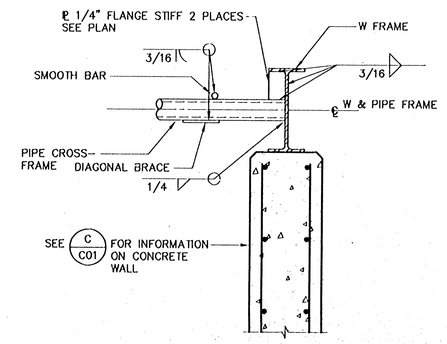
EQUESTRIAN DETENTION BASIN

OUTLET STRUCTURE PLAN AND SECTIONS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CO-1
OF	

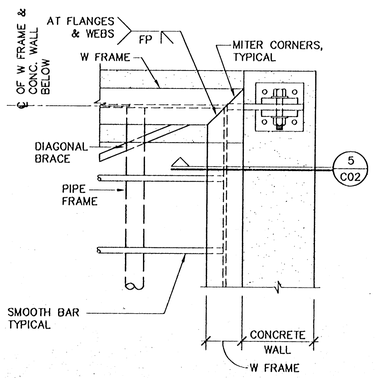
RECORD DRAWINGS

FILENAME: 184C-C02.DWG



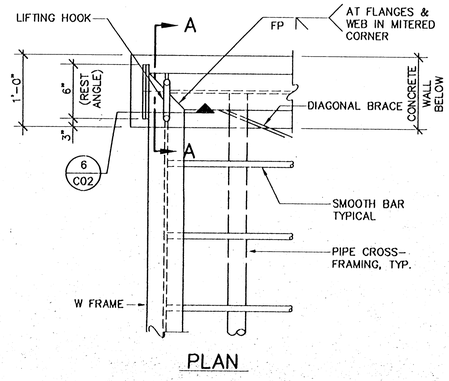
METAL GRATE FRAME DETAIL — 7

NO SCALE

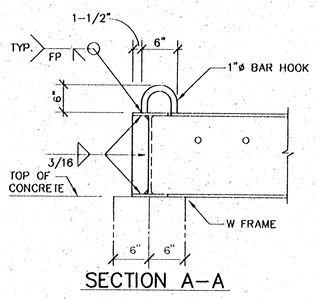


GRATE FRAME CORNER DETAIL — 4

NO SCALE



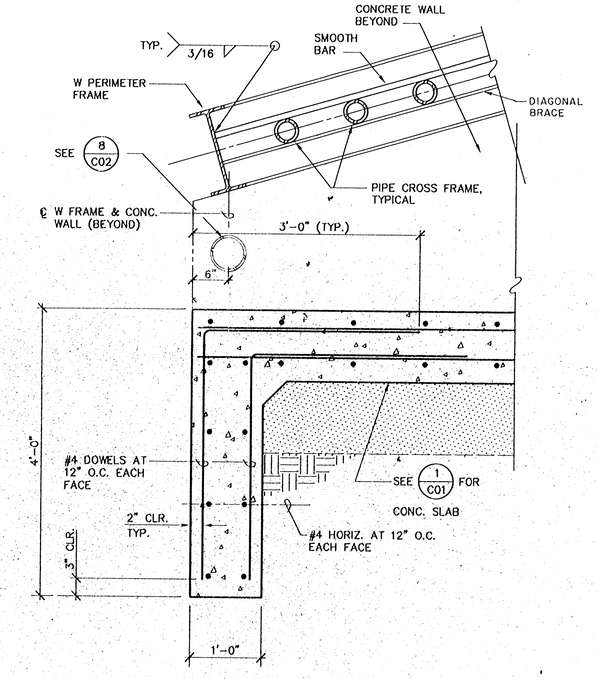
PLAN



SECTION A-A

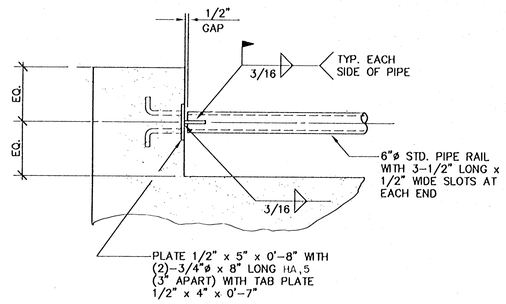
LIFTING HOOK DETAIL — 3

NO SCALE



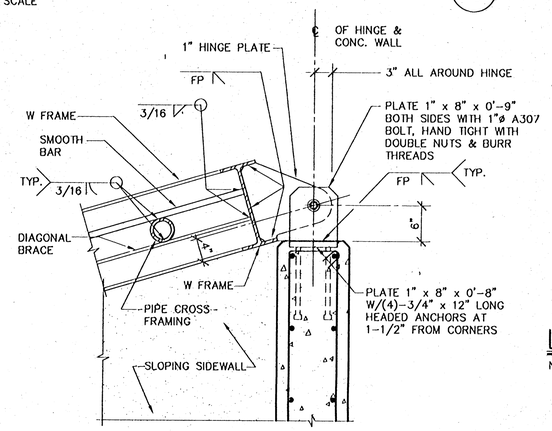
OUTLET STRUCTURE ENTRANCE SECTION — 1

SCALE: 1"= 1'-0"



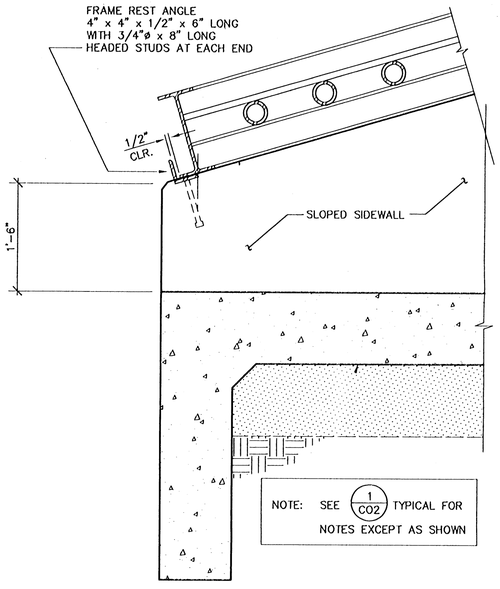
PIPE CONNECTION DETAIL — 8

NO SCALE



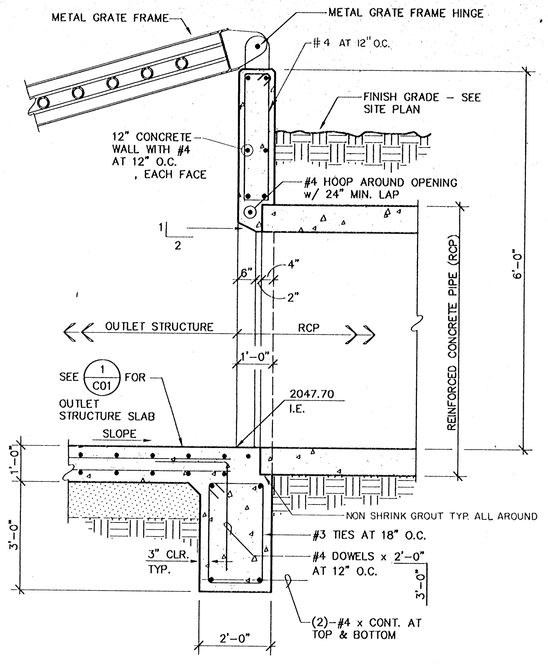
FRAME SECTION AT HINGE — 5

SCALE: 1" = 1'-0"



FRAME REST ANGLE DETAIL — 6

NO SCALE



OUTLET STRUCTURE ENDWALL SECTION — 2

NO SCALE

NOTE:
ALL METAL ASSEMBLIES FOR TRASH RACK/ENTRANCE STRUCTURE SHALL BE HOT DIPPED GALVANIZED, PER SECTION 715 OF SPECS.

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — TIMOTHY E. POGGEMEYER — No. 9263 — CIVIL

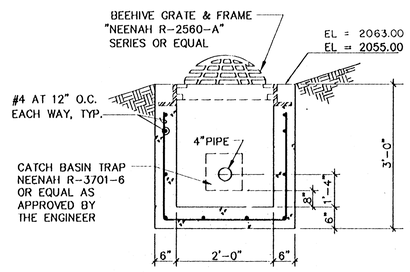
EQUESTRIAN DETENTION BASIN

OUTLET STRUCTURE DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	C0-2

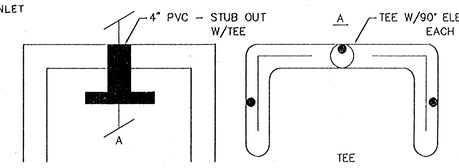
RECORD DRAWINGS

FILENAME: 184C-C03.DWG



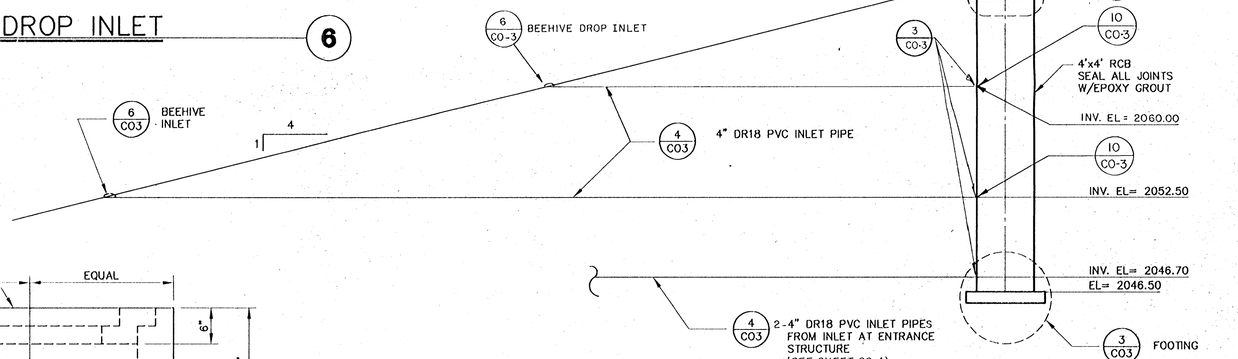
BEEHIVE DROP INLET — 6

NO SCALE



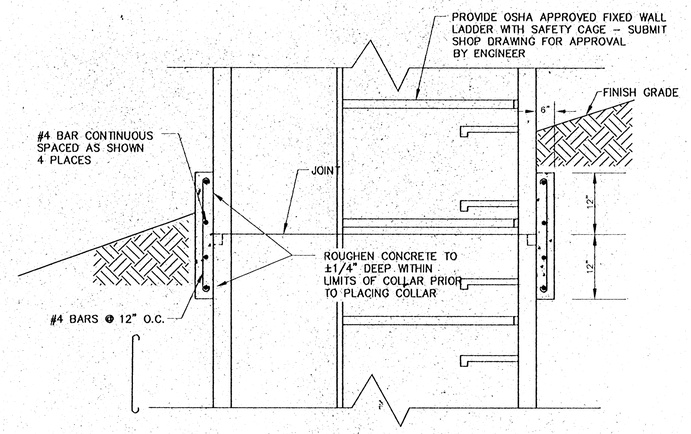
PVC STUB OUT DETAIL — 10

NO SCALE



STILLING WELL — 1

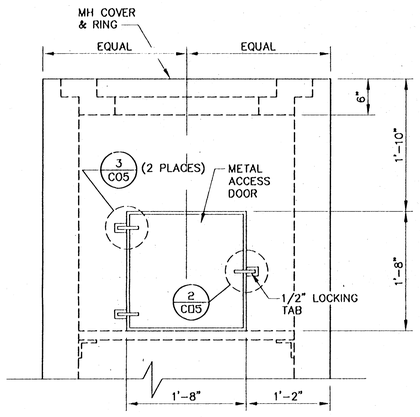
NO SCALE



NOTE: CONCRETE COLLAR MAY BE ELIMINATED IF UPPERMOST JOINT IS A MINIMUM OF 3' BELOW FINISH GRADE.

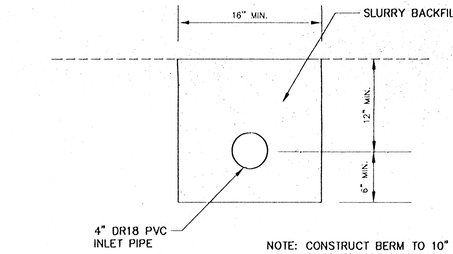
CONCRETE COLLAR — 2

NO SCALE



METAL ACCESS DOOR DETAIL — 7

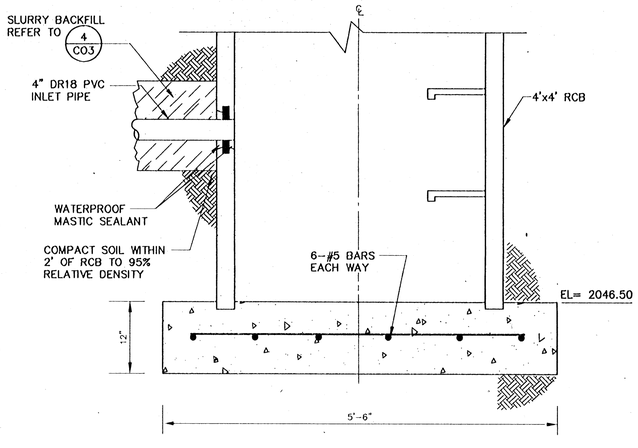
NO SCALE



NOTE: CONSTRUCT BERM TO 10" MINIMUM OVER TOP OF INLET PIPE, EXCAVATE TRENCH FOR INLET PIPE AND BACKFILL WITH SLURRY.

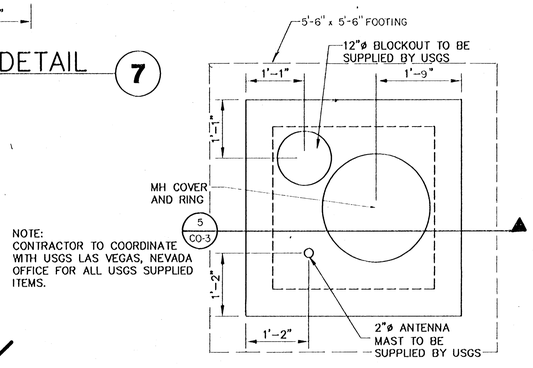
INLET PIPE DETAIL FOR STILLING WELL — 4

NO SCALE



FOOTING DETAIL — 3

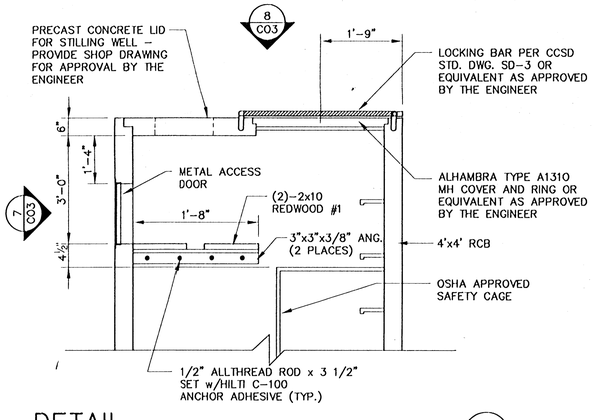
NO SCALE



NOTE:
CONTRACTOR TO COORDINATE WITH USGS LAS VEGAS, NEVADA OFFICE FOR ALL USGS SUPPLIED ITEMS.

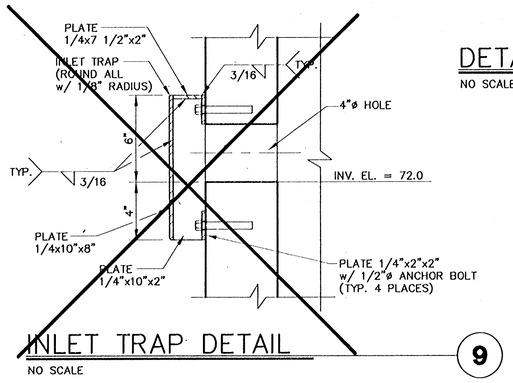
DETAIL — 8

NO SCALE



DETAIL — 5

NO SCALE



INLET TRAP DETAIL — 9

NO SCALE

NOTE:
ALL METAL ASSEMBLIES FOR THE STILLING WELL TO BE HOT DIPPED GALVANIZED PER SECTION 715 OF THE STANDARD SPECIFICATIONS.

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

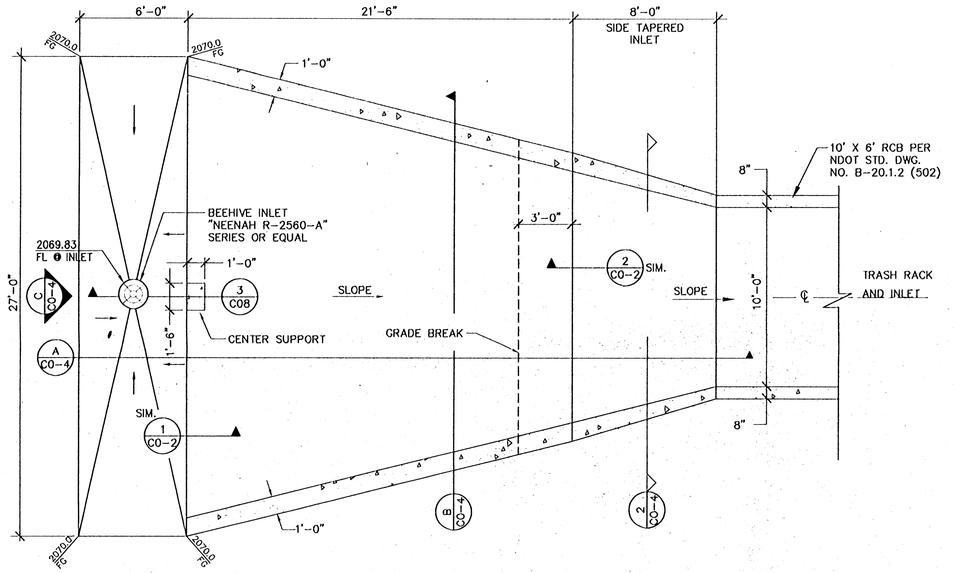
EQUESTRIAN DETENTION BASIN

DETENTION BASIN STILLING WELL & DETAILS

JOB NUMBER	95184C
DESIGNED BY	JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CO-3
OF	

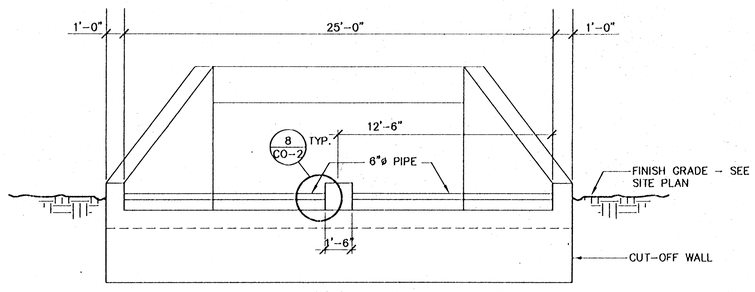
RECORD DRAWINGS

FILENAME: 184-C04.DWG



SLAB PLAN – ENTRANCE STRUCTURE (3)

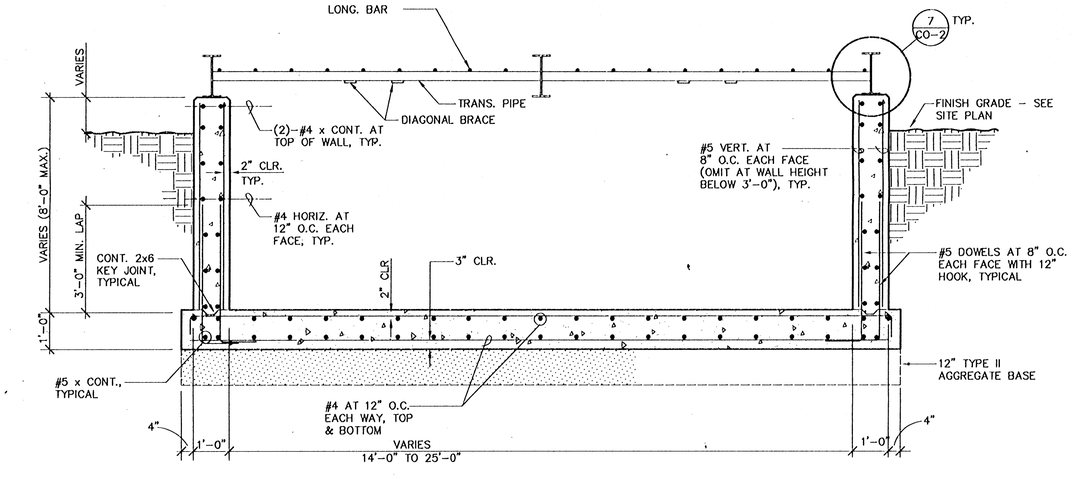
SCALE: 1/4" = 1'-0"



NOTE: METAL GRATE FRAMING NOT SHOWN FOR CLARITY

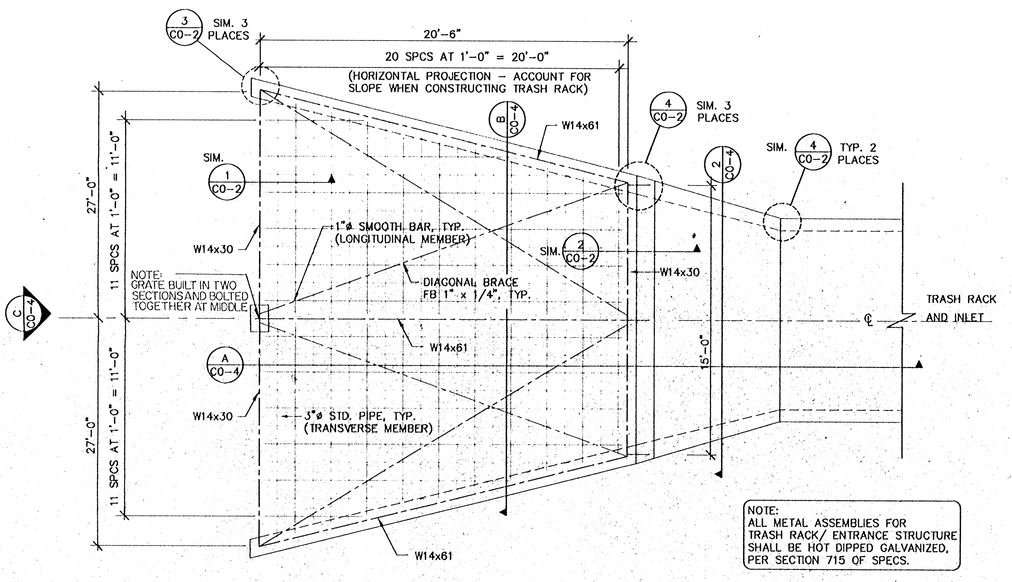
FRONT ELEVATION (C)

SCALE: 1/4" = 1'-0"



TRANSVERSE SECTION – ENTRANCE STRUCTURE (B)

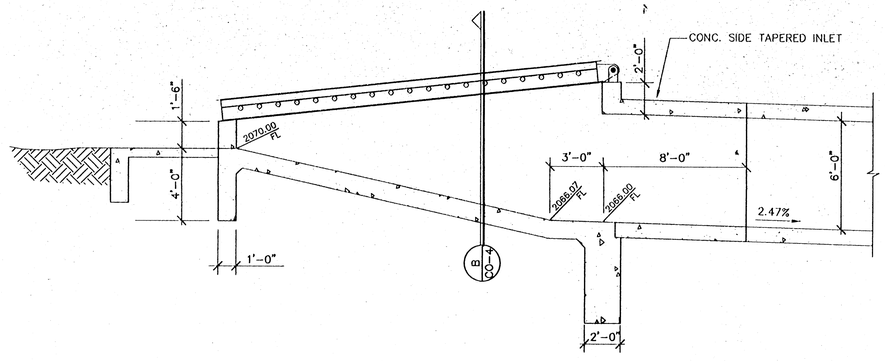
SCALE: 1/2" = 1'-0"



NOTE:
ALL METAL ASSEMBLIES FOR TRASH RACK/ ENTRANCE STRUCTURE SHALL BE HOT DIPPED GALVANIZED, PER SECTION 715 OF SPECS.

