

Request for a Conditional Letter of Map Revision
Flamingo Wash Channel Improvements
Phase II
Maryland Parkway to Algonquin Drive
Clark County, Nevada

Prepared for
CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT



Clark County Regional Flood Control District
600 S. Grand Central Parkway
Las Vegas, NV 89155

05-09-0402R

Prepared by

PBSJ

2270 Corporate Circle, Suite 100
Henderson, NV 89074
(702) 263-7275

December 2004



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INTRODUCTION

This request for a Conditional Letter of Map Revision (CLOMR) is to address a construction project consisting of channel improvements to a portion of the Flamingo Wash from Maryland Parkway to Algonquin Drive. The flood control improvements for the Flamingo Wash from Maryland Parkway to approximately 350 feet downstream of Spencer Street are being implemented in two phases with Phase I completed. Phase I consists of the channel improvements from Algonquin Drive to Spencer Street. Prior to the construction of Phase I, (4) 10' x 6' box culverts under Spencer Street did not have sufficient capacity to convey the 100-year flood. The wash in the project reach was earthen with irregular erosion protection on both banks. In July 1999, floodwater overtopped the Spencer Street box culverts and caused severe damage to the structure. A request for a Letter of Map Revision (LOMR) for Phase I was prepared and submitted by the Louis Berger Group, Inc. in October of 2003 and approved by FEMA, Case #04-09-0167P. Phase II will extend the concrete lined channel upstream from Algonquin Drive to Maryland Parkway. The proposed Phase II section of the Flamingo Wash consists of approximately 1,500 feet of channel improvements. Note that the Phase II plans do not show any improvements to the culvert crossing at Maryland Parkway. The existing RCB's will remain in-place and the Phase II improvements will tie-in immediately downstream of the culverts. Also, no bridge or culvert crossing is proposed at Algonquin Drive. As shown on the Phase II improvement plans a pre-fabricated pedestrian span bridge will be constructed at Algonquin Drive to allow for access across the channel. Please refer to **Figure 1 Area/Vicinity Map** for an overall view of the project area. Also, refer to **Figure 2A and Figure 2B CCRFCD Flood Control Facilities Map** that shows existing and proposed facilities within and adjacent to the project area. Appendix E includes the improvement plans for Phase II.

This study analyzes the Phase II portion of the proposed Flamingo Wash improvements from Maryland Parkway to Algonquin Drive and demonstrates that the proposed conditions will better contain the base flood in this reach as shown on the current effective FIRM Panel 2557 dated September 27, 2002. Although this reach is and will continue to be designated an un-numbered Zone A, this study provides hydraulic data for the proposed improved condition.

HYDROLOGY

The regulatory discharge in the Flamingo Wash for the 100-year storm is 5,300 cfs upstream of Maryland Parkway and remains 5,300 cfs downstream to the limits of this study. The hydrology is reported in the 1997 Flood Insurance Restudy for the Flamingo Wash prepared by G.C. Wallace Inc. for the Clark County Regional Flood Control District (CCRFCD). The corresponding hydrologic reference material has been provided in Appendix C.

It should be noted that the HGL shown on the as-built plans at the downstream end of the Phase I improvements is based on the channel 100-year design flow of 5,610 cfs, which represents ultimate build-out condition in which the tributary watershed to the Flamingo Wash is fully developed. However, the analysis of the proposed Phase II improvements uses the regulatory flow of 5,300 cfs.

HYDRAULICS

Hydraulic modeling of the Flamingo Wash was performed using the U.S. Army Corp of Engineers' River Analysis System (HEC-RAS), version 3.1.1 and conforming to local standards that are specified in the CCRFCD Hydrologic Criteria and Drainage Design Manual. The pre-project conditions model for this study is derived from the recently approved LOMR by the Louis Berger Group, Inc. (Phase I) and the 1997 Flood Insurance Restudy for the Flamingo Wash prepared by G.C. Wallace Inc. The HEC-2 model used in the FIS Restudy was based on the National Geodetic Vertical Datum 1929 (NGVD29). Please refer to Appendix D for the HEC-2 output file for the 1997 Flood Insurance Study Restudy and Appendix F for the HEC-RAS output file for the Phase I improvements. In the Phase I improvements, the Louis Berger Group Inc. converted the datum from NGVD29 to the North American Vertical Datum 1988 (NAVD88) which raised the channel and bridge elevations 2.26 feet, see Appendix F for datum conversion.

FLAMINGO WASH RESULTS

The post-project conditions model for the study reach was analyzed with HEC-RAS using the supercritical flow regime option with an upstream boundary condition set to critical depth. Critical depth was selected as the boundary condition since this was shown in the 1997 FIS Restudy at cross-section 220. Note that with the exception to cross-sections 220 and 210, the project reach shows supercritical flow. The depth of the channel at sections 220 and 210 is approximately 12-feet; thus, critical depth (6.84') and the energy grade elevation (10.29') would be contained. The 1997 FIS Restudy shows a datum corrected water surface elevation at cross-section 220 of 1977.92'. The post-project model at cross-section 220 shows a water surface elevation of 1978.04'. Therefore, the 1997 FIS Restudy model and the post-project model tie-in within 0.12' at cross-section 220.

A downstream boundary condition was not applied to the HEC-RAS model. The post project HEC-RAS model has been extended downstream of Algonquin Drive to cross-section 75. The Phase I improvements are between cross-section 81 and 50 (see Figure 5). It should be noted that the portion of the channel between cross-sections 160 and 81 has been previously improved prior to Phase I or II. The Phase I model by Louis Berger shows a water surface elevation at cross-section 75 of 1949.35'. The post-project model at cross-section 75 shows a water surface elevation of 1949.12'. Therefore, the Louis Berger Phase I model and the post-project model tie-in within 0.23' at cross-section 75.

Figure 5 is the workmap for this study and shows the locations of the cross sections for Phase I as well as the cross sections used for the LOMR and the FIS Restudy mentioned in this report. The revised Zone A boundaries and the upstream and downstream limits of this study are shown on the workmap. Please refer to **Figure 6** that shows the proposed post-project Phase I & Phase II flood zone delineations. Note that a blue and red line is used to represent the flood zone delineations on **Figure 6**. The lines are used for representation only and it should be assumed that the actual floodzone boundary is the width of the channel.

The results show that the supercritical flow is contained within the channel throughout the Phase II improvements. Please refer to Appendix D for the HEC-RAS output of the 1997 FIS Restudy HEC-2 model and the post-project model.

CONCLUSION

The proposed flood zone revision for the Flamingo Wash within this request for a Conditional Letter of Map Revision is based on the best available data, approved improvement plans, and supporting calculations. We believe that based on this information the revisions to the Flamingo Wash are warranted. Please refer to **Figure 3 FEMA Flood Zone Map** and **Figure 4 Annotated FEMA Flood Zone Map**. **Figure 6** shows the proposed revisions to the current effective flood zone delineation.

Once approved and upon completion of the proposed Phase II channel improvements to the Flamingo Wash, a request for a LOMR will be submitted with the appropriate supporting information to request revision of the current Zone A flood zone.

REFERENCES

- HCDDM Clark County Regional Flood Control District, *Hydrologic Criteria and Drainage Design Manual*, 1999.
- 2002 MPU Clark County Regional Flood Control District, *2002 Master Plan Update*. Prepared by PBS&J, Louis Berger and G.C. Wallace.
- HEC-RAS U.S. Army Corps of Engineers' River Analysis System (HEC-RAS) V3.1.1, Hydrologic Engineering Center, 2002.
- MWH Improvement Plans for Flamingo Wash-Phase II Plans. Prepared by Montgomery Watson Harza, dated December 2003.
- LBG Request for a Letter of Map Revision Flamingo Wash at Spencer Street. Prepared by The Louis Berger Group Inc., dated October 15, 2003.
- GCW Flamingo Wash Flood Insurance Study Restudy. Prepared by G.C. Wallace, dated May, 1997.

**FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM**

*O.M.B No. 3067-0148
Expires September 30, 2005*

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this 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, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. Please do not send your completed survey to the above address.

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

- ☒ **CLOMR:** A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- ☐ **LOMR:** A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
320003	Clark County Unincorporated Areas	NV	32003C	2557E	09/27/02

2. Flooding Source: Flamingo Wash

3. Project Name/Identifier: Flamingo Wash- Maryland Parkway to Algonquin Drive Phase II

4. FEMA zone designations affected: A (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

- ☒ Physical Change ☐ Improved Methodology/Data
- ☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

- Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
- ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)
- Structures: ☒ Channelization ☐ Levee/Floodwall ☐ Bridge/Culvert
- ☐ Dam ☐ Fill ☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included?

☐ Yes

Fee amount: \$ _____

☒ No, Attach ExplanationPlease see the FEMA Web site at http://www.fema.gov/fhm/frm_fees.shtml for Fee Amounts and Exemptions.**D. SIGNATURE**

All documents submitted in support of this request are 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.

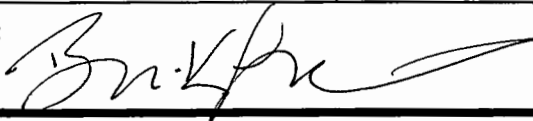
Name: Brian K. Loffman, CFM

Company: PBS&J

Mailing Address:
2270 Corporate Circle Drive
Suite 100
Henderson, NV 89074-7755Daytime Telephone No.:
702-263-7275Fax No.:
702-263-7200

E-Mail Address: bloffman@pbsj.com

Signature of Requester (required):



Date:

12/1/04

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: David Betley, P.E., Principal Engineer, Civil Engineering Division

Telephone No.:
702-455-4808

Community Name: Clark County Unincorporated Areas

Community Official's Signature (required):

Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are 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.

Certifier's Name: Mathew S. Baird, P.E., CFM

License No.: NV 13684

Expiration Date:
12/31/04

Company Name: PBS&J

Telephone No.: 702-263-7275

Fax No.:
702-263-7200

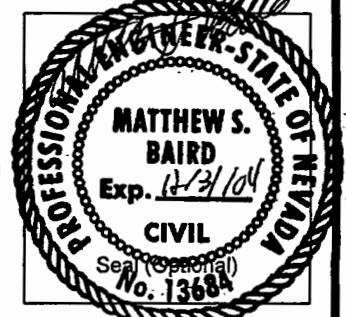
Signature:

Date:

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)**Required if...**

- ☒ Riverine Hydrology and Hydraulics Form (Form 2) New or revised discharges or water-surface elevations
- ☒ Riverine Structures Form (Form 3) Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
- ☐ Coastal Analysis Form (Form 4) New or revised coastal elevations
- ☐ Coastal Structures Form (Form 5) Addition/revision of coastal structure
- ☐ Alluvial Fan Flooding Form (Form 6) Flood control measures on alluvial fans



FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE HYDROLOGY & HYDRAULICS FORM

*O.M.B No. 3067-0148
Expires September 30, 2005*

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this 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, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Flamingo Wash
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

- | | | |
|---|--|--|
| ☒ Not revised (skip to section 2) | ☐ No existing analysis | ☐ Improved data |
| ☐ Alternative methodology | ☐ Proposed Conditions (CLOMR) | ☐ Changed physical condition of watershed |

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)
----------	-------------------------	-----------	---------------

3. Methodology for New Hydrologic Analysis (check all that apply)

- | | | |
|---|--|------------------------------|
| ☐ Statistical Analysis of Gage Records | ☐ Precipitation/Runoff Model | [TR-20, HEC-1, HEC-HMS etc.] |
| ☐ Regional Regression Equations | ☐ Other (please attach description) | |

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtml.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	Downstream XS FEMA Tie-In	75	1949.35	1949.12
Upstream Limit	XS Downstream of Maryland Parkway	220	1977.92	1978.04

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS V3.11 [HEC-2, HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/fhm/firm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☐ Yes ☒ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name: N/A
Corrected Effective Model*	Natural File Name:	Floodway File Name: N/A
Existing or Pre-Project Conditions Model	Natural File Name:	Floodway File Name: N/A
Revised or Post-Project Conditions Model	Natural File Name: Post.prj	Floodway File Name: N/A
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach a **copy of the effective FIRM and/or FBFM**, annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:

- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☐ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☐ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE STRUCTURES FORM

O.M.B. No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Flamingo Wash

Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization complete Section B
Bridge/Culvert complete Section C
Dam complete Section D
Levee/Floodwall complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. Name of Structure: Maryland Parkway to Algonquin Drive Phase II Improvements

Type (check one): ☒ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Flamingo Wash from Maryland Parkway to Algonquin Drive

Downstream Limit/Cross Section: 160

Upstream Limit/Cross Section: 220

2. Name of Structure:

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

3. Name of Structure:

Type (check one) ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

NOTE: For more structures, attach additional pages as needed.

B. CHANNELIZATION

Flooding Source: Flamingo Wash

Name of Structure: Maryland Parkway to Algonquin Drive Phase II Improvements

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe):

- ☐ Drop structures
- ☒ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Hydraulic Considerations

The channel was designed to carry 5300 (cfs) and/or the 100-year flood.

The design elevation in the channel is based on (check one):

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

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

- ☐ Inlet to channel
- ☐ Outlet of channel
- ☐ At Drop Structures
- ☐ At Transitions
- ☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source:

Name of Structure:

1. This revision reflects (check one):

- ☐ New bridge/culvert not modeled in the FIS
- ☐ Modified bridge/culvert previously modeled in the FIS
- ☐ New analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8):

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- ☐ Dimensions (height, width, span, radius, length)
- ☐ Shape (culverts only)
- ☐ Material
- ☐ Beveling or Rounding
- ☐ Wing Wall Angle
- ☐ Skew Angle
- ☐ Distances Between Cross Sections
- ☐ Erosion Protection
- ☐ Low Chord Elevations – Upstream and Downstream
- ☐ Top of Road Elevations – Upstream and Downstream
- ☐ Structure Invert Elevations – Upstream and Downstream
- ☐ Stream Invert Elevations – Upstream and Downstream
- ☐ Cross-Section Locations

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☐ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

D. DAM

Flooding Source:

Name of Structure:

1. This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport).

If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)

FIS

REVISED

10-year (10%)

50-year (2%)

100-year (1%)

500-year (0.2%)

Normal Pool Elevation

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

- ☐ upgrading of an existing levee/floodwall system
- ☐ a newly constructed levee/floodwall system
- ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

- | | | |
|---|---------|----|
| ☐ earthen embankment, dike, berm, etc. | Station | to |
| ☐ structural floodwall | Station | to |
| ☐ Other (describe): | Station | to |

c. Structural Type (check one):

- ☐ monolithic cast-in place reinforced concrete
- ☐ reinforced concrete masonry block
- ☐ sheet piling
- ☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

- ☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

- | | |
|--|----------------|
| 1. Plan of the levee embankment and floodwall structures. | Sheet Numbers: |
| 2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. | Sheet Numbers: |
| 3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. | Sheet Numbers: |
| 4. A layout detail for the embankment protection measures. | Sheet Numbers: |
| 5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. | Sheet Numbers: |

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

- 3.0 feet or more at the downstream end and throughout
- 3.5 feet or more at the upstream end
- 4.0 feet within 100 feet upstream of all structures and/or constrictions

- | | |
|------------------------------|-----------------------------|
| ☐ Yes | ☐ No |
| ☐ Yes | ☐ No |
| ☐ Yes | ☐ No |

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runoff (whichever is greater).

- ☐ Yes ☐ No

2.0 feet above the 1%-annual-chance stillwater surge elevation

- ☐ Yes ☐ No

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

- b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

- a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

- a. The maximum levee slope landside is:
- b. The maximum levee slope floodside is:
- c. The range of velocities along the levee during the base flood is: (min.) to (max.)
- d. Embankment material is protected by (describe what kind):
- e. Riprap Design Parameters (check one): ☐ Velocity ☐ Traction stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D ₁₀₀	D ₅₀	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

- f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No
- g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

- a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

- b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

- c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

- d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

- e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

- f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

- g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

- h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ $P_A =$ psf; $P_p =$ psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ $P_w =$ psf

☐ Seepage (Uplift); ☐ Earthquake @ $P_{eq} =$ %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overtum	Sliding	Overtum	Sliding	Overtum	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

- a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No
- b. The computed range of settlement is ft. to ft.
- c. Settlement of the levee crest is determined to be primarily from :
- ☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):
- d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.
- Attach engineering analysis to support construction plans.

8. Interior Drainage

- a. Specify size of each interior watershed:
- Draining to pressure conduit: acres
Draining to ponding area: acres
- b. Relationships Established
- Ponding elevation vs. storage ☐ Yes ☐ No
Ponding elevation vs. gravity flow ☐ Yes ☐ No
Differential head vs. gravity flow ☐ Yes ☐ No
- c. The river flow duration curve is enclosed: ☐ Yes ☐ No
- d. Specify the discharge capacity of the head pressure conduit: cfs
- e. Which flooding conditions were analyzed?
- Gravity flow (Interior Watershed) ☐ Yes ☐ No
• Common storm (River Watershed) ☐ Yes ☐ No
• Historical ponding probability ☐ Yes ☐ No
• Coastal wave overtopping ☐ Yes ☐ No
- If No for any of the above, attach explanation.
- f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No
- If No, attach explanation.
- g. The rate of seepage through the levee system for the base flood is cfs
- h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

- i. Will pumping plants be used for interior drainage?

☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic?

☐ Yes ☐ No

If the pumps are electric, are there backup power sources?

☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

- a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem

Hydrocompaction ☐ is ☐ is not a problem

Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

- b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

- c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

- d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

- a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
- b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No
- c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

- a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

STATEMENT OF EXPLANATIONS

- MT-2 FORM -1

C: Clark County Regional Flood Control District will submit fee upon receiving an invoice from FEMA.

- MT-2 FORM-2

A-5: Sediment transport was not considered as the tributary watershed is largely urbanized and the supercritical flow regime of the channel.