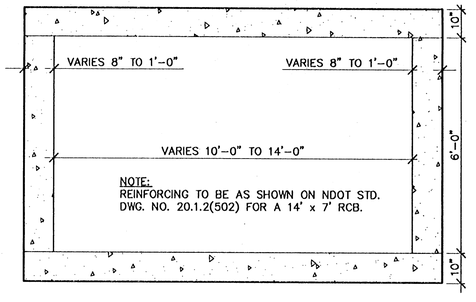
TRASH RACK PLAN – ENTRANCE STRUCTURE (1)

SCALE: 1/4" = 1'-0"



LONGITUDINAL SECTION – ENTRANCE STRUCTURE (A)

SCALE: 1/4" = 1'-0"



SECTION – SIDE TAPERED INLET (2)

NO SCALE

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA REGISTERED PROFESSIONAL ENGINEER TIMOTHY E. PERRY No. 5969 CIVIL

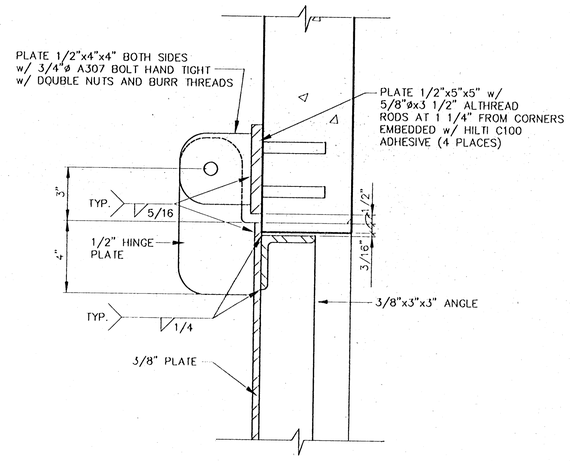
EQUESTRIAN DETENTION BASIN

MAGIC WAY INLET SECTIONS AND DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JDD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-1395
SHEET NUMBER	C0-4
OF	

RECORD DRAWINGS

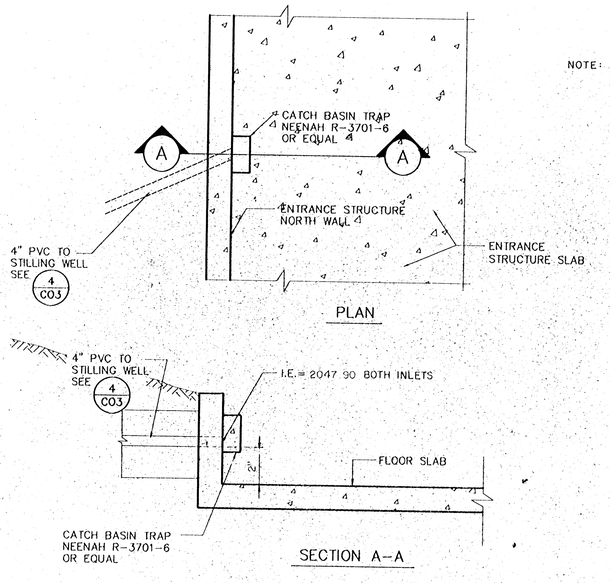
FILENAME: 1946-C05.DWG



HINGE TAB DETAIL

NO SCALE

3

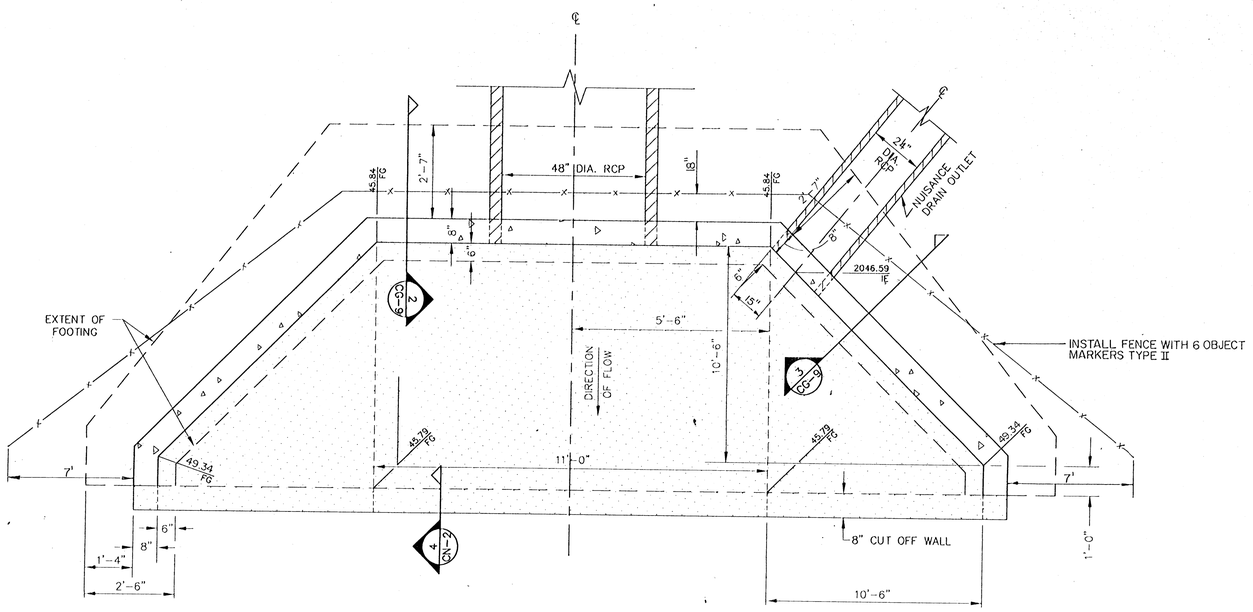


STILLING WELL INLET DETAIL

NO SCALE

1

NOTE: CATCH BASIN TRAPS TO BE LOCKABLE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO APPROVE LOCKING METHOD/DEVICES.



TEMPORARY OUTLET WORKS

NO SCALE

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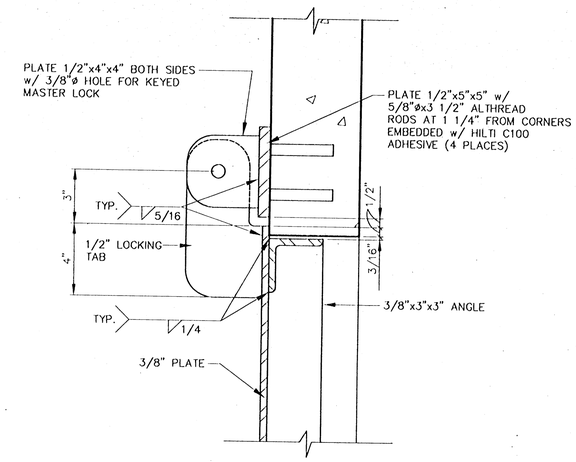

LOCKING TAB DETAIL

NO SCALE

2

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

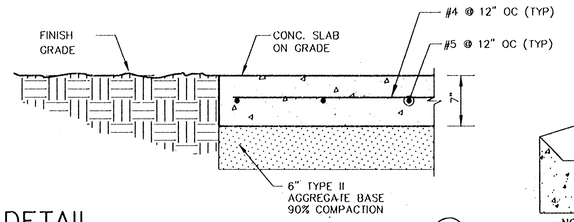
EQUESTRIAN DETENTION BASIN

STILLING WELL INLET DETAILS

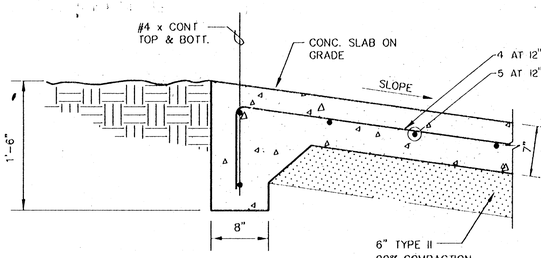
JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	C0-5
OF	

RECORD DRAWINGS

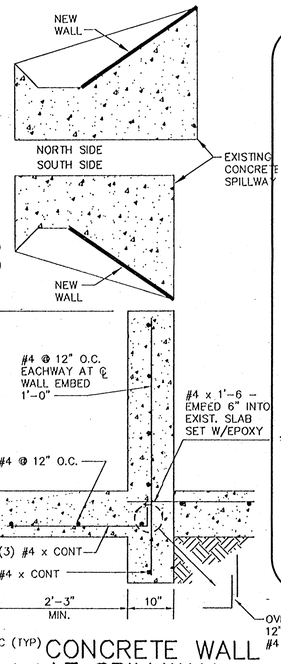
FILENAME: 1840-C06.DWG



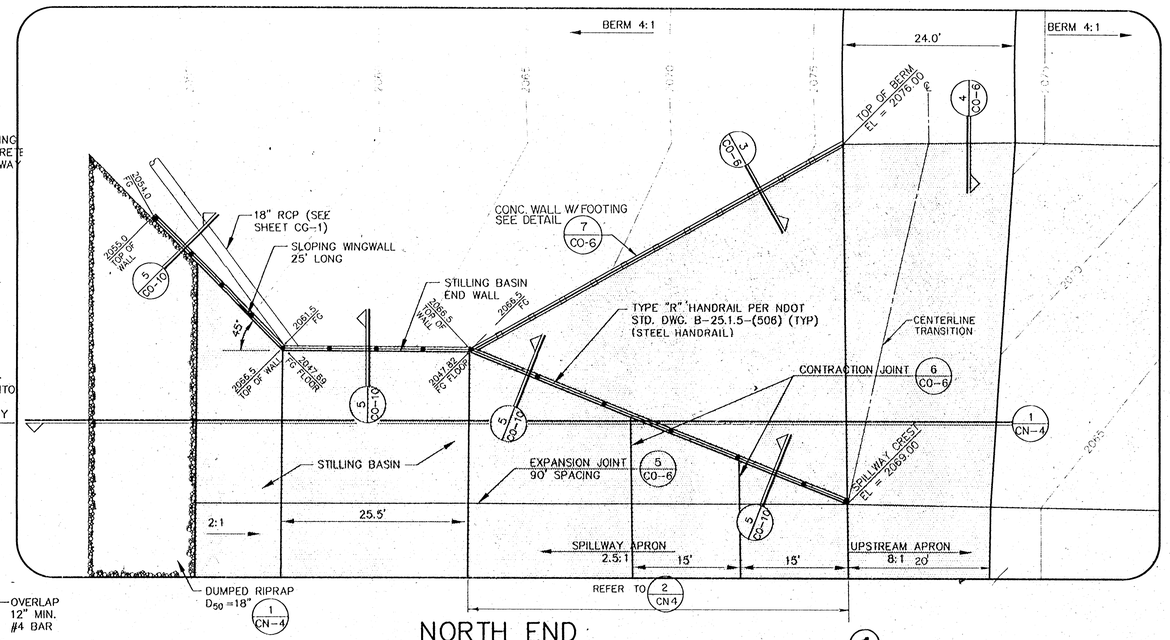
DETAIL 3
NO SCALE



DETAIL 4
NO SCALE



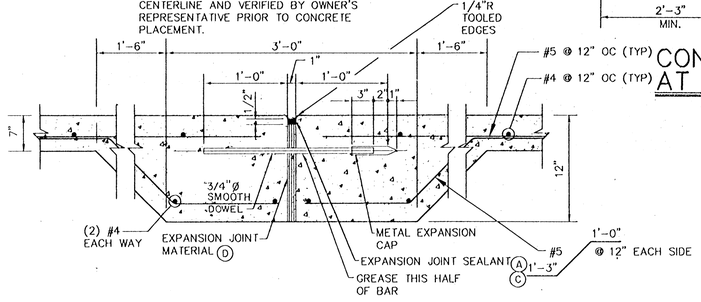
CONCRETE WALL AT SPILLWAY 7
NO SCALE



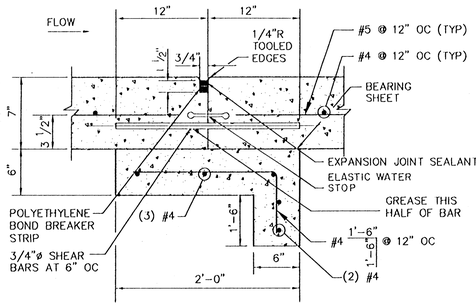
NORTH END 1
1" = 10'-0"

SCALE: 1" = 10'

NOTE:
ALL DOWELS AND SHEAR BARS SHALL BE SET LEVEL AND PARALLEL TO CENTERLINE AND VERIFIED BY OWNER'S REPRESENTATIVE PRIOR TO CONCRETE PLACEMENT.



SPILLWAY & STILLING BASIN CONSTRUCTION/EXPANSION JOINT 90' O.C. 5
NO SCALE



SPILLWAY & STILLING BASIN CONTRACTION JOINT 6
NO SCALE

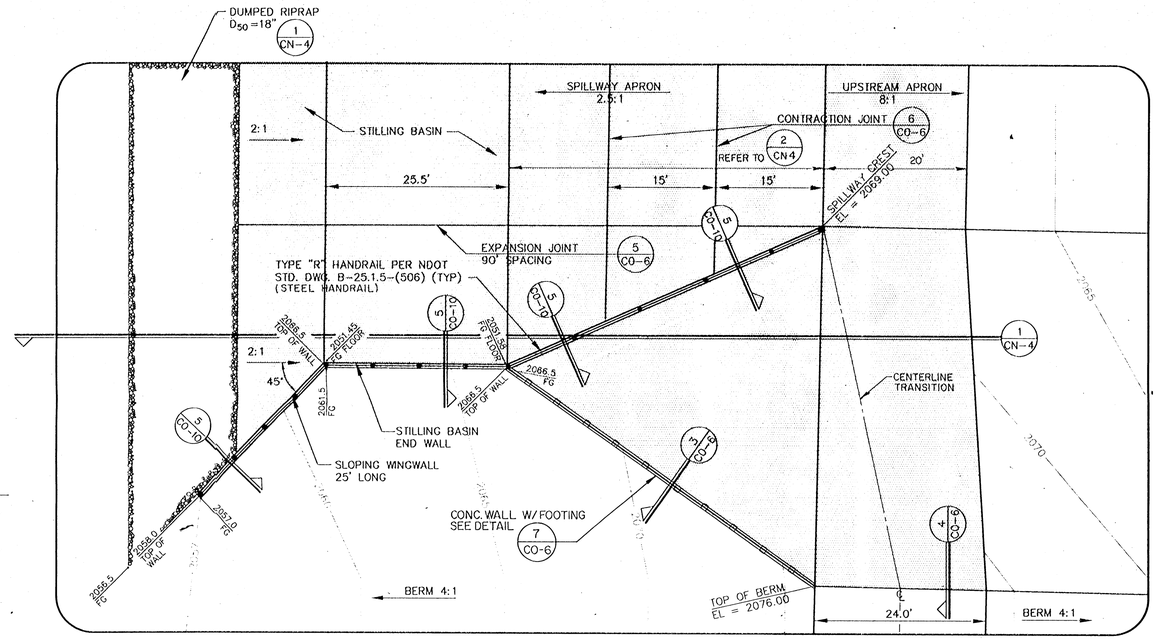
JOINT NOTES

(A) "EVAZOTE 380 MODEL E1.25" BY EPOXY INDUSTRIES OR EQUAL.

(B) "EVAZOTE 380 MODEL E1.00" BY EPOXY INDUSTRIES OR EQUAL.

(C) U.V. RESISTANT VINYL JOINT SURFACE PAINT "FLEXCOAT #19" BY EPOXY INDUSTRIES OR EQUAL.

(D) "EVA-SEAL" BY EPOXY INDUSTRIES OR EQUAL.



SOUTH END 2
1" = 10'-0"

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REVISION	DATE

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — TIMOTHY E. PAGE — No. 9525 — CIVIL

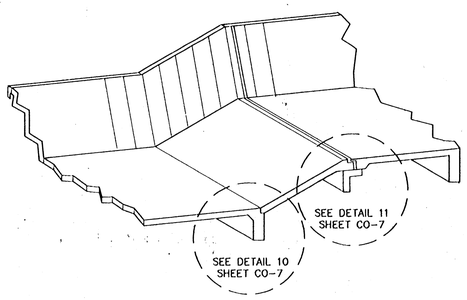
EQUESTRIAN DETENTION BASIN

PARTIAL SPILLWAY PLANS AND DETAILS

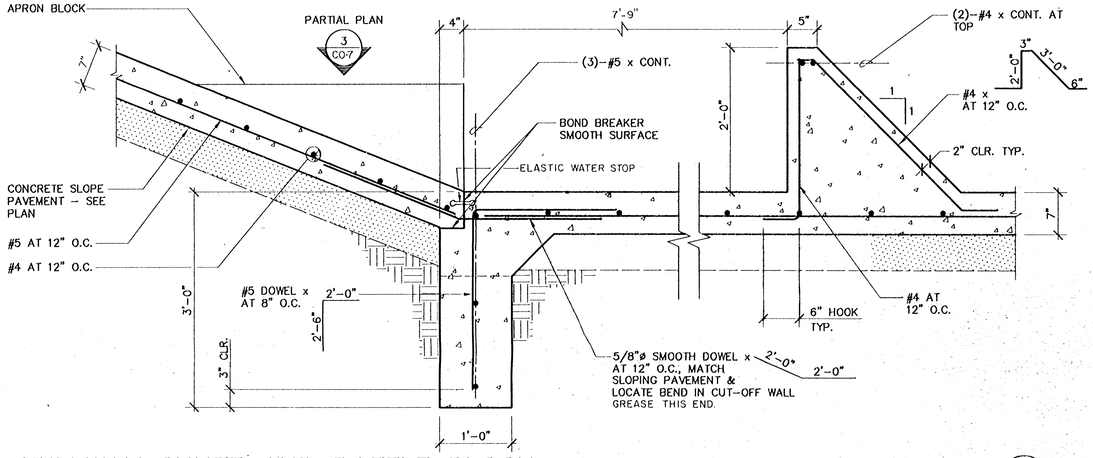
JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH/DRF
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CO-6

RECORD DRAWINGS

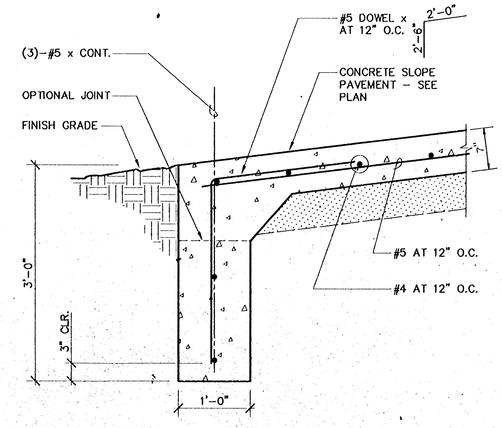
FILENAME: 184C-C07.DWG



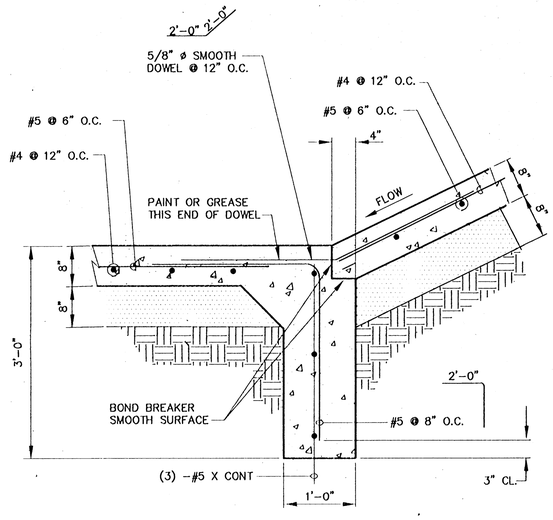
SLOPING DROP (TYP) — 9
NO SCALE



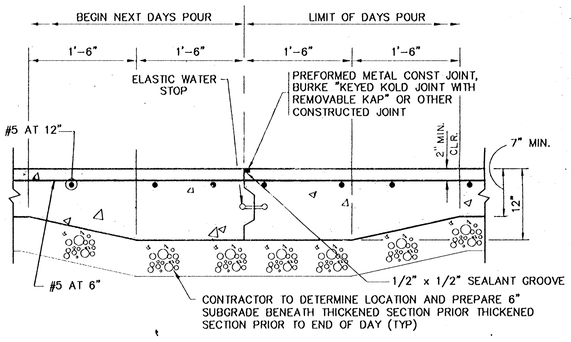
SPILLWAY CHUTE AND BAFFLE BLOCK — 4
1" = 1'–0"



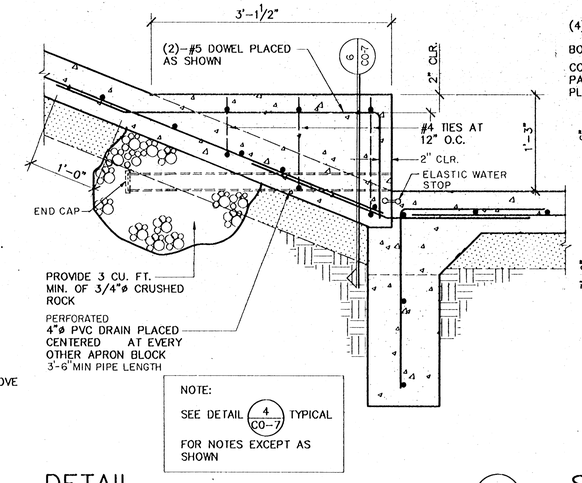
UPSTREAM SPILLWAY APRON CUTOFF WALL — 1
1" = 1'–0"



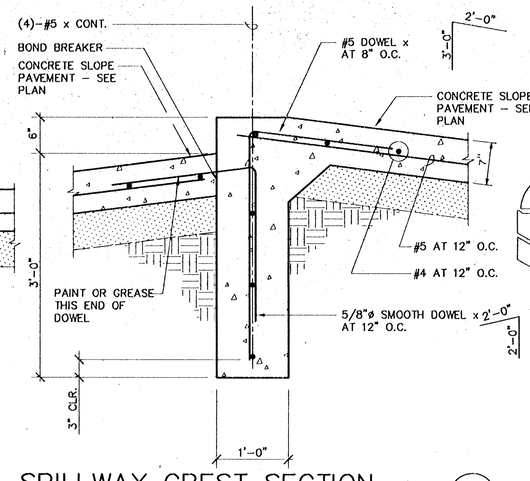
SLOPING DROP CUTOFF WALL — 10
1" = 1'–0"



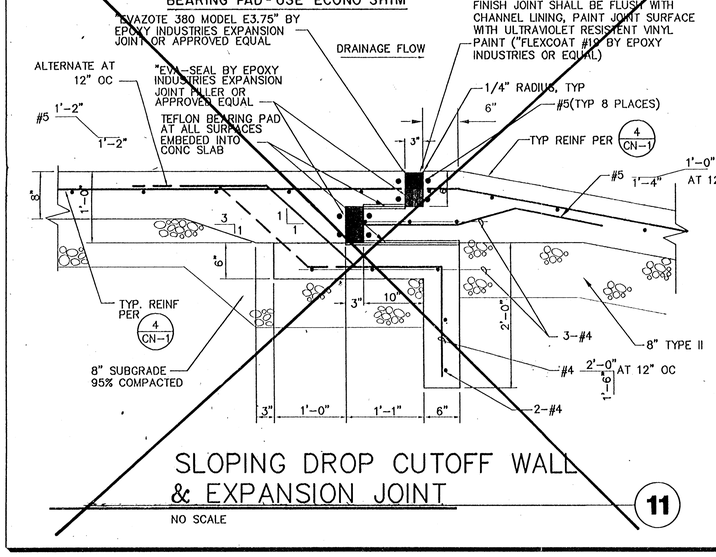
SPILLWAY & STILLING BASIN CONSTRUCTION JOINT — 7
NO SCALE



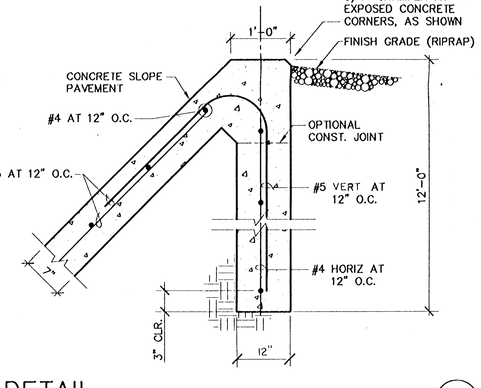
DETAIL — 5
1" = 1'–0"



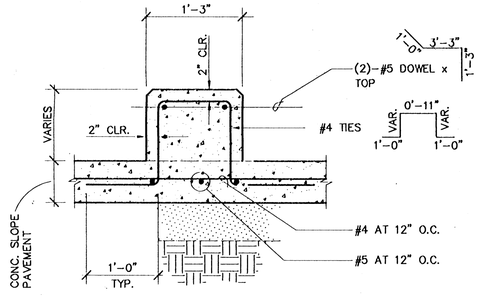
SPILLWAY CREST SECTION — 2
1" = 1'–0"



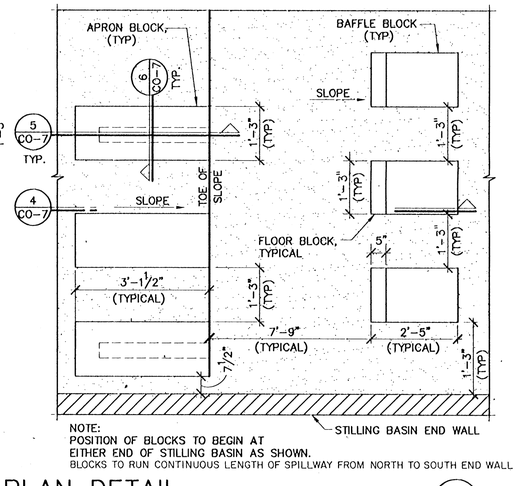
SLOPING DROP CUTOFF WALL & EXPANSION JOINT — 11
NO SCALE



DETAIL — 8
NO SCALE



SPILLWAY CHUTE BLOCK SECTION — 6
1" = 1'–0"



PLAN DETAIL — 3
NO SCALE

DATE	REVISION

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

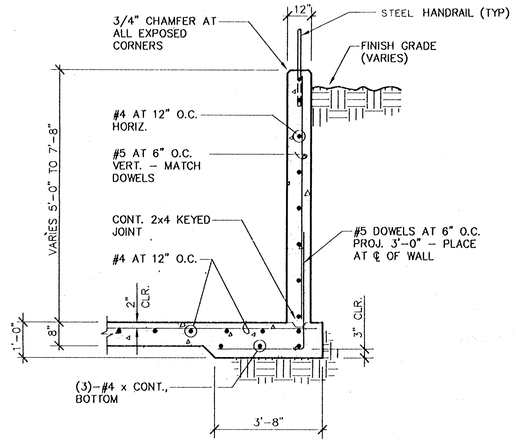
EQUESTRIAN DETENTION BASIN

SPILLWAY DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11–13–95
SHEET NUMBER	C0-7

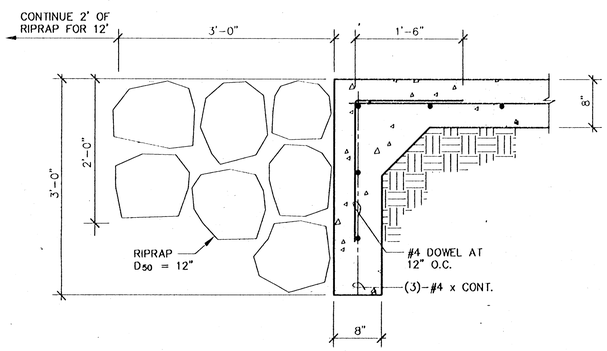
RECORD DRAWINGS

FILENAME: 184C-C08.DWG



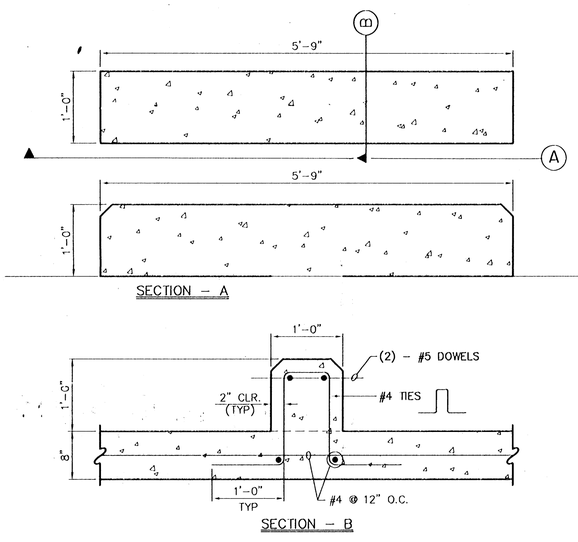
SECTION — 6

NO SCALE



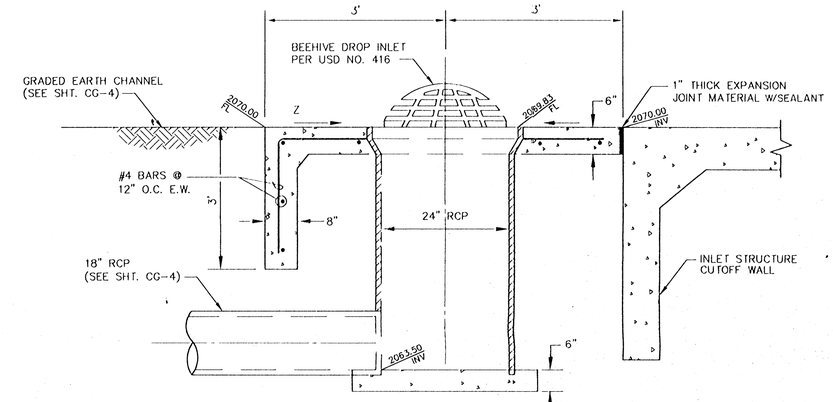
MAGIC WAY CUT–OFF WALL SECTION — 7

1" = 1'-0"



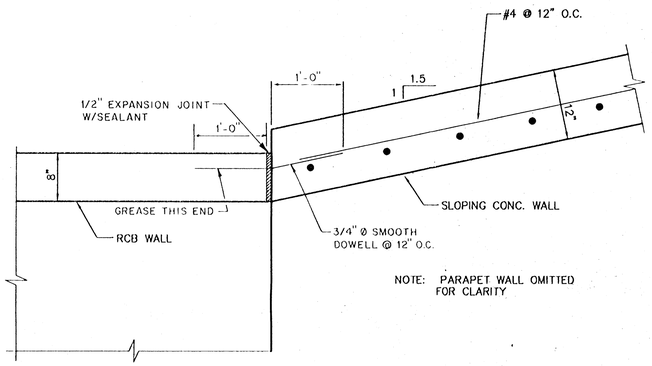
MAGIC WAY BAFFLE BLOCK DETAIL — 8

NO SCALE



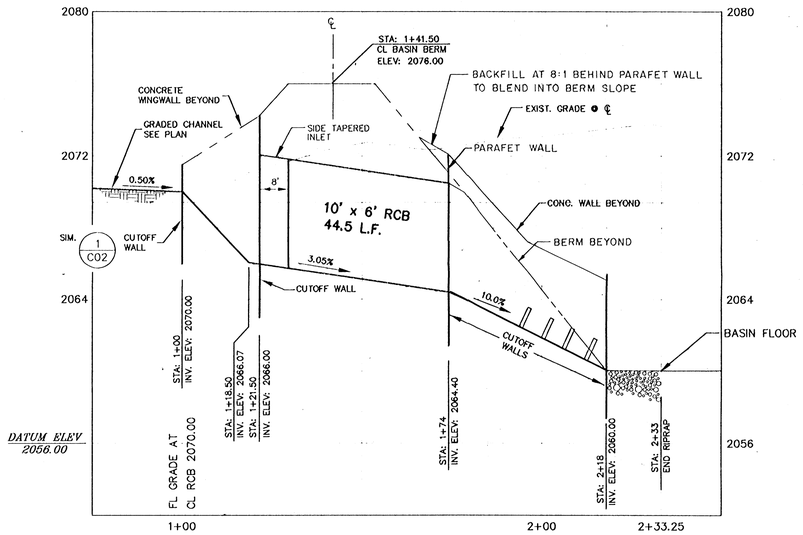
SECTION – NUISANCE WATER INLET — 3

NO SCALE



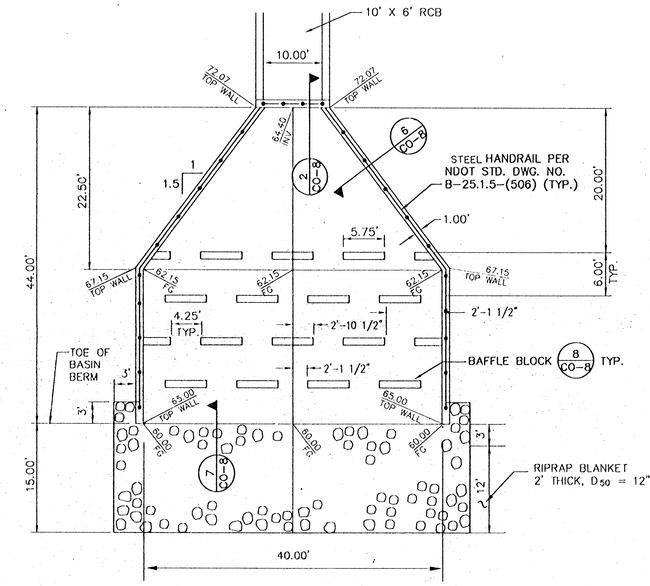
RCB – CONC WALL DETAIL (TYP) — 4

SCALE: 1" = 1'-0"



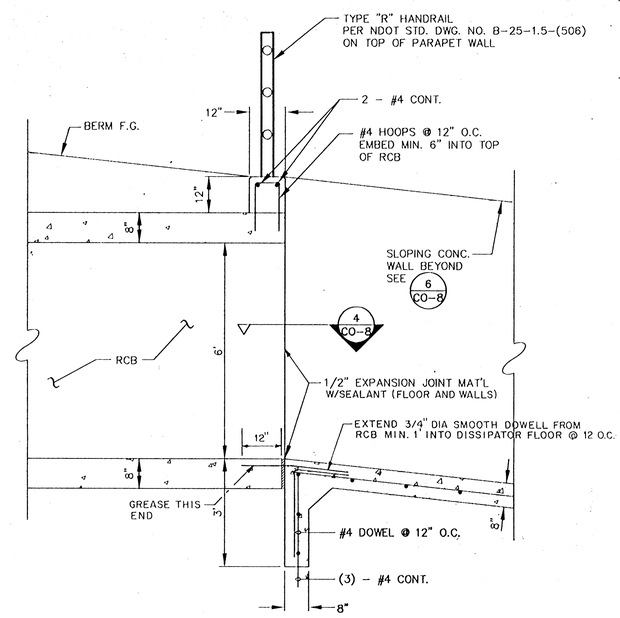
PROFILE — 5

SCALE: 1" = 20' HORIZ.
1" = 4' VERT.



MAGIC WAY ENERGY DISSIPATOR PLAN — 1

SCALE: 1" = 10'-0"



MAGIC WAY RCB OUTLET SECTION — 2

NO SCALE

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS • PLANNERS SURVEYORS
2601 NORTH TENAYA WAY • LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — TIMOTHY E. PAPPET — CIVIL — No. 9889 — ON 12/31/96

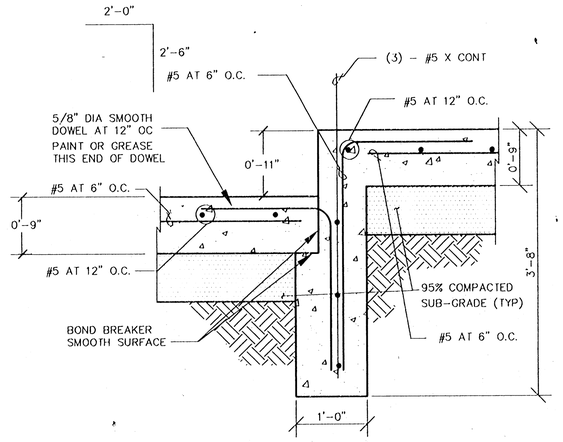
EQUESTRIAN DETENTION BASIN

MAGIC WAY INLET PROFILE AND DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	C0-8
OF	

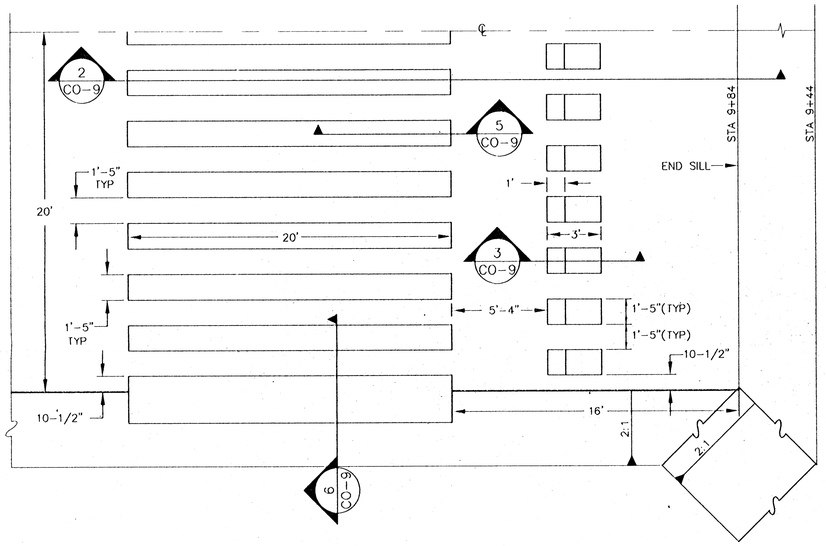
RECORD DRAWINGS

FILENAME: 184C-C09.DWG



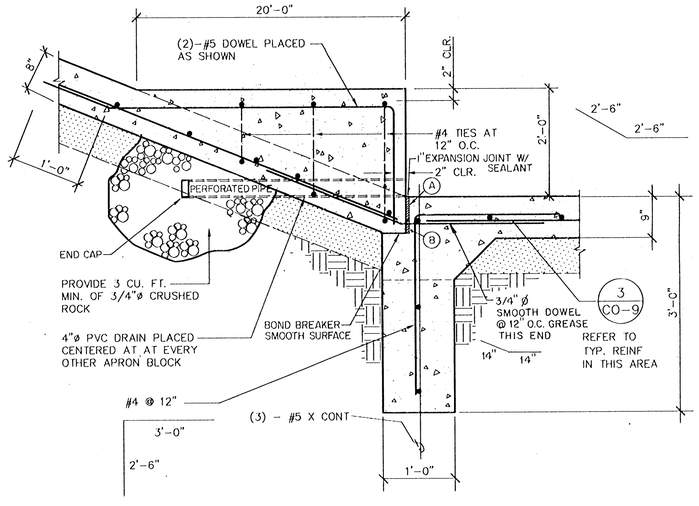
END SILL DETAIL (4)

SCALE: 1" = 1'-0"



PLAN (1)

NO SCALE

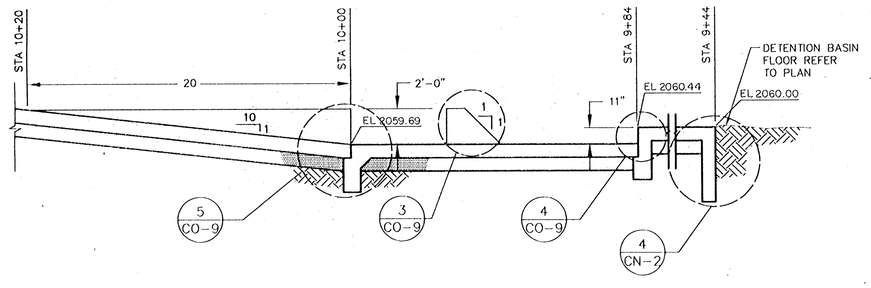


Ⓐ 2" DEEP EXPANSIOIN JOINT "EVAZOTE 380 MODEL EI.75 BY EPOXY INDUSTRIES OR APPROVED EQUAL. PAINT JOINT SURFACE WITH U.V. RESISTANT VINYL PAINT ("FLEXCOAT # 19" BY EPOXY INDUSTRIES OR APPROVED EQUAL).

Ⓑ 6" DEEP EXPANSION JOINT FILLER ("EVA-SEAL" BY EPOXY INDUSTRIES OR APPROVED EQUAL).