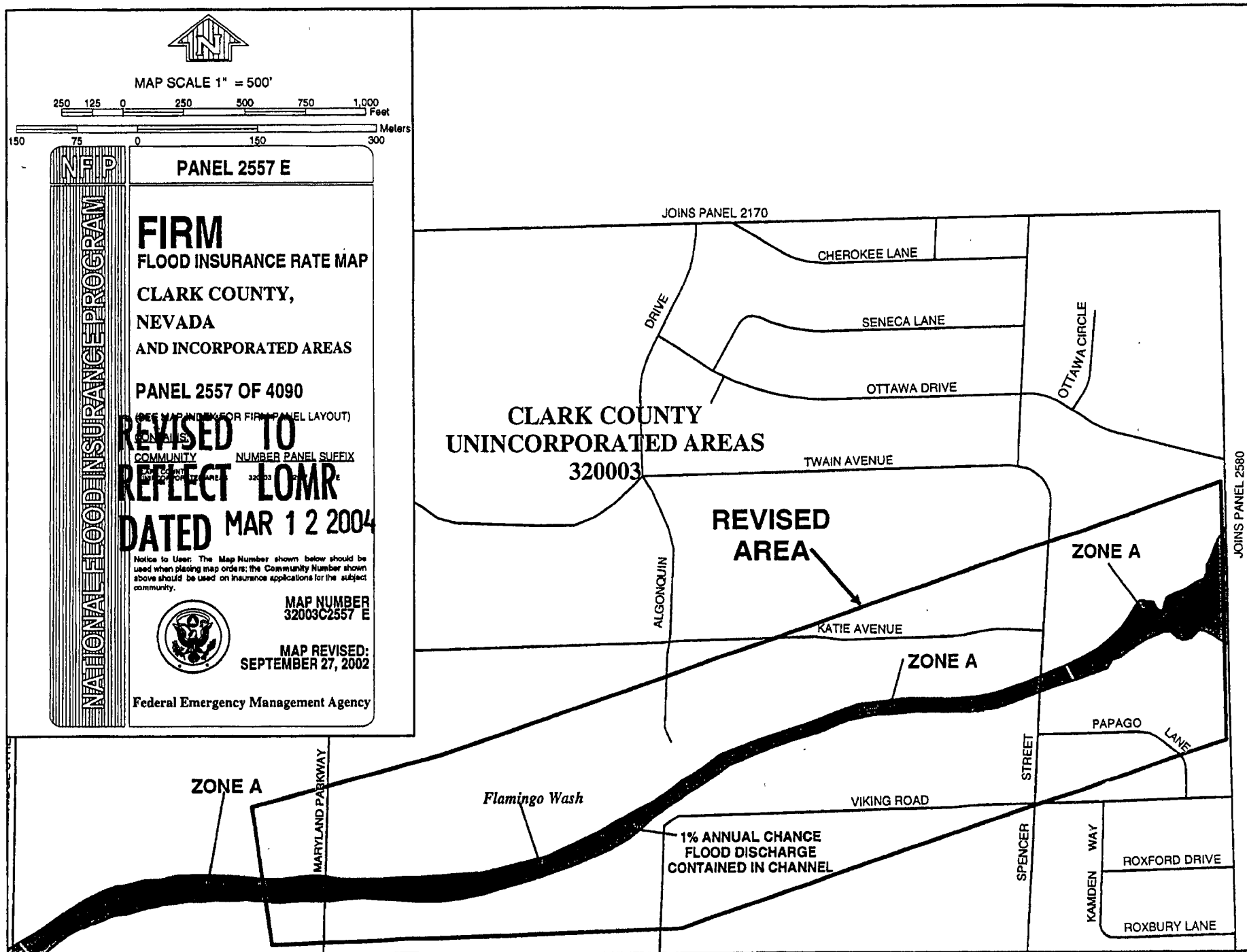


FIGURE 3A

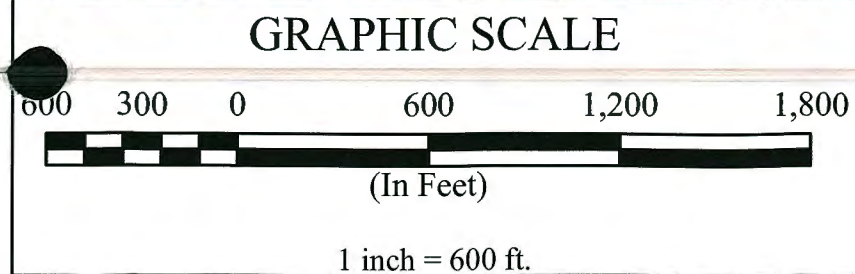
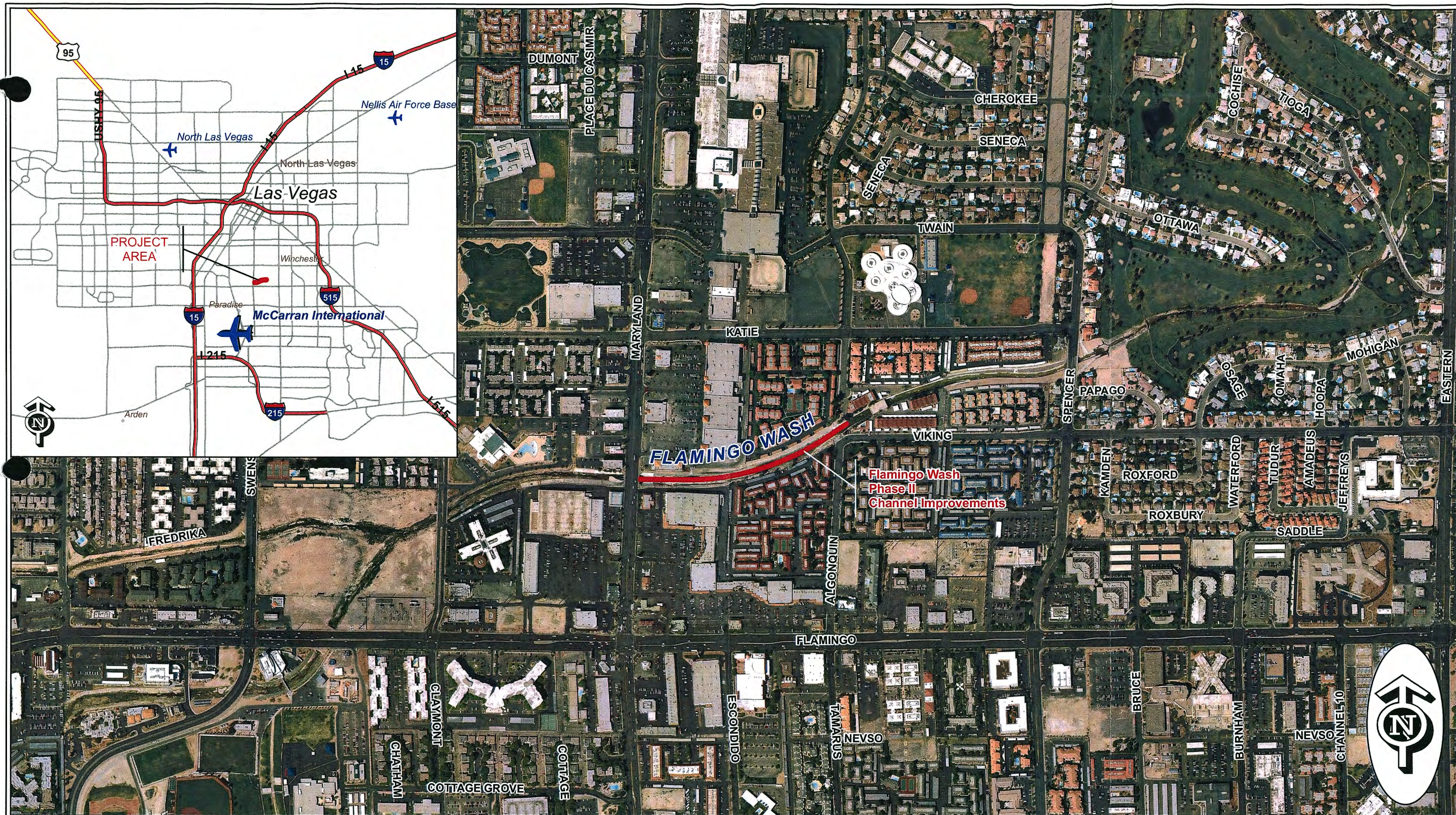
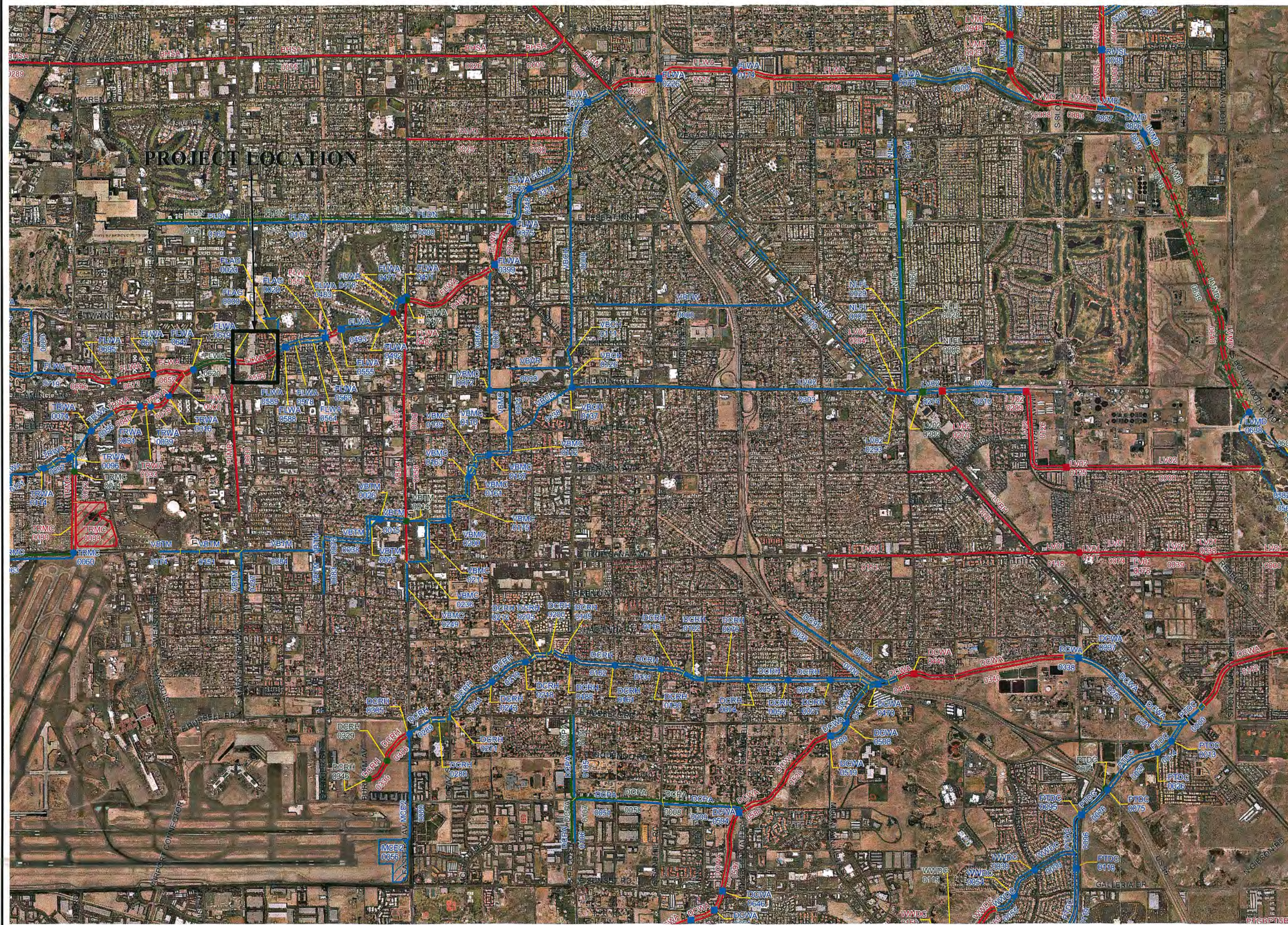


FIGURE 1: VICINITY MAP
 Flamingo Wash Channel Improvements CLOMR

— Proposed Wash Improvements Alignment





2002 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Culvert
- Bridge
- Pipeline
- Lined Channel
- Unlined Channel
- Dike
- Natural Wash
- ID-Mile Separator



0 1,000 2,000 3,000 4,000 5,000
Feet

SCALE: 1 inch = 3000 feet



FLOOD CONTROL FACILITIES FIGURE F-17



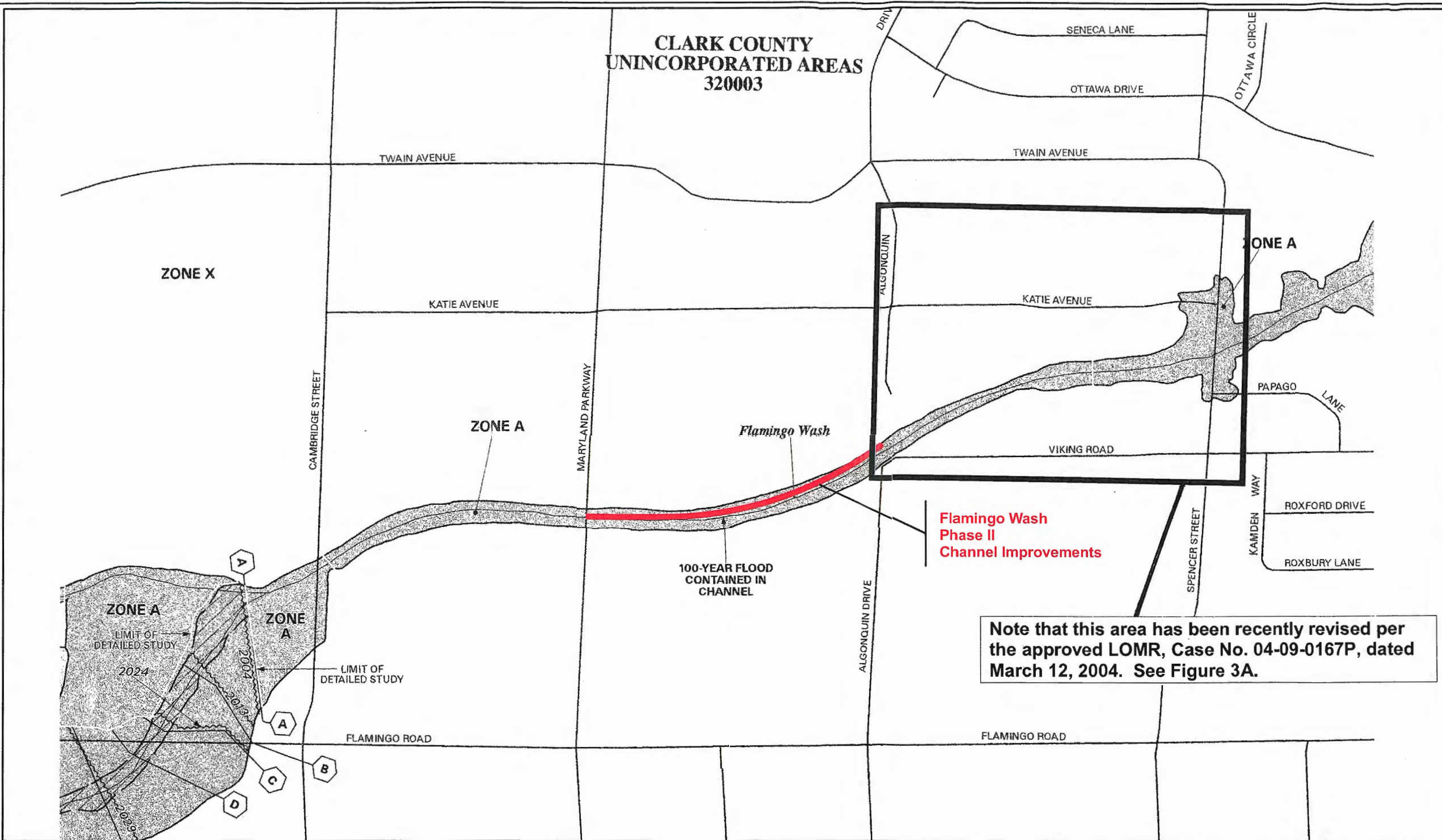
FIGURE 2

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BHSA 0000	E	72" RCP	1350	3462	CSA11*	SW3SC	7.76	0.79
0000	P1	14" X 12" RCB	1350	3462	CSA11*	SW3SC	7.76	0.79
0026	P1	12" X 12" RCB	4000	3462	CSA11*	SW3SC	7.76	1.30
	P1	12" X 10" RCB	5280	3462	CSA11*	SW3SC	7.76	2.11
	P1	14" X 13" RCB	6000	3462	CSA11*	SW3SC	7.76	0.87
	P1	14" X 12" RCB	2300	3462	CSA11*	SW3SC	7.76	0.87
DC35 0000	E	DUCK CREEK - US 95 BRANCH	2090	403	CDCC420	DUCK3	0.79	1.90
0038	E	72" RCP	1770	486	CDCC420	DUCK3	0.79	1.90
	E	64" RCP						
DCPA 0000	E	DUCK CREEK - PATRICK COLLECTOR	450	1333	CDCC340W	DUCK3	1.57	1.50
0001	P0	Parallel 78" & 66" RCP	450	1333	CDCC340W	DUCK3	1.57	1.50
0008	P0	Add 1: 66" RCP	2210	1333	CDCC340W	DUCK3	1.57	1.00
0009	P0	Add 1: 11" X 6" RCB	2210	1333	CDCC340W	DUCK3	1.57	0.80
0050	P0	Add 1: 14" X 5" RCB	2860	1333	CDCC340W	DUCK3	1.57	0.80
0051	E	66" RCP	2860	1333	CDCC340W	DUCK3	1.57	0.80
0104	P0	Add 1: 6" X 5" RCB	2650	406	DCC370	DUCK3	0.53	0.40
0105	E	60" RCP	2650	406	DCC370	DUCK3	0.53	0.40
0106	E	48" RCP	1360	449	CDCC330	DUCK3	0.51	0.50
0107	P0	Add 1: 8" X 4" RCB	1360	449	CDCC330	DUCK3	0.51	0.50
DCRH 0000	E	DUCK CREEK - RAWHIDE CHANNEL	610	1401	CDCC400W	DUCK3SC	2.16	1.80
0010	E	Gabion Chnl 20'W 10'D 2:1 SS	930	1401	CDCC400W	DUCK3SC	2.16	2.30
0010	E	Conc Chnl 15'W 6'D 1.5:1 SS	930	1401	CDCC400W	DUCK3SC	2.16	2.30
0027	E	2: 9' X 5' RCB @ Mountain Vista	80	1401	CDCC400W	DUCK3SC	2.16	1.40
0028	E	Conc Chnl 15'W 6'D 1.5:1 SS	1260	1401	CDCC400W	DUCK3SC	2.16	1.80
0052	E	2: 9' X 5' RCB @ Palm Ave	80	1401	CDCC400W	DUCK3SC	2.16	1.50
0053	E	Conc Chnl 10'W 6'D 1.5:1 SS	1320	1401	CDCC400W	DUCK3SC	2.16	1.60
0074	E	2: 9' X 5' RCB @ Lamb Blvd	50	1401	CDCC400W	DUCK3SC	2.16	1.30
0076	E	Conc Chnl 10'W 6'D 1.5:1 SS	1320	1401	CDCC400W	DUCK3SC	2.16	2.40
0101	E	Grass-lined Overflow Chnl 0'W 3.0'D 10:1 SS	730	1401	CDCC400W	DUCK3SC	2.16	0.70
0102	E	2: 8' X 5' RCB @ Annie Oakley	740	1401	CDCC400W	DUCK3SC	2.16	0.85
0116	E	Conc Chnl 15'W 6'D 1.5:1 SS	720	1401	CDCC400W	DUCK3SC	2.16	0.80
0130	E	2: 12' X 4' RCB @ Sandhill Rd	1091	1401	CDCC390	DUCK3SC	1.56	0.50
0131	E	Conc Chnl 11'W 3.5'D 1.5:1 SS	1410	1091	CDCC390	DUCK3SC	1.56	1.60
0161	E	2: 12' X 4' RCB @ Pearl Ave	80	1091	CDCC390	DUCK3SC	1.56	1.30
0162	E	Conc Chnl 11'W 3.5'D 1.5:1 SS	1300	1091	CDCC390	DUCK3SC	1.56	1.60
0188	E	2: 12' X 4' RCB @ Pecos Rd	200	759	CDCC380	DUCK3SC	1.03	0.90
0189	E	Conc Chnl 17'W 5.3'D 1.5:1 SS	650	759	CDCC380	DUCK3SC	1.03	1.80
0200	E	2: 8' X 4' RCB @ Sagebrush Rd	240	759	CDCC380	DUCK3SC	1.03	1.20
0205	E	Conc Chnl 12'W 5'D 1:1 SS	370	759	CDCC380	DUCK3SC	1.03	1.30
0212	E	Conc Chnl 11'W 5'D 1.5:1 SS	340	759	CDCC380	DUCK3SC	1.03	0.70
0216	E	2: 8' X 4' RCB @ Mojave Rd	80	759	CDCC380	DUCK3SC	1.03	1.00
0218	E	Conc Chnl 11'W 5'D 1.5:1 SS	1220	759	CDCC380	DUCK3SC	1.03	1.30
0243	E	2: 8' X 4' RCB @ McLeod Dr	120	759	CDCC380	DUCK3SC	1.03	2.10
0244	E	Conc Chnl 11'W 4'D 1.5:1 SS	1570	759	CDCC380	DUCK3SC	1.03	1.20
0271	E	2: 12' X 4' RCB @ Topaz St	480	759	CDCC380	DUCK3SC	1.03	0.50
0280	E	Conc Chnl 10'W 5'D 2:1 SS	510	759	CDCC380	DUCK3SC	1.03	0.70
0289	E	15' X 5' RCB @ Euclid Ave	710	759	CDCC380	DUCK3SC	1.03	0.70
0302	E	Transition Structure	50	535	CDMC060	DUCK3SC	0.60	1.00
0305	E	3: 8' X 4' RCB @ Eastern Ave	125	535	CDMC060	DUCK3SC	0.60	0.80
0306	E	Earth Chnl 15'W 4'D 1:1 SS	1090	535	CDMC060	DUCK3SC	0.60	0.70
0306	P1	Conc Chnl 12'W 4.5'D 1.5:1 SS	1090	535	CDMC060	DUCK3SC	0.60	0.70
0329	E	2: 36" RCP @ Oquendo Rd	60	535	CDMC060	DUCK3SC	0.60	0.60
0329	E	Replaces with 3: 7' X 5' RCB @ Oquendo Rd	60	535	CDMC060	DUCK3SC	0.60	0.60
0330	E	Earth Chnl 15'W 4.5'D 1:1 SS	860	535	CDMC060	DUCK3SC	0.60	0.70
0330	P1	Conc Chnl 12'W 4.5'D 1.5:1 SS	860	535	CDMC060	DUCK3SC	0.60	0.70
0330	E	3: 18" RCP @ Burnham Rd	60	535	CDMC060	DUCK3SC	0.60	0.60
0330	P0	Replaces with 1: 10' X 7' RCB @ Burnham Rd	60	535	CDMC060	DUCK3SC	0.60	0.60
DCWA 0000	E	DUCK CREEK WASH	2700		CLDC020	DUCKPIT	51.06	0000
0168	E	Natural Wash	80		CLDC020	DUCKPIT	50.83	0168
0168	E	Dip Section @ Broadbent	140		CLDC020	DUCKPIT	50.83	0168
0168	P2	4: 28" X 8" RCB	500		CLDC020	DUCKPIT	50.83	0168
0168	P2	Conc Chnl 118'W 8.4'D 0:1 SS	500		CLDC020	DUCKPIT	50.83	0168
0168	P2	Conc Chnl 70'W 9'D 2:1 SS	3000		CLDC010	DUCKPIT	50.38	0168
0236	E	Conc Chnl 85'W 7.9'D 0:1 SS	200	10078	CLDC010	DUCKPIT	50.38	0236
0240	E	2: 20' X 10' RCB @ Boulder Hwy	5470	850	CDCC470	DUCK3SC	26.23	0240
0251	E	Conc Chnl 40'W 8.4'D 0:1 SS	850	6770	CDCC470	DUCK3SC	26.23	0251
0271	E	Conc Chnl 60'W 4.8'D 0:1 SS	710	6678	CDCC465	DUCK3SC	25.82	0271
0281	E	Conc Chnl 60'W 8.4'D 2:1 SS	2740	6644	CDCC460	DUCK3SC	25.59	0281
0337	E	Free Span Bridge 60'W 9.0'D @ Stephanie	80	6623	CDCC450	DUCK3SC	25.33	0337
0338	E	Conc Chnl 60'W 7.0'D 2:1 SS	450	6623	CDCC450	DUCK3SC	25.33	0338
0340	E	Earth Chnl 40'W 5'D 2:1 SS	3570	6623	CDCC450	DUCK3SC	25.33	0340
0340	P2	Conc Chnl 60'W 7'D 2:1 SS	3570	6623	CDCC450	DUCK3SC	25.33	0340
0429	P2	Drop Structure	6577	CDCC430W	DUCK3SC	24.88	0429	
0430	E	Earth Chnl 20'W 10'D 2:1 SS	1340	6577	CDCC430W	DUCK3SC	24.88	0430
0430	P2	Conc Chnl 60'W 6.4'D 2:1 SS	1340	6577	CDCC430W	DUCK3SC	24.88	0430
0443	P2	Free Span Bridge 60'W 7.9'D @ Nellis Blvd	150	6577	CDCC430W	DUCK3SC	24.88	0443
0444	E	Earth Chnl 20'W 15'D 2:1 SS	530	6577	CDCC430W	DUCK3SC	24.88	0444
0444	P2	Conc Chnl 60'W 6.4'D 2:1 SS	530	6577	CDCC430W	DUCK3SC	24.88	0444
0453	E	Conc Chnl 80'W 17.8'D 0:1 SS	330	6577	CDCC430W	DUCK3SC	24.88	0453
0457	E	Drop Structure	486	6555	CDCC385	DUCK3SC	24.54	0457
0458	E	Gabion Chnl 60'W 12'D 2:1 SS	180	6555	CDCC385	DUCK3SC	24.54	0458
0465	E	Free Span Bridge 50'W 18.5'D @ US 95	220	6562	CDCC400	DUCK3SC	24.00	0465
0466	E	Gabion Chnl 70'W 10'D 2:1 SS	110	5826	CDCC360*	DUCK3SC	21.47	0466
0468	E	Drop Structure	5826	CDCC360*	DUCK3SC	21.47	0468	
0469	E	Gabion Chnl 75'W 12'D 2:1 SS	220	5826	CDCC360*	DUCK3SC	21.47	0469
0470	E	Drop Structure	5826	CDCC360*	DUCK3SC	21.47	0470	
0471	E	Gabion Chnl 75'W 12'D 2:1 SS	1120	5826	CDCC360*	DUCK3SC	21.47	0471
0473	E	Drop Structure	5826	CDCC360*	DUCK3SC	21.47	0473	
0476	E	Drop Structure	5826	CDCC360*	DUCK3SC	21.47	0476	
0479	E	Drop Structure	5826	CDCC360*	DUCK3SC	21.47	0479	
0482	E	Drop Structure	5826	CDCC360*	DUCK3SC	21.47	0482	
0508	E	Free Span Bridge 140'W 15'D @ Russell	100	5826	CDCC360*	DUCK3SC	21.47	0508
0509	E	Gabion Chnl 75'W 12'D 2:1 SS	670	5826	CDCC360*	DUCK3SC	21.47	0509
0519	E	2 Span Bridge 50'W 15'18'D @ Min Vista	100	5826	CDCC360	DUCK3SC	21.47	0519
0520	E	Natural Wash	3660	5826	CDCC360	DUCK3SC	21.47	0520
0520	P1	Gabion Chnl 75'W 6.5'D 2:1 SS	3660	5826	CDCC360	DUCK3SC	21.47	0520
0580	P1	Conc Chnl 50'W 6.5'D 2:1 SS	230	5743	CDCC190*	DUCK3SC	19.15	0580
0594	E	2 Span Bridge 130'W 15'D @ GVP/Patrick	70	5743	CDCC190*	DUCK3SC	19.15	0594
0597	E	Natural Wash	2500	5743	CDCC190*	DUCK3SC	19.15	0597
0597	P1	Gabion Chnl 65'W 7'D 2:1 SS	2500	5743	CDCC190*	DUCK3SC	19.15	0597

*The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.

**As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
DCWA 0046	E	DUCK CREEK WASH - continued	100	5743	CDCC190	DUCK3SC	19.15	1.70
0647	E	Earth Chnl 50'W 15'D 2:1 SS	600	5743	CDCC190	DUCK3SC	19.15	1.00
0647	P1	Conc Chnl 50'W 6.5'D 2:1 SS	600	5743	CDCC190	DUCK3SC	19.15	1.00
0654	E	Free Span Bridge 40'W 15'D 3:1 SS	50	5743	CDCC190	DUCK3SC	19.15	1.00
0655	E	Earth Chnl 50'W 15'D 2:1 SS	790	5743	CDCC190	DUCK3SC	19.15	0.60
0655	P1	Conc Chnl 50'W 7.5'D 2:1 SS	790	5743	CDCC190	DUCK3SC	19.15	0.60
0668	E	Free Span Bridge 40'W 15'D 3:1 SS @ Sunfire	40	5743	CDCC190	DUCK3SC	19.15	1.00
0669	E	Natural Wash	1120	5743	CDCC190	DUCK3SC	19.15	1.00
0669	P1	Conc Chnl 50'W 8'D 2:1 SS	1120	5743	CDCC190	DUCK3SC	19.15	1.29
FLAG 0000	E	FLAMINGO WASH - ALGONQUIN	1080	543	FW21	FLAM3SC	0.47	0.50
0020	E	72" RCP	460	543	FW21	FLAM3SC	0.47	1.00
	E	66" RCP						
FLBN 0000	E	FLAMINGO - BOULDER HIGHWAY NORTH	2200	3827	CFR03	SW5SC	12.68	0.70
0000	P1	Conc Chnl 5'W 6'D 2:1 SS	2200	3827	CFR03	SW5SC	12.68	0.70
0038	E	Channel - Unknown Characteristics	6600	2706	CFR04	SW3SC	3.86	0.59
0038	P1	3: 9' X 8' RCB	6600	2706	CFR04	SW3SC	3.86	0.59
FLBS 0000	E	FLAMINGO - BOULDER HIGHWAY SOUTH	4060	1461	CB6	FLAM3SC	2.18	1.30
0000	E	Unlined Median Chnl 0'W 6.5'D 4.5:1 SS	8850	959	CB4	FLAM3SC	1.38	0.90
0167	E	Unlined Median Chnl 0'W 3.5'D 9:1 SS						
FLDN 0000	E	DESERT INN DRAIN EAST	6160	1321	CFW30AW	FLAM3SC	1.61	1.22
0001	P0	Add Parallel 12' X 6" RCB	6160	1321	CFW30AW	FLAM3SC	1.61	1.22
0116	E	54" RCP	2330	1184	CFW29	FLAM3SC	1.31	1.77
0117	P0	Add Parallel 10' X 6" RCB	2330	1184	CFW29	FLAM3SC	1.31	1.77
0160	E	48" RCP	2950	995	CFW28	FLAM3SC	1.00	1.28
0161	P0	Add Parallel 10' X 6" RCB	2950	995	CFW28	FLAM3SC	1.00	1.28
FLFA 0000	E	FLAMINGO - FASHION	2050	729	CFW17N	FLAM3SC	0.72	0.28
0037	E	12' X 5' RCB	3060	527	FW14	FLAM3SC	0.44	0.45
	E	8' X 5' RCB						
FLMR 0000	P1	FLAMINGO MARYLAND PARKWAY	4800	339	FW19	FLAM3SC	0.45	0.50
FLSP 0000	E	FLAMINGO WASH - SPENCER	420	543	FW21	FLAM3SC	0.47	1.10
0000	E	48" RCP						
FLWA 0000	E	FLAMINGO WASH	4570	10241	CFW38	FLAM5SC	34	



PANEL 2557 E

FIRM
FLOOD INSURANCE RATE MAP
 CLARK COUNTY,
 NEVADA AND
 INCORPORATED AREAS

PANEL 2557 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:	COMMUNITY	NUMBER	PANEL	SHEET
CLARK COUNTY, UNINCORPORATED AREAS	320003	2557	E	

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



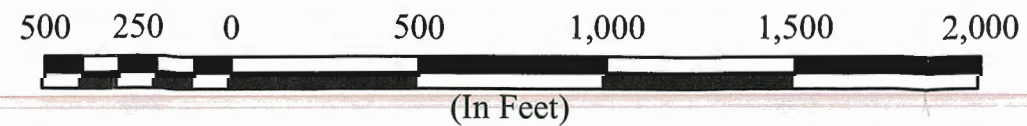
MAP NUMBER
 32003C2557 E

MAP REVISED:
 SEPTEMBER 27, 2002

Federal Emergency Management Agency



GRAPHIC SCALE



1 inch = 500 ft.

FIGURE 3

FEMA FLOODZONE MAP



2270 Corporate Circle
 Suite 100
 Henderson, Nevada 89074
 Tele: 702-263-7275
 Fax: 702-263-7200

ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES

**Request for Letter of Map Revision
Flamingo Wash
at Spencer Street
Clark County, Nevada**

Prepared for:
**CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT**
500 S. Grand Central Parkway
Las Vegas, NV 89155

**C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT**



Prepared by:
THE Louis Berger Group, INC.
500 Amigo Court, Suite 100
Las Vegas, Nevada 89119
(702) 736-6632



November 26, 2003



I. INTRODUCTION

This study provides hydraulic models and as-built plans in support of the Letter of Map Revision for the Flamingo Wash Maryland Parkway to Spencer Street Phase 1 improvements in Clark County, Nevada. The project consisted of approximately 1,070 ft of rectangular concrete channel improvements, replacement of box culverts with a free-span bridge, and construction of an energy dissipater at the downstream end (see Appendix D).

2.0 PRE-PROJECT CONDITIONS

Prior to construction of Flamingo Wash - Maryland Parkway to Spencer Street Phase I, the reinforced box culverts at Spencer Street did not have capacity to convey the 100-year flood. The wash in the project reach was earthen with discontinuous erosion protection on both banks. In July 1999, floodwater overtopped the Spencer Street box culvert and caused severe damage to the structure.

Figure 1 of Appendix B shows the limits of the pre-project (effective) 100-year special flood hazard area, Zone A, reflecting the backwater at the Spencer Street bridge. The effective 100-year flow in the project reach is 5,300 cfs. The effective special flood hazard area was modeled and delineated in the 1997 Flood Insurance Study (FIS) Restudy for the Flamingo Wash in Clark County, Nevada prepared by G.C. Wallace Inc. for the Clark County Regional Flood Control District.

3.0 POST-PROJECT CONDITIONS

Phase I of Flamingo Wash - Maryland Parkway to Spencer Street included the replacement of four 10 ft x 6 ft box culverts under Spencer Street with a single span bridge. The new bridge has an opening height of 10 ft and a span of 35 ft. The total open area is approximately 350 square feet.

A rectangular concrete channel was constructed between the bridge and the existing concrete lining located approximately 870 ft upstream of the bridge. The channel width varies from 45 ft to 35 ft wide, and the depth from 7.1 ft to 9 ft, respectively. Downstream of the bridge, the channel transitions to 50' wide before discharging into a sloped hydraulic jump basin. The basin was constructed to dissipate energy prior to releasing the flow into the grass-lined downstream reach of the wash.



As-built plans of the Flamingo Wash -- Maryland Parkway to Spencer Street Phase I improvements are provided in Appendix D. It should be noted that the HGL shown on the as-built plans is based on the channel 100-year design flow of 5,610 cfs, which represents future development in the upstream watershed.

With construction of the Flamingo Wash Phase I improvements, the 100-year flood is now contained within the channel as shown on the annotated FIRM, Figure 2 of Appendix B.

4.0 HYDRAULIC MODELS

4.1 Effective and Corrected Effective HEC-2 Models

A hydraulic model was prepared in the FIS for the reach of Flamingo Wash between Imperial Palace and Spencer Street. The "effective" FIS model was performed for the subcritical flow regime using the US Army Corps of Engineers HEC-2 Water Surface Profile computer program. Since the existing wash in the project reach was previously unlined, the subcritical model established the effective base flood elevations (BFEs).

The Louis Berger Group, Inc. (Berger) used the effective FIS model with two modifications. First, the model was imported into HEC-RAS; and second, the section and bridge elevations were raised by a factor of 2.26 ft to adjust them from the National Geodetic Vertical Datum of 1929 (NGVD29) to the North America Vertical Datum of 1988 (NAVD88). Datum conversion calculations are provided in Appendix C.

The modified FIS model is referred to herein as the "corrected" effective HEC-RAS model. A comparison of the results is provided in Table 1. Both the effective and corrected effective models are provided in Appendix C.

EFFECTIVE MODEL HEC-2 OUTPUT FILE (NGVD 29)

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1*****
* HEC-2 WATER SURFACE PROFILES *
* *
* Version 4.6.2; May 1991 *
* *
* RUN DATE 26NOV03 TIME 13:46:16 *
*****

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BASE2A.OUT

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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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PAGE 1

THIS RUN EXECUTED 26NOV03 13:46:16

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*****
HEC-2 WATER SURFACE PROFILES
Version 4.6.2; May 1991
*****