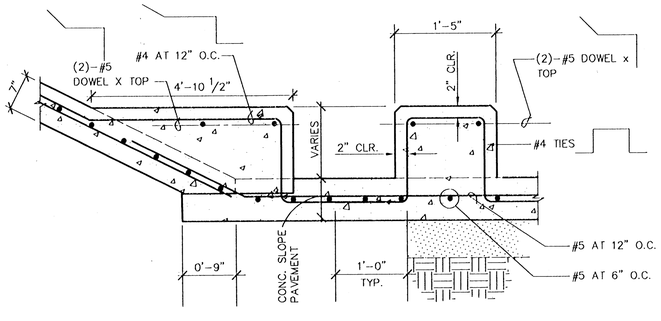
DETAIL (5)

NO SCALE



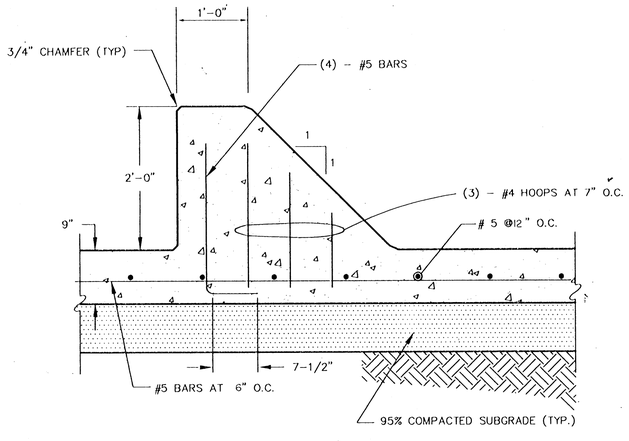
SECTION (2)

NO SCALE



DETAIL (6)

SCALE: 1" = 1'-0"



SAF FLOOR BLOCK (3)

SCALE: 1" = 1'-0"

REVISION	DATE

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POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHE E. PAYNE No. 5959 CIVIL

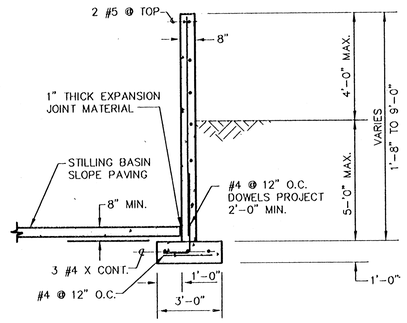
EQUESTRIAN DETENTION BASIN

ST ANTHONY FALLS STILLING BASIN DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH/DRF
CHECKED BY	TEP
DATE	11-13-95
SHEET NUMBER	CO-9
OF	

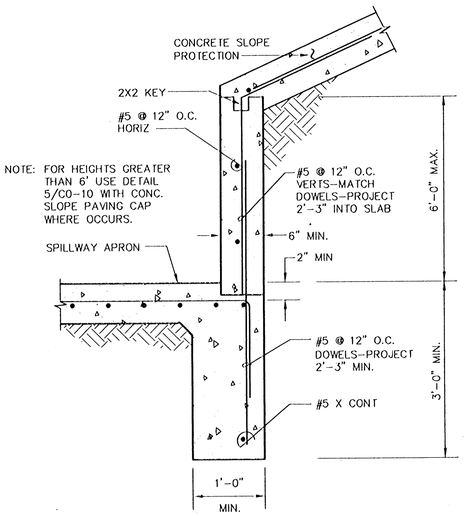
RECORD DRAWINGS

FILENAME: 184-C01C.DWG



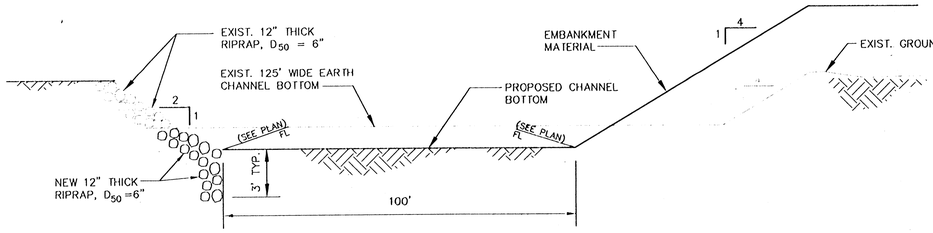
SECTION
NO SCALE

6



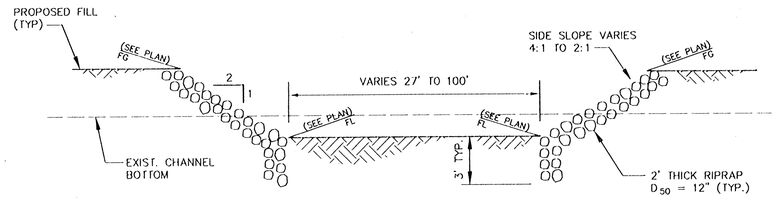
SECTION
NO SCALE

7



MAGIC WAY CHANNEL SECTION
NO SCALE

3



MAGIC WAY CHANNEL SECTION
NO SCALE

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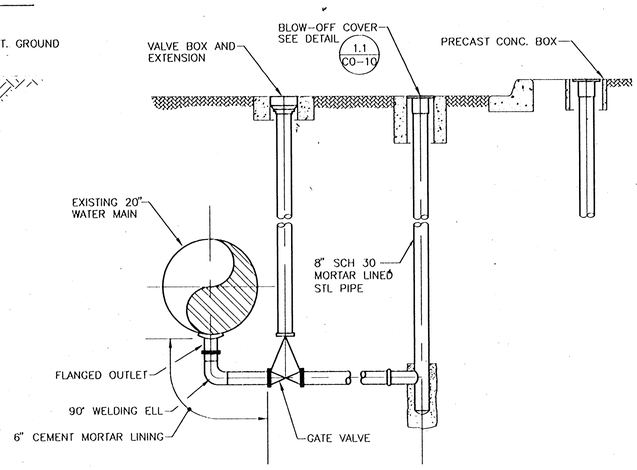
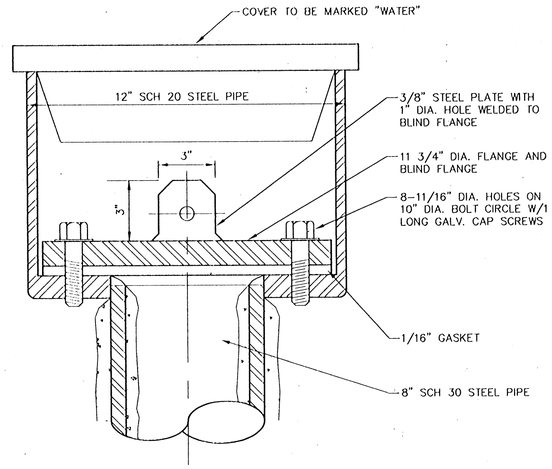


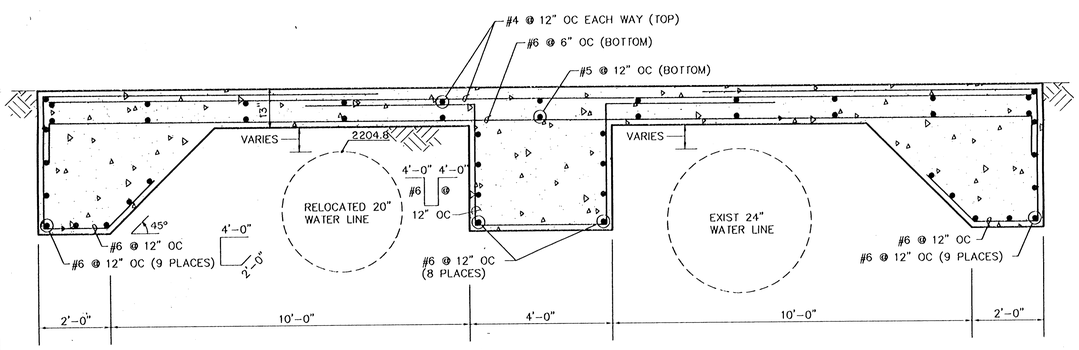
EXISTING BLOW-OFF DETAIL
NO SCALE

1



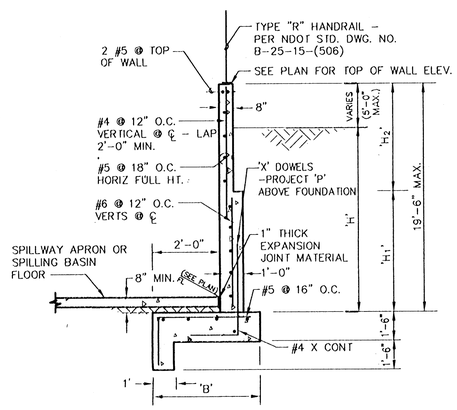
EXISTING BLOW-OFF COVER DETAIL
NO SCALE

1.1



WATERLINE CONCRETE CAP
NO SCALE

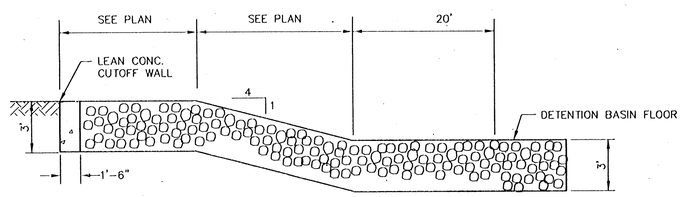
8



H	H_1	H_2	B	X	P
≤ 7'-8"	0'-0"	12'-8"	4'-0"	#6 @ 12" O.C.	7'-0"
7'-8" ≤ 10'-0"	4'-8"	10'-0"	5'-0"	#6 @ 12" O.C.	4'-8"
10'-0" ≤ 12'-4"	7'-8"	7'-0"	6'-0"	#6 @ 12" O.C.	4'-8"
12'-4" ≤ 14'-8"	7'-8"	9'-4"	7'-6"	#6 @ 6" O.C.	4'-8"
14'-8" ≤ 16'-2"	9'-2"	10'-4"	9'-0"	#7 @ 6" O.C.	6'-2"

SECTION
NO SCALE

5



RIP RAP SLOPE PROTECTION
NO SCALE

2

ANY INFORMATION OR DATA ON THIS DRAWING IS NOT INTENDED TO BE SUITABLE FOR REUSE BY ANY PERSON, FIRM, OR CORPORATION FOR USE ON EXTENSIONS OF THIS PROJECT OR ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION AND ADAPTATION BY THE ENGINEER FOR THE SPECIFIC PURPOSE INTENDED, WILL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO THE ENGINEER

REVISION	DATE

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2801 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA TIMOTHY E. HOLTHUS CIVIL No. 9269

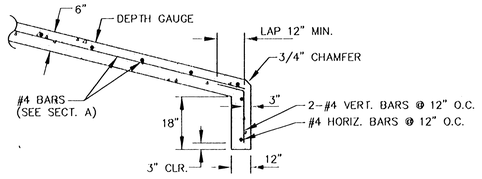
EQUESTRIAN DETENTION BASIN

MISCELLANEOUS DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	JGH
CHECKED BY	TEP
DATE	12-11-95
SHEET NUMBER	CO-10

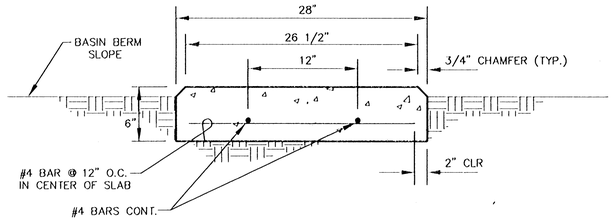
RECORD DRAWINGS

FILENAME: 184-C011.DWG



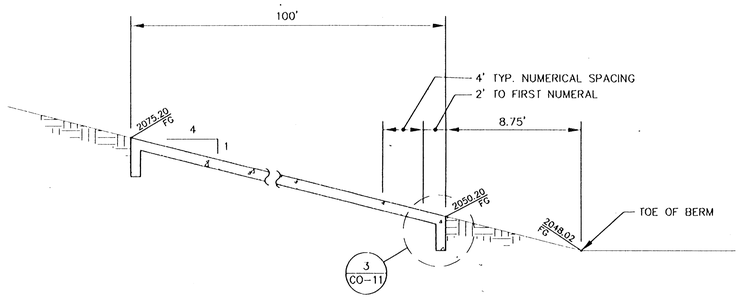
DETAIL – DEPTH GAUGE ANCHOR WALL (3)

NO SCALE



SECTION – BASIN DEPTH GAUGE (A)

NO SCALE



SECTION – BASIN DEPTH GAUGE (B)

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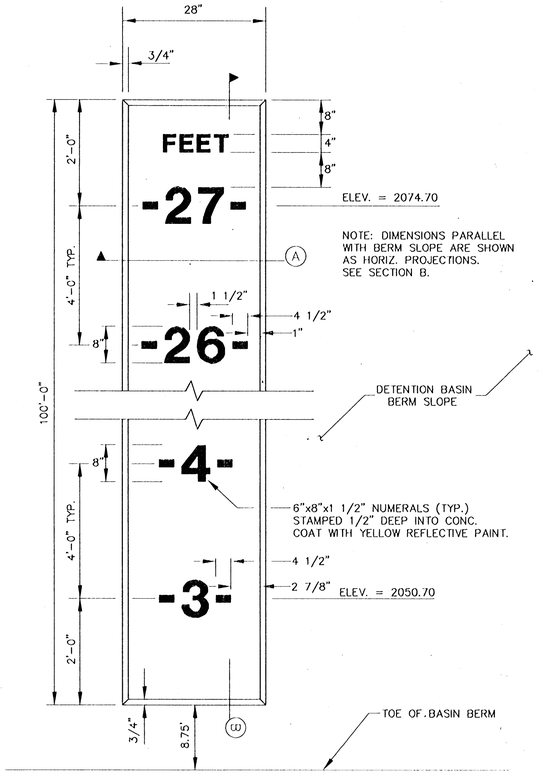
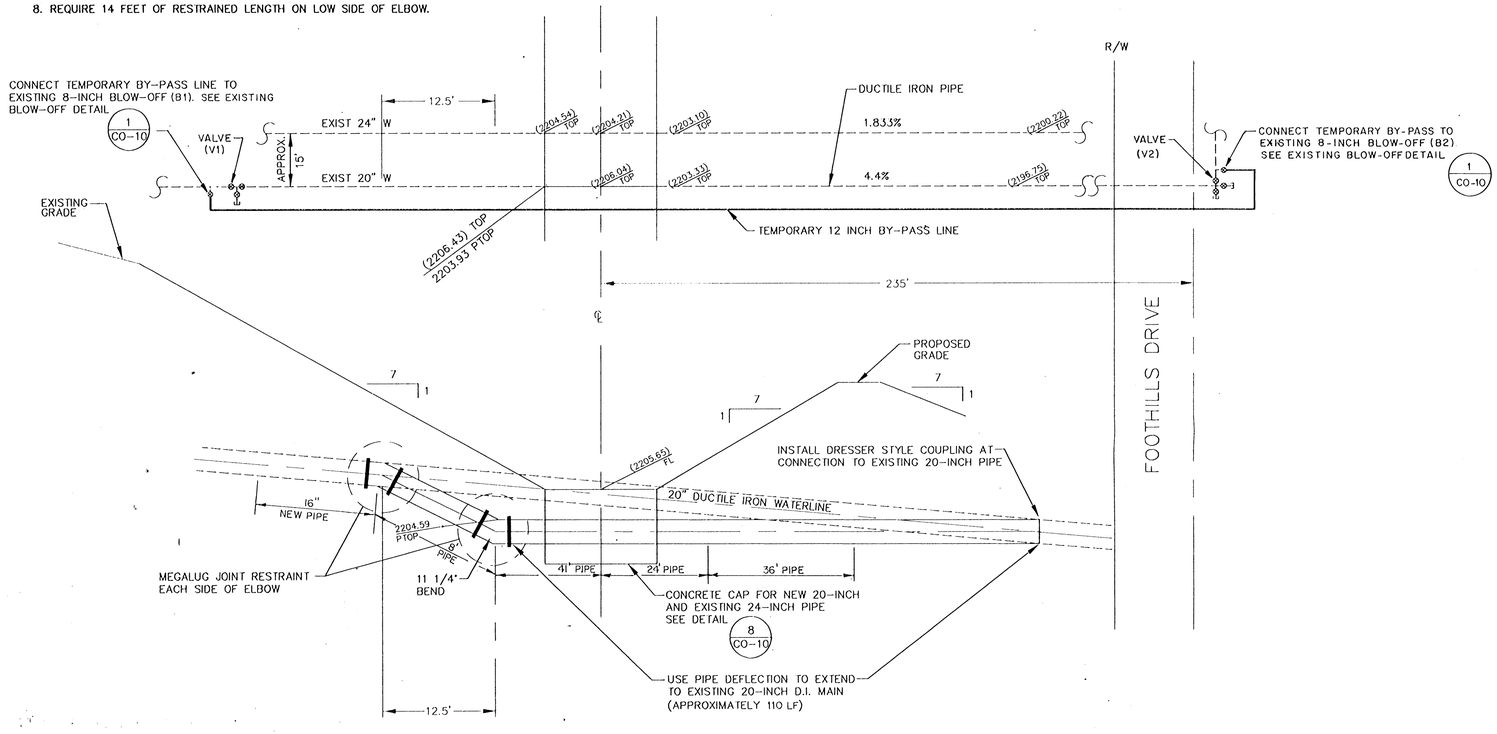


DETENTION BASIN DEPTH GAUGE (1)

NO SCALE

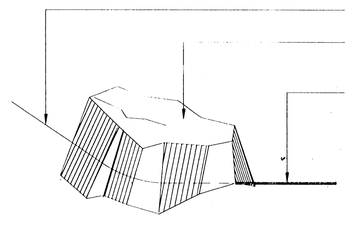
NOTES

1. THE WATERLINE RELOCATION WORK SHALL NOT BE PERFORMED DURING THE TIME PERIOD OF MAY 1 THRU SEPTEMBER 30.
2. CONTRACTOR SHALL FIELD VERIFY PIPE LOCATION, DEPTH, MATERIAL AND O.D..
3. CONTRACTOR SHALL NOTIFY THE CITY OF HENDERSON UTILITY SERVICES DIVISION AT LEAST FOUR (4) WORKING DAYS PRIOR TO RELOCATION WORK.
4. CONTRACTOR TO PROVIDE APPROXIMATELY 800 LF OF 12-INCH TEMPORARY LINE FROM EXISTING 8-INCH BLOW-OFF ASSEMBLY (B2) IN FOOTHILLS DRIVE EAST TO EXISTING 8-INCH BLOW-OFF ASSEMBLY (B1). TEMPORARY LINE CAN BE PLACED ABOVE GROUND WHERE PRACTICAL.
5. CONTRACTOR TO PRESSURE TEST EXISTING LINE (BETWEEN CONNECTION POINTS OF TEMPORARY LINE) BEFORE AND AFTER CONSTRUCTION TO VERIFY THAT ANY FINAL LEAKS ARE THE RESULT OF THE CONSTRUCTION.
6. TEMPORARY LINE TO BE DISINFECTED PER SPECIFICATIONS PRIOR TO ITS USE.
7. REQUIRE 14 FEET OF RESTRAINED LENGTH ON HIGH SIDE OF CUT. IF EXISTING PIPE LENGTH ON HIGH SIDE FROM CUT IS LESS THAN 14 FEET WITHOUT JOINTS, THEN TWO OPTIONS AVAILABLE TO CONTRACTOR:
   - OPTION 1: RESTRAIN EXISTING JOINT WITHIN 14 FOOT LENGTH WITH MEGALUG JOINT RESTRAINT.
   - OPTION 2: REPLACE PIPE LENGTH WITH SINGLE NON-JOINTED SEGMENT WITH MINIMUM LENGTH OF 14 FEET.
8. REQUIRE 14 FEET OF RESTRAINED LENGTH ON LOW SIDE OF ELBOW.

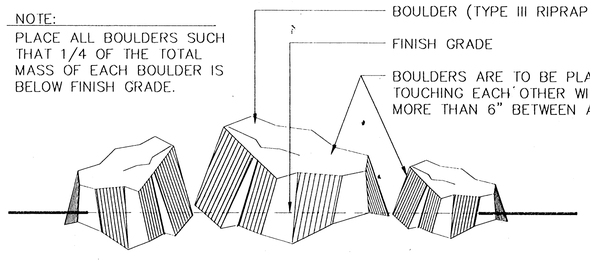


WATERLINE RELOCATION DETAIL (4)

NO SCALE



NOTE:
PLACE ALL BOULDERS SUCH THAT 1/4 OF THE TOTAL MASS OF EACH BOULDER IS BELOW FINISH GRADE.



VEHICLE BARRIER FENCE (2)

NO SCALE

REVISION	DATE

ANY INFORMATION OR DATA ON THE DRAWING IS NOT INTENDED TO BE SUITABLE FOR REUSE BY ANY PERSON, FIRM, CORPORATION, OR ANY OTHERS ON EXTENSIONS OF THIS PROJECT OR FOR ANY USE ON ANY OTHER PROJECT. ANY REUSE WITHOUT WRITTEN VERIFICATION AND ADAPTATION BY POGGEMEYER DESIGN GROUP FOR THE SPECIFIC PURPOSE INTENDED WILL BE AT USER'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO THE ENGINEER.

POGGEMEYER DESIGN GROUP
ENGINEERS PLANNERS SURVEYORS
2601 NORTH TENAYA WAY LAS VEGAS, NEVADA 89128 (702) 255-8100

STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — No. 5969 — TIMOTHY E. PUTNAM — CIVIL

EQUESTRIAN DETENTION BASIN

MISCELLANEOUS DETAILS

JOB NUMBER	95184C
DESIGNED BY	SJJ/JJD
DRAWN BY	
CHECKED BY	TEP
DATE	12-13-95
SHEET NUMBER	CO-11
OF	

RECORD DRAWINGS

APPENDIX Q

REFERENCE LOMR's & CLOMR's

FEMA

CLOMR's

And

LOMR's

95-09-938P

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 95-09-938P

The Honorable Robert A. Groesbeck
Mayor, City of Henderson
240 Water Street
Henderson, Nevada 89015

Community: City of Henderson, Nevada
Community No.: 320005
Panel Affected: 32003C2615 D
Effective Date of
This Revision: OCT 04 1995

102-D

Dear Mayor Groesbeck:

This is in response to a letter dated August 18, 1995, from Mr. Curt Chandler, P.E., Land Development Manager, Department of Public Works, City of Henderson, regarding the reissuance of a Letter of Map Revision (LOMR) dated March 17, 1995, for the City of Henderson, Nevada. The March 17 LOMR revised Panel 0020 B of the Flood Insurance Rate Map (FIRM) for the City of Henderson, Nevada, dated June 15, 1982. The FIRM has since been superseded by a FIRM for Clark County, Nevada and Incorporated Areas, dated August 16, 1995. The analysis used to amend the FIRM is still valid.

The March 17 LOMR was issued in response to a letter dated March 3, 1995, from Mr. Larry R. Nelson, P.E., President, L.R. Nelson Consulting Engineers, Inc., regarding the effective FIRM for the City of Henderson, Nevada. With his letter, Mr. Nelson provided additional information to support an October 31, 1994, request from Mr. A. Nelson Stone II, P.E., Principal Engineer, FES Consulting Engineers, Inc., for a LOMR. Mr. Stone requested that the Federal Emergency Management Agency (FEMA) revise the effective FIRM to show the effects of channel and culvert improvements for the Country Hills Condominiums development site along an unnamed wash northwest of the intersection of Sausalito Drive and South Racetrack Road. The March 17 LOMR followed up on a Conditional Letter of Map Revision, which was issued on September 26, 1994.