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T1 550.032
T2 FLAMINGO WASH FIS RESTUDY
T3 FLOODPLAIN DETERMINATION
T4 FILES: BASE2.DWG, BASE2.DAT
T4 STARTING WSE = NORMAL DEPTH
T4 SUBCRITICAL RUN

```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2			0.01			5500	1930	
J2	NPROF	IPLT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1		-1			-2		-6		

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	100	150								
NC	0.035	0.035	0.03	0.1	0.3					
X1	10	32	1220.49	1306.65						
GR	1935.1	1000	1934	1049.49	1932	1095.06	1930	1144.27	1928.13	1220.49
GR	1928	1220.83	1926	1228.41	1924	1235.7	1923.35	1237.99	1922	1249.9
GR	1921.7	1252.38	1922	1254.61	1924	1271.01	1924.23	1272.95	1925.54	1279.8
GR	1926	1285.65	1928	1306.65	1930	1322.46	1931.03	1329.96	1932	1344.12
GR	1934	1372.27	1936	1402.27	1936.46	1409.32	1936.88	1418.36	1938	1426.01
GR	1939	1436.49	1940	1496.07	1940.85	1580.86	1942	1671.03	1942.26	1677.54
GR	1942.4	1685.16	1944	1718.9						
NC	0.035	0.035	0.03							
X1	20	35	1227.96	1305.87	314.44	275.67	297.76			
GR	1936	1000	1935.65	1006.11	1934	1064.7	1932	1208.86	1931.19	1227.96
GR	1930	1233.9	1928	1243.73	1926	1253.48	1925.75	1254.71	1924.4	1278.37
GR	1925.1	1284.64	1926	1286.28	1928	1290.47	1930	1294.74	1931.66	1298.29
GR	1932	1305.87	1934	1329.91	1936	1346.51	1938	1362.32	1940	1377.32
GR	1940.2	1379.3	1940.6	1458.06	1940	1497.53	1939.68	1514.53	1939.62	1517.34
GR	1939.5	1549.95	1939.75	1574.13	1940	1575.86	1941.16	1586.4	1942	1601.6
GR	1942.2	1603.5	1944	1614.3	1945.22	1621.6	1945.43	1765.27	1946	1766.42
NC	0.025	0.025	0.015							
X1	30	28	1130.52	1218.84	407.19	429.8	417.8			

	1941.1	1000	1941.1	1090.06	1940.79	1103.29	1940	BASE2A.OUT	1938	1133.35
GR	1936	1135.91	1934	1138.18	1932	1140.33	1930	1130.52	1929.61	1142.75
GR	1929.4	1159.96	1928.83	1167.49	1930	1172.19	1930.19	1142.47	1930.28	1191.06
GR	1930	1194.2	1929.29	1201.75	1930	1203.16	1932	1173.44	1934	1211
GR	1936	1214.92	1938	1218.84	1939.89	1222.54	1940	1207.08	1941.2	1249.47
								1224.83		

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GR	1942	1260.06	1942.66	1268.85	1944	1274.05				
NC	0.025	0.025	0.015							
X1	40	12	1133.81	1184.19	10	10	10			
X3	0			1133.81	1942	1184.19	1942			
GR	1941.3	1000	1941.45	1090.13	1941.22	1104.02	1940	1133.81	1933.6	1133.81
GR	1933.6	1184.19	1940	1184.19	1940	1206.88	1941.22	1232.32	1942	1242.6
GR	1942.6	1251.47	1944	1256.84						

NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	170	50.38	2.38	240	0	1934.6	1933.6
X1	50	12	1184.49	1234.87	112.85	117.18	115.08			
X2			1	1939.599	1943.13			1.33		
X3	0			1184.49	1945	1234.87	1945			
GR	1942.5	1000	1943.06	1093.5	1942.65	1100.84	1942.61	1115.98	1942	1129.89
GR	1942	1184.49	1934.6	1184.49	1934.6	1234.87	1943	1234.87	1943	1239.96
GR	1943.2	1254.01	1943.64	1350.42						

NC	0.025	0.025	0.015							
QT	1	5300								
X1	60	27	1059.71	1149.4	375.8	397.17	387.41			
GR	1949.4	1000	1948	1015.95	1947.88	1017.39	1946.17	1047.07	1946	1049.22
GR	1945.2	1059.71	1944	1062.77	1942	1067.82	1940	1072.95	1939.77	1073.57
GR	1939.5	1090.82	1938	1094.84	1936.76	1097.96	1936.87	1110.33	1938	1113.23
GR	1939.2	1116.15	1939.37	1137.83	1940	1138.84	1942	1142.41	1944	1145.9
GR	1946	1149.4	1947.75	1152.54	1948	1155.14	1949.08	1165.1	1949.24	1192.51
GR	1950	1202.7	1950.32	1206.97						

NC	0.025	0.025	0.015							
X1	70	23	1062.67	1154.22	427.31	406.33	417.23			
GR	1952	1000	1951.01	1048.35	1950	1062.67	1949.99	1063.36	1948	1067.18
GR	1946	1070.79	1944	1074.17	1942.83	1076	1943.1	1084.29	1942	1099.07
GR	1941.8	1099.92	1941.57	1112.55	1942	1115.39	1943.17	1121.4	1943.35	1139.21
GR	1944	1140.31	1946	1143.61	1948	1146.85	1950	1149.96	1951.72	1152.28
GR	1952	1154.22	1953.75	1165.11	1953.84	1194.64				

NC	0.025	0.025	0.015							
X1	80	19	1056.35	1140.68	1	1	1			
GR	1952	1000	1952	1002.13	1951.45	1036.88	1950.33	1056.35	1950	1056.92
GR	1948	1060.33	1946	1063.74	1944	1067.15	1942.6	1068.83	1942.6	1132.22
GR	1944	1132.98	1946	1136.05	1948	1138.66	1950	1140.68	1951.88	1142.98
GR	1952	1143.96	1954	1156.72	1954	1157.77	1954.38	1201.02		

NC	0.025	0.025	0.015							
X1	90	23	1052.98	1113.6	53.02	56.59	51.93			
GR	1955.2	1000	1954	1006.02	1953.68	1007.66	1952.47	1022.15	1952	1035.65
GR	1951.6	1045.56	1951.07	1052.98	1950	1054.57	1948	1057.59	1946	1060.63
GR	1944	1063.71	1943.1	1065.06	1943.1	1105.06	1944	1109.3	1946	1110.15
GR	1948	1110.99	1950	1111.87	1952	1112.94	1953.03	1113.6	1954	1119.02
GR	1954.3	1121.63	1954	1145.66	1953.67	1187.07				

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NC	0.025	0.025	0.015							
X1	100	27	1068.7	1129.14	346.14	339.84	342.73			
GR	1958.9	1000	1959.19	1057.4	1958.29	1068.55	1958	1068.7	1956	1070.39
GR	1954	1071.98	1952	1073.58	1950	1075.17	1948	1076.75	1946	1078.32
GR	1944.7	1079	1944.7	1119	1946	1119.77	1948	1121.07	1950	1122.37
GR	1952	1123.68	1954	1124.99	1956	1126.31	1956.84	1126.86	1958	1129.14
GR	1960	1133.08	1961.7	1136.43	1962	1161.01	1962	1164.12	1962	1169.92
GR	1962.1	1180.79	1963.48	1218.41						

NC	0.025	0.025	0.015							
X1	110	25	1070.23	1130.3	1	1	1			
GR	1958	1000	1959.26	1058.72	1958.52	1069.8	1958	1070.23	1956	1071.86
GR	1954	1073.49	1952	1075.13	1950	1076.77	1948	1078.41	1947.23	1079.37

	GR	1947.2	1119.37	1948	1122.31	1950	1123.63	1952	BASE2A.OUT	1954	1126.29
	GR	1956	1127.61	1956.94	1128.23	1958	1130.3	1960	1124.96	1961.78	1137.72
	GR	1962	1156.11	1962	1162.57	1962	1167.55	1962.22	1134.23	1963.53	1218.4
	NC	0.025	0.025	0.015							
	X1	120	27	1082.95	1140.72	25.32	22.42	24.78			
	GR	1959.7	1000	1960	1034.06	1960.7	1069.3	1960	1077.37	1959.54	1081.8
	GR	1958	1082.95	1956	1084.44	1954	1085.94	1952	1087.44	1950	1088.93
	GR	1948	1090.43	1947.5	1090.88	1947.5	1130.88	1948	1133.47	1950	1134.85
	GR	1952	1136.24	1954	1137.62	1956	1138.99	1957.22	1139.81	1958	1140.72
	GR	1960	1142.7	1962	1144.46	1962.02	1148.81	1962	1152.73	1962	1157.77
	GR	1962.4	1185.25	1963.78	1223.58						
	NC	0.025	0.025	0.015							
	X1	130	24	1091.34	1145.53	125.29	125.61	125.31			
	GR	1963	1000	1962	1082.33	1960	1086.89	1958.57	1090.09	1958	1091.34
	GR	1956	1092.89	1954	1094.44	1952	1095.99	1950	1097.54	1948	1099.5
	GR	1948	1139.5	1950	1141.65	1952	1142.63	1954	1143.6	1956	1144.57
	GR	1958	1145.53	1960	1147.33	1961.39	1148.78	1962	1151.72	1962.83	1155.18
	GR	1964	1156.8	1964.47	1157.37	1965.16	1174.08	1965.71	1213.65		
	NC	0.025	0.025	0.015							
	X1	140	25	1123.53	1181.8	57.23	56.76	55.76			
	GR	1965.1	1000	1964	1109.48	1964.09	1112.94	1962	1117.49	1960	1121.87
	GR	1959.2	1123.53	1958	1124.74	1956	1126.67	1954	1128.54	1952	1130.26
	GR	1950	1131.84	1948.5	1132.5	1948.5	1172.5	1950	1175.19	1952	1176.29
	GR	1954	1177.52	1956	1178.95	1958	1180.42	1959.86	1181.8	1960	1182.12
	GR	1962	1186.57	1964	1191.03	1966	1195.47	1966.85	1197.34	1966.36	1258.33
	NC	0.025	0.025	0.015							
	X1	150	24	1135	1193.6	1	1	1			
	GR	1965.4	1000	1964.25	1124.53	1964	1124.8	1962	1129.47	1960	1133.87
	GR	1959.5	1135	1958	1136.46	1956	1138.43	1954	1140.4	1952	1142.4
	GR	1950.5	1143.5	1950.5	1183.5	1952	1187.45	1954	1189.03	1956	1190.57
	GR	1958	1192.09	1959.99	1193.6	1960	1193.68	1962	1198.04	1964	1202.42
	GR	1966	1206.72	1966.89	1208.61	1967.17	1222.54	1966.39	1280.29		

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	NC	0.025	0.025	0.015							
	X1	160	21	1022.9	1081.97	119.51	110.97	114.85			
	GR	1964	1000	1962	1020.85	1961.14	1022.9	1960	1024.28	1958	1026.68
	GR	1956	1029.05	1954	1031.39	1952	1033.69	1951.76	1033.96	1951.77	1074.55
	GR	1952	1074.73	1954	1076.3	1956	1077.86	1958	1079.44	1960	1081.05
	GR	1961.1	1081.97	1962	1085.8	1964	1091.98	1966	1097.23	1966.68	1098.86
	GR	1967.1	1124.37								
	NC	0.025	0.025	0.015							
	X1	170	24	1021.94	1098.85	98.31	96.38	97.13			
	GR	1967	1000	1966	1012.58	1965.99	1012.86	1964	1017.32	1962	1021.94
	GR	1961.3	1023.53	1960	1025.98	1958	1029.63	1956	1033.27	1954	1036.91
	GR	1952.3	1039.96	1952.49	1078.78	1952.8	1090.15	1954	1091.24	1956	1093.09
	GR	1958	1094.94	1960	1096.8	1961.88	1098.54	1962	1098.85	1964	1103.45
	GR	1966	1107.87	1968	1112.15	1968.22	1112.6	1968.32	1119.73		
	NC	0.03	0.03	0.025							
	X1	180	37	1105.54	1192.93	358.08	374.39	363.91			
	GR	1970	1000	1969.41	1028.94	1968.36	1064.62	1968.63	1086	1970	1087.29
	GR	1970.1	1087.42	1970	1100.03	1969.97	1105.54	1968	1109.38	1966	1113.23
	GR	1964	1117.01	1962	1120.79	1960	1124.58	1958	1128.36	1956.15	1131.88
	GR	1956.8	1143	1956	1147.31	1955.07	1152.03	1956	1170.74	1955.93	1170.74
	GR	1958	1176.71	1959.49	1180.23	1960	1180.82	1962	1183.17	1964	1185.58
	GR	1966	1188.01	1968	1190.47	1970	1192.93	1972	1195.38	1974	1197.84
	GR	1975.3	1199.53	1976	1202.18	1976.53	1204.15	1978	1230.41	1978.06	1230.73
	GR	1979.6	1268.21	1980	1278.63						
	NC	0.03	0.03	0.025							
	X1	190	42	1045.63	1134.18	349.99	362.07	356.25			
	GR	1980	1000	1979.83	1002.64	1978.63	1026.03	1978	1042.24	1977.86	1045.63
	GR	1976	1048.01	1974.65	1049.5	1974	1051.69	1972.2	1057.64	1972	1057.83
	GR	1970	1059.68	1968	1061.56	1966	1063.46	1964	1065.36	1962	1067.28
	GR	1960.4	1068.9	1960.4	1079.82	1960	1081.62	1958	1090.14	1957.64	1091.57
	GR	1957.9	1101.67	1958	1101.76	1960	1106.43	1960.85	1108.4	1962	1111.96
	GR	1963.3	1116.18	1964	1117.03	1966	1119.5	1968	1121.97	1970	1124.43
	GR	1972	1126.89	1974	1129.33	1976	1131.76	1978	1134.18	1980	1136.59

GR	1980.8	1137.6	1981.5	1143.92	1982	1150.97	1982.99	BASE2A.OUT	1984	1176.63
GR	1984.3	1179.97	1984.45	1222.66				1166.12		
NC	0.03	0.03	0.025							
X1	200	35	1081.17	1169.9	344.1	367.63	357.38			
GR	1979.8	1000	1979.18	1029.49	1979.12	1052.59	1978.6	1067.43	1978	1077.24
GR	1977.7	1081.17	1976	1083.12	1974	1085.36	1972	1087.6	1970	1089.84
GR	1968	1092.07	1966	1094.26	1964	1096.33	1963.25	1097.1	1962.44	1108.96
GR	1963.4	1118.36	1963.2	1132.05	1964	1134.42	1965.81	1139.65	1966	1140.91
GR	1968	1152.85	1968.07	1153.21	1970	1155.03	1972	1156.9	1974	1158.74
GR	1976	1160.58	1978	1162.42	1980	1164.26	1982	1166.1	1984	1167.93
GR	1986	1169.8	1986.14	1169.9	1985.91	1175.55	1988	1199.66	1988.33	1203.15

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NC	0.025	0.025	0.015							
X1	210	28	1020.72	1112.24	218.28	223.05	220.26			
GR	1984	1000	1984.02	1005.21	1982.67	1015.97	1982	1020.72	1980	1024.38
GR	1978	1026.77	1976	1029.13	1974	1031.45	1972	1033.74	1970	1036.02
GR	1968	1038.3	1966	1040.57	1965.48	1041.23	1965.56	1087.58	1966	1088.46
GR	1968	1090.47	1970	1092.59	1972	1094.71	1974	1096.83	1976	1098.95
GR	1978	1101.07	1980	1103.2	1982	1105.33	1984	1107.49	1986	1109.84
GR	1986.9	1112.24	1987.25	1118.07	1988	1138.44				

NC	0.025	0.025	0.015							
X1	220	7	1044.15	1104.44	96.67	97.77	95.38			
X3	0		1044.15	1044.15	1987	1104.44	1987			
GR	1986.2	1000	1986.57	1044.15	1968.66	1044.15	1968.66	1094.4	1986	1094.4
GR	1986.8	1104.44	1986.9	1141.04						

NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	115	50.25	2.25	576	0	1969.76	1968.66
X1	230	6	1059.76	1110.01	105.83	104.98	106.05			
X2			1	1981.76	1987.6			1.33		
X3	0			1059.76	1987.2	1110.01	1987.2			
GR	1987.1	1000	1987.1	1059.76	1969.76	1059.76	1969.76	1110.01	1987.1	1110.01
GR	1987.1	1161.77								

NC	0.025	0.025	0.025							
X1	240	24	1023.48	1114.49	100.09	99.49	98.95			
GR	1986	1000	1985.03	1014.57	1984.8	1023.48	1984	1025.31	1982	1030.02
GR	1980	1034.87	1978	1039.77	1976	1044.7	1975.59	1045.71	1975.71	1065.01
GR	1975.9	1076.65	1976	1079.47	1976.57	1085.82	1978	1090.42	1980	1094.27
GR	1982	1098.12	1984	1101.96	1986	1105.8	1988	1109.64	1990	1113.5
GR	1990.5	1114.49	1992.03	1119.47	1992	1119.74	1992.15	1125.82		

NC	0.025	0.025	0.025							
X1	250	29	1057.08	1169.75	483.82	467.47	478.12			
GR	1997.3	1000	1996	1025.03	1994	1057.08	1993.84	1059.01	1992	1061.82
GR	1990	1064.74	1988	1067.62	1986	1070.5	1984.57	1072.52	1984.32	1091.51
GR	1984	1092.06	1982	1095.54	1980	1099.12	1978.65	1101.59	1979.52	1114.22
GR	1980	1115.21	1982	1119.32	1982.68	1120.71	1982.27	1141.82	1984	1145.49
GR	1986	1149.77	1988	1154.11	1990	1158.51	1992	1162.95	1994	1167.41
GR	1995	1169.75	1994.48	1179.68	1996	1217.96	1998	1250.87		

NC	0.025	0.025	0.025							
X1	260	32	1125.84	1217.45	458.42	414.37	437.75			
GR	2002	1000	2000	1099.97	1999.98	1125.84	1998	1129.08	1996	1132.43
GR	1994	1135.78	1992	1139.14	1990.39	1141.83	1990.13	1157.45	1990	1157.66
GR	1988	1160.93	1986	1164.19	1984	1167.44	1982.24	1170.27	1982.12	1181.56
GR	1984	1184.35	1984.49	1185.06	1986	1192.93	1986.42	1195.31	1986.94	1204.85
GR	1988	1205.87	1990	1207.79	1992	1209.67	1994	1211.5	1996	1213.28
GR	1998	1214.99	2000	1216.64	2001.02	1217.45	2002	1230.77	2002.83	1241.5
GR	2002.6	1268.79	2003.91	1441.11						

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NC	0.025	0.025	0.02							
X1	270	16	1119.93	1157.26	213.44	213.44	213.69			
X3	0			1119.93	1999	1157.26	1999			
GR	1998.6	1000	1998.21	1067.08	1998	1077.71	1997.87	1089.69	1998	1095.71
GR	1998.1	1098.35	1998	1119.93	1983.4	1119.93	1983.4	1157.26	1998	1157.26
GR	2000	1175.33	2000.38	1176.08	2002	1184.44	2002.72	1188.02	2002.76	1209.37

BASE2A.OUT

GR	2004	1230.11								
NC	0.025	0.025	0.02							
SB	0.9	1.56	2.6	94	37.33	1.33	360	0	1984.3	1983.4
X1	280	17	1088.14	1124.47	110.45	115.15	110.04			
X2			1	1994.3	1997.3			1.33		
X3	0			1088.14	1999	1124.47	1999			
GR	2006	1000	2005.55	1016.53	2004	1023.84	2002	1033.33	2000.41	1040.84
GR	2000	1045.99	1999.38	1053.66	1998	1071.53	1997.96	1088.14	1984.3	1088.14
GR	1984.3	1124.47	1997.88	1124.47	1998	1130.07	1998.01	1135.33	1998	1135.45
GR	1997.3	1158.85	1998	1171.46						
NC	0.025	0.025	0.025							
QT	1	3900								
X1	290	27	1087.68	1216.15	402.5	479.38	451.82			
GR	2012.9	1000	2012.48	1087.68	2012	1088.64	2010	1092.64	2008	1096.63
GR	2006	1100.61	2004	1104.6	2002	1108.58	2000.01	1112.53	2000	1112.78
GR	1999.1	1129	1998	1131.23	1996	1134.95	1994	1138.62	1993.63	1139.29
GR	1993.7	1156.13	1994	1156.77	1996	1161.74	1998	1166.26	1998.4	1167.13
GR	2000	1187.26	2001.03	1198.95	2002	1203.24	2004	1211.29	2005.27	1216.15
GR	2006	1237.37	2006	1253.12						
NC	0.025	0.025	0.025							
X1	300	38	1101.61	1253.69	445.34	406.87	430.29			
GR	2022	1000	2023.2	1052.04	2023.19	1099.68	2022	1101.61	2020	1104.85
GR	2018	1108.13	2016	1111.46	2014	1114.82	2012	1118.18	2010.62	1120.51
GR	2010.6	1138.37	2010	1139.8	2008	1144.21	2006	1148.61	2004	1153
GR	2003.1	1154.97	2002	1161.54	2001.94	1161.9	2002	1162.1	2003.16	1166.76
GR	2004	1168.39	2006	1172.05	2008	1175.68	2010	1179.14	2012	1182.49
GR	2012.8	1183.85	2012.62	1222.77	2013.26	1227.82	2014	1230.57	2016	1238.32
GR	2016.5	1240.47	2018	1243.56	2020	1247.79	2022	1252.02	2022.49	1253.69
GR	2022.9	1271	2024	1310.6	2024.22	1318.33				
NC	0.025	0.025	0.015							
X1	310	9	1036.87	1067.87	360.41	351.83	353.38			
X3	0			1036.87	2020	1067.87	2020			
GR	2020.2	1000	2020	1012.51	2019.76	1026.57	2018	1036.87	2008	1036.87
GR	2008	1067.87	2018	1067.87	2018.74	1089.14	2020	1105.23		
NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	58	31	1	210	0	2008.4	2008
X1	320	6	1074.88	1105.88	89.08	89.25	86.84			
X2			1	2015.4	2020.2			1.33		
X3	0			1074.88	2021	1105.88	2021			
GR	2022	1000	2020	1074.88	2008.4	1074.88	2008.4	1105.88	2020	1105.88
GR	2020.4	1120.7								

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NC	0.035	0.035	0.03							
X1	330	32	1073.22	1159.42	407.14	409.75	409.02			
GR	2028.2	1000	2028	1028.29	2027.94	1033.37	2026.74	1044.04	2028	1061.85
GR	2028.6	1070.03	2028	1073.22	2027.23	1077.02	2026	1081.25	2024	1088.07
GR	2022	1094.83	2020	1101.57	2019.81	1102.13	2018	1104.59	2016	1107.4
GR	2015.2	1108.46	2014.22	1116.23	2015.11	1124.64	2016	1126.01	2018	1129.12
GR	2020	1132.3	2020.97	1133.92	2021.77	1151.67	2022	1152.07	2024	1155.53
GR	2026	1158.82	2026.16	1159.42	2026.49	1168.36	2026.56	1198.52	2028	1224.16
GR	2028	1226.25	2028	1243.60						
NC	0.035	0.035	0.03							
X1	340	23	1056.91	1165.92	416.01	411.16	414.66			
GR	2034	1000	2033.54	1041.15	2032.89	1056.91	2032	1071.73	2031.99	1071.84
GR	2030	1076.76	2028	1081.57	2026	1086.12	2024	1090.12	2023.05	1093.65
GR	2022	1113.5	2021.92	1114.5	2022	1115.38	2022.98	1128.04	2024	1134.12
GR	2025.2	1141.02	2026	1143.48	2028	1149.7	2030	1155.88	2031.85	1161.5
GR	2032	1165.92	2032.4	1227.24	2032.47	1306.6				
NC	0.025	0.025	0.015							
X1	350	8	1014	1077.2	391.21	407.9	400.22			
X3	0			1014	2036	1077.2	2036			
GR	2035.1	1000	2034	1014	2025.9	1014	2025.9	1077.2	2034	1077.2
GR	2036	1086.37	2036.2	1094.88	2036.44	1095.33				
NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	70	63.2	3.2	480	0	2025.9	2025.9

BASE2A.OUT

X1	360	8	1023.92	1087.12	69.15	67.58	69.23			
X2			1	2033.9	2036.06			1.33		
X3	0			1023.92	2037	1087.12	2037			
GR	2036	1000	2036.27	1011.98	2036	1023.92	2025.9	1023.92	2025.9	1087.12
GR	2036	1087.12	2036.11	1091.98	2036.81	1114.07				
NC	0.025	0.025	0.015							
X1	370	23	1037.84	1109.55	67.22	66.57	66.95			
GR	2039.2	1000	2039.54	1028.04	2038	1035.22	2037.44	1037.84	2036	1044.09
GR	2034	1048.46	2032	1052.89	2030	1057.17	2028	1060.8	2028	1064.5
GR	2028	1081.98	2028	1089.63	2028	1099.06	2028	1106.03	2030	1106.68
GR	2032	1107.62	2034	1108.62	2035.81	1109.55	2036	1112.07	2036.77	1118.39
GR	2037.6	1131.72	2038	1190.66	2038	1190.72				
NC	0.025	0.025	0.015							
X1	380	17	1037.66	1118.27	1	1	1			
GR	2039.3	1000	2039.67	1028.22	2038	1035.96	2037.63	1037.66	2036	1043.96
GR	2034	1049.96	2032	1055.19	2030	1060.04	2030	1066.79	2030	1104.28
GR	2032	1106.78	2034	1108.4	2035.83	1109.57	2036	1111.36	2036.85	1118.27
GR	2037.7	1131.66	2038	1190.48						
NC	0.035	0.035	0.03							
X1	390	28	1040.49	1129.17	384.6	427.73	409.92			
GR	2043.5	1000	2043.12	1008.96	2044	1038.32	2044.06	1040.22	2044	1040.49
GR	2043.9	1040.61	2044	1040.96	2044.44	1044.41	2044	1045.36	2042	1049.72
GR	2040	1054.05	2038	1058.31	2036	1062.53	2034	1066.73	2033.2	1068.42
GR	2033.1	1081	2032.17	1087.19	2033.73	1092.76	2033.91	1107.36	2034	1107.55
1	26NOV03	13:46:16							PAGE	8
GR	2036	1112.48	2038	1117.34	2040	1122.11	2042	1126.83	2042.99	1129.17
GR	2042	1141.02	2042.83	1171.51	2042.75	1213.88				
NC	0.025	0.025	0.015							
X1	400	26	1023.26	1125.1	427.56	379.77	400.26			
GR	2043.4	1000	2044	1008.84	2044.48	1016.77	2044.6	1018.87	2044.76	1023.26
GR	2044	1029.09	2043.84	1030.28	2042	1035.42	2040	1041	2038	1046.59
GR	2036	1052.17	2034.55	1056.13	2034	1071.56	2033.36	1076.02	2034	1078.19
GR	2034.8	1081.88	2035.08	1097.23	2036	1100.89	2036.84	1104.16	2038	1107.49
GR	2040	1113.12	2042	1118.75	2043.92	1124.26	2044	1125.1	2046	1147.4
GR	2048	1170.4								
NC	0.025	0.025	0.015							
X1	410	27	1023.15	1123.94	1	1	1			
GR	2043.5	1000	2044	1007.48	2044.57	1016.63	2044.79	1018.64	2044.89	1023.15
GR	2044	1030.2	2044.01	1030.29	2042	1035.51	2040	1040.71	2038	1045.88
GR	2036	1051.03	2035.83	1051.5	2034.27	1053.8	2034	1065.18	2033.41	1076.18
GR	2033.8	1083.76	2034	1088.34	2034.44	1098.59	2035.86	1100.44	2036	1101.24
GR	2038	1106.68	2040	1112.44	2042	1118.2	2043.99	1123.94	2044	1124.08
GR	2046	1146.2	2048	1169.51						
NC	0.025	0.025	0.015							
X1	420	24	1043.78	1135.75	57.42	58.75	57.86			
GR	2044.5	1000	2044.02	1013.17	2045.14	1029.1	2045.24	1031.49	2045.15	1043.78
GR	2044	1044.56	2042	1045.39	2040	1046.21	2038	1047.01	2036	1047.78
GR	2034.3	1048.4	2034	1070.27	2033.65	1090.96	2034	1102.69	2034.75	1134.3
GR	2036	1134.46	2038	1134.73	2040	1135	2042	1135.29	2044	1135.59
GR	2045	1135.75	2046	1151.17	2048	1177.91	2048.44	1184.02		
NC	0.025	0.025	0.015							
X1	430	11	1060.08	1090.66	208.31	211.94	208.45			
X3	0			1060.08	2048	1090.66	2048			
GR	2049	1000	2048	1009.5	2047.54	1017.61	2046.6	1060.08	2034.15	1060.08
GR	2034.1	1090.66	2046.6	1090.66	2046.27	1095.89	2046.88	1121.19	2047.37	1136.94
GR	2047.3	1157.66								
NC	0.025	0.025	0.015							
SB	1.25	1.56	2.6	31.5	30.58	0.58	300	0	2048.53	2034.15
X1	440	15	1046.07	1076.65	1470.06	1457.21	1463.68			
X2			1	2058.53	2060.53			2		
X3	0			1046.07	2060	1076.65	2060			
GR	2058.6	1000	2059.32	1015.39	2058.81	1046.07	2048.53	1046.07	2048.53	1076.65
GR	2058.8	1076.65	2060	1087.37	2062	1090.99	2064	1094.51	2065.63	1098.52
GR	2066	1100.87	2066.3	1103.82	2066	1113.26	2065.91	1115.86	2065.96	1135.4
NC	0.025	0.025	0.015							

							BASE2A.OUT			
X1	450	21	1069.16	1100.27	388.92	404.9	397.95			
GR	2063.1	1000	2062.46	1062.1	2062.1	1069.08	2062	1069.16	2060	1070.84
GR	2058	1072.51	2056	1074.19	2054	1075.87	2052.22	1077.38	2052.71	1098.84
GR	2054	1099.01	2056	1099.27	2058	1099.53	2060	1099.79	2062	1100.06
GR	2062.4	1100.27	2062.24	1102.13	2064	1106.77	2065.41	1110.3	2066	1138.35
GR	2068	1229.16								

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NC	0.025	0.025	0.015							
X1	460	23	1069.93	1105.01	393.56	408.01	401.61			
GR	2067.7	1000	2067.03	1064.15	2068	1069.93	2068.18	1070.53	2068	1070.67
GR	2066	1072.3	2064	1073.93	2062	1075.55	2060	1077.18	2058	1078.81
GR	2057.4	1079.29	2057.56	1100.18	2058	1100.27	2060	1100.7	2062	1101.09
GR	2064	1101.46	2066	1101.81	2066.59	1101.91	2068	1105.01	2068.95	1107
GR	2070	1116.39	2070.87	1124.41	2070	1214.9				

NC	0.025	0.025	0.015							
X1	470	21	1076.93	1115.33	402.75	394.14	398.77			
GR	2073.8	1000	2072.77	1065.9	2073.13	1076.93	2072	1077.24	2070	1078.56
GR	2068	1079.79	2066	1080.99	2064	1082.22	2062.67	1083.04	2062.71	1107.09
GR	2064	1107.31	2066	1107.65	2068	1108.01	2070	1108.51	2071.42	1108.98
GR	2072	1110.03	2074	1114.41	2074.36	1115.33	2074	1124.29	2073.8	1135.27
GR	2074	1315.22								

NC	0.025	0.025	0.015							
X1	480	21	1026.66	1163.79	213.66	185.9	192.99			
X3	0		1026.66	1026.66	2076	1163.79	2076			
GR	2073.6	1000	2073.75	1014.61	2074	1017.95	2074.97	1026.66	2074	1030.55
GR	2072	1042.8	2070	1054.27	2068	1065.84	2066	1074.47	2064.18	1079.6
GR	2064.2	1126.09	2066	1130.87	2068	1136.31	2070	1145.62	2072	1154.99
GR	2073.1	1163.79	2073.64	1179.89	2074	1182.32	2074	1184.45	2073.75	1196.44
GR	2073.7	1218.52								

NC	0.1	0.1	0.016							
NH	5	0.1	1078.9	0.016	1133.91	0.1	1380	0.016	1473.5	0.1
NH	1592.8									
QT	1	1950								
X1	490	26	1380	1473.5	137.94	134.7	133.56			
X3	0		1380	1380	2077	1473.5	2077			
GR	2076.2	1000	2076	1070.44	2075.7	1078.9	2075.65	1093.59	2074.77	1095.59
GR	2075.1	1113.21	2074.62	1131.24	2075.52	1133.91	2075.42	1139.4	2074.8	1147.24
GR	2074.6	1237.96	2074.44	1262.26	2075.25	1380	2074	1384.16	2072.88	1388.18
GR	2073.4	1392.2	2072.56	1396.28	2072.65	1422.63	2072.87	1453.13	2073.88	1455.88
GR	2074	1460.2	2074.02	1460.41	2075.24	1473.5	2076	1489.31	2076.27	1548.19
GR	2076.6	1592.8								

NC	0.1	0.1	0.016							
NH	5	0.1	1085.11	0.016	1149.87	0.1	1383.37	0.016	1469.12	0.1
NH	1584.8									
X1	500	29	1383.37	1469.12	201.63	205.58	201.53			
X3	0		1383.37	1383.37	2079	1469.12	2079			
GR	2077.9	1000	2078	1079.54	2078.04	1084.64	2078	1085.11	2077.79	1096.49
GR	2077	1098.93	2076.88	1117.48	2076.69	1135.33	2077.46	1137.07	2076.9	1141.08
GR	2078	1148.66	2078.19	1149.87	2078	1161.08	2077.06	1239.92	2076.66	1266.66
GR	2076	1383.37	2076	1383.6	2075.41	1391.31	2075.55	1394.62	2074.64	1397.49
GR	2074.8	1425.39	2074.83	1456.48	2075.69	1459.45	2075.8	1463.28	2076	1464.24
GR	2076.8	1469.12	2077.99	1555.71	2078	1559.68	2078	1584.8		

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NC	0.1	0.1	0.016							
NH	5	0.1	1084.93	0.016	1136.15	0.1	1383.68	0.016	1470.61	0.1
NH	1543.7									
X1	510	28	1383.68	1470.61	200.34	198.87	199.21			
X3	0		1383.68	1383.68	2081	1470.61	2081			
GR	2080.5	1000	2080	1069.72	2079.8	1084.93	2079.47	1096.82	2078.88	1098.95
GR	2079.3	1116.36	2078.64	1134.53	2079.78	1136.15	2079.18	1140.94	2079.36	1149.29
GR	2080	1183.52	2080	1201.45	2078.71	1236.9	2078.59	1265.15	2079.65	1292.21
GR	2078.4	1383.68	2078	1386.37	2077.43	1390	2077.38	1394.06	2076.69	1397.95
GR	2076.7	1425.28	2076.58	1455.81	2077.08	1458.62	2077.38	1463.12	2078	1465.32
GR	2079.5	1470.61	2080	1485.7	2080.44	1543.7				

BASE2A.OUT

NC	0.1	0.1	0.016							
NH	5	0.1	1084.05	0.016	1123.94	0.1	1366.83	0.016	1457.45	0.1
NH	1523									
X1	520	29	1366.83	1457.45	198.12	199.29	199.24			
X3	0			1366.83	2082	1457.45	2082			
GR	2081.5	1000	2081.42	1074.05	2081.73	1084.05	2080.98	1087.47	2081.18	1103.48
GR	2081	1121.11	2081.86	1123.94	2081.43	1128.1	2082.01	1134.95	2081.95	1146.76
GR	2082	1147.04	2082	1203.66	2081.83	1213.57	2081.16	1228.52	2080.95	1263.15
GR	2080.5	1366.83	2080	1370.04	2078.47	1378.27	2079.13	1381.53	2078.01	1385.19
GR	2078	1386.82	2078	1398.81	2078.24	1413.06	2078.26	1444.5	2079.01	1446.65
GR	2079.4	1450.39	2080	1453.11	2080.92	1457.45	2081.93	1523		

NC	0.1	0.1	0.016							
NH	5	0.1	1082.96	0.016	1123.08	0.1	1346.74	0.016	1431.3	0.1
NH	1601									
X1	530	22	1346.74	1431.3	210.23	241.33	227.48			
X3	0			1346.74	2084	1431.3	2084			
GR	2083.2	1000	2083.7	1072.53	2083.71	1082.96	2082.35	1086.89	2082.9	1102.27
GR	2082.6	1119.01	2083.62	1123.08	2083.29	1128.26	2083.02	1136.13	2083.01	1241.73
GR	2082.6	1346.74	2082	1350.59	2080.52	1359.41	2081.3	1362.33	2079.98	1367.32
GR	2080.1	1393.44	2080.61	1421.98	2081.51	1425.57	2081.9	1430.88	2082	1431.3
GR	2084	1513.51	2084	1601						

NC	0.1	0.1	0.016							
NH	5	0.1	1034.63	0.016	1082.12	0.1	1155.7	0.016	1242.61	0.1
NH	1662.5									
X1	540	30	1155.7	1235.18	173.09	201.13	189.3			
X3	0			1155.7	2085	1235.18	2085			
GR	2085.3	1000	2084.14	1027.87	2084.28	1034.63	2084	1036.59	2083.69	1038.99
GR	2083.3	1056.98	2083.17	1073.21	2084	1074.74	2084.32	1075.3	2084	1077.59
GR	2083.7	1080.12	2084	1081.27	2084.31	1082.12	2084.15	1103.24	2084	1125.27
GR	2083	1155.7	2082.23	1161.51	2082.99	1165.34	2082.14	1167.92	2082	1174.17
GR	2081.4	1199.23	2082	1213.92	2082.61	1230.67	2083.48	1235.18	2083.43	1242.61
GR	2084	1265.06	2083.87	1279.58	2084	1288.94	2086	1635.3	2086.16	1662.5

NC	0.1	0.1	0.016							
X1	550	11	1113.83	1286.4	237.87	248.39	244.36			
X3	0			1113.83	2087	1286.4	2087			
GR	2086	1000	2086	1006.83	2085.22	1113.83	2084.16	1169.33	2084.02	1177.67
GR	2084	1177.78	2084	1240.62	2084.59	1242.98	2084.41	1250.04	2086	1277.72
GR	2086.6	1286.4								

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NC	0.016	0.016	0.015							
QT	1	3900								
X1	560	19	1011.29	1090.36	63.57	64.65	67.51			
GR	2090.9	1009.62	2084.97	1009.62	2084	1011.29	2082	1014.16	2080	1017.23
GR	2078	1020.53	2077.65	1021.06	2076	1034.43	2076	1048.77	2076.12	1053.14
GR	2078	1053.74	2080	1054.61	2082	1055.47	2083.53	1056.15	2083.54	1085.21
GR	2084	1086.7	2085.15	1090.36	2085.23	1098.87	2088.23	1098.87		

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SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XLN	XLNCH	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
ALLOWABLE ERROR FOR CRITICAL DEPTH DETERMINATION (ALLDC) = 2.000 PERCENT OF THE DEPTH

CCHV=	.100	CEHV=	.300							
*SECNO	10.000									
3720	CRITICAL DEPTH ASSUMED									
10.000	8.50	1930.20	1930.20	1930.00	1931.98	1.78	.00	.00	1928.13	
5500.0	291.9	5142.0	66.1	87.1	466.3	19.1	.0	.0	1928.00	
.00	3.35	11.03	3.45	.035	.030	.035	.000	1921.70	1139.32	

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.005307 0. 0. 0. 0 8 5 .00 BASE2A.OUT
184.60 1323.92

*SECNO 20.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

20.000	8.92	1933.32	1933.32	.00	1935.22	1.90	1.56	.04	1931.19
5500.0	290.5	5185.3	24.2	95.9	456.1	10.5	3.9	1.4	1932.00
.01	3.03	11.37	2.31	.035	.030	.035	.000	1924.40	1113.63
.005174	314.	298.	276.	0	8	0	.00	208.12	1321.75

*SECNO 30.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

30.000	6.93	1935.76	1935.76	.00	1938.47	2.71	1.29	.24	1940.00
5500.0	.0	5500.0	.0	.0	416.7	.0	8.6	2.7	1938.00
.02	.00	13.20	.00	.000	.015	.000	.000	1928.83	1136.18
.002049	407.	418.	430.	0	15	0	.00	78.28	1214.46

*SECNO 40.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1133.8 1184.2 TYPE= 1 TARGET= 50.380

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SECNO	DEPTH	CWSEL	CRIS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XLN	XLNCH	XLNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

ELENC=	1942.00	ELENCR=	1942.00						
40.000	7.15	1940.75	1940.75	.00	1944.37	3.62	.02	.27	1940.00
5500.0	.0	5500.0	.0	.0	360.4	.0	8.7	2.7	1942.00
.02	.00	15.26	.00	.000	.015	.000	.000	1933.60	1133.81
.002365	10.	10.	10.	0	8	0	.00	50.38	1184.19

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 1939.65 , NOT 1940.75 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFO	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.90	1.56	2.60	170.00	50.38	2.38	240.00	.00	1934.60	1933.60	

*SECNO 50.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
1953.48	1947.40	.00	2011.	3490.	240.	240.	1939.60	1943.13	170.

3470 ENCROACHMENT STATIONS= 1184.5 1234.9 TYPE= 1 TARGET= 50.380

ELENC=	1945.00	ELENCR=	1945.00						
50.000	8.98	1943.58	.00	.00	1945.88	2.29	1.51	.00	1942.00
5500.0	.0	5500.0	.0	.0	452.5	.0	9.8	2.9	1945.00

.02	.00	12.16	.00	.000	.015	.000	.000	BASE2A.OUT	
.001174	113.	115.	117.	5	0	4	.00	1934.60	1184.49
								50.38	1234.87

*SECNO 60.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

60.000	7.62	1944.38	1944.38	.00	1946.90	2.51	.59	.07	1945.20
5300.0	.0	5300.0	.0	.0	416.6	.0	13.6	3.5	1946.00
.03	.00	12.72	.00	.000	.015	.000	.000	1936.76	1061.80
.002073	376.	387.	397.	0	15	0	.00	84.77	1146.57

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 70.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

70.000	6.80	1948.37	1948.37	.00	1950.94	2.58	.86	.02	1950.00
5300.0	.0	5300.0	.0	.0	411.4	.0	17.6	4.3	1952.00
.04	.00	12.88	.00	.000	.015	.000	.000	1941.57	1066.48
.002036	427.	417.	406.	0	11	0	.00	80.94	1147.42

*SECNO 80.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

80.000	5.79	1948.39	1948.39	.00	1950.98	2.59	.00	.00	1950.33
5300.0	.0	5300.0	.0	.0	410.2	.0	17.6	4.3	1950.00
.04	.00	12.92	.00	.000	.015	.000	.000	1942.60	1059.66
.002032	1.	1.	1.	0	11	0	.00	79.40	1139.06

*SECNO 90.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

90.000	7.27	1950.37	1950.37	.00	1953.58	3.21	.11	.19	1951.07
5300.0	.0	5300.0	.0	.0	368.4	.0	18.1	4.4	1953.03
.04	.00	14.39	.00	.000	.015	.000	.000	1943.10	1054.03
.002065	53.	52.	57.	0	11	0	.00	58.04	1112.07

*SECNO 100.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

100.000	7.80	1952.50	1952.50	.00	1956.01	3.51	.72	.09	1958.00
5300.0	.0	5300.0	.0	.0	352.6	.0	20.9	4.8	1958.00
.04	.00	15.03	.00	.000	.015	.000	.000	1944.70	1073.18
.002123	346.	343.	340.	0	8	0	.00	50.82	1124.01

*SECNO 110.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

110.000	7.50	1954.70	1954.70	.00	1958.06	3.35	.00	.02	1958.00
5300.0	.0	5300.0	.0	.0	360.6	.0	20.9	4.8	1958.00
.04	.00	14.70	.00	.000	.015	.000	.000	1947.20	1072.92
.002059	1.	1.	1.	0	8	0	.00	53.84	1126.76