All data required to complete our review of the March 17 LOMR were submitted with Mr. Nelson's letter dated March 3 and with Mr. Stone's letters dated October 31, 1994, and January 9 and January 30, 1995. Because this LOMR is a reissuance of the March 17 LOMR, 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 and have revised the FIRM to modify the floodplain boundary delineations of a flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along the unnamed wash from Sausalito Drive to approximately 600 feet downstream of the northern property line for the Country Hills Condominiums development site along South Racetrack Road. The base flows upstream of the Country Hills Condominiums development site are partially contained in a 6-foot by 4-foot reinforced concrete box (RCB) culvert constructed for a K-Mart Shopping Center, and run along the western side of South Racetrack Road and under Sausalito Drive south of the project area. The base flows are diverted to the north into a 6-foot by 5-foot RCB culvert, constructed as part of this project, located along the western side of South Racetrack Road. Additional offsite flows affecting the Country Hills Condominiums development site are diverted eastward along Sausalito Drive, using the street and a triangular channel along the northern side of Sausalito Drive that discharges into the RCB culvert at South Racetrack Road.

The triangular channel extends approximately 200 feet beyond the western property line to eliminate the flood hazard for the northwestern portion of the site. The base flows are contained within these storm-drain systems, consisting of the triangular channel and the street along Sausalito Drive, and the RCB culvert and the street along South Racetrack Road. All onsite base flows are diverted into adjacent streets or channels.

The width of the Special Flood Hazard Area (SFHA) decreased by a maximum of approximately 300 feet along South Racetrack Road north of its intersection with Sausalito Drive because of site grading and the construction of the referenced storm-drain systems. The boundaries of the SFHA were also modified to show the base flow contained along Sausalito Drive and South Racetrack Road at the southeast corner of the project site.

The modifications are shown on the enclosed annotated copy of FIRM Panel 32003C2615 D for Clark County, Nevada and Incorporated Areas. This LOMR hereby revises this panel of the effective FIRM dated August 16, 1995.

The revisions are effective as of the date of this letter; however, 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.

Due to present funding constraints, we must limit the number of physical map revisions processed. Consequently, we will not republish the FIRM for your community to reflect the modifications described in this LOMR at this time. However, when changes to FIRM Panel 32003C2615 D for your community warrant a physical revision and republication in the future, we will incorporate the modifications described in this LOMR at that time.

This response to Mr. Chandler's request is based on minimum floodplain management criteria established under the National Flood Insurance Program (NFIP). Your community is responsible for approving all floodplain development, including this request, and for ensuring that necessary permits required by Federal or State law have been received. With knowledge of local conditions and in the interest of safety, State and community officials may set higher standards for construction, or may limit development in floodplain areas. If the State of Nevada or your community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence.

The basis of this LOMR is, in whole or in part, a channel-modification/culvert 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 channel modification/culvert 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 an article for publication in your community's local newspaper. This article should describe the change that has been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

The map panel as listed above and as revised by this letter will be used for all flood insurance policies and renewals issued for 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 to which the regulations apply and the modification made by 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. John Magnotti of our staff in Washington, DC, either by telephone at (202) 646-3932 or by facsimile at (202) 646-4596.

Sincerely,

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

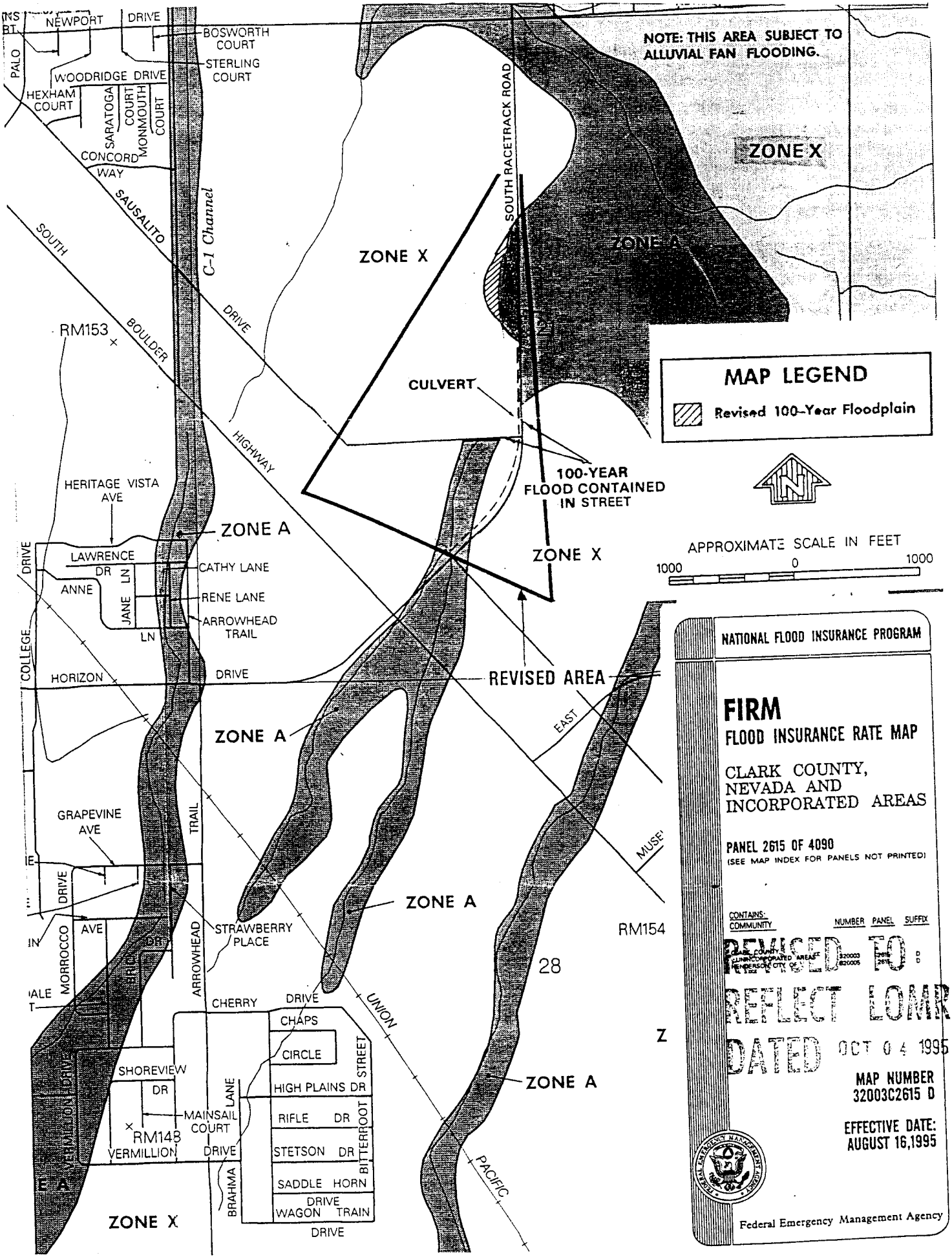
Enclosure

cc: Mr. Curt Chandler, P.E.
Land Development Manager
Department of Public Works
City of Henderson

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

Mr. Larry R. Nelson, P.E.
President
L.R. Nelson Consulting Engineers, Inc.

Mr. Tom Moss
R.V. Jones Development



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2615 OF 4090

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY UNINCORPORATED AREAS	320003	2615	D
HENDERSON, CITY OF	320005	2615	D

REVISED TO REFLECT LOMR DATED OCT 04 1995

MAP NUMBER 32003C2615 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency

95-09-934

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 95-09-934P

The Honorable Robert A. Groesbeck
Mayor, City of Henderson
240 Water Street
Henderson, Nevada 89015

Community: City of Henderson, Nevada
Community No.: 320005
Panels Affected: 32003C2955 D and 2975 D
Effective Date of
This Revision: OCT 06 1995

102-D

Dear Mayor Groesbeck:

This is in response to a letter dated August 18, 1995, from Mr. Curt Chandler, P.E., Land Development Manager, Department of Public Works, City of Henderson, regarding the reissuance of Letters of Map Revision (LOMRs) dated July 20, 1995 (Case No. 95-09-435P), and August 3, 1995 (Case No. 95-09-465P), for the City of Henderson, Nevada. The July 20 and August 3 LOMRs both revised Panel 320005 0020 B of the Flood Insurance Rate Map (FIRM) for the City of Henderson, Nevada, dated June 15, 1982. The FIRM has since been superseded by a FIRM for Clark County, Nevada and Incorporated Areas, dated August 16, 1995. The analyses used to amend the FIRM are still valid.

The July 20 LOMR was issued in response to a facsimile dated June 30, 1995, from Mr. W. Scott Wonders, E.I.T., VTN Nevada, regarding the effective FIRM for the City of Henderson, Nevada. With his letter, Mr. Wonders provided additional information to support his April 6, 1995, request for a LOMR. Mr. Wonders requested that the Federal Emergency Management Agency (FEMA) revise the effective FIRM to show the effects of the Mission Hills detention basin and on-site drainage improvements for the Black Mountain Ranch development site along an unnamed wash affecting the site. The July 20 LOMR followed up on a Conditional Letter of Map Revision, which was issued on December 19, 1994.

The August 3 LOMR was issued in response a letter dated July 25, 1995, from Mr. John P. Clark, P.E., VTN Nevada, regarding the effective FIRM for the City of Henderson, Nevada. With his letter, Mr. Clark provided additional information to support his April 17, 1995, request for a LOMR. Mr. Clark requested that FEMA revise the effective FIRM to show the effects of the Mission Hills detention basin and on-site drainage improvements for the Desert Highlands development site along an unnamed wash affecting the site.

All data required to complete our review of the July 20 LOMR were submitted with Mr. Wonders' letters dated April 6, June 12, and June 22, 1995, and his June 30 facsimile. All data required to complete our review of the August 3 LOMR were submitted with Mr. Clark's letters dated April 17, June 15, and July 25, 1995. Because this LOMR is a reissuance of the July 20 and August 3 LOMRs, 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 and have revised the FIRM to modify the floodplain boundary delineations of a flood having a 1-percent

chance of being equaled or exceeded in any given year (base flood) along the unnamed wash affecting the Black Mountain Ranch and Desert Highlands development sites, from I-515 to approximately 1,500 feet upstream of Arrowhead Trail. Construction of the Mission Hills detention basin significantly reduced the watershed area and base flows contributing to the Black Mountain Ranch and Desert Highlands development sites. The base flood is contained in the streets and on-site drainage facilities within the Black Mountain Ranch and Desert Highlands development sites. The Special Flood Hazard Area designated Zone A has been removed upstream of I-515 based on the reduced discharge values and on-site drainage improvements.

The modifications are shown on the enclosed annotated copies of FIRM Panels 32003C2955 D and 2975 D. This LOMR hereby revises these panels of the effective FIRM dated August 16, 1995.

A separate LOMR (copy enclosed) was issued on the same date as this LOMR to show the effects of the project described herein on the SFHA in the unincorporated areas of Clark County, Nevada.

The revisions are effective as of the date of this letter; however, 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.

Due to present funding constraints, we must limit the number of physical map revisions processed. Consequently, we will not republish the FIRM for your community to reflect the modifications described in this LOMR at this time. However, when changes to FIRM Panels 32003C2955 D and 2975 D for your community warrant a physical revision and republication in the future, we will incorporate the modifications described in this LOMR at that time.

This response to Mr. Chandler's request is based on minimum floodplain management criteria established under the National Flood Insurance Program (NFIP). Your community is responsible for approving all floodplain development, including this request, and for ensuring that necessary permits required by Federal or State law have been received. With knowledge of local conditions and in the interest of safety, State and community officials may set higher standards for construction, or may limit development in floodplain areas. If the State of Nevada or your community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence.

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 channel modification 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 an 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.

The map panels as listed above and as revised by this letter will be used for all flood insurance policies and renewals issued for 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 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. John Magnotti of our staff in Washington, DC, either by telephone at (202) 646-3932 or by facsimile at (202) 646-4596.

Sincerely,

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

Enclosures

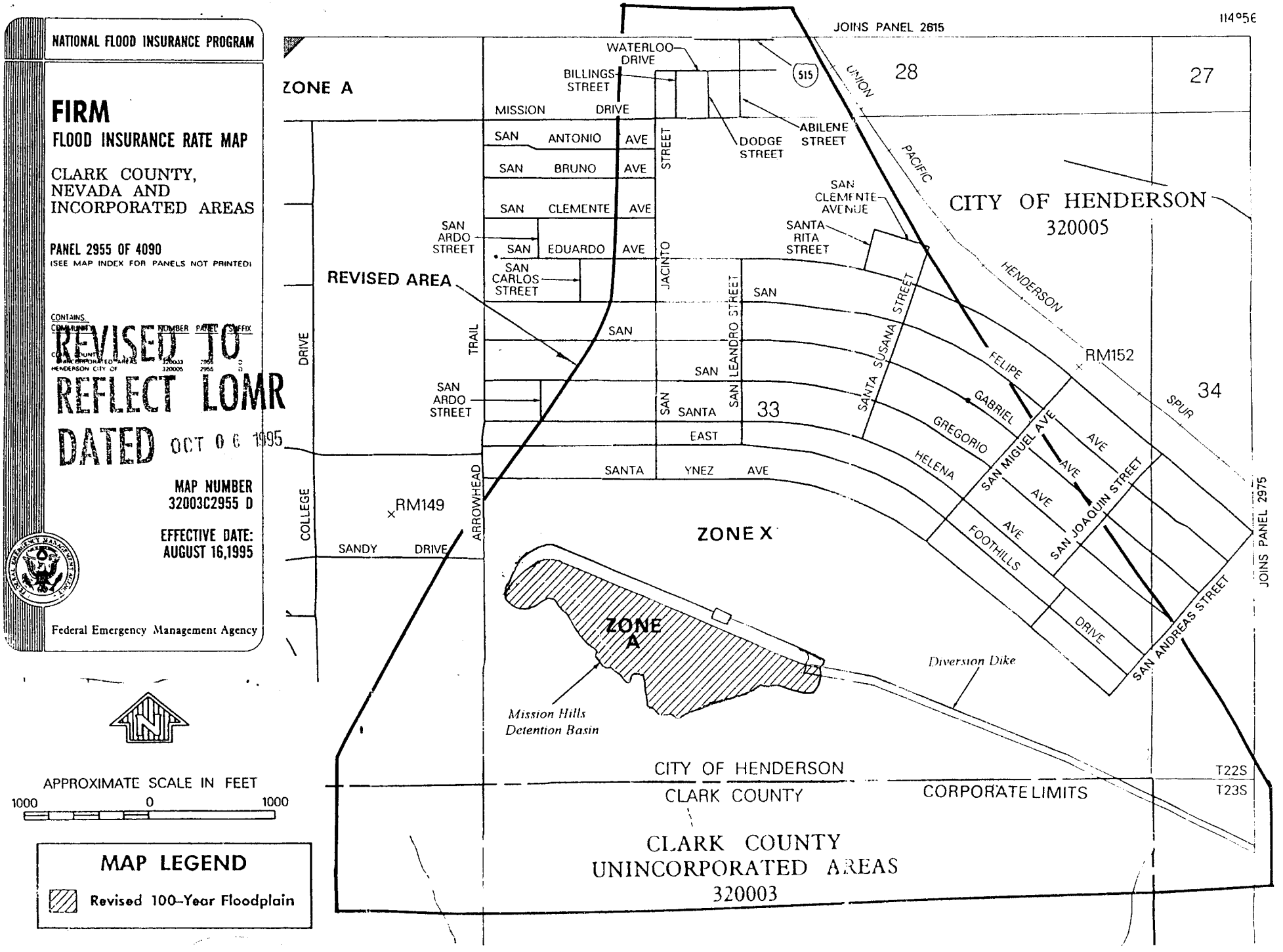
cc: The Honorable Yvonne Atkinson Gates
Chairperson, Clark County Board
of Commissioners

Mr. Curt Chandler, P.E.
Land Development Manager
Department of Public Works
City of Henderson

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

Mr. David P. Swallow
VTN Nevada

Mr. John P. Clark, P.E.
VTN Nevada


NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS
PANEL 2955 OF 4090
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
CLARK COUNTY UNINCORPORATED AREAS 320003 2955 D
HENDERSON CITY OF 320005 2955 D
REVISED TO REFLECT LOMR DATED OCT 06 1995
MAP NUMBER 32003C2955 D
EFFECTIVE DATE: AUGUST 16,1995
Federal Emergency Management Agency
JOINS PANEL 2615
114°56
ZONE A
WATERLOO DRIVE
BILLINGS STREET
MISSION DRIVE
515
UNION PACIFIC
28
27
ABILENE STREET
DODGE STREET
SAN ANTONIO AVE
SAN BRUNO AVE
SAN CLEMENTE AVE
SAN CLEMENTE AVENUE
SANTA RITA STREET
CITY OF HENDERSON
320005
SAN ARDO STREET
SAN EDUARDO AVE
SAN CARLOS STREET
REVISED AREA
JACINTO STREET
SAN LEANDRO STREET
SANTA SUSANA STREET
HENDERSON SPUR
RM152
34
TRAIL DRIVE
SAN ARDO STREET
SAN SANTA 33
SAN EAST
FELIPE
GABRIEL
GREGORIO
HELENA
SAN MIGUEL AVE
AVE
SAN JOAQUIN STREET
FOOTHILLS DRIVE
SAN ANDREAS STREET
JOINS PANEL 2975
COLLEGE ARROWHEAD
SANTA YNEZ AVE
RM149
SANDY DRIVE
ZONE X
ZONE A
Diversion Dike
Mission Hills Detention Basin
CITY OF HENDERSON
CLARK COUNTY
CORPORATE LIMITS
T22S
T23S
CLARK COUNTY
UNINCORPORATED AREAS
320003
APPROXIMATE SCALE IN FEET
1000 0 1000
MAP LEGEND
Revised 100-Year Floodplain

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2975 OF 4090
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
BOULDER CITY, CITY OF	320004	2975	D
CLARK COUNTY, UNINCORPORATED AREAS	320003	2975	D
HENDERSON, CITY OF	320005	2975	D

REVISED TO REFLECT LOMR DATED OCT 06 1995

MAP NUMBER
32003C2975 D

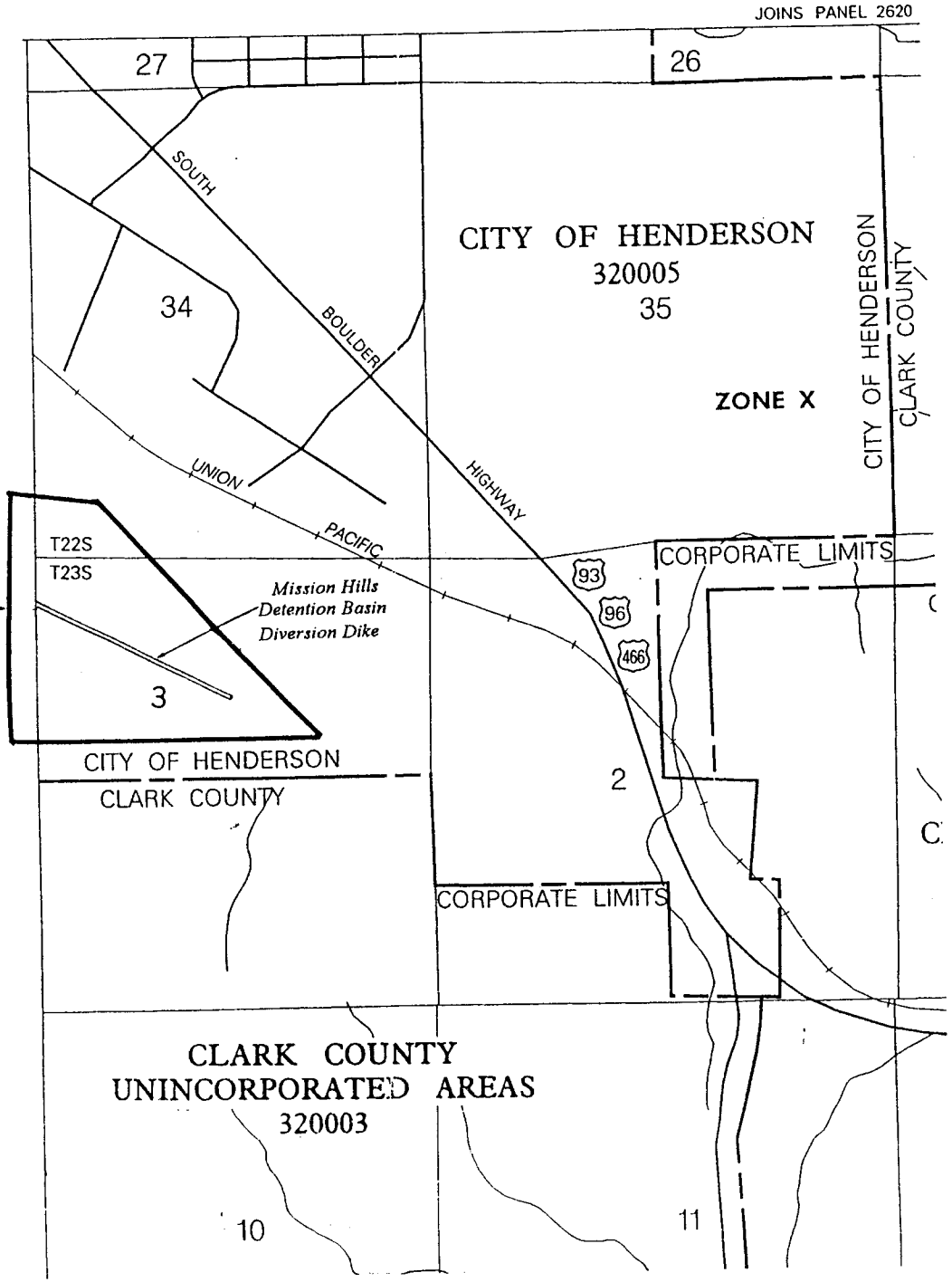
EFFECTIVE DATE:
AUGUST 16,1995

Federal Emergency Management Agency

APPROXIMATE SCALE IN FEET
2000 0 2000

JOINS PANEL 2620

REVISED AREA



THIS AREA IS SHOWN ON MAP NUMBER 32003C2955

LOMR DE

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 96-09-678P

The Honorable Robert A. Groesbeck
Mayor, City of Henderson
240 Water Street
Henderson, Nevada 89015

Community: City of Henderson, Nevada
Community No.: 320005
Panel Affected: 32003C2615 D
Effective Date of
This Revision: SEP 06 1996

102-I-C

Dear Mayor Groesbeck:

This responds to a request for a revision to the effective Flood Insurance Study and National Flood Insurance Program (NFIP) map for your community. Specifically, this responds to a letter dated August 28, 1996, from Mr. David W. Trushaw, P.E., Project Engineer, VTN Nevada, regarding the effective Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas. With his letter, Mr. Trushaw provided additional information to support an April 2, 1996, request for a Letter of Map Revision (LOMR) from Mr. David C. Swallow, E.I.T., VTN Nevada. Mr. Swallow requested that the Federal Emergency Management Agency (FEMA) revise the effective FIRM to show the effects of modifications to C-1 Channel from just upstream to approximately 1,400 feet upstream of the Union Pacific Railroad (UPRR) and detailed topographic data for C-1 Channel from approximately 200 feet downstream of the UPRR to approximately 700 feet upstream of Vermillion Place.