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	BASE2A.OUT	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	ELMIN	ENDST
								TOPWID	
*SECNO 120.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
120.000	7.52	1955.02	1955.02	.00	1958.42	3.40	.05	.01	1958.00
5300.0	.0	5300.0	.0	.0	358.3	.0	21.1	4.8	1958.00
.04	.00	14.79	.00	.000	.015	.000	.000	1947.50	1085.18
.002086	25.	25.	22.	0	5	0	.00	53.14	1138.32

*SECNO 130.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
130.000	7.65	1955.65	1955.65	.00	1959.14	3.49	.26	.03	1958.00
5300.0	.0	5300.0	.0	.0	353.6	.0	22.1	5.0	1958.00
.05	.00	14.99	.00	.000	.015	.000	.000	1948.00	1093.16
.002111	125.	125.	126.	0	8	0	.00	51.24	1144.40

*SECNO 140.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
140.000	7.67	1956.17	1956.17	.00	1959.59	3.42	.12	.01	1959.20
5300.0	.0	5300.0	.0	.0	357.0	.0	22.6	5.0	1959.86
.05	.00	14.85	.00	.000	.015	.000	.000	1948.50	1126.51
.002091	57.	56.	57.	0	5	0	.00	52.57	1179.07

*SECNO 150.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
150.000	7.47	1957.97	1957.97	.00	1961.26	3.29	.00	.01	1959.50
5300.0	.0	5300.0	.0	.0	364.1	.0	22.6	5.0	1959.99
.05	.00	14.56	.00	.000	.015	.000	.000	1950.50	1136.49
.002038	1.	1.	1.	0	8	0	.00	55.57	1192.06

*SECNO 160.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
160.000	7.60	1959.36	1959.36	.00	1962.64	3.29	.23	.00	1961.14
5300.0	.0	5300.0	.0	.0	364.3	.0	23.6	5.2	1961.10
.05	.00	14.55	.00	.000	.015	.000	.000	1951.76	1025.05
.002033	120.	115.	111.	0	5	0	.00	55.48	1080.53

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

*SECNO 170.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.78

170.000	9.32	1961.62	1959.03	.00	1962.94	1.32	.10	.20	1962.00
5300.0	.0	5300.0	.0	.0	575.2	.0	24.6	5.3	1962.00
.05	.00	9.21	.00	.000	.015	.000	.000	1952.30	1022.79
.000641	98.	97.	96.	5	11	0	.00	75.51	1098.30

*SECNO 180.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

BASE2A.OUT

3720 CRITICAL DEPTH ASSUMED
 180.000 8.00 1963.07 1963.07 .00 1966.04 2.97 .52 .49 1969.97
 5300.0 .0 5300.0 .0 .0 383.5 .0 28.6 5.9 1970.00
 .06 .00 13.82 .00 .000 .025 .000 .000 1955.07 1118.76
 .005561 358. 364. 374. 0 15 0 .00 65.70 1184.46

*SECNO 190.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
 190.000 9.21 1966.85 1966.85 .00 1970.05 3.20 1.98 .07 1977.86
 5300.0 .0 5300.0 .0 .0 369.4 .0 31.7 6.4 1978.00
 .07 .00 14.35 .00 .000 .025 .000 .000 1957.64 1062.65
 .005536 350. 356. 362. 0 8 0 .00 57.91 1120.55

*SECNO 200.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
 200.000 8.06 1970.50 1970.50 .00 1973.44 2.93 1.99 .03 1977.70
 5300.0 .0 5300.0 .0 .0 385.6 .0 34.8 6.9 1986.14
 .07 .00 13.74 .00 .000 .025 .000 .000 1962.44 1089.27
 .005582 344. 357. 368. 0 11 0 .00 66.23 1155.50

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SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XLN	XLNCH	XLNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 210.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
 210.000 6.98 1972.46 1972.46 .00 1975.53 3.07 .69 .04 1982.00
 5300.0 .0 5300.0 .0 .0 377.2 .0 36.7 7.3 1986.90
 .08 .00 14.05 .00 .000 .015 .000 .000 1965.48 1033.21
 .002020 218. 220. 223. 0 11 0 .00 61.98 1095.20

*SECNO 220.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
 3470 ENCROACHMENT STATIONS= 1044.2 1104.4 TYPE= 1 TARGET= 60.290
 ELENCL= 1987.00 ELENCR= 1987.00
 220.000 7.00 1975.66 1975.66 .00 1979.19 3.53 .21 .14 1986.57
 5300.0 .0 5300.0 .0 .0 351.7 .0 37.5 7.4 1987.00
 .08 .00 15.07 .00 .000 .015 .000 .000 1968.66 1044.15
 .002397 97. 95. 98. 0 5 0 .00 50.25 1094.40

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 1974.60 , NOT 1975.66 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.90	1.56	2.60	115.00	50.25	2.25	576.00	.00	1969.76	1968.66	

*SECNO 230.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.41

CLASS B LOW FLOW

3420 BRIDGE W.S.= 1976.44 BRIDGE VELOCITY= 15.27 CALCULATED CHANNEL AREA= 321.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN

.00 1980.78 .00 0. 5300. 576. 576. 1981.76 BASE2A.OUT
1987.60 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

3470 ENCROACHMENT STATIONS= 1059.8 1110.0 TYPE= 1 TARGET= 50.250
 ELENCL= 1987.20 ELENCR= 1987.20
 230.000 8.77 1978.53 .00 .00 1980.78 2.24 1.59 .00 1987.10
 5300.0 .0 5300.0 .0 .0 440.9 .0 38.5 7.5 1987.20
 .08 .00 12.02 .00 .000 .015 .000 1969.76 1059.76
 .001213 106. 106. 105. 0 0 0 .00 50.25 1110.01

*SECNO 240.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

240.000	7.26	1982.85	1982.85	.00	1985.65	2.79	.22	.16	1984.80
5300.0	.0	5300.0	.0	.0	395.2	.0	39.4	7.6	1990.50
.09	.00	13.41	.00	.000	.025	.000	.000	1975.59	1028.01
.005513	100.	99.	99.	0	15	0	.00	71.75	1099.76

*SECNO 250.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

250.000	8.94	1987.59	1987.59	.00	1990.11	2.52	2.73	.03	1994.00
5300.0	.0	5300.0	.0	.0	415.8	.0	43.9	8.5	1995.00
.10	.00	12.75	.00	.000	.025	.000	.000	1978.65	1068.21
.005924	484.	478.	467.	0	11	0	.00	85.01	1153.22

*SECNO 260.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

260.000	10.17	1992.29	1992.29	.00	1995.08	2.79	2.56	.08	1999.98
5300.0	.0	5300.0	.0	.0	395.7	.0	48.0	9.3	2001.02
.10	.00	13.40	.00	.000	.025	.000	.000	1982.12	1138.65
.005753	458.	438.	414.	0	8	0	.00	71.29	1209.94

*SECNO 270.000

3301 HV CHANGED MORE THAN HVINS

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 1119.9 1157.3 TYPE= 1 TARGET= 37.330
 ELENCL= 1999.00 ELENCR= 1999.00
 270.000 9.27 1992.67 1991.95 .00 1996.31 3.64 .98 .26 1998.00
 5300.0 .0 5300.0 .0 .0 346.2 .0 49.8 9.6 1999.00
 .11 .00 15.31 .00 .000 .020 .000 1983.40 1119.93
 .003731 213. 214. 213. 3 11 0 .00 37.33 1157.26

SPECIAL BRIDGE

BASE2A.OUT

5227 DOWNSTREAM ELEV IS 1990.77 , NOT 1992.67 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.56	2.60	94.00	37.33	1.33	360.00	.00	1984.30	1983.40

*SECNO 280.000

3301 HV CHANGED MORE THAN HVINS

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
1997.92	1997.77	.00	75.	5214.	360.	360.	1994.30	1997.30	94.

3470 ENCROACHMENT STATIONS=	1088.1	1124.5	TYPE=	1	TARGET=	36.330
ELENC= 1999.00	ELENC= 1999.00					
280.000	10.40	1994.70	.00	.00	1997.75	3.05
5300.0	.0	5300.0	.0	.0	378.0	.0
.11	.00	14.02	.00	.000	.020	.000
.002868	110.	110.	115.	4	0	2
						.00
						36.33
						1124.47

*SECNO 290.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

290.000	7.98	2001.61	2001.61	.00	2003.57	1.96	1.75	.11	2012.48
3900.0	.0	3900.0	.0	.0	347.0	.0	54.4	10.3	2005.27
.12	.00	11.24	.00	.000	.025	.000	.000	1993.63	1109.36
.006359	403.	452.	479.	0	19	0	.00	92.14	1201.50

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	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 300.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

300.000	10.59	2012.53	2012.53	.00	2014.71	2.18	2.46	.07	2022.00
3900.0	.0	3900.0	.0	.0	328.9	.0	57.8	11.1	2022.49
.13	.00	11.86	.00	.000	.025	.000	.000	2001.94	1117.29
.005150	445.	430.	407.	0	10	0	.00	66.10	1183.39

*SECNO 310.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=	1036.9	1067.9	TYPE=	1	TARGET=	31.000
ELENC= 2020.00	ELENC= 2020.00					
310.000	7.87	2015.87	2015.87	.00	2019.84	3.97
3900.0	.0	3900.0	.0	.0	244.0	.0
.14	.00	15.99	.00	.000	.015	.000
.002875	360.	353.	352.	0	15	0
						.00
						31.00
						1067.87

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 2014.87 , NOT 2015.87 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

BASE2A.OUT

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.56	2.60	58.00	31.00	1.00	210.00	.00	2008.40	2008.00

*SECNO 320.000

3280 CROSS SECTION 320.00 EXTENDED .31 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.89

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
2024.22	2020.63	.00	468.	3429.	210.	210.	2015.40	2020.20	58.

3470 ENCROACHMENT STATIONS=	1074.9	1105.9	TYPE=	1	TARGET=	31.000
ELENCL= 2021.00 ELENCR= 2021.00						
320.000	12.31	2020.71	.00	.00	2022.33	1.62
3900.0	.0	3900.0	.0	.0	381.4	.0
.14	.00	10.22	.00	.000	.015	.000
.000803	89.	87.	89.	3	0	2
						.00
						31.00
						1105.88

*SECNO 330.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED									
330.000	9.55	2023.77	2023.77	.00	2026.20	2.43	.78	.24	2028.00
3900.0	.0	3900.0	.0	.0	311.7	.0	64.0	12.0	2026.16
.15	.00	12.51	.00	.000	.030	.000	.000	2014.22	1088.84
.008833	407.	409.	410.	0	19	0	.00	66.29	1155.13

*SECNO 340.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED									
340.000	6.59	2028.51	2028.51	.00	2030.81	2.30	3.56	.01	2032.89
3900.0	.0	3900.0	.0	.0	320.4	.0	67.0	12.7	2032.00
.16	.00	12.17	.00	.000	.030	.000	.000	2021.92	1080.35
.008371	416.	415.	411.	0	19	0	.00	70.92	1151.27

*SECNO 350.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED									
3470 ENCROACHMENT STATIONS=	1014.0	1077.2	TYPE=	1	TARGET=	63.200			
ELENCL= 2036.00 ELENCR= 2036.00									
350.000	4.89	2030.79	2030.79	.00	2033.26	2.47			
3900.0	.0	3900.0	.0	.0	309.3	.0			
.17	.00	12.61	.00	.000	.015	.000			
.002362	391.	400.	408.	0	15	0			
						.00			
						63.20			
						1077.20			

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BASE2A.OUT

5227 DOWNSTREAM ELEV IS 2030.01 , NOT 2030.79 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

*SECNO 360,000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

3420 BRIDGE W.S.= 2030.98 BRIDGE VELOCITY= 12.79 CALCULATED CHANNEL AREA= 305.

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3470 ENCROACHMENT STATIONS=      1023.9      1087.1  TYPE=      1  TARGET=      63.200
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*SECNO 370,000

3301 HV CHANGED MORE THAN HVINS

3720 CRITICAL DEPTH ASSUMED									
370.000	5.82	2033.82	2033.82	.00	2036.39	2.57	.10	.31	2037.44
3900.0	.0	3900.0	.0	.0	303.2	.0	71.0	13.5	2035.81
.17	.00	12.86	.00	.0000	.015	.0000	.000	2028.00	1048.85
.002156	67.	67.	67.	0	11	0	.00	59.68	1108.53

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LOSS

*SECNO 380.000

3720 CRITICAL DEPTH ASSUMED									
380.000	5.71	2035.71	2035.71	.00	2038.15	2.44	.00	.01	2037.63
3900.0	.0	3900.0	.0	.0	311.4	.0	71.0	13.5	2036.85
.17	.00	12.52	.00	.000	.015	.000	.000	2030.00	1044.82
.002114	1.	1.	1.	0	8	0	.00	64.68	1109.50

*SECNO 390.000

3720 CRITICAL DEPTH ASSUMED									
390.000	7.17	2039.34	2039.34	.00	2041.78	2.44	1.54	.00	2044.00
3900.0	.0	3900.0	.0	.0	311.3	.0	73.9	14.1	2042.99
.18	.00	12.53	.00	.0000	.030	.0000	.000	2032.17	1055.45
.008386	385.	410.	428.	0	11	0	.00	65.09	1120.54

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SECNO	DEPTH	CWSEL	CRIS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XLN	XLNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
2046.15	2060.72	.01	0.	8287.	300.	300.	2058.53	2060.53	32.

3470 ENCROACHMENT STATIONS= 1046.1 1076.7 TYPE= 1 TARGET= 30.580
 ELENCL= 2060.00 ELENCR= 2060.00
 440.000 8.59 2057.12 .00 .00 2060.54 3.42 14.47 .00 2058.81
 3900.0 .0 3900.0 .0 .0 262.6 .0 88.9 16.2 2060.00
 .23 .00 14.85 .00 .000 .015 .000 .000 2048.53 1046.07
 .002315 1470. 1464. 1457. 5 0 20 .00 30.58 1076.65

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

450.000	9.49	2061.71	2061.71	.00	2065.76	4.05	.99	.19	2062.00
3900.0	.0	3900.0	.0	.0	241.6	.0	91.2	16.5	2062.40
.23	.00	16.15	.00	.000	.015	.000	.000	2052.22	1069.41
.002654	389.	398.	405.	0	8	0	.00	30.62	1100.02

*SECNO 460.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

460.000	9.36	2066.76	2066.76	.00	2070.93	4.17	1.09	.04	2068.00
3900.0	.0	3900.0	.0	.0	237.9	.0	93.4	16.7	2068.00
.24	.00	16.39	.00	.000	.015	.000	.000	2057.40	1071.68
.002759	394.	402.	408.	0	8	0	.00	30.60	1102.28

*SECNO 470.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

470.000	8.95	2071.62	2071.62	.00	2075.50	3.88	1.06	.03	2073.13
3900.0	.0	3900.0	.0	.0	246.9	.0	95.7	17.0	2074.36
.25	.00	15.80	.00	.000	.015	.000	.000	2062.67	1077.49
.002545	403.	399.	394.	0	8	0	.00	31.85	1109.34

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SECNO	DEPTH	CWSEL	CRIS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XLN	XLNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 480.000

3280 CROSS SECTION 480.00 EXTENDED 2.00 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 5.24

3470 ENCROACHMENT STATIONS= 1026.7 1163.8 TYPE= 1 TARGET= 137.130
 ELENCL= 2076.00 ELENCR= 2076.00

480.000	11.53	2075.71	2069.57	.00	2075.91	.21	.05	BASE2A.OUT	
3900.0	.0	3900.0	.0	.0	1066.1	.0	98.6	17.4	2076.00
.26	.00	3.66	.00	.000	.015	.000	.000	2064.18	1026.66
.000093	214.	193.	186.	3	14	0	.00	137.13	1163.79

1490 NH CARD USED
*SECNO 490.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=	1380.0	1473.5	TYPE=	1	TARGET=	93.500		
ELENCI= 2077.00	ELENCR= 2077.00							
490.000	3.00	2075.56	2075.56	.00	2076.76	1.20	.02	.30 2075.25
1950.0	.0	1950.0	.0	.0	221.4	.0	100.5	17.8 2077.00
.27	.00	8.81	.00	.000	.016	.000	.000	2072.56 1380.00
.002891	138.	134.	135.	0	14	0	.00	93.50 1473.50

1490 NH CARD USED
*SECNO 500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=	1383.4	1469.1	TYPE=	1	TARGET=	85.750		
ELENCI= 2079.00	ELENCR= 2079.00							
500.000	2.94	2077.58	2077.58	.00	2078.85	1.27	.57	.02 2076.00
1950.0	.0	1950.0	.0	.0	215.8	.0	101.5	18.2 2079.00
.27	.00	9.03	.00	.000	.016	.000	.000	2074.64 1383.37
.002814	202.	202.	206.	0	8	0	.00	85.75 1469.12

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SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

1490 NH CARD USED
*SECNO 510.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=	1383.7	1470.6	TYPE=	1	TARGET=	86.930		
ELENCI= 2081.00	ELENCR= 2081.00							
510.000	2.90	2079.48	2079.48	.00	2080.75	1.27	.56	.00 2078.40
1950.0	.0	1950.0	.0	.0	216.0	.0	102.5	18.6 2081.00
.28	.00	9.03	.00	.000	.016	.000	.000	2076.58 1383.68
.002823	200.	199.	199.	0	5	0	.00	86.86 1470.54

1490 NH CARD USED
*SECNO 520.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=	1366.8	1457.4	TYPE=	1	TARGET=	90.620		
ELENCI= 2082.00	ELENCR= 2082.00							
520.000	3.00	2081.00	2081.00	.00	2082.23	1.23	.57	.00 2080.50
1950.0	.0	1950.0	.0	.0	219.3	.0	103.5	19.0 2082.00
.28	.00	8.89	.00	.000	.016	.000	.000	2078.00 1366.83
.002856	198.	199.	199.	0	8	0	.00	90.62 1457.45

1490 NH CARD USED
*SECNO 530.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=	1346.7	1431.3	TYPE=	1	TARGET=	84.560		
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ELENCI=	2084.00	ELENCR=	2084.00						
530.000	3.15	2083.13	2083.13	.00	2084.42	1.29	.65	.02	2082.60
1950.0	.0	1950.0	.0	.0	214.0	.0	104.7	19.4	2084.00
.29	.00	9.11	.00	.0000	.016	.0000	.000	2079.98	1346.74
.002865	210.	227.	241.	0	8	0	.000	84.56	1431.30

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SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

3470 ENCROACHMENT STATIONS=		1155.7	1235.2	TYPE=	1	TARGET=	79.480			
ELENC=	2085.00	ELENCR=	2085.00							
540.000	3.28	2084.68	2084.68	.00	2086.05	1.37	.55	.03	2083.00	
1950.0	.0	1950.0	.0	.0	207.3	.0	105.6	19.8	2085.00	
.30	.00	9.40	.00	.000	.016	.000	.000	2081.40	1155.70	
.002931	173.	189.	201.	0	8	0	.00	79.48	1235.18	

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=		1113.8	1286.4	TYPE=	1	TARGET=	172.570
ELENC=	2087.00	ELENCR=	2087.00				
550.000	2.10	2086.10	2086.10	.00	2086.92	.82	.75 .05 2085.22
1950.0	.0	1950.0	.0	.0	267.8	.0	106.9 20.5 2087.00
.31	.00	7.28	.00	.000	.016	.000	.000 2084.00 1113.83
.003237	238.	244.	248.	0	14	0	.00 165.35 1279.18

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.04

560.000	9.98	2085.98	2084.29	.00	2087.09	1.11	.08	.09	2084.00
3900.0	5.9	3879.9	14.2	2.5	457.5	6.7	107.5	20.7	2085.15
.31	2.34	8.48	2.11	.016	.015	.016	.000	2076.00	1009.62
.000793	64.	68.	65.	2	23	0	.00	89.25	1098.87

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THIS RUN EXECUTED 26NOV03 13:46:16

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HEC-2 WATER SURFACE PROFILES
Version 4.6.2; May 1991
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SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	BASE2A.OUT H3	DEPTH	CWSEL	VCH	EG
*	50.000	1947.40	1939.60	1953.48	1943.13	3489.83	2011.25	30.00	.00	8.98	1943.58	12.16	1945.88
*	230.000	1980.78	1981.76	.00	1987.60	5300.00	.00	2.00	.00	8.77	1978.53	12.02	1980.78
*	280.000	1997.77	1994.30	1997.92	1997.30	5214.18	74.70	30.00	.00	10.40	1994.70	14.02	1997.75
*	320.000	2020.63	2015.40	2024.22	2020.20	3428.95	468.26	30.00	.00	12.31	2020.71	10.22	2022.33
*	360.000	2033.65	2033.90	.00	2036.06	3900.00	.00	2.00	.00	6.23	2032.13	9.91	2033.65
*	440.000	2060.72	2058.53	2046.15	2060.53	8286.56	.08	30.00	.01	8.59	2057.12	14.85	2060.54

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FLOODPLAIN DETERMINATION

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRWS	EG	10*KS	VCH	AREA	.01K
*	10.000	.00	.00	.00	1921.70	5500.00	1930.20	1930.20	1931.98	53.07	11.03	572.50	754.96
*	20.000	297.76	.00	.00	1924.40	5500.00	1933.32	1933.32	1935.22	51.74	11.37	562.50	764.65
*	30.000	417.80	.00	.00	1928.83	5500.00	1935.76	1935.76	1938.47	20.49	13.20	416.67	1215.16
*	40.000	10.00	.00	.00	1933.60	5500.00	1940.75	1940.75	1944.37	23.65	15.26	360.42	1131.07
*	50.000	115.08	1943.13	1939.60	1934.60	5500.00	1943.58	.00	1945.88	11.74	12.16	452.47	1605.42
*	60.000	387.41	.00	.00	1936.76	5300.00	1944.38	1944.38	1946.90	20.73	12.72	416.57	1164.04
*	70.000	417.23	.00	.00	1941.57	5300.00	1948.37	1948.37	1950.94	20.36	12.88	411.36	1174.59
*	80.000	1.00	.00	.00	1942.60	5300.00	1948.39	1948.39	1950.98	20.32	12.92	410.21	1175.72
*	90.000	51.93	.00	.00	1943.10	5300.00	1950.37	1950.37	1953.58	20.65	14.39	368.37	1166.20
*	100.000	342.73	.00	.00	1944.70	5300.00	1952.50	1952.50	1956.01	21.23	15.03	352.64	1150.38
*	110.000	1.00	.00	.00	1947.20	5300.00	1954.70	1954.70	1958.06	20.59	14.70	360.59	1168.07
*	120.000	24.78	.00	.00	1947.50	5300.00	1955.02	1955.02	1958.42	20.86	14.79	358.25	1160.36
*	130.000	125.31	.00	.00	1948.00	5300.00	1955.65	1955.65	1959.14	21.11	14.99	353.61	1153.64
*	140.000	55.76	.00	.00	1948.50	5300.00	1956.17	1956.17	1959.59	20.91	14.85	356.98	1159.00
*	150.000	1.00	.00	.00	1950.50	5300.00	1957.97	1957.97	1961.26	20.38	14.56	364.11	1173.91
*	160.000	114.85	.00	.00	1951.76	5300.00	1959.36	1959.36	1962.64	20.33	14.55	364.28	1175.60
*	170.000	97.13	.00	.00	1952.30	5300.00	1961.62	1959.03	1962.94	6.41	9.21	575.23	2092.60
*	180.000	363.91	.00	.00	1955.07	5300.00	1963.07	1963.07	1966.04	55.61	13.82	383.48	710.71
*	190.000	356.25	.00	.00	1957.64	5300.00	1966.85	1966.85	1970.05	55.36	14.35	369.42	712.34
*	200.000	357.38	.00	.00	1962.44	5300.00	1970.50	1970.50	1973.44	55.82	13.74	385.61	709.39
*	210.000	220.26	.00	.00	1965.48	5300.00	1972.46	1972.46	1975.53	20.20	14.05	377.22	1179.25
*	220.000	95.38	.00	.00	1968.66	5300.00	1975.66	1975.66	1979.19	23.97	15.07	351.74	1082.44
*	230.000	106.05	1987.60	1981.76	1969.76	5300.00	1978.53	.00	1980.78	12.13	12.02	440.93	1522.04
*	240.000	98.95	.00	.00	1975.59	5300.00	1982.85	1982.85	1985.65	55.13	13.41	395.19	713.82

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRWS	BASE2A.OUT EG	10*KS	VCH	AREA	.01K
*	250.000	478.12	.00	.00	1978.65	5300.00	1987.59	1987.59	1990.11	59.24	12.75	415.75	688.58
*	260.000	437.75	.00	.00	1982.12	5300.00	1992.29	1992.29	1995.08	57.53	13.40	395.67	698.76
	270.000	213.69	.00	.00	1983.40	5300.00	1992.67	1991.95	1996.31	37.31	15.31	346.17	867.66
*	280.000	110.04	1997.30	1994.30	1984.30	5300.00	1994.70	.00	1997.75	28.68	14.02	377.95	989.64
*	290.000	451.82	.00	.00	1993.63	3900.00	2001.61	2001.61	2003.57	63.59	11.24	347.01	489.07
*	300.000	430.29	.00	.00	2001.94	3900.00	2012.53	2012.53	2014.71	51.50	11.86	328.87	543.47
*	310.000	353.38	.00	.00	2008.00	3900.00	2015.87	2015.87	2019.84	28.75	15.99	243.96	727.29
*	320.000	86.84	2020.20	2015.40	2008.40	3900.00	2020.71	.00	2022.33	8.03	10.22	381.45	1375.97
*	330.000	409.02	.00	.00	2014.22	3900.00	2023.77	2023.77	2026.20	88.33	12.51	311.67	414.98
*	340.000	414.66	.00	.00	2021.92	3900.00	2028.51	2028.51	2030.81	83.71	12.17	320.45	426.26
*	350.000	400.22	.00	.00	2025.90	3900.00	2030.79	2030.79	2033.26	23.62	12.61	309.28	802.39
*	360.000	69.23	2036.06	2033.90	2025.90	3900.00	2032.13	.00	2033.65	11.09	9.91	393.70	1171.27
*	370.000	66.95	.00	.00	2028.00	3900.00	2033.82	2033.82	2036.39	21.56	12.86	303.25	839.87
*	380.000	1.00	.00	.00	2030.00	3900.00	2035.71	2035.71	2038.15	21.14	12.52	311.43	848.26
*	390.000	409.92	.00	.00	2032.17	3900.00	2039.34	2039.34	2041.78	83.86	12.53	311.30	425.87
*	400.000	400.26	.00	.00	2033.36	3900.00	2041.44	2040.16	2042.77	9.92	9.25	421.69	1238.16
	410.000	1.00	.00	.00	2033.41	3900.00	2041.75	2039.71	2042.80	6.91	8.23	474.09	1483.61
*	420.000	57.86	.00	.00	2033.65	3900.00	2042.44	2038.08	2042.88	2.10	5.32	732.59	2694.15
*	430.000	208.45	.00	.00	2034.10	3900.00	2042.06	2042.06	2046.07	29.06	16.08	242.59	723.52
*	440.000	1463.68	2060.53	2058.53	2048.53	3900.00	2057.12	.00	2060.54	23.15	14.85	262.62	810.62
*	450.000	397.95	.00	.00	2052.22	3900.00	2061.71	2061.71	2065.76	26.54	16.15	241.55	757.01
*	460.000	401.61	.00	.00	2057.40	3900.00	2066.76	2066.76	2070.93	27.59	16.39	237.91	742.42
*	470.000	398.77	.00	.00	2062.67	3900.00	2071.62	2071.62	2075.50	25.45	15.80	246.87	773.14
*	480.000	192.99	.00	.00	2064.18	3900.00	2075.71	2069.57	2075.91	.93	3.66	1066.10	4048.35
*	490.000	133.56	.00	.00	2072.56	1950.00	2075.56	2075.56	2076.76	28.91	8.81	221.40	362.69
*	500.000	201.53	.00	.00	2074.64	1950.00	2077.58	2077.58	2078.85	28.14	9.03	215.83	367.62

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRWS	EG	10*KS	VCH	AREA	.01K
*	510.000	199.21	.00	.00	2076.58	1950.00	2079.48	2079.48	2080.75	28.23	9.03	216.04	366.99
*	520.000	199.24	.00	.00	2078.00	1950.00	2081.00	2081.00	2082.23	28.56	8.89	219.25	364.87
*	530.000	227.48	.00	.00	2079.98	1950.00	2083.13	2083.13	2084.42	28.65	9.11	214.05	364.33
*	540.000	189.30	.00	.00	2081.40	1950.00	2084.68	2084.68	2086.05	29.31	9.40	207.34	360.18
*	550.000	244.36	.00	.00	2084.00	1950.00	2086.10	2086.10	2086.92	32.37	7.28	267.76	342.74
*	560.000	67.51	.00	.00	2076.00	3900.00	2085.98	2084.29	2087.09	7.93	8.48	466.68	1384.97

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SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	10.000	5500.00	1930.20	.00	.00	.20	184.60	.00
*	20.000	5500.00	1933.32	.00	3.12	.00	208.12	297.76
*	30.000	5500.00	1935.76	.00	2.44	.00	78.28	417.80
*	40.000	5500.00	1940.75	.00	4.99	.00	50.38	10.00
*	50.000	5500.00	1943.58	.00	2.83	.00	50.38	115.08
*	60.000	5300.00	1944.38	.00	.80	.00	84.77	387.41
*	70.000	5300.00	1948.37	.00	3.99	.00	80.94	417.23
*	80.000	5300.00	1948.39	.00	.03	.00	79.40	1.00
*	90.000	5300.00	1950.37	.00	1.97	.00	58.04	51.93
*	100.000	5300.00	1952.50	.00	2.13	.00	50.82	342.73
*	110.000	5300.00	1954.70	.00	2.21	.00	53.84	1.00
*	120.000	5300.00	1955.02	.00	.31	.00	53.14	24.78
*	130.000	5300.00	1955.65	.00	.63	.00	51.24	125.31
*	140.000	5300.00	1956.17	.00	.52	.00	52.57	55.76
*	150.000	5300.00	1957.97	.00	1.80	.00	55.57	1.00
*	160.000	5300.00	1959.36	.00	1.39	.00	55.48	114.85
*	170.000	5300.00	1961.62	.00	2.27	.00	75.51	97.13
*	180.000	5300.00	1963.07	.00	1.45	.00	65.70	363.91
*	190.000	5300.00	1966.85	.00	3.78	.00	57.91	356.25
*	200.000	5300.00	1970.50	.00	3.65	.00	66.23	357.38
*	210.000	5300.00	1972.46	.00	1.96	.00	61.98	220.26
*	220.000	5300.00	1975.66	.00	3.20	.00	50.25	95.38
*	230.000	5300.00	1978.53	.00	2.88	.00	50.25	106.05
*	240.000	5300.00	1982.85	.00	4.32	.00	71.75	98.95

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	250.000	5300.00	1987.59	.00	4.74	.00	85.01	478.12
*	260.000	5300.00	1992.29	.00	4.70	.00	71.29	437.75
	270.000	5300.00	1992.67	.00	.38	.00	37.33	213.69
*	280.000	5300.00	1994.70	.00	2.03	.00	36.33	110.04
*	290.000	3900.00	2001.61	.00	6.91	.00	92.14	451.82
*	300.000	3900.00	2012.53	.00	10.92	.00	66.10	430.29
*	310.000	3900.00	2015.87	.00	3.34	.00	31.00	353.38
*	320.000	3900.00	2020.71	.00	4.84	.00	31.00	86.84
*	330.000	3900.00	2023.77	.00	3.07	.00	66.29	409.02

BASE2A.OUT

*	340.000	3900.00	2028.51	.00	4.74	.00	70.92	414.66
*	350.000	3900.00	2030.79	.00	2.29	.00	63.20	400.22
*	360.000	3900.00	2032.13	.00	1.34	.00	63.20	69.23
*	370.000	3900.00	2033.82	.00	1.69	.00	59.68	66.95
*	380.000	3900.00	2035.71	.00	1.89	.00	64.68	1.00
*	390.000	3900.00	2039.34	.00	3.63	.00	65.09	409.92
*	400.000	3900.00	2041.44	.00	2.10	.00	80.20	400.26
	410.000	3900.00	2041.75	.00	.31	.00	81.34	1.00
*	420.000	3900.00	2042.44	.00	.69	.00	90.15	57.86
*	430.000	3900.00	2042.06	.00	-.38	.00	30.58	208.45
*	440.000	3900.00	2057.12	.00	15.06	.00	30.58	1463.68
*	450.000	3900.00	2061.71	.00	4.59	.00	30.62	397.95
*	460.000	3900.00	2066.76	.00	5.05	.00	30.60	401.61
*	470.000	3900.00	2071.62	.00	4.86	.00	31.85	398.77
*	480.000	3900.00	2075.71	.00	4.08	.00	137.13	192.99
*	490.000	1950.00	2075.56	.00	-.15	.00	93.50	133.56
*	500.000	1950.00	2077.58	.00	2.02	.00	85.75	201.53

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	510.000	1950.00	2079.48	.00	1.90	.00	86.86	199.21
*	520.000	1950.00	2081.00	.00	1.52	.00	90.62	199.24
*	530.000	1950.00	2083.13	.00	2.13	.00	84.56	227.48
*	540.000	1950.00	2084.68	.00	1.55	.00	79.48	189.30
*	550.000	1950.00	2086.10	.00	1.42	.00	165.35	244.36
*	560.000	3900.00	2085.98	.00	-.12	.00	89.25	67.51

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SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO=	10.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	20.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	20.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	30.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	30.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	40.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	40.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	50.000	PROFILE=	1	HYDRAULIC JUMP D.S.
WARNING SECNO=	50.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=	60.000	PROFILE=	1	CRITICAL DEPTH ASSUMED

CAUTION SECNO=	60.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	70.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	70.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	80.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	80.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	90.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	90.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	100.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	100.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	110.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	110.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	120.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	120.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	130.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	130.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	140.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	140.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	150.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	150.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	160.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	160.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
WARNING SECNO=	170.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=	180.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	180.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY

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CAUTION SECNO=	190.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	190.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	200.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	200.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	210.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	210.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	220.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	220.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	230.000	PROFILE=	1	HYDRAULIC JUMP D.S.
WARNING SECNO=	230.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=	240.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	240.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	250.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	250.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	260.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	260.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	280.000	PROFILE=	1	HYDRAULIC JUMP D.S.
CAUTION SECNO=	290.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	290.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	300.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	300.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	310.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	310.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
CAUTION SECNO=	320.000	PROFILE=	1	HYDRAULIC JUMP D.S.

WARNING SECNO= 320.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO= 330.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 330.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 340.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 340.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 350.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 350.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 360.000 PROFILE= 1 HYDRAULIC JUMP D.S.
 WARNING SECNO= 360.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO= 370.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 370.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

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CAUTION SECNO= 380.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 380.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 390.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 390.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 WARNING SECNO= 400.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO= 420.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO= 430.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 430.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 440.000 PROFILE= 1 HYDRAULIC JUMP D.S.
 CAUTION SECNO= 440.000 PROFILE= 1 20 TRIALS OF EG NOT ENOUGH
 CAUTION SECNO= 450.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 450.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 460.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 460.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 470.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 470.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 WARNING SECNO= 480.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO= 490.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 490.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 500.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 500.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 510.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 510.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO= 540.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 CAUTION SECNO= 550.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