All data required to complete our review of this request were submitted with Mr. Swallow's April 2 letter, and with letters dated May 20, June 11, June 12, June 28, July 25, and August 28, 1996, from Mr. Trushaw.

We have completed our review of the submitted data and the flood data shown on the effective FIRM, and 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 C-1 Channel from approximately 200 feet downstream of the UPRR to approximately 700 feet upstream of Vermillion Place. The base flood is contained within C-1 Channel from approximately 200 feet downstream of the UPRR to approximately 1,200 feet upstream of the UPRR and from approximately 1,400 feet downstream to approximately 600 feet downstream of Vermillion Place. The width of the Special Flood Hazard Area (SFHA) increased and decreased along the revised reach as a result of the modifications to C-1 Channel and more detailed topographic data. The maximum increase in SFHA width, approximately 75 feet, occurred approximately 1,500 feet upstream of the UPRR, and the maximum decrease in SFHA width, approximately 600 feet, occurred approximately 600 feet downstream of Vermillion Place.

The modifications are shown on the enclosed annotated copy of FIRM Panel 32003C2615 D. This LOMR hereby revises this panel of the effective FIRM dated August 16, 1995.

The revisions are effective as of the date of this letter; however, 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.

We will not physically revise and republish the FIRM for your community to reflect the modifications made by this LOMR at this time. However, when changes to FIRM Panel 32003C2615 D for your community warrant a physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This response to Mr. Swallow's request is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, including this request, and for ensuring that necessary permits required by Federal or State law have been received. With knowledge of local conditions and in the interest of safety, State and community officials may set higher standards for construction, or may limit development in floodplain areas. If the State of Nevada or your community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence.

The basis of this LOMR is, in whole or in part, a channel-modification/culvert 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 and culvert 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 an 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.

The map panel as listed above and as revised by this letter will be used for all flood insurance policies and renewals issued for 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 to which the regulations apply and the modifications described in 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,

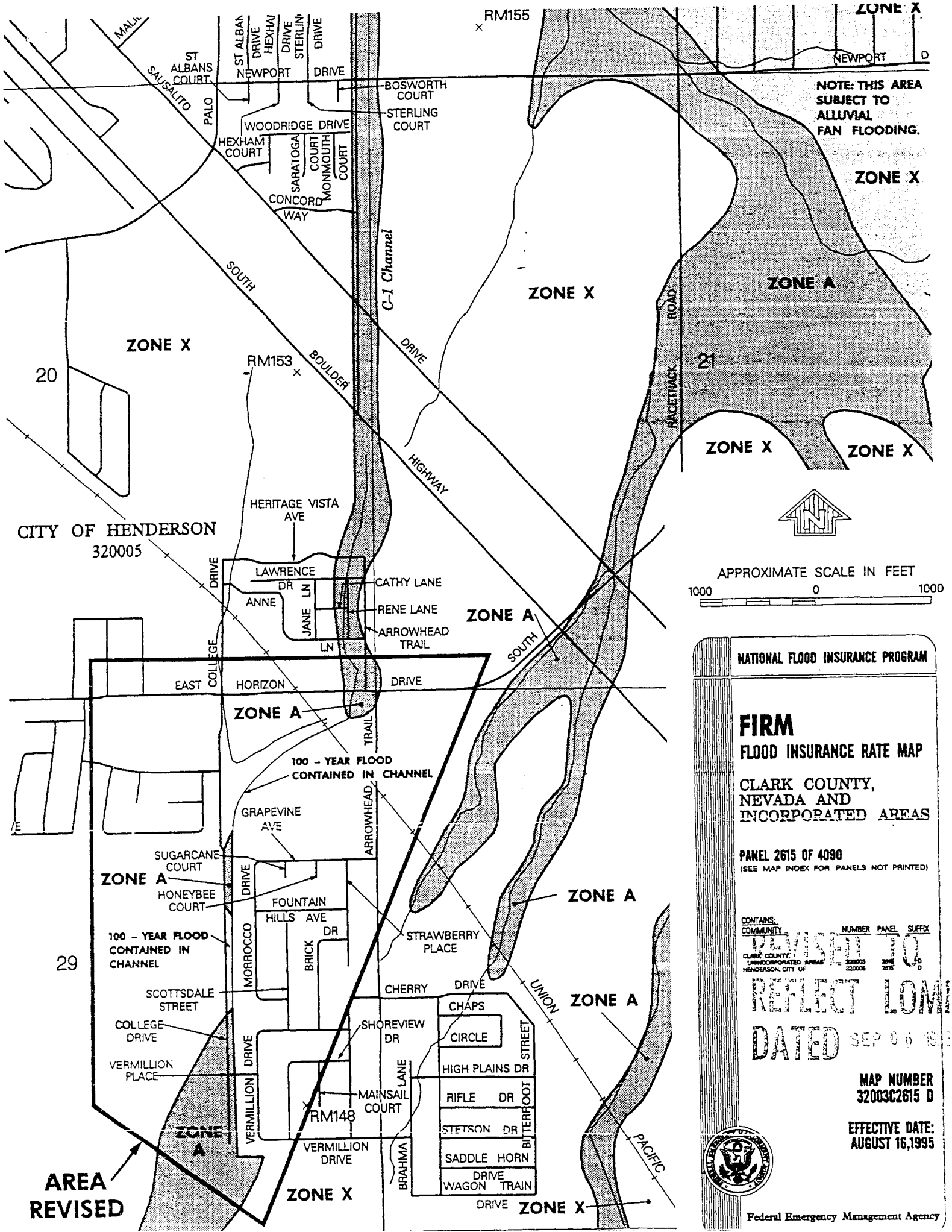
Michael K. Buckley, P.E., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosure

cc: Mr. Curt Chandler, P.E.
Land Development Manager
Department of Public Works
City of Henderson

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

Mr. David C. Swallow, E.I.T.
VTN Nevada


RM155
ZONE X
NEWPORT
D
NOTE: THIS AREA SUBJECT TO ALLUVIAL FAN FLOODING.
ZONE X
ST ALBANS COURT
ST ALBANS DRIVE
NEWPORT DRIVE
HEXHAM DRIVE
STERLING DRIVE
SAUSALITO
PALO
BOSWORTH COURT
STERLING COURT
WOODRIDGE DRIVE
HEXHAM COURT
SARATOGA COURT
MONMOUTH COURT
CONCORD WAY
C-1 Channel
ZONE X
ZONE A
SOUTH BOULDER HIGHWAY
DRIVE
RACETRACK ROAD
20
21
RM153
ZONE X
ZONE X
ZONE X
HERITAGE VISTA AVE
CITY OF HENDERSON
320005
LAWRENCE DR
ANNE LN
JANE LN
CATHY LANE
RENE LANE
ARROWHEAD TRAIL
ZONE A
SOUTH COLLEGE DRIVE
EAST HORIZON DRIVE
ZONE A
TRAIL
100 - YEAR FLOOD CONTAINED IN CHANNEL
ARROWHEAD
GRAPEVINE AVE
SUGARCANE COURT
ZONE A
HONEYBEE COURT
DRIVE
FOUNTAIN HILLS AVE DR
100 - YEAR FLOOD CONTAINED IN CHANNEL
MORROCCO
BRICK
STRAWBERRY PLACE
ZONE A
29
SCOTTSDALE STREET
CHERRY DRIVE
CHAPS CIRCLE
UNION
ZONE A
COLLEGE DRIVE
SHOREVIEW DR
VERMILLION PLACE
VERMILLION DRIVE
HIGH PLAINS DR
BITTERROOT STREET
MAINSAIL COURT
RM148
RIFLE DR
STETSON DR
SADDLE HORN DRIVE
WAGON TRAIN
BRAHMA LANE
ZONE A
VERMILLION DRIVE
ZONE X
PACIFIC DRIVE
ZONE X
AREA REVISED
APPROXIMATE SCALE IN FEET
1000 0 1000
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA AND INCORPORATED AREAS
PANEL 2615 OF 4090
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS 320003 2615 D
HENDERSON, CITY OF 320005 2615 D
REVISED TO REFLECT LOMR
DATED SEP 06
MAP NUMBER 32003C2615 D
EFFECTIVE DATE: AUGUST 16,1995
Federal Emergency Management Agency

Federal Emergency Management Agency

Washington, D.C. 20472

FEB 19 1997

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 96-09-943R

The Honorable Robert Groesbeck
Mayor, City of Henderson
240 Water Street
Henderson, Nevada 89015

Community: City of Henderson, Nevada
Community No.: 320005

104

Dear Mayor Groesbeck:

This responds to a request that the Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on 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 July 1, 1996, Mr. John P. Clark, P.E., Project Engineer, VTN Nevada, requested that FEMA evaluate the effects that construction of the Equestrian Detention Basin (EDB) and a diversion channel would have on the flood hazard information shown on the effective FIRM.

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Mr. Clark.

In a letter dated June 19, 1996, Mr. Curt Chandler, P.E., Land Development Manager, Department of Public Works, City of Henderson, certified that the project is a flood-control project that is sponsored by a Federal, State, or local government, is for public benefit, and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas that were in existence prior to commencement of the flood-control project. Therefore, in accordance with Section 72.5 of the NFIP regulations, the fees associated with our review of this CLOMR have been waived.

We have completed our review of the submitted data and the flood data used to prepare the effective FIRM for your community. We believe that, if the proposed project is constructed as shown on Sheets CG-1 through CG-9, CH-1 through CH-5, CI-1 through CI-10, CN-1 through CN-4, and CO-1 through CO-11 of the plans entitled "Equestrian Detention Basin, Contract No. 95 - 96 * 02," prepared by Poggemeyer Design Group, dated November 13, 1995, and pending resolution of the issues detailed below, a revision to the FIRM would be warranted.

The proposed diversion channel will be constructed along the east side of Foothills Drive from South Boulder Highway north to East Equestrian Drive and along the north side of East Equestrian Drive from Foothills Drive west to the EDB. The channel will intercept runoff from drainage areas to the north and east of the EDB. The EDB will also receive runoff from these drainage areas through a secondary inlet on the east side of the basin. Additional flow from drainage areas located to the south and west will enter the EDB at an inlet east of South Magic Way, just north of the intersection of South Magic Way and East Equestrian Drive.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM.

1. Detailed application and certification forms, which were used in processing this request, must be used for requesting final revisions to the maps. Therefore, when the map revision request

for the area covered by this letter is submitted, Form 1, entitled "Revision Requester and Community Official Form," and Form 2, entitled "Certification by Registered Professional Engineer and/or Land Surveyor," must be included. (Copies of these forms are enclosed.)

2. The detailed application and certification forms listed below may be required if as-built conditions differ from the preliminary plans. If required, please submit new forms (copies of which are enclosed) or annotated copies of the previously submitted forms showing the revised information.

   Form 3, entitled "Hydrologic Analysis Form"

   Form 4, entitled "Riverine Hydraulic Analysis Form"

   Form 5, entitled "Riverine/Coastal Mapping Form"

   Form 6, entitled "Channelization Form"

   Form 11, entitled "Dam Form"

   Hydraulic analyses, for as-built conditions, of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) and the flood having a 0.2-percent chance of being equaled or exceeded in any given year, must be submitted with Form 4, and a topographic work map showing the revised floodplain boundaries must be submitted with Form 5.

3. Effective October 1, 1996, FEMA revised the fee schedule for reviewing and processing requests for modifications to published flood information and maps. Under this schedule, FEMA established flat review and processing fees for most types of requests. All requests dated October 1, 1996, or later will be processed under this new schedule. The fee for your map revision request will be $2,300 and must be received before we can begin processing your request. Payment of this fee shall be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card. The payment must be forwarded to the following address:

   Federal Emergency Management Agency
   Fee-Collection System Administrator
   P.O. Box 3173
   Merrifield, VA 22116-3173

4. As-built plans, certified by a registered professional engineer, of all proposed project elements

5. Community acknowledgment of the map revision request

6. An officially adopted maintenance and operation plan for the EDB and the diversion channel. This plan, which may be in the form of a written statement from the community Chief Executive Officer, an ordinance, or other legislation, must describe the nature of the maintenance activities, the frequency with which they will be performed, and the title of the local community official who will be responsible for ensuring that the maintenance activities are accomplished.

7. The submittal included the following five HEC-1 computer models of the base flood discharge entering the detention basin from contributory drainage basins north of South Boulder Highway and east of South Magic Way: "100-yr. Design Model," dated April 6, 1994, and "100-Year HEC-1 Model Including Subbasin C4C," dated April 13, 1994, both prepared by Poggemeyer Design Group, Inc., and "100yr Clearwater Inflow, 5 min Interval, Inflow Hydrograph, Unmodified Volume," "100yr Clearwater Inflow, 5-minute Interval, Modified Volume," and "100yr Clearwater Inflow, 7-min Interval, Modified Volume," all prepared by Poggemeyer Design Group, Inc., and dated October 4, 1995.

   In addition, the undated report included with this submittal, entitled "Supplemental Design Calculations for The Equestrian Detention Basin," prepared by Poggemeyer Design Group, Inc., included a HEC-1 model, entitled "Runoff Evaluation for Flow Interception at Equestrian Drive," dated October 5, 1994, which analyzed the discharge entering the EDB at the Magic Way inlet.

   It is unclear from the submitted hydrologic models how much discharge will flow west along East Equestrian Drive to South Magic Way during the base flood. It is also unclear what effect, if any, the discharge entering the basin at the Magic Way inlet will have on the detention basin outflow. Please submit a single hydrologic analysis which includes all drainage basins contributory to the EDB. Please also submit a topographic map showing the contributing watershed and delineations of all drainage basins used in the hydrologic model.

8. The HEC-1 model entitled "Runoff Evaluation for Flow Interception at Equestrian Drive" included several diversions of flow to the north across South Boulder Highway. Please submit analyses of all culvert and weir flows to the north across South Boulder Highway included in the hydrologic analysis requested in Item 7. Please also submit as-built plans, certified by a registered professional engineer, for all reaches of South Boulder Highway and culverts included in the model. The as-built culvert plans should include, at a minimum, inlet and outlet elevations, culvert lengths, slopes, and entrance geometries.

9. The report entitled "Supplemental Design Calculations for The Equestrian Detention Basin" stated that a peak flow of 850 cubic feet per second will be conveyed in an earthen channel along the east side of South Magic Way to the Magic Way inlet. The report further stated that this channel has been constructed as part of the Wellington Manor development. Please submit a hydraulic analysis of the flow in the earthen channel; as-built channel plans, certified by a registered professional engineer; and a topographic map showing revised floodplain boundary delineations. The revised floodplain boundary delineations must tie into those shown on the effective FIRM at the upstream and downstream ends of the revised reach. The scale and topographic definition of the map must be sufficient to provide reasonable accuracy, and the map must be certified by a registered professional engineer.

10. The plans entitled "Equestrian Detention Basin, Contract No. 95 - 96 * 02" show a berm along the west side of the proposed diversion channel. Before we can revise the FIRM based on the effects of this proposed berm, we must receive documentation that demonstrates the berm meets the requirements of Section 65.10 of the NFIP regulations. If the berm is not designed to provide protection from the base flood for property west of the channel, please revise the hydrologic analysis requested in Item 7 and submit hydraulic analyses of the westward flow with and without the proposed berm. Also, please submit a topographic map, as described in Item 9, showing revised floodplain boundary delineations.

11. The request included a WSPG hydraulic computer model of flow in the EDB diversion channel, entitled "Equestrian Detention Basin, Model Headwater to Basin, Typical Channel Sections Used," prepared by Poggemeyer Design Group, Inc., dated July 10, 1995. A comparison of this model to the plans entitled "Equestrian Detention Basin, Contract No. 95 - 96 * 02," indicates that a number of the typical channel sections used in the WSPG model are not representative of the proposed channel geometry. Please submit a revised hydraulic model based on representative as-built channel sections. We note that many of the computed water-surface elevations in the WSPG model are based on supercritical flow. FEMA accepts supercritical hydraulic models in concrete-lined, engineered channels only. Because the upstream reach of the proposed diversion channel will be unlined, the hydraulic analysis for this portion of the channel must be based on subcritical modeling. Critical depth is the minimum depth that can be used to map the base floodplain in the channel.

12. The WSPG model mentioned in Item 11 indicates velocities within the diversion channel as high as 27.71 feet per second. Please provide documentation, including typical cross sections and calculations, demonstrating that erosion of the unlined portion of the east channel bank and erosion of the proposed berms will not occur.

13. Please submit documentation demonstrating that all water and sediment flows to the west along the north side of South Boulder Highway will enter the diversion channel at its south end. If all flow will not enter the diversion channel, but will instead continue westward, please revise the hydrologic analysis requested in Item 7 to account for this additional flow. Please submit as-built plans, certified by a registered professional engineer, of the existing berm along South Boulder Highway shown on Sheet CI-10 of the channel plans.

14. Please submit documentation demonstrating that sediment or debris will not obstruct the detention basin outlet works and that sediment deposition in the EDB will not affect the detention basin outflow rate. If sediment deposition will affect the detention basin outflow rate, please submit an analysis of the effects of this deposition. The effects of sediment deposition over time on the storage capacity and outflow rate of a detention basin should also be addressed in the maintenance and operation plan mentioned in Item 6.

15. Please submit documentation demonstrating that outflow from the detention basin will not create a Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, immediately downstream of the EDB, or submit a hydraulic analysis of the area downstream of the detention basin and a topographic map showing revised base floodplain delineations, as described in Item 9.

16. Please submit documentation demonstrating that the release of clearwater from the EDB will not result in scouring or head cutting of the downstream unnamed wash.

17. Please submit a computer diskette containing the input and output files for all computer models used in your hydrologic, hydraulic, and sediment analyses.

The basis of this CLOMR 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.

This CLOMR 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.

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 CLOMR, 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. John P. Clark, P.E.
Project Engineer
VTN Nevada

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

Mr. Curt Chandler, P.E.
Land Development Manager
Department of Public Works
City of Henderson

Federal Emergency Management Agency

Washington, D.C. 20472

MAR 13 1997

The Honorable Robert A. Groesbeck
Mayor, City of Henderson
240 Water Street
Henderson, Nevada 89015

IN REPLY REFER TO CASE NO. 97-09-428A
Follows Case No. 96-09-009R
Community: City of Henderson, Nevada
Community No.: 320005
Map Panel Affected: 32003C2615 D
Map Effective Date: August 16, 1995
218-65-R-RS

Dear Mayor Groesbeck:

We reviewed a request dated January 24, 1997, from Mr. Edward F. Taney, P.E., Alpha Engineering, for a Letter of Map Revision. All required information for this request, including the required processing fee, was received on February 28, 1997. This property was elevated by the placement of fill after the date of the earliest National Flood Insurance Program (NFIP) map showing the area in the SFHA.

Using the information submitted and the effective NFIP map, we determined Lots 299 through 304, 315 through 319, and 430 through 433 described below are not located in the Special Flood Hazard Area (SFHA), the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). We also determined portions of Lots 427, 428,and 429 described below are located in the SFHA; however, the structures on these lots are not in the SFHA.

Property Description: Lots 299 through 304 and 315 through 319, Block 12; Lots 427, 428, and 429, Block 5; and Lots 430 through 433, Block 7, The Downs-Unit 2-B, as shown on the Plat recorded as Instrument No. 01164 in Book 71 of Plats, Page 41, Official Records Book 951228, in the Office of the Recorder, Clark County, Nevada

Flooding Source: Unnamed Wash

This letter revises the above-referenced NFIP map to remove Lots 299 through 304, 315 through 319, and 430 through 433, and the structures on Lots 427, 428, and 429 from the SFHA. These lots and structures are now located in Zone X (shaded), an area subject to alluvial fan flooding where the base flood depth is, on average, less than 1.0 foot. It should be noted that the hazards associated with alluvial fan flooding are just as severe in areas designated Zone X (shaded) as those in areas designated Zone AO, an area inundated by the base flood, with average depths and velocities determined. The distinction between the zones should be regarded as a distinction between flooding potentials and not a distinction between the severity of damages to be expected in the event of a flood. Because portions of the property remain in the SFHA, any future construction or substantial improvement on the property remains subject to Federal, State, and local regulations for floodplain management.

Although the criteria for removal of a parcel of land based on fill have been met for this request, we encourage you to require that both the lowest adjacent grade (lowest ground touching the structure) and the lowest floor (including basement/crawl space) of each structure placed on the property be elevated to a level at or above the base flood elevation.

The enclosed document provides additional information about Letters of Map Revision. If you have any questions about this letter, please contact Ms. Agnes De Coca of our staff in Washington, DC, either by telephone at (202) 646-2746 or by facsimile at (202) 646-4596.

Sincerely,

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

Enclosure

cc: Community Map Repository

Mr. Edward F. Taney, P.E.
Alpha Engineering

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

ADDITIONAL INFORMATION REGARDING LETTERS OF MAP REVISION BASED ON FILL

In making determinations on requests for Letters of Map Revision based on the placement of fill (LOMR-Fs), the Federal Emergency Management Agency (FEMA) bases its determination on the flood hazard information available at the time of the determination. Requesters should be aware that flood conditions may change or new information may be generated that would supersede FEMA's determination. In such cases, the community will be informed by letter.

Requesters also should be aware that removal of a property(parcel of land or structure) from the Special Flood Hazard Area (SFHA) means FEMA has determined that the property is not subject to inundation by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This does not mean the property is not subject to other flood hazards. The property could be inundated by a flood with a magnitude greater than the base flood or by localized flooding not shown on the effective National Flood Insurance Program (NFIP) map.

The effect of a LOMR-F is that it removes the Federal requirement for the lender to require flood insurance coverage for the property described. The LOMR-F *is not* a waiver of the condition that the property owner maintain flood insurance coverage for the property. *Only* the lender can waive the flood insurance purchase requirement because the lender imposed the requirement. *The property owner must request and receive a written waiver from the lender before canceling the policy*. The lender may determine, on its own as a business decision, that it wishes to continue the flood insurance requirement to protect its financial risk on the loan.

The LOMR-F provides FEMA's comment on the mandatory flood insurance requirements of the NFIP as they apply to a particular property. A LOMR-F is not a building permit, nor should it be construed as such. Any development, new construction, or substantial improvement of a property impacted by a LOMR-F must comply with all applicable State and local criteria and other Federal criteria.

If the lender decides to release the property owner from the flood insurance requirement, and the property owner decides to cancel the policy and seek a refund, the NFIP will refund the premium paid for the current policy year, provided that no claim is pending or has been paid on the policy during the current policy year. The property owner must provide the written waiver of the flood insurance requirement from the lender to the property insurance agent or company that is servicing his or her policy. The agent or company will then process the refund request.

Even though structures are not located in an SFHA, as mentioned above, they could be flooded by a flooding event with a greater magnitude than the base flood. In fact, more than 25 percent of all losses in the NFIP occur to structures located outside the SFHA in Zones B, C, X (shaded), or X (unshaded). More than one-fourth of all policies purchased under the NFIP protect structures located in these zones. That risk is just not as great as the flood risk to structures located in SFHAs. To offer flood insurance protection to owners of such structures, the NFIP offers two types of flood insurance policies: the Standard Policy and a policy for flood insurance at low rates. The low-rate policy is available for 1- to 4-family residential structures located outside the SFHA with little or no loss history. The Standard Policy is available for all other structures. Property owners should discuss their Individual flood risk situations and insurance needs with an insurance agent or company before making a final decision regarding flood insurance coverage.

aw 4-28-97

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Robert A. Groesbeck
Mayor, City of Henderson
240 Water Street
Henderson, Nevada 89015

IN REPLY REFER TO:
Case No.: 97-09-105P

Community: City of Henderson, Nevada
Community No.: 320005
Panel Affected: 32003C2615 D
Effective Date of
This Revision: APR 18 1997

102-I-C

Dear Mayor Groesbeck:

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 (the effective FIRM for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated October 21, 1996, Mr. Mark A. Sorensen, P.E., Manager, Hydrologic Services, Post, Buckley, Schuh & Jernigan, Inc., requested that FEMA revise the FIRM to show the effects of a revised hydrologic analysis, more detailed topographic information, and street improvements for the Racetrack III development, along an unnamed tributary to the C-1 Channel. This request follows up on a Conditional Letter of Map Revision issued on January 31, 1996.

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

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 and zone designations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along the unnamed tributary to the C-1 Channel from just downstream to approximately 2,550 feet downstream of East Equestrian Drive. As a result of the modifications, the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, for the unnamed tributary to the C-1 Channel was removed from just downstream to approximately 1,250 feet downstream of Greyhound Lane. The base flood is now routed along Greyhound Lane to another unnamed C-1 Channel tributary just east of the Racetrack III site. The width of the SFHA for this unnamed C-1 Channel tributary east of the Racetrack III site increased from just downstream to approximately 1,100 feet downstream of South Magic Way. The zone designation of the area between the unnamed tributaries, East Equestrian Drive, and the SFHA to the north has also been changed to Zone X (shaded), the area that would be inundated by the base flood with average depths of less than 1 foot. As a result of the revised hydrologic analysis, more detailed topographic information, and street improvements, the Racetrack III development is now shown in Zone X (shaded). The modifications are shown on the enclosed annotated copy of FIRM Panel(s) 32003C2615 D. This Letter of Map Revision (LOMR) hereby revises the above-referenced panel(s) of the effective FIRM dated August 16, 1995.

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.

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.

We will not physically revise and republish the FIRM and Flood Insurance Study (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.

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.

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

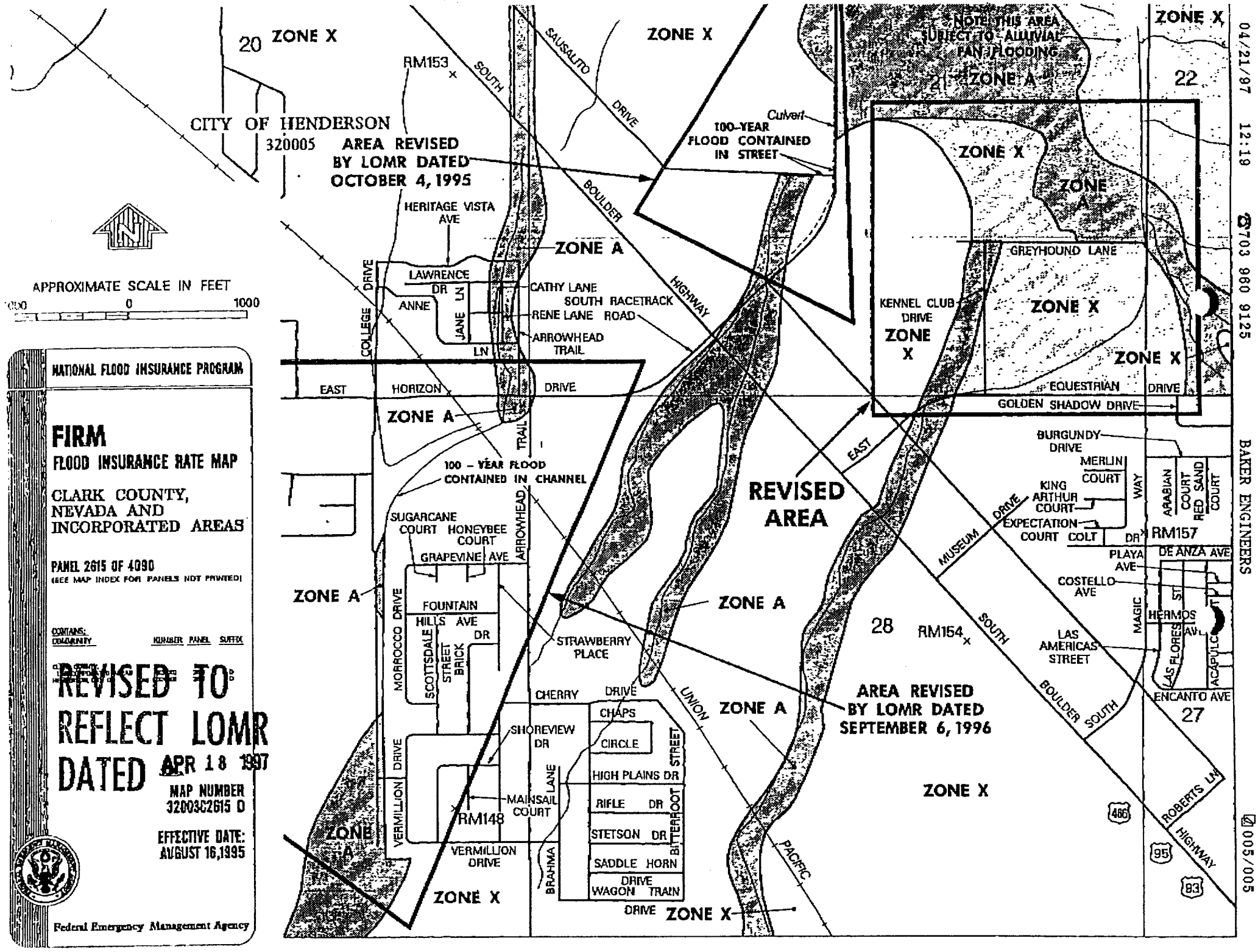
Enclosure(s)

cc: Mr. Curt Chandler, P.E.
Land Development Manager
Department of Public Works
City of Henderson

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

Mr. Mark Sorensen, P.E.
Manager, Hydrologic Services
Post, Buckley, Schuh & Jernigan, Inc.

Mr. Brian Seager
Beazer Homes



04/21/97 12:19 ☎703 960 9125 BAKER ENGINEERS ☑005/005

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 96-09-1095P

The Honorable James B. Gibson
Mayor, City of Henderson
240 Water Street
Henderson, Nevada 89015

Community: City of Henderson, Nevada
Community No.: 320005
Panel Affected: 32003C2615 D
Effective Date of This Revision: AUG 19 1997

102-I-C

Dear Mayor Gibson:

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 (the effective FIRM for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated August 12, 1996, Mr. Marc A. Bolduc, E.I.T., Manager of Water Resources, L. Bruce Nybo, Inc., requested that FEMA revise the FIRM to show the effects of construction of Foxfield Estates Units 1, 2, and 3 and channel and street improvements along the west side of South Racetrack Road, from approximately 800 feet to approximately 2,900 feet north of the intersection of South Racetrack Road and Sausalito Drive. The channel improvements include construction of an 8-foot by 4-foot reinforced-concrete box culvert under Trackers Glen Avenue, a 60-inch by 38-inch reinforced-concrete elliptical pipe culvert under Blue Lantern Drive, and a 48-inch-diameter reinforced-concrete pipe storm drain from approximately 1,900 feet to approximately 2,900 feet north of the intersection of South Racetrack Road and Sausalito Drive. In a letter dated February 13, 1997, Mr. Bolduc informed us that this project was transferred to Orion Engineering and Surveying, Inc., to be completed under his direction as Project Manager with that firm. This request follows up on a Conditional Letter of Map Revision issued on November 6, 1995.

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

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 South Racetrack 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, along South Racetrack Road increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copy of FIRM Panel(s) 32003C2615 D. This Letter of Map Revision (LOMR) hereby revises the above-referenced panel(s) of the effective FIRM dated August 16, 1995.

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.

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.

We will not physically revise and republish the FIRM and Flood Insurance Study (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.

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/culvert 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 and culvert 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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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,

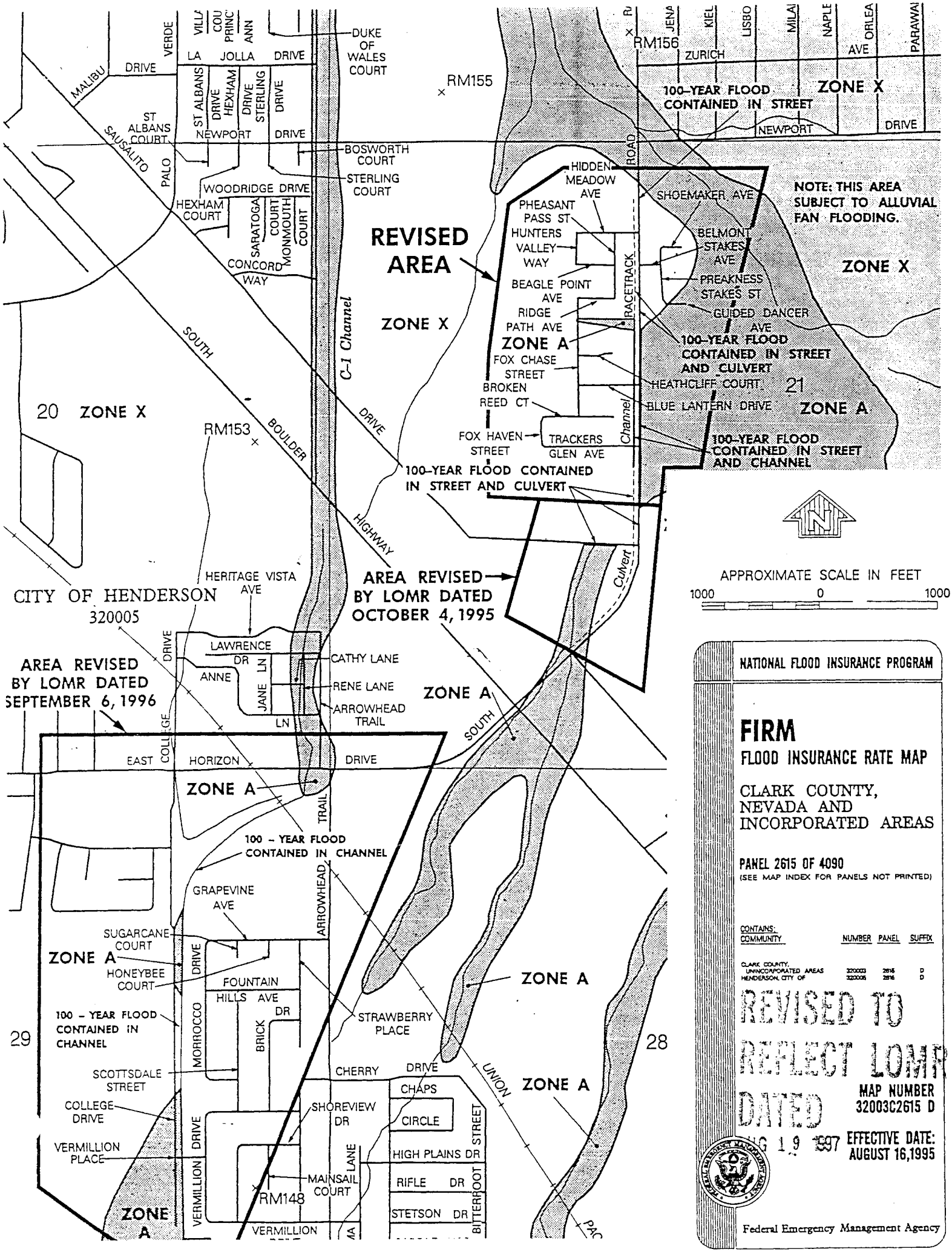
Frederick H. Shaffrocks, Jr., Chief
for Hazard Identification Branch
Mitigation Directorate

Enclosure(s)

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

Mr. Curt Chandler, P.E.
Land Development Manager
Department of Public Works
City of Henderson

Mr. Marc A. Bolduc, E.I.T.
Project Manager
Orion Engineering and Surveying, Inc.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2615 OF 4090

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320033	2615	D
HENDERSON, CITY OF	320005	2615	D

REVISED TO REFLECT LOMR DATED AUG 19 1997

MAP NUMBER 32003C2615 D

EFFECTIVE DATE: AUGUST 16,1995

Federal Emergency Management Agency

CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
PROFESSIONAL SERVICES
SINCE 1961

July 1, 1996
W.O. #5041

Federal Emergency Management Agency
Federal Insurance Administration
Office of Risk Assessment
Technical Operations Division
500 C Street SW.
Washington, D.C. 20472

Attention: Michael Buckley

SUBJECT: **CONDITIONAL LETTER OF MAP REVISION BASED ON PHYSICAL CHANGES FOR THE EQUESTRIAN DETENTION BASIN**

Enclosed is the technical data in support of this request for the Conditional Letter of Map Revision (CLOMR) for the Equestrian Detention Basin, in the City of Henderson, Nevada. The request for revision is based on physical changes to the watershed and floodplain due to the construction of the Equestrian Detention Basin by the City of Henderson. The construction of this Regional Flood Control Project has reduced the peak runoff within the floodplain downstream of the Equestrian Detention Basin site. This CLOMR is requested by the City of Henderson to eliminate the Zone "A" from the Equestrian Detention Basin northeast to the C1 Channel.

Enclosed with this request are the following:

1. Revision Requestor and Community Official Form (FORM 1)
2. Certification by Registered Professional Engineer And/Or Land Surveyor Form (FORM 2)
3 Hydrological Analysis Form (FORM 3)
4. Riverine Hydraulic Analysis Form (FORM 4)
5. Riverine/Costal Mapping Form (FORM 5)
6. Channelization Form (FORM 6)
7. Dam Form (FORM 11)
8. Proposed FIRM Map.
9. Clark County Regional Flood Control District Maintenance of Structures Manual.
10. Equestrian Detention Basin Calculation Notebook

An annotated FIRM for the Equestrian Detention Basin CLOMR showing the proposed revisions has been included with this request. Since the Zone A floodplain should no longer exist from the Equestrian Detention Basin northeast to the C1 Channel.

2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89102-5148
TEL (702) 873-7550 FAX 362-2597

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PROFESSIONAL QUALITY SERVICES SINCE 1961

July 1, 1996
W.O. #5041

Federal Emergency Management Agency
Federal Insurance Administration
Office of Risk Assessment
Technical Operations Division
500 C Street SW.
Washington, D.C. 20472

Attention: Michael Buckley

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2727 SOUTH RAINBOW BOULEVARD LAS VEGAS NEVADA 89102-5148
TEL 702 873-7550 FAX 362-2597

Because this is a public project and is funded by the Clark County Regional Flood Control District, it is our understanding that the fee for reviewing this CLOMR application is waived.

If there are any questions or additional information is necessary please contact this office at (702) 247-4020.

Respectfully Submitted,

VTN NEVADA

JOHN P. CLARK, P.E.
Project Engineer

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

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

BOARD OF DIRECTORS

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City of Henderson

Bruce L. Woodbury
Clark County

April 30, 1996

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

Equestrian Detention Basin CLOMR

Dear Mr. Smith:

This letter is written to acknowledge submittal of a Conditional Letter Of Map Revision request based on the construction and operation of the Equestrian Detention Basin. The Equestrian Detention Basin was designed and is being constructed under the administration of the City of Henderson with funds provided by the Clark County Regional Flood Control District (District). Therefore, the Equestrian Detention Basin meet all of the minimum design and construction standards prescribed by the District. Completion of construction is expected by November of 1996.

Furthermore, the District has established a master plan of facilities to control stormwater runoff within Clark County. Projects identified within the master plan are eligible for maintenance funding provided by the District. The Equestrian Detention Basin referenced above is included on the master plan and, therefore, maintenance and operation is funded by the District.

The various governmental entities within Clark County take the lead in procuring and expending CCRFCD funds for design, right-of-way acquisition, construction, maintenance and operation of the facilities included on the master plan. Each project "belongs" to the individual entity who owns the rights-of-way on which they are constructed. Maintenance work plans and interlocal funding contracts are developed annually by each entity in support of their request to the CCRFCD Board of Directors for maintenance and operation funds.

I hope this information will allow for the processing of the subject CLOMR request to proceed. If I can be of any further assistance, please call.

Sincerely,

Kevin Eubanks, P.E.
Assistant General Manager

Enclosures

cc: Curt Chandler, City of Henderson
Karl Mohr, FEMA
Ken Gilbreth, VTN

File: HEN.06.B.95

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

FEDERAL EMERGENCY MANAGEMENT AGENCY REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM	O.M.B. Burden No. 3067-0148 Expires July 31 1997	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472, and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

1. The basis for this revision request is (are): *(check all that apply)*
   - ☒ Physical change
     - ☐ Existing
     - ☒ Proposed
   - ☐ Improved methodology
   - ☐ Improved data
   - ☐ Floodway revision
   - ☐ Other _____

   Explain _____

2. Flooding Source: Unnamed Wash

3. Project Name/Identifier: Equestrian Detention Basin

4. FEMA zone designations affected: A

   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX: 480301	Katy,City	Harris, Fort Bend	TX	480301	0005D	02/08/83
480287	Harris County	Harris	TX	48201C	0220G	09/28/90
32005	City of Henderson	Clark	NV	32003C	2620D	08/16/95
32005	City of Henderson	Clark	NV	32003C	2615D	08/16/95

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding	Structures	Disciplines*
☒ Riverine	☒ Channelization	☒ Water Resources
☐ Coastal	☐ Levee/Floodwall	☒ Hydrology
☐ Alluvial Fan	☐ Bridge/Culvert	☐ Hydraulics
☐ Shallow Flooding *(e.g. Zones AO and AH)*	☒ Dam	☐ Sediment Transport
☐ Lakes	☐ Coastal	☐ Interior Drainage
Affected by wind/wave action	☐ Fill	☐ Structural
☐ Yes	☐ Pump Station	☐ Geotechnical
☐ No	☐ None	☐ Land Surveying
	☐ Channel Relocation	☐ Other *(describe)*
	☐ Excavation	
	☐ Other *(describe)*	

☐ Other(describe) _____ _____ _____

* Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ☐ Yes ☒ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM ☐ Yes ☒ No

   If yes, give reason: _____

FEDERAL EMERGENCY MANAGEMENT AGENCY

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM

O M B Burden No 3067-0148
Expires July 31 1997

FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 23 hour per response The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472, and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2

2 I am licensed with an expertise in Hydrology and Hydraulics
(example: water resources (*hydrology, hydraulics, sediment transport, interior drainage*)* structural, geotechnical, land surveying.)

3 I have 6 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and /or designs, is/are being certified:

To remove the Zone A based on a physical change

7. Base upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. ☐ Viewed all phases of actual construction.

b. ☐ Compared plans and specifications with as-built survey information.

c. ☐ Examined plans and specifications and compared with completed projects.

d. ☒ Other currently under construction

8. All information submitted in support of this request is correct to the best of my knowledge I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: John P. Clark
(please print or type)

Title: Project Engineer
(please print or type)

Registration No. 11504 Expiration Date: 12/31/96

State Nevada

Type of License Civil Engineering

Signature

6/25/96
Date

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions

9. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP? ☐ Yes ☒ No

If yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

3. PROPOSED ENCROACHMENTS

10. With floodways

1A. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☐ No

1B. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No

11. Without floodways:

2A. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☒ Yes ☐ No

2B. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot (*or other surcharge limit if community or state has adopted more stringent criteria*)? ☐ Yes ☐ No

If the answer to either Items 1B or 2B is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ☐ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ☒ Yes ☐ No

14. Does this revision request have the endorsement of the community? ☒ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and /or notification is required for all requests as outlined in Section 65.4 (b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g., levees, floodwalls, channelization, basins, dams)? ☒ Yes ☐ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by City of Henderson (entity) _____ with a maximum interval of 12 months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities will be conducted by _____ (entity) to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☒ has not been prepared for the flood control structure.

D The community is willing to assume responsibility for ☒ performing ☐ overseeing compliance with the maintenance and operation plans of the Equestrian Detention Basin (Name)

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps. A guide for Community Officials," dated January 1990, this request is for a:

XX a.	CLOMR	A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.
____ b.	LOMR	A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. I Parts 60 and 65.)*
____ c.	PMR	A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. I, Parts 60 and 65.)*
____ d.	Other:	Describe_____

8. FORMS INCLUDED

17. Form 2 entitled, "Certification By Registered Professional Engineer and/or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	☒ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	☒ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	☐ Riverine /Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☐ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	☐ Bridge/Culvert Form (Form 7)
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☒ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9 INITIAL REVIEW FEE

18 The minimum initial review fee for the appropriate request category has been included ☐ Yes ☐ No

Initial fee amount $ _____

Check or money order only. Make check or money order payable to **National Flood Insurance Program**. If paying by Visa or Mastercard please refer to the credit card information form which follows this form.

or

19. This request is for a project that is for public benefit and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas which were in existence prior to the commencement of construction of the flood control project. ☒ Yes ☐ No

or

20. This request is to correct map errors, to include the effects of natural changes within the areas of special flood hazard, or solely to provide more detailed data. ☐ Yes ☐ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Signature of Revision Requester

John P. Clark, Project Engineer
Printed Name and Title of Revision Requester

VTN Nevada
Company Name

(702) 247-4020
Telephone No. Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

W. Curt Chandler
Signature of Community Official

Curt Chandler, Land Development Mgr
Printed Name and Title of Community Official

City of Henderson
Community Name

6-19-96
Date

Does this request impact any other communities? ☐ Yes ☒ No

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS FORM**	O.M.B Burden No 3067-0148 Expires July 31 1997	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472, and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503

Community Name: City of Henderson

Flooding Source: Unnamed Wash
(One form for each flooding source)

Project Name/Identifier: Equestrian Detention Basin

1. HYDROLOGIC ANALYSIS IN FIS

- [X] Approximate study stream (Zone A)
- [ ] Detailed study stream (briefly explain methodology) _____

2. REASON FOR NEW HYDROLOGIC ANALYSIS

- [ ] No existing analysis
- [ ] Improved data *(see data revision on page 3)*
- [X] Changed physical conditions of watershed *(explain)* Construction of Flood Control Facility in the watershed, the Equestrian Detention BaSIN
- [ ] Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*
- [X] Evaluation of proposed conditions (CLOMRs only) (explain) Currently under Construction project should be complete by Feb. 1997
- [ ] Other _____

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100- and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

- [X] Approval of hydrologic analysis, including the resulting peak discharge value (s) has been provided by the appropriate local, state, or Federal Agency. (i.e., City of Henderson, Clark County Regional Flood Control District, Division of Water Resources, Dam Safet)
  Attach evidence of approval.
- [ ] Approval of the hydrologic analysis is not required by any local, State, or Federal Agency.

4. REVIEW OF RESULTS

Stream: Unnamed Wash

Comparison of 100-year Discharges

Location	Drainage area (Sq mi.)	FIS (cfs):	Revised (cfs):
Equestrian Detention Basin	7.5	3300	220

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or be affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*

With the construction of the Equestrian Detention Basin, the Zone A floodplan has been reduced and is confined to the existing washes downstream of the Detention Basin.

ATTACH A COMPLETED REVIEW OF RESULTS PAGE FOR EACH FLOODING SOURCE.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)*? ☐ Yes ☒ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

FEMA does not normally revise NFIP maps solely due to insignificant flow changes where changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ☒ No

If yes, provide the following

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*

N/A

Gaging Station: _____

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data (*New*) or as revising existing data (*Revised*). *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Hydrology/Hydraulic Analysis	☒	☐	Clark County Regional Flood Control
	☐	☐	
	☐	☐	
	☐	☐	
	☐	☐	

- Data source can be from a Federal, State, or local government agency, or from a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records (*use Attachment A*)

☐ Regional Regression Equations *(use Attachment B)*

☒ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

_____

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

Gaging Station: _____

Gage Location (latitude and longitude): _____

	FIS	Revised
1. Number of years of data	_____	_____
Systematic	_____	_____
Historical	_____	_____
2. Homogeneous data	☐ Yes ☐ No	☐ Yes ☐ No
3. Data adjustments	☐ Yes ☐ No	☐ Yes ☐ No
4. Number of high outliers	_____	_____
Low outliers	_____	_____
Zero events	_____	_____
5. Generalized skew	_____	_____
6. Station skew	_____	_____
7. Adopted skew	_____	_____
8. Probability distribution used (justify if log-Pearson III was not used)	_____	_____
9. Transfer equations to ungaged sites		☐ Yes ☐ No

If yes, specify method

_____

_____

_____

10. Expected probability* ☐ Yes ☐ No

11. Comparison of results with other analyses ☐ Yes ☐ No

If yes, describe comparison

_____

_____

_____

*FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data is not available, indicate by N/A.

Attach analysis including plot of flood frequency curve.

ATTACHMENT B. REGIONAL REGRESSION EQUATIONS

1 Bibliographical Reference

_____

_____

_____

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

_____

_____

_____

		FIS:		Revised:	
5.	Urbanized conditions calculations	☐ Yes	☐ No	☐ Yes	☐ No
6	Percent of watershed urbanization	_____		_____	
7.	Is the watershed controlled?	☐ Yes	☐ No	☐ Yes	☐ No
8.	Comparison with other analyses	☐ Yes	☐ No	☐ Yes	☐ No

If the answer to 5, 7, or 8 is yes, explain methodology in Comments.

If data is not available, indicate by N/A.

Comments

_____

_____

_____

_____

Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT C. PRECIPITATION/RUNOFF MODEL

		FIS	Revised
1	Method or model used	Unknown	HEC-1
	Version	"	410
	Date	"	3/23/93
2	Source of rainfall depth	"	NOAA Altas II
3	Source of rainfall distribution	"	NSACE
4.	Rainfall duration	"	6 Hr
5.	Areal adjustment to precipitation (%)	"	Varies
6.	Maximum overland flow length	"	5001
7.	Hydrograph development method	"	SCS
8.	Loss rate method	"	SCS
	Source of soils information	"	USDA Soil Survey
	Source of land use information	"	Current Zoning
9.	Channel routing method	"	Kinematic
10.	Reservoir routing	☐ Yes ☒ No	☒ Yes ☐ No
11.	Baseflow considerations	☐ Yes ☒ No	☐ Yes ☒ No

If yes, explain how baseflow was determined:

12.	Snowmelt considerations	☐ Yes ☐ No	☐ Yes ☒ No
13.	Model calibration	☐ Yes ☐ No	☐ Yes ☒ No

If yes, explain how calibration was performed

14.	Future land use condition	☒ Yes ☐ No

If yes, explain why

Because this Detention Basin is a Clark COunty Regional Flood Control District Master Plan Facility the Facility was designed using ultimate land use conditions.

NOTE: FEMA policy is to base flooding on existing conditions.
If data is not available, indicate by N/A.

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream _____

Select one location for Confidence Limits Evaluation (*describe location*) _____

_____

Discharges for selected location:

Exceedance Probability		PIS	Revised
10%	(10-year)	_____ cfs	_____ cfs
2%	(50-year)	_____ cfs	_____ cfs
1%	(100-year)	_____ cfs	_____ cfs
0.2%	(500-year)	_____ cfs	_____ cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs

95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs

75% limit _____ cfs

If the value of the 100-year frequency flood in the PIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

FEDERAL EMERGENCY MANAGEMENT AGENCY RIVERINE HYDRAULIC ANALYSIS FORM	O M B Burden No 3067-0148 Expires July 31 199-	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472, and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503

Community Name: City of Henderson

Flooding Source: Unnamed Wash
(One form for each flooding source)

Project Name/Identifier: Equestrian Detention Basin

1. REACH TO BE REVISED

Downstream limit: C1/Drake Channel

Upstream limit: Equestrian Detention Basin

2. EFFECTIVE FIS

☐ Not studied

☒ Studied by approximate methods

Downstream limit of study _____

Upstream limit of study _____

☐ Studied by detailed methods

Downstream limit of study _____

Upstream limit of study _____

☐ Floodway delineated

Downstream limit of Floodway _____

Upstream limit of Floodway _____

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM. *(Check all that apply)*

☒ Not studied in FIS

☐ Improved hydrologic data/analysis. Explain: _____

☐ Improved hydraulic analysis. Explain: _____

☒ Flood control structure. Explain: Construction of the Equestrian Detention Basin and Appurtenant

☐ Other. Explain: _____

For areas which have detailed flooding:

Full input and output listings along with files on diskette (if available) for each of the models listed below (items 1, 2, 3, 4, and 5) and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (e.g. duplicate effective model to corrected effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

For areas which do not have detailed flooding:

Only the 100-year flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses for existing or pre-project conditions and revised or post-project conditions must be submitted. All calculations must be submitted for these analyses. (See item 6 below)

1 Duplicate Effective Model — Natural ☐ Floodway ☐

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models *(10-, 50-, 100-, and 500-year multi-profile runs and the floodway run)* must be obtained and then reproduced on the requestor's equipment to produce the duplicate effective model. This is required to assure that the effective model input data has been transferred correctly to the requestor's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. **Corrected Effective Model** — Natural ☐ Floodway ☐

The corrected effective model is the model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the currently effective model. The corrected effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model — Natural ☒ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

4. Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this model should reflect proposed conditions.

5. Other: Please attach a sheet describing all other models submitted. — Natural ☒ Floodway ☐

6. Hydraulic Analyses (Only if Hydraulic Models are not developed)

Please attach all calculations for the existing or pre-project conditions and the revised or post-project conditions. Proceed to Form 5, "Riverine/Coastal Mapping Form".

4. MODEL PARAMETERS *(from model used to revise 100-year water surface elevation)*

1. Discharges	Upstream Limit	Downstream Limit
10-year		
50-year		
100-year	Boulder Hwy. & Foothills Drive	Equestrian Detention Basin
500-year		

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined the water surface elevations were determined using the revised HEC-1 flow rates.

3. Give range of friction loss coefficients (*Manning's "N"*) Channel ..... .015 .025

Overbanks ..... .015 .025

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised

Explain:

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

From Design Drawing for the Construction.

5. Were natural channel banks selected as the location of the left and right channel banks in the model?

☐ Yes ☒ No If no, explain why not: Because this is a man-made channel and all of the flow is contained in the channel.

6 Explain how reach lengths for channel and overbanks were determined

From Construction Plans for the Channel see Design Calculation Notebook.

5. RESULTS *(from model used to revise 100-year water surface elevations)*

1. Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ☐ Yes ☒ No

b. Supercritical depth? ☒ Yes ☐ No

c. Critical depth? ☐ Yes ☒ No

d. Other unique situations ☒ Yes ☐ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

2. What is the maximum change in energy gradient between cross-sections? _____

Specify location _____

3. What is the distance between the cross-sections in 2 above? _____

4. What is the maximum distance between cross-sections? _____

Specify location _____

5. Floodway determination

a. What is the maximum surcharge allowed by the community or State? _____ foot

b. What is the maximum surcharge for the revised conditions? _____ foot

Specify location _____

c. What is the maximum velocity? 34 fps

Specify location _____

d. Are there any negeative surcharge values at any cross-section? ☐ Yes ☒ No

If yes, the floodway may need to be widened. If it is not widened, please explain and indicate the maximum negative surcharge.

Explain: _____

6 Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? ☒ Yes ☐ No

If Yes, explain.

No Channel at this location for 100-year flood elevations new construction.

7. Do 100-year water surface elevations increase at any location? ☐ Yes ☐ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases. *(For example: State if the increase is due to fill placed within the floodway fringe or placed within the currently adopted floodway limits)*

Please attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

6. REVISED FIRM/FBFM AND FLOOD PROFILES

A. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section_____ within_____feet *(vertical)* and upstream of the project at cross section_____within_____feet *(vertical)*. N/A

B. The revised floodway elevations tie into those computed by the effective FIS model, dowstream of the project at cross section_____within_____feet *(vertical)* and upstream of the project at cross section_____ within_____feet *(vertical)*. N/A

C. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets.

D. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report.

Proceed to Riverine /Coastal Mapping Form

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGEMENT AGENCY RIVERINE/COASTAL MAPPING FORM	O M B Burden No 3067-0148 Expires July 31 199-	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

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Community Name: City of Henderson

Flooding Source: Unnamed Wash

Project Name/Identifier: Equestrian Detention Basin

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable)*:

		Included		
A.	Revised approximate 100-year floodplain boundaries (Zone A)	☒ Yes	☐ No	☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☐ Yes	☐ No	☒ N/A
C.	Revised 100-year floodway boundaries	☐ Yes	☒ No	☐ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	☒ Yes	☐ No	☐ N/A
E.	Stream alignments, road and dam alignments	☒ Yes	☐ No	☐ N/A
F.	Current community boundaries	☐ Yes	☐ No	☒ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map	☒ Yes	☐ No	☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries	☐ Yes	☐ No	☒ N/A
I.	The requestor's property boundaries and community easements	☐ Yes	☐ No	☒ N/A
J.	The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
K.	Location and description of reference marks	☒ Yes	☐ No	☐ N/A
L.	Vertical datum (example: NGVD, NAVD etc.)	☒ Yes	☐ No	☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes	☐ No	☒ N/A

If any of the items above are marked no or N/A, please explain: B&C Detail boundaries are not included on the firm map. F. Community boundaries have not been changed. H. N/A M. & N. Costal Zones N/A

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? _____

3. What is the scale and contour interval of the following work maps?

   a. Effective FIS ---------- scale -------- Contour interval

   b. Revision Request _____ scale _____ Contour interval

NOTE: Revised topographic information must be of equal or greater detail.

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies.

   Attach additional pages if needed.

5. Flood Boundaries and 100-year water surface elevations.

Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's? ☐ Yes ☒ No

If yes, please give the location of shift or increase and an explanation for the increase.

a. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ..... ☐ Yes ☐ No

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

b. What is the number of insurable structures that will be impacted by this shift or increase?_____

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ..... ☐ Yes ☒ No

If yes, explain:

7. If a V- zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? ☐ Yes ☐ No

If no, explain:

N/A

8. Manual or digital map submission:

☒ Manual

☐ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT

1. The fill is. ☐ Existing ☐ Proposed N/A Fill has not been utilized to remove the site from a Zone A.

2. Has fill been/will be placed in the regulatory floodway? ..... ☐ Yes ☒ No
   If yes, please attach completed Riverine Hydraulic Analysis Form.

3. Has fill been/will be placed in floodway fringe *(area between the floodway and 100-year floodplain boundaries)*? ..... ☐ Yes ☒ No

   If yes, then complete A, B, C, and D below.

   A. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ..... ☐ Yes ☐ No

      If yes, justify steeper slopes_____

   B. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* ..... ☐ Yes ☐ No

      If no, describe erosion protection provided_____

   C. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

   D. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

   If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

4. Has fill been/will be placed in a V-zone? ☐ Yes ☒ No

   If yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall? ☐ Yes ☐ No

   If yes, attach the coastal structures form.

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION FORM**	O M B Burden No 3067-0148 Expires July 31 1997	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 75 hours per response The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S W., Washington, DC 20472, and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503

Community Name: City of Henderson

Flooding Source: Unnamed Wash

Project Name/Identifier: Equestrian Detention Basin

1. EXTENT OF CHANNELIZATION

Downstream limit: _____

Upstream limit: _____

2. CHANNEL DESCRIPTION

1. Describe the inlet to the channel _____

2. Briefly describe the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)* Trapizodial concrete lined channel with a 25ft bottom width and :2:1:V side slopes

3. Describe the outlet from the channel _____

4. The channelization includes:

- ☐ Levees *(Attach Levee Form)*
- ☐ Drop structures
- ☐ Superelevated sections
- ☒ Transitions in cross sectional geometry
- ☒ Debris basin/detention basin
- ☐ Energy dissipater
- ☐ Other _____

5. Attach the following:

a. Certified engineering drawings showing channel alignment and locations of inlet, outlet, and items checked in item 4

b. Typical cross sections and profiles of channel banks and invert

3. HYDRAULIC CONSIDERATIONS

1. What is the 100-year discharge? 3175 & 1474 cfs

2. Do the cross sections in the hydraulic model match the typical cross sections in the plans? ☒ Yes ☐ No

3. Are the channel banks higher than the 100- year flood elevations everywhere? ☒ Yes ☐ No

4. Are the channel banks higher than the 100-year flood energy grade lines everywhere? ☐ Yes ☒ No

5. Is the land on both sides of the channel above the adjacent 100-year flood elevation at all points along the channel? ☒ Yes ☐ No

6. What is the range of freeboard? 2 – 5 feet

7. What is the range of the 100-year flood velocities? 35 – 2 ft/sec

8. What is the lining type? (both bottom and sides) concrete bottom & sides to Station the channel with native material

Explain how the channel lining prevents erosion and maintains channel stability *(attach documentation)*

See Design Calculation Notebook.

9. What is the design elevation in the channel based on?

- ☐ Subcritical flow
- ☐ Critical flow
- ☒ Supercritical flow
- ☐ Energy grade line

Is 100-year flood profile based on the above type of flow? ☒ Yes ☐ No

If no, explain:

10. Is there the potential for a hydraulic jump at the following locations?

Inlet to channel	☐ Yes ☐ No
Outlet of channel	☒ Yes ☐ No
At Drop Structures	☐ Yes ☐ No
At Transitions	☒ Yes ☐ No

Other locations. Explain:

If the answer to any of the above is yes, please explain how the hydraulic jump is controlled and the effects of the hydraulic jump on the stability of the channel.

Explain: Outlet of channel is into Equestrian Detention Basin which will control the depth of flow by the pool elevation. Minor jump occurs at junction where incoming flow impact Wesley.

4. SEDIMENT TRANSPORT CONSIDERATIONS

1 A Is there any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year water surface elevations and/or the capacity of the channel? ☒ Yes ☐ No

B Based on the conditions of the watershed and stream bed, is there a potential for sediment transport (including scour and deposition) to affect the 100-year water surface elevations and /or the capacity of the channel? ☒ Yes ☐ No

2. If the answer to either 1A or 1B is yes:

A. What is the estimated sediment (bed) load?
_____cfs (attach gradation curve)

Explain method used to estimate load See Design Calculation Notebook.

B. Is the 100-year flood velocity anywhere within the channel less than the 100-year flood velocity of the inlet? ☐ Yes ☒ No

C. Will sediment accumulate anywhere within the channel? ☒ Yes ☐ No

D. Will deposition or scour occur at or near the inlet? ☐ Yes ☒ No

E. Will deposition or scour occur at or near the outlet? ☐ Yes ☒ No

Attach documentation showing affects on the Hydrologic and Hydraulic analyses

FEDERAL EMERGENCY MANAGEMENT AGENCY **DAM FORM**	O M B Burden No 3067-0148 Expires July 31 199[illegible]	FEMA USE ONLY

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Community Name: City of Henderson

Flooding Source: Unnamed Wash

Project Name/Identifier: Equestrian Detention Basin

IDENTIFIER

Name of Dam: Equestrian Detenion Basin

Location of dam along flood source (in terms of stream distance or cross section identifier):

Check one of the following:

- ☐ Existing dam
- ☒ New dam
- ☐ Modifications of existing dam (describe modifications)

Was the dam designed by ____Federal agency ____State agency

____Local government agency _X_ Private organization?

BACKGROUND

Does the dam have dedicated flood control storage? ☒ Yes ☐ No

Does the project involve revised hydrology? ☒ Yes ☐ No

If yes, complete Hydrologic Analysis Form and include calculations of the 100-year inflow flood hydrograph routed through the dam with the beginning pool at the normal pool elevation (spillway crest elevation for ungated spillway). Include any inflow hydrograph bulking by watershed sediment yield and provide necessary debris and sediment yield analysis.

Does the revised hydrology affect the 100-year water-surface elevation behind the dam or downstream of the dam? ☒ Yes ☐ No

If yes, complete the Riverine Hydraulic Analysis Form and complete the table shown on the following page.

	Stillwater Elevation Behind the Dam	
	FIS	Revised
10-year		
50-year		
100-year		2069
500-year		
Normal Pool Elevation		-0-

Was long term sediment accumulation taken into consideration in determining the normal pool elevation? ☒ Yes ☐ No

Was the dam designed to withstand the hydrostatic and hydrodynamic forces associated with floods greater than the 100-year flood? ☒ Yes ☐ No

If no, and the dam has a reasonable probability of failure during the 100-year flood, please attach dam break analysis.

Provide the following data on the dam:

Dimensional Height: 28ft.

Crest Elevation of top of dam: 2076ft.

100-year flood storage capacity: 409 Ac-ft.

Freeboard (measured from 100-year water surface elevation): 7ft

Spillway(s):

Type: ☐ gated ☒ ungated

Dimensional Width: 890' Broad Crested Weir

Dimensional Height: R1'

Crest Elevation of top of spillway: 2069

Outlet(s):

Type: ☐ gated ☒ ungated

Width:

Height

Diameter: 48"

Invert Elevation: 2048

Explain flow regulation plan:

Are the project features, including the emergency spillway, designed to accommodate the 100-year flood discharge without overtopping the dam? ☒ Yes ☐ No

Was the dam designed in accordance with all currently applicable local, State, and Federal regulations? ☒ Yes ☐ No

If no, please provide explanation.

FEMA may request a list of regulations that have been complied with and supporting documentation demonstrating compliance with these regulations.

Attach copy of formal operation and maintenance plan

Answer N/A to any questions which are not applicable

APPENDIX R

CD WITH ALL CALCULATIONS