 CAUTION SECNO= 550.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY
 WARNING SECNO= 560.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

**POST PROJECT CONDITIONS HEC-RAS OUTPUT FILE
(NAVD 88)**

post.rep

HEC-RAS Version 3.1.2 April 2004
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X   X   XXXXX   XXXX   XXXX   XX   XXXX
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   XXXXXX   XXXX   X   X   X   X   XXXXX
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PROJECT DATA

Project Title: fla_post
Project File : post.prj
Run Date and Time: 12/7/2004 7:38:08 AM

Project in English units

Project Description:

FLOODPLAIN DETERMINATION
FILES: BASE2.DWG, BASE2.DAT

STARTING WSE = NORMAL DEPTH
SUBCRITICAL RUN

PLAN DATA

Plan Title: Post-Project

Plan File : 1:\PROJECTS\511606-CLOMR's\Flamingo Wash - Algonquin\Final Product\HYDRAULICS\Post-Project_NoBridge\post.p01

Geometry Title: Post-Project

Geometry File : 1:\PROJECTS\511606-CLOMR's\Flamingo Wash - Algonquin\Final Product\HYDRAULICS\Post-Project_NoBridge\post.g01

Flow Title : Post-Project

Flow File : 1:\PROJECTS\511606-CLOMR's\Flamingo Wash - Algonquin\Final Product\HYDRAULICS\Post-Project_NoBridge\post.f01

Plan Summary Information:

Number of:	Cross Sections =	19	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Supercritical Flow

FLOW DATA

Flow Title: Post-Project

Flow File : 1:\PROJECTS\511606-CLOMR's\Flamingo Wash - Algonquin\Final Product\HYDRAULICS\Post-Project_NoBridge\post.f01

Flow Data (cfs)

River	Reach	RS	Post-Project
Flamingo Wash	Phase II	220	5300

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Flamingo Wash	Phase II	Post-Project	Critical	

GEOMETRY DATA

Geometry Title: Post-Project

Geometry File : 1:\PROJECTS\511606-CLOMR's\Flamingo Wash - Algonquin\Final Product\HYDRAULICS\Post-Project_NoBridge\post.g01

CROSS SECTION

RIVER: Flamingo Wash

REACH: Phase II RS: 220

INPUT

Description:

Station Elevation Data		num=	4						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1989.2	1000	1971.2	1052	1971.2	1052	1989.2		

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1000	1052		85.5	85.5	85.5		.3	.5

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 210

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1981.9	1000	1970	1020	1969.6	1040	1970	1040	1981.9

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1000	1040		100	100	100		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 205

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1980.2	1000	1968.2	1020	1967.8	1040	1968.2	1040	1980.2

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1000	1040		200	200	200		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 195

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1977	1000	1965.04	1020	1964.64	1040	1965.04	1040	1976.5

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1000	1040		208	200	200		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 192

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1975.5	1000	1964	1020	1963.6	1040	1964	1040	1974

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1000	1040		204	200	200		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 186

INPUT

Description:

post.rep

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1972	1000	1963	1020	1962.6	1040	1963	1040	1972

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1000	1040		204 200	200		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 182

INPUT
Description:
Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1971.2	1000	1962.04	1020	1961.64	1040	1962.04	1040	1971.2

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1000	1040		203.4 200	200		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 175

INPUT
Description:
Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1967.4	1000	1959	1020	1958.6	1040	1959	1040	1967.4

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1000	1040		200 200	195.19		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 170

INPUT
Description:
Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1970	1000	1956	1020	1955.6	1040	1956	1040	1968.5

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1000	1040		102.41 102.41	102.41		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 160

INPUT
Description: Begin Phase II Improvements
Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1962.5	1005	1954.03	1045	1954.03	1050	1962.5

Manning's n Values		num=	1
Sta	n Val		
1000	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1000	1050		119.51 114.85	110.97		.1	.3

CROSS SECTION

RIVER: Flamingo Wash
REACH: Phase II RS: 150

INPUT
Description: Phase I cross-section 150
Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1135	1961.76	1136.46	1960.26	1138.43	1958.26	1140.4	1956.26	1142.4	1954.26
1143.5	1952.76	1183.5	1952.76	1187.45	1954.26	1189.03	1956.26	1190.57	1958.26

1192.09 1960.26 1193.6 1962.25

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1135 .015 1135 .015 1193.6 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1135 1193.6 1 1 1 .1 .3

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 140

INPUT

Description: Phase I cross-section 140

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1123.53	1961.46	1124.74	1960.26	1126.67	1958.26	1128.54	1956.26	1130.26	1954.26
1131.84	1952.26	1132.5	1950.76	1172.5	1950.76	1175.19	1952.26	1176.29	1954.26
1177.52	1956.26	1178.95	1958.26	1180.42	1960.26	1181.8	1962.12		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1123.53 .015 1123.53 .015 1181.8 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1123.53 1181.8 57.23 55.76 56.76 .1 .3

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 130

INPUT

Description: Phase I cross-section 130

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1091.34	1960.26	1092.89	1958.26	1094.44	1956.26	1095.99	1954.26	1097.54	1952.26
1099.5	1950.26	1139.5	1950.26	1141.65	1952.26	1142.63	1954.26	1143.6	1956.26
1144.57	1958.26	1145.53	1960.26						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1091.34 .015 1091.34 .015 1145.53 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1091.34 1145.53 125.29 125.31 125.61 .1 .3

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 120

INPUT

Description: Phase I cross-section 120

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1961.96	1034.06	1962.26	1069.3	1962.96	1077.37	1962.26	1081.8	1961.8
1082.95	1960.26	1084.44	1958.26	1085.94	1956.26	1087.44	1954.26	1088.93	1952.26
1090.43	1950.26	1090.88	1949.76	1130.88	1949.76	1133.47	1950.26	1134.85	1952.26
1136.24	1954.26	1137.62	1956.26	1138.99	1958.26	1139.81	1959.48	1140.72	1960.26
1142.7	1962.26	1144.46	1964.26	1148.81	1964.28	1152.73	1964.26	1157.77	1964.26
1185.25	1964.66	1223.58	1966.04						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1000 .025 1082.95 .015 1140.72 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1082.95 1140.72 25.32 24.78 22.42 .1 .3

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 110

INPUT

Description: Phase I cross-section 110

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1960.26	1058.72	1961.52	1069.8	1960.78	1070.23	1960.26	1071.86	1958.26
1073.49	1956.26	1075.13	1954.26	1076.77	1952.26	1078.41	1950.26	1079.37	1949.49
1119.37	1949.46	1122.31	1950.26	1123.63	1952.26	1124.96	1954.26	1126.29	1956.26
1127.61	1958.26	1128.23	1959.2	1130.3	1960.26	1134.23	1962.26	1137.72	1964.04
1156.11	1964.26	1162.57	1964.26	1167.55	1964.26	1180.81	1964.48	1218.4	1965.79

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1000 .025 1070.23 .015 1130.3 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1070.23 1130.3 1 1 1 .1 .3

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 100

INPUT

Description: Phase 1 cross-section 100

Station Elevation Data		num= 27	
Sta	Elev	Sta	Elev
1000	1961.93	1057.4	1962.22
1071.98	1957.03	1073.58	1955.03
1079	1947.73	1119	1947.73
1123.68	1955.03	1124.99	1957.03
1133.08	1963.03	1136.43	1964.73
1180.79	1965.13	1218.41	1966.51

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
1000	.025	1068.7	.015
1129.14	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1068.7	1129.14	346.14	342.73	339	.1	.3		

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 90

INPUT

Description: Phase 1 cross-section 90

Station Elevation Data		num= 23	
Sta	Elev	Sta	Elev
1000	1958.08	1006.02	1956.88
1045.56	1954.48	1052.98	1953.95
1063.71	1946.88	1065.06	1945.98
1110.99	1950.88	1111.87	1952.88
1121.63	1957.18	1145.66	1956.88

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
1000	.025	1052.98	.015
1113.6	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1052.98	1113.6	53.02	51.93	56.59	.1	.3		

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 81

INPUT

Description: Phase 1 cross-section 81

Station Elevation Data		num= 12	
Sta	Elev	Sta	Elev
1000	1954.26	1002.13	1954.26
1121.75	1945.72	1129.75	1953.68
1157.77	1956.26	1201.02	1956.64

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
1000	.025	1070.25	.015
1129.75	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1070.25	1129.75	50	50	50	.1	.3		

CROSS SECTION

RIVER: Flamingo Wash
 REACH: Phase II RS: 75

INPUT

Description: Phase 1 cross-section 75

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
1077.5	1952.32	1077.5	1944.52
1100	1944.07	1122.5	1944.52
1122.5	1952.32		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
1077.5	.025	1077.5	.015
1122.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1077.5	1122.5	0	0	0	.1	.3		

SUMMARY OF MANNING'S N VALUES

River: Flamingo Wash

Reach	River Sta.	n1	n2	n3
Phase II	220	.015		
Phase II	210	.015		
Phase II	205	.015		
Phase II	195	.015		
Phase II	192	.015		

post.rep

Phase II	186	.015		
Phase II	182	.015		
Phase II	175	.015		
Phase II	170	.015		
Phase II	160	.015		
Phase II	150	.015	.015	.015
Phase II	140	.015	.015	.015
Phase II	130	.015	.015	.015
Phase II	120	.025	.015	.025
Phase II	110	.025	.015	.025
Phase II	100	.025	.015	.025
Phase II	90	.025	.015	.025
Phase II	81	.025	.015	.025
Phase II	75	.025	.015	.025

SUMMARY OF REACH LENGTHS

River: Flamingo Wash

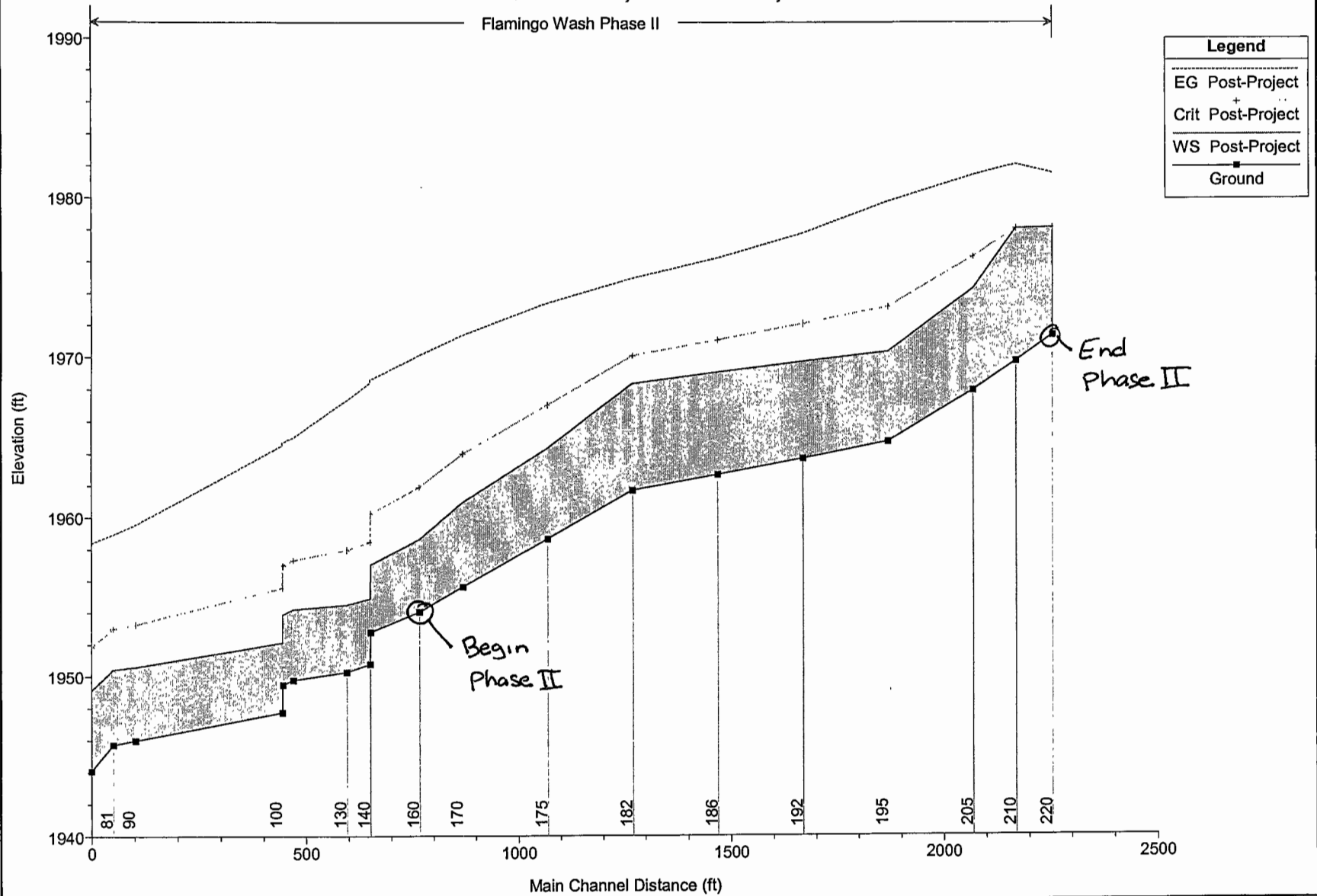
Reach	River Sta.	Left	Channel	Right
Phase II	220	85.5	85.5	85.5
Phase II	210	100	100	100
Phase II	205	200	200	200
Phase II	195	208	200	200
Phase II	192	204	200	200
Phase II	186	204	200	200
Phase II	182	203.4	200	200
Phase II	175	200	200	195.19
Phase II	170	102.41	102.41	102.41
Phase II	160	119.51	114.85	110.97
Phase II	150	1	1	1
Phase II	140	57.23	55.76	56.76
Phase II	130	125.29	125.31	125.61
Phase II	120	25.32	24.78	22.42
Phase II	110	1	1	1
Phase II	100	346.14	342.73	339
Phase II	90	53.02	51.93	56.59
Phase II	81	50	50	50
Phase II	75	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Flamingo Wash

Reach	River Sta.	Contr.	Expan.
Phase II	220	.3	.5
Phase II	210	.1	.3
Phase II	205	.1	.3
Phase II	195	.1	.3
Phase II	192	.1	.3
Phase II	186	.1	.3
Phase II	182	.1	.3
Phase II	175	.1	.3
Phase II	170	.1	.3
Phase II	160	.1	.3
Phase II	150	.1	.3
Phase II	140	.1	.3
Phase II	130	.1	.3
Phase II	120	.1	.3
Phase II	110	.1	.3
Phase II	100	.1	.3
Phase II	90	.1	.3
Phase II	81	.1	.3
Phase II	75	.1	.3

fla_post Plan: Post-Project 12/7/2004 7:38:08 AM
Geom: Post-Project Flow: Post-Project



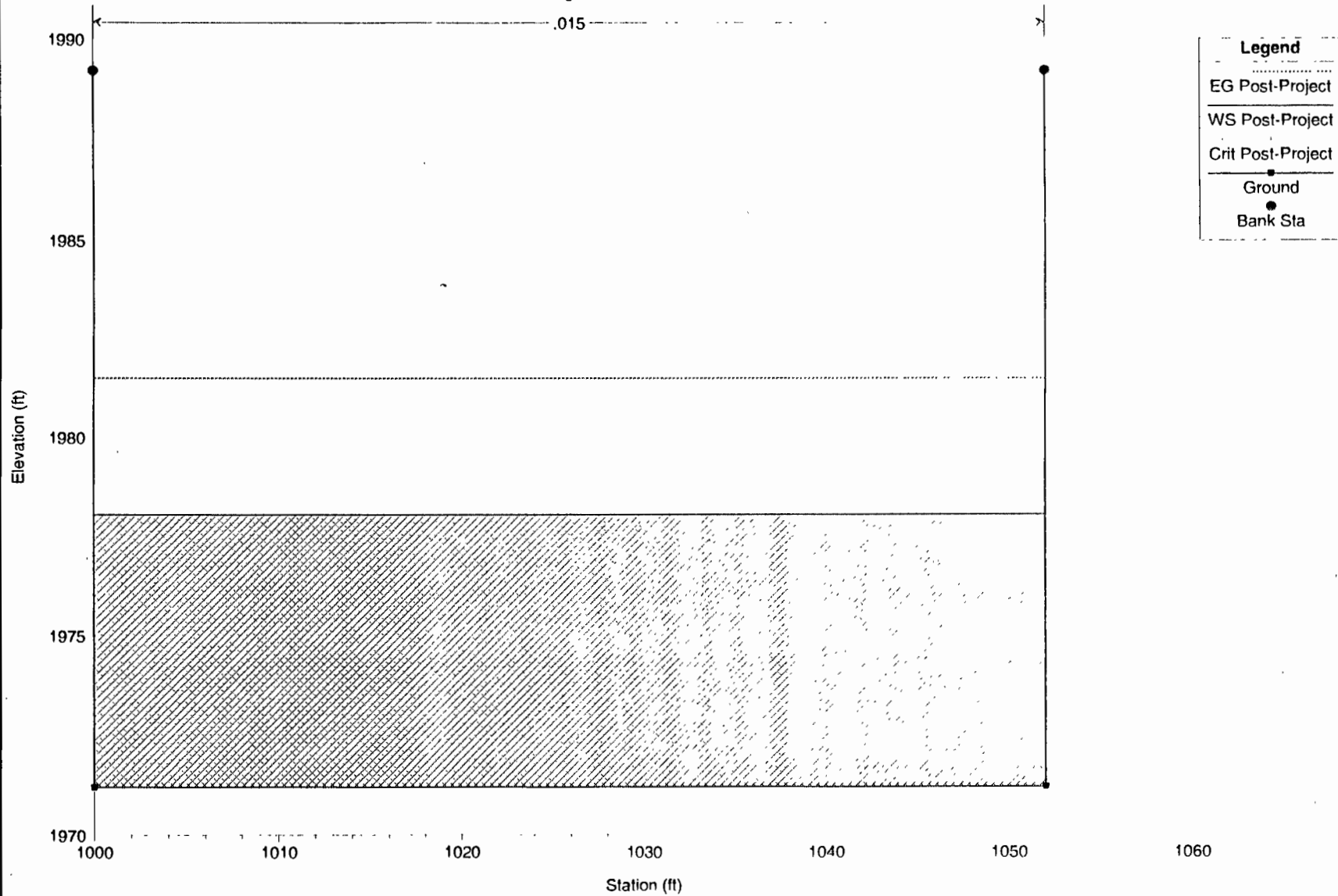
HEC-RAS Plan: Post River: Flamingo Wash Reach: Phase II Profile: Post-Project

Reach	River Sta	Profile	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)	
Phase II	220	Post-Project	5300.00	1971.20	1978.04	1978.04	1981.49	0.002381	14.90	355.61	52.00	1.00
Phase II	210	Post-Project	5300.00	1969.60	1977.97	1977.97	1982.05	0.002550	16.22	326.71	40.00	1.00
Phase II	205	Post-Project	5300.00	1967.80	1974.14	1976.17	1981.37	0.005963	21.57	245.72	40.00	1.53
Phase II	195	Post-Project	5300.00	1964.64	1970.20	1973.01	1979.69	0.009021	24.72	214.37	40.00	1.88
Phase II	192	Post-Project	5300.00	1963.60	1969.62	1971.97	1977.68	0.007036	22.78	232.63	40.00	1.66
Phase II	186	Post-Project	5300.00	1962.60	1968.97	1970.97	1976.13	0.005885	21.48	246.79	40.00	1.52
Phase II	182	Post-Project	5300.00	1961.64	1968.28	1970.00	1974.86	0.005185	20.59	257.39	40.00	1.43
Phase II	175	Post-Project	5300.00	1958.60	1964.30	1966.97	1973.32	0.008353	24.11	219.85	40.00	1.81
Phase II	170	Post-Project	5300.00	1955.60	1960.92	1963.97	1971.33	0.010386	25.89	204.71	40.00	2.02
Phase II	160	Post-Project	5300.00	1954.03	1958.60	1961.87	1970.06	0.012445	27.17	195.09	45.39	2.31
Phase II	150	Post-Project	5300.00	1952.76	1957.01	1960.23	1968.56	0.013562	27.27	194.32	49.94	2.44
Phase II	140	Post-Project	5300.00	1950.76	1954.86	1958.44	1968.35	0.016512	29.47	179.84	46.92	2.65
Phase II	130	Post-Project	5300.00	1950.26	1954.47	1957.94	1967.25	0.015076	28.69	184.74	46.91	2.55
Phase II	120	Post-Project	5300.00	1949.76	1954.19	1957.27	1964.97	0.011955	26.35	201.13	48.70	2.29
Phase II	110	Post-Project	5300.00	1949.46	1953.87	1956.97	1964.67	0.012081	26.38	200.90	49.25	2.30
Phase II	100	Post-Project	5300.00	1947.73	1952.12	1955.55	1964.50	0.014156	28.24	187.65	45.88	2.46
Phase II	90	Post-Project	5300.00	1945.98	1950.59	1953.25	1959.52	0.009563	23.98	221.04	52.83	2.07
Phase II	81	Post-Project	5300.00	1945.72	1950.42	1952.99	1958.91	0.008803	23.38	226.71	52.95	1.99
Phase II	75	Post-Project	5300.00	1944.07	1949.12	1951.84	1958.38	0.009552	24.42	217.08	45.00	1.96

fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

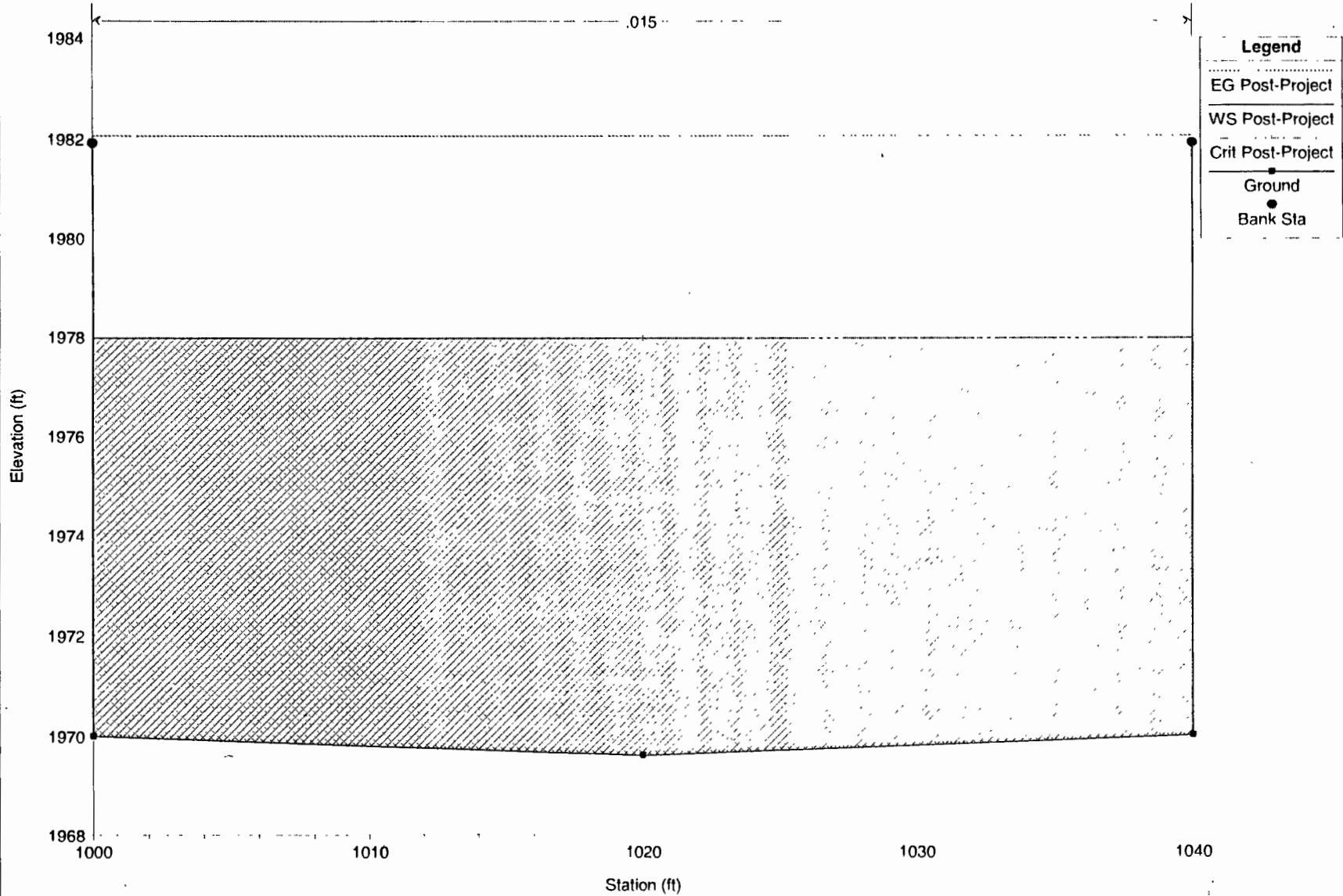
River = Flamingo Wash Reach = Phase II RS = 220



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

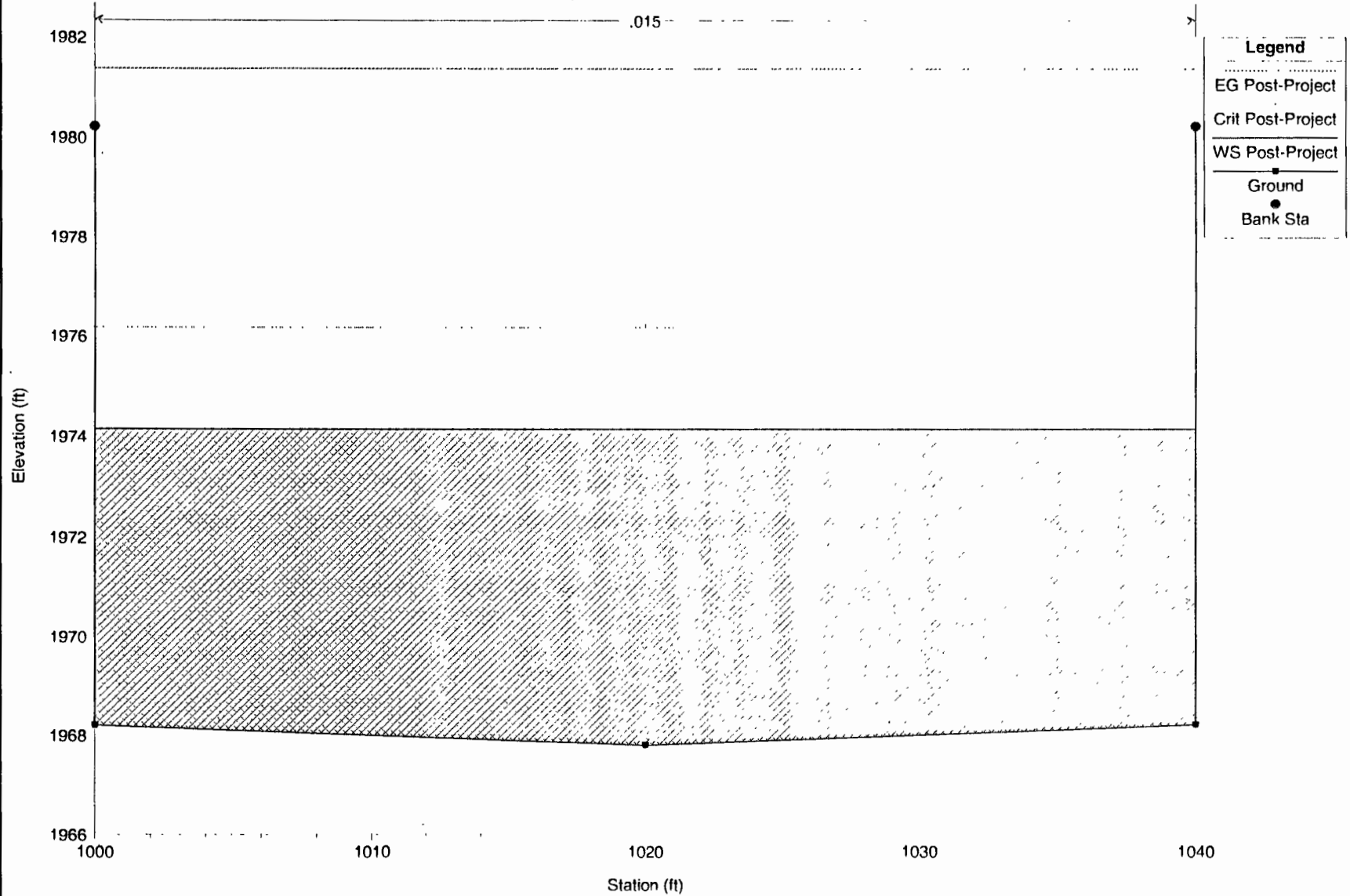
River = Flamingo Wash Reach = Phase II RS = 210



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

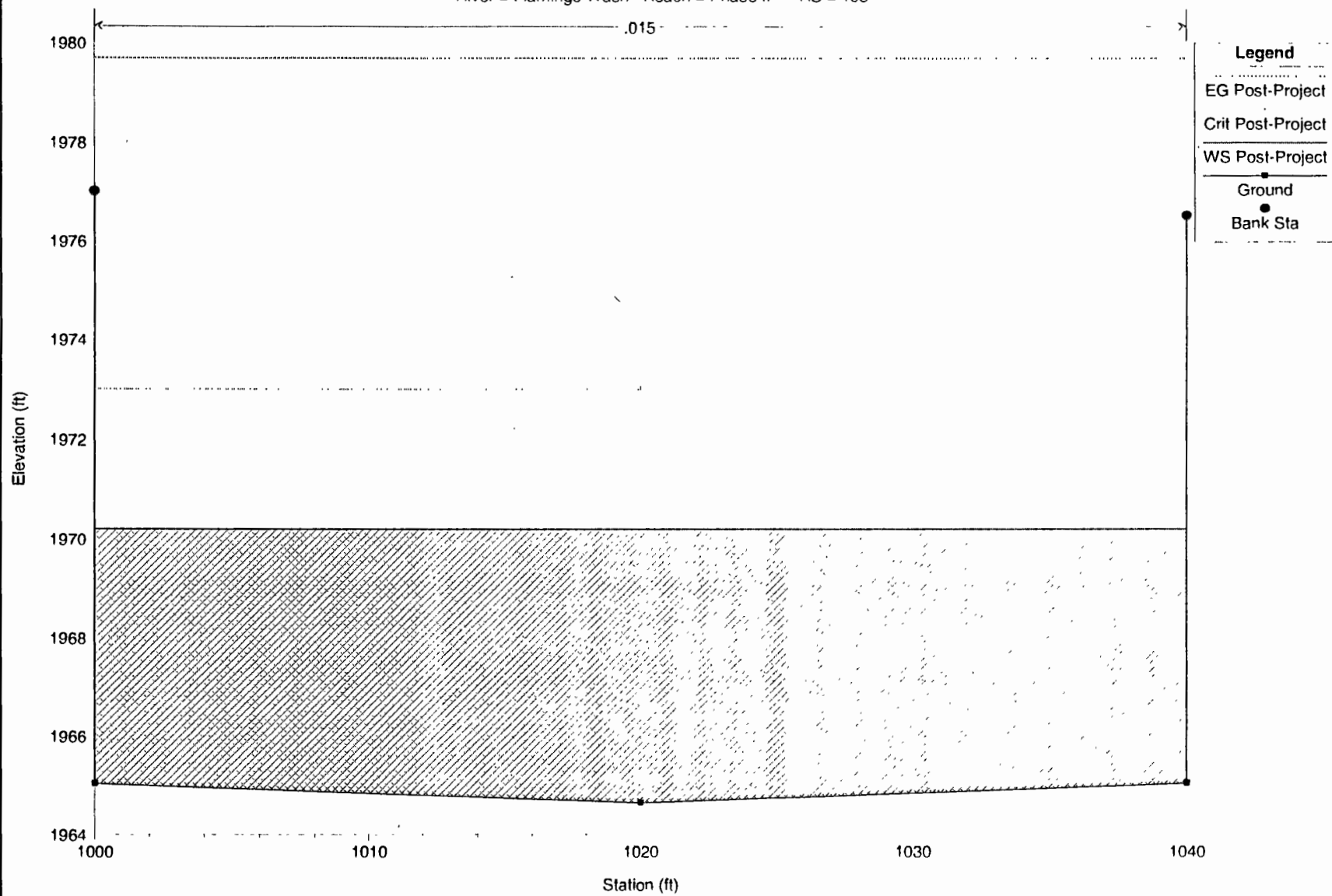
River = Flamingo Wash Reach = Phase II RS = 205



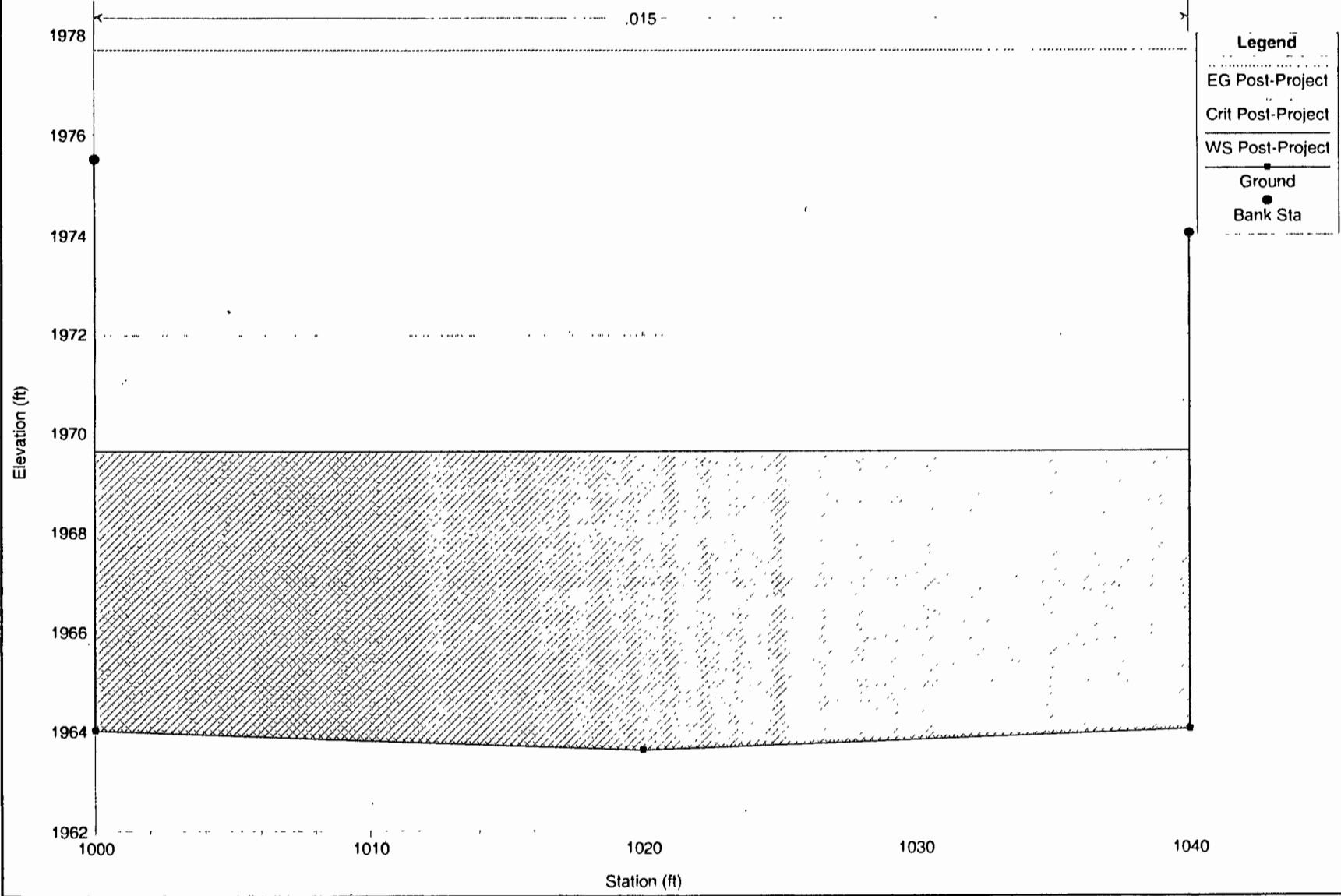
fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

River = Flamingo Wash Reach = Phase II RS = 195



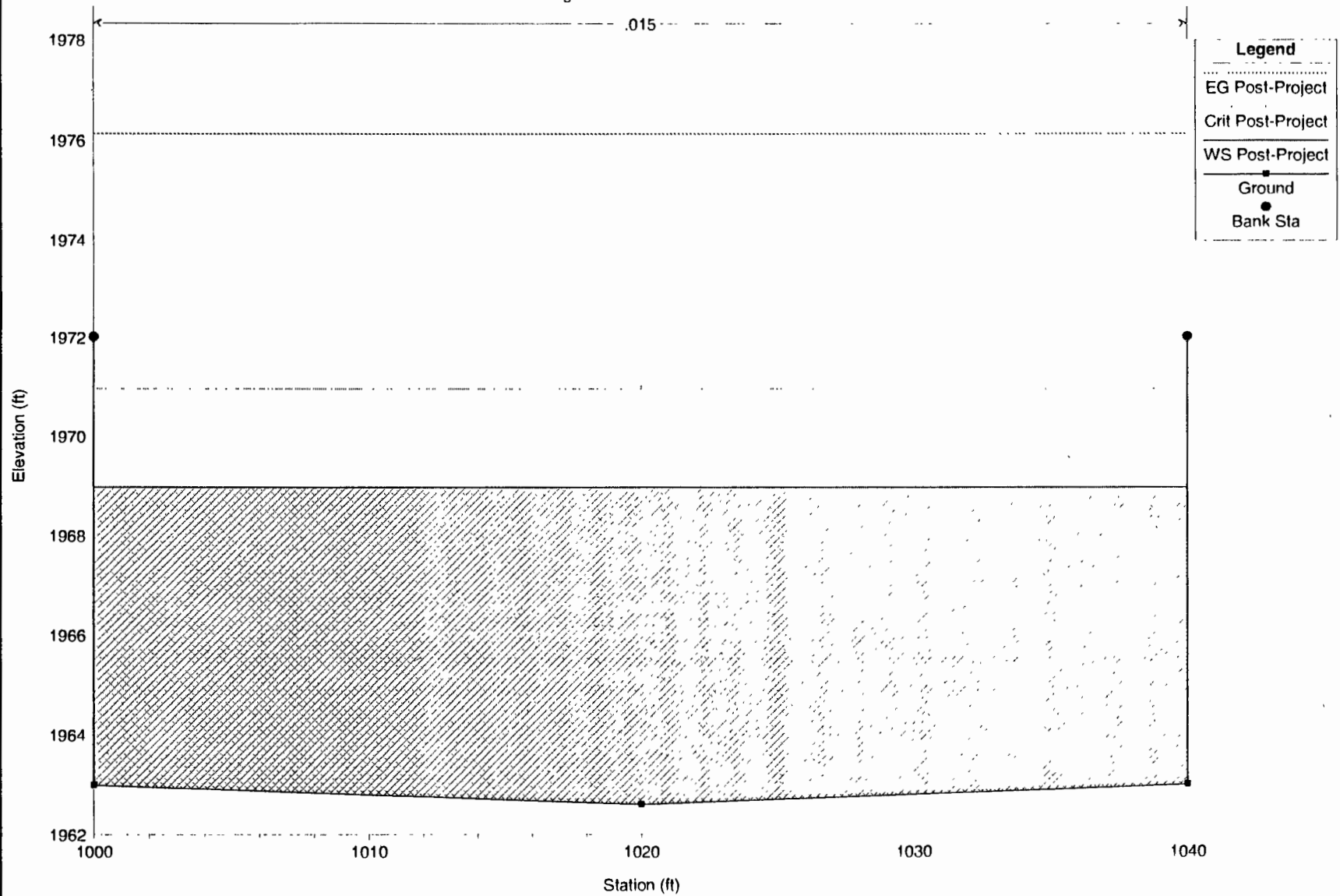
fla_post Plan: Post-Project 12/7/2004 7:38:08 AM
Geom: Post-Project Flow: Post-Project
River = Flamingo Wash Reach = Phase II RS = 192



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

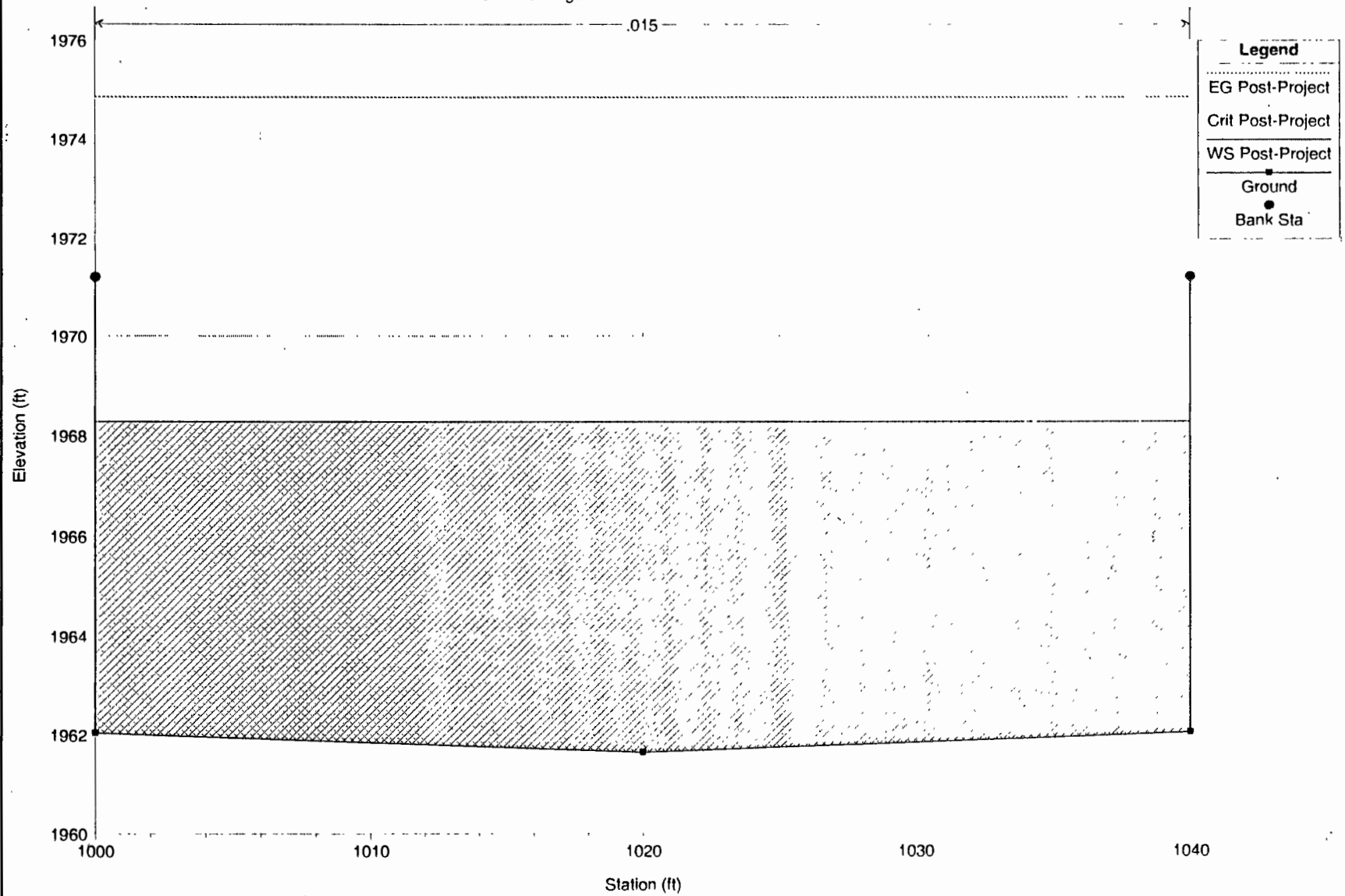
River = Flamingo Wash Reach = Phase II RS = 186



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

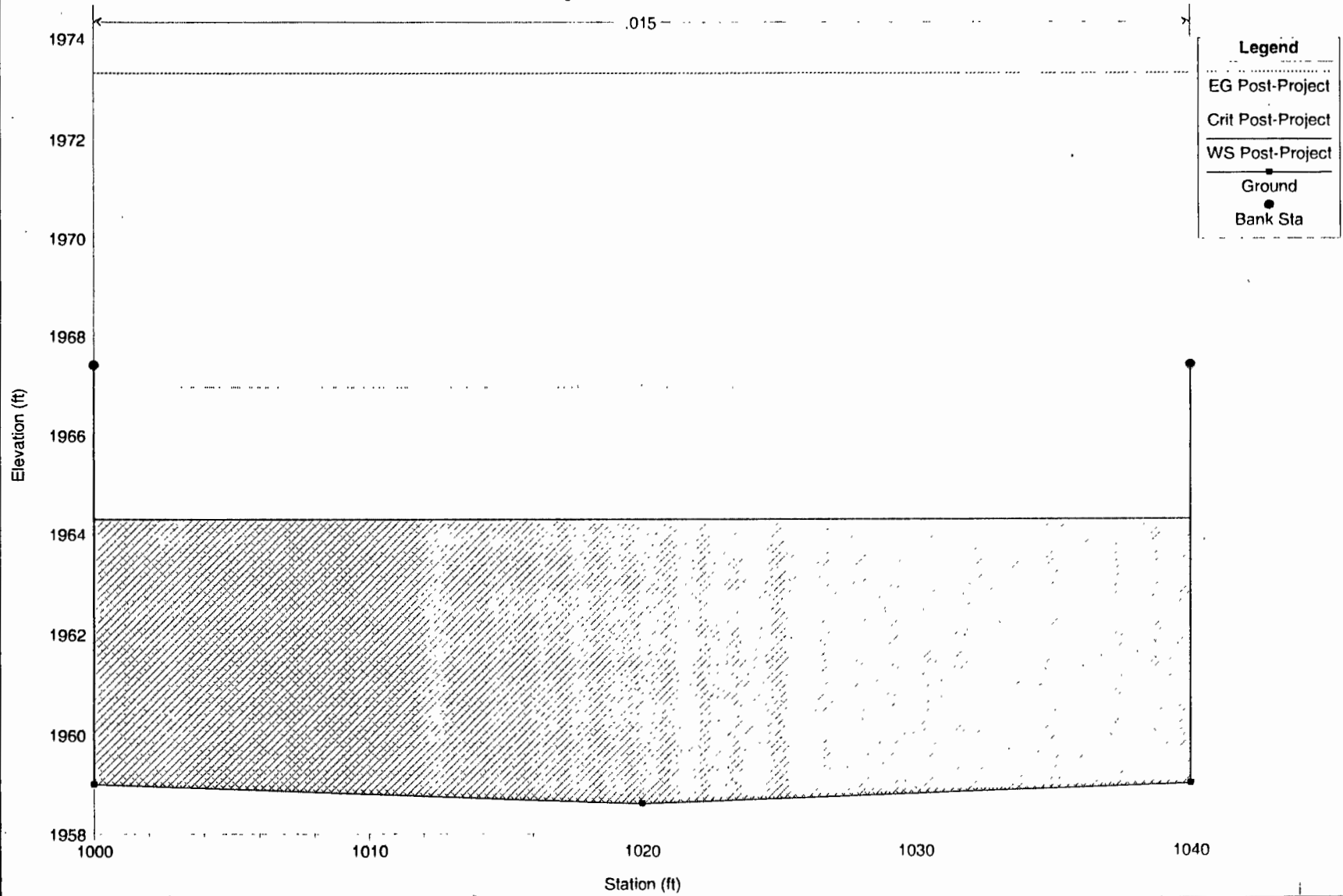
River = Flamingo Wash Reach = Phase II RS = 182



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

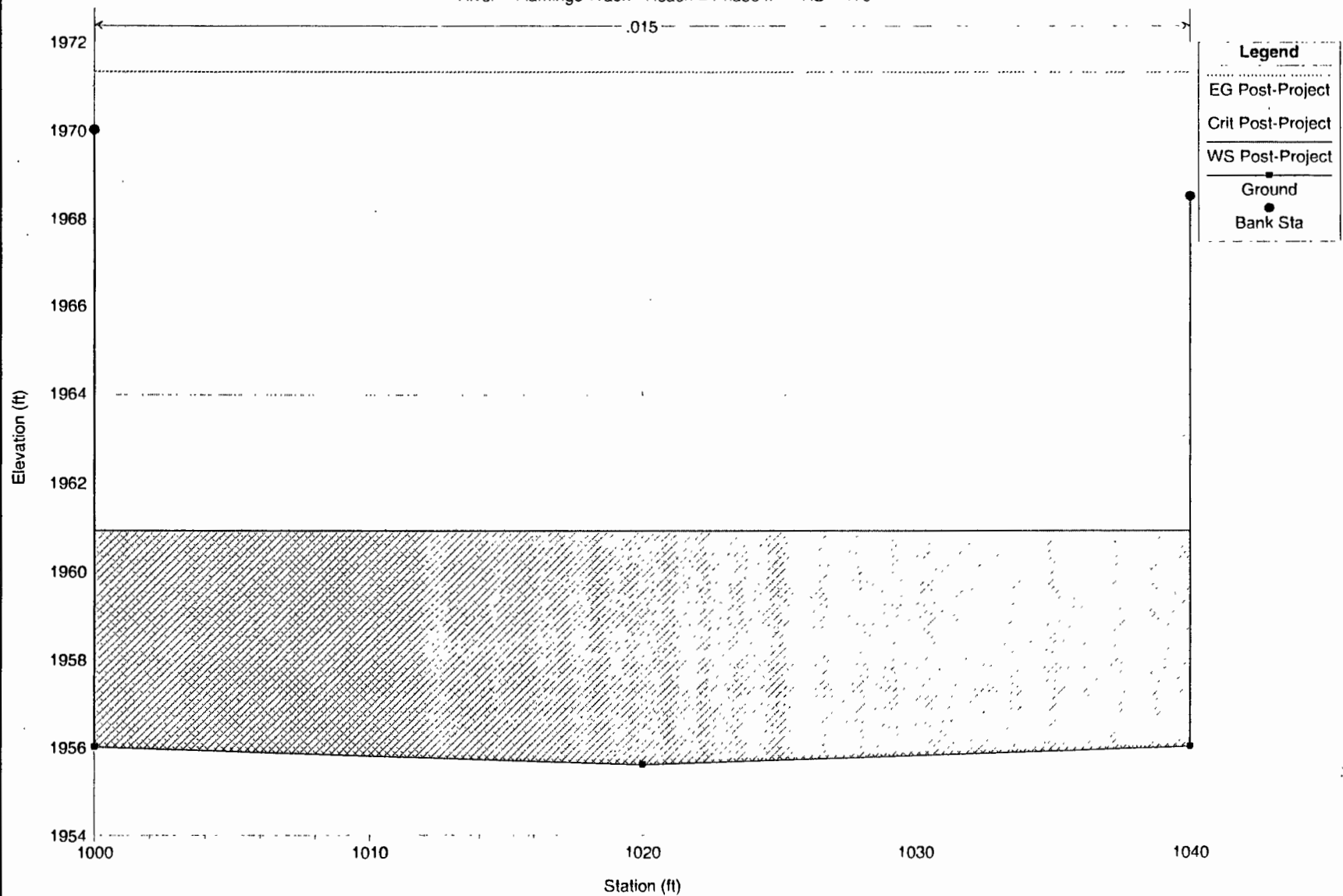
River = Flamingo Wash Reach = Phase II RS = 175



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

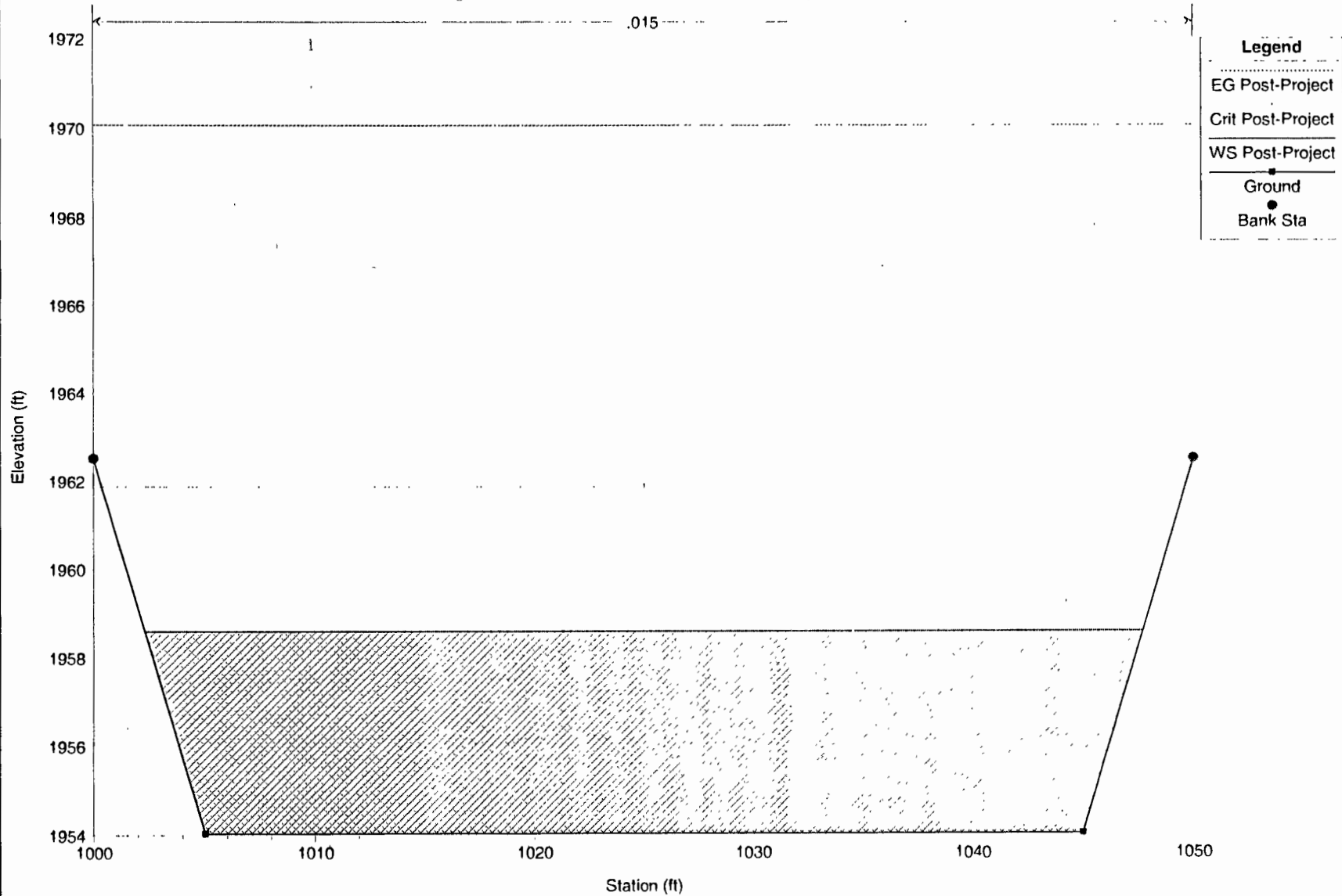
River = Flamingo Wash Reach = Phase II RS = 170

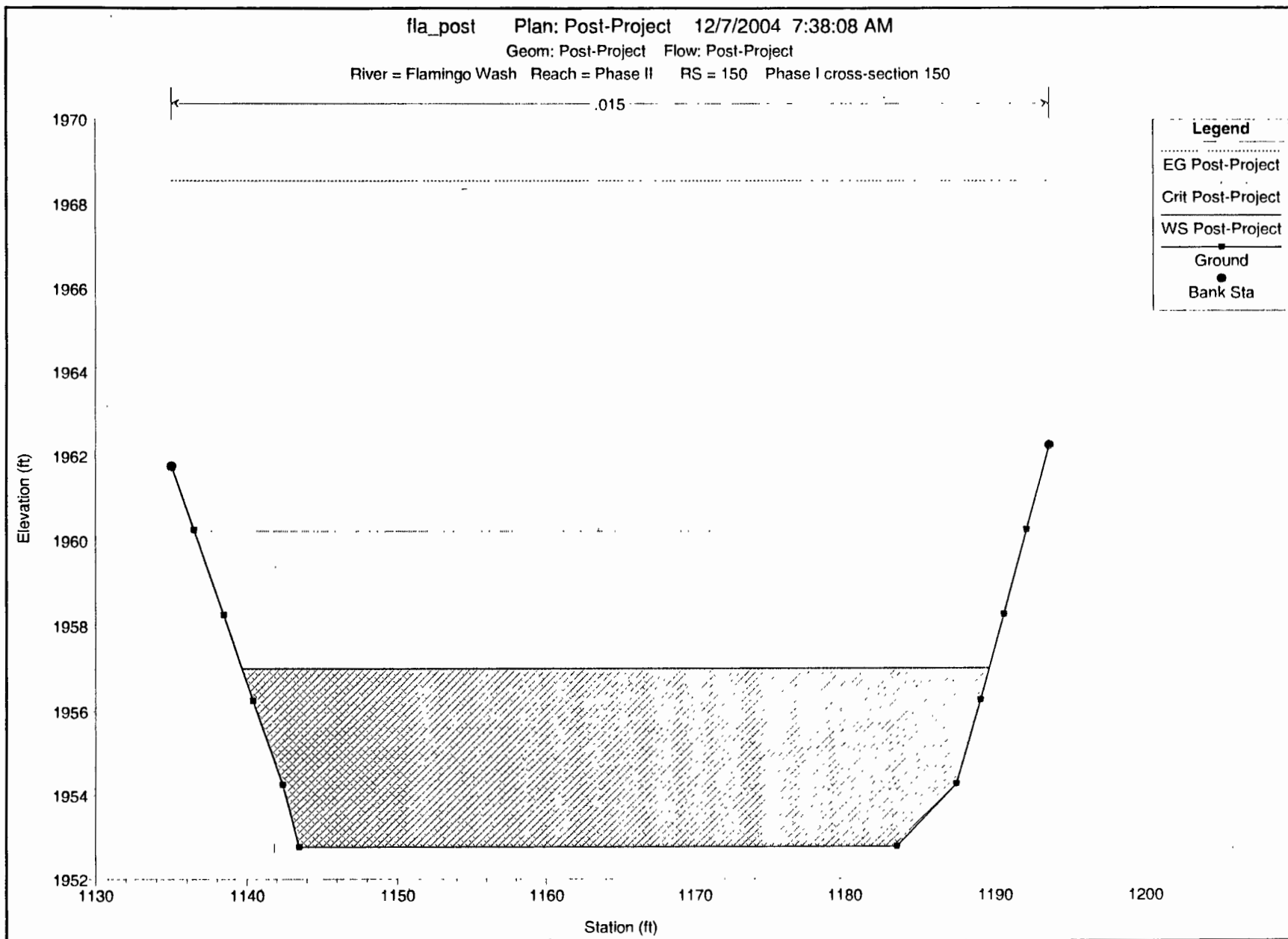


fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

River = Flamingo Wash Reach = Phase II RS = 160 Begin Phase II Improvements

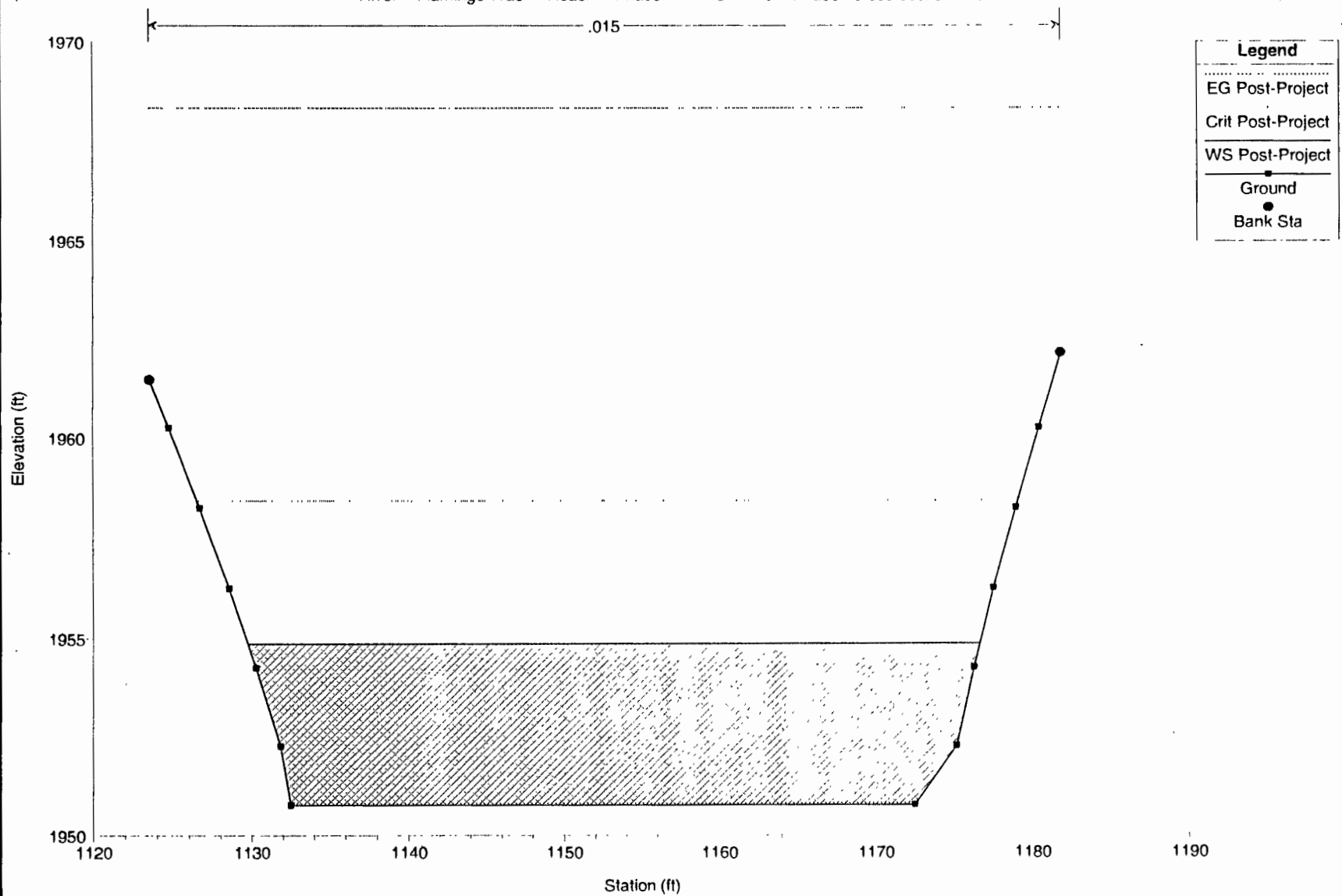




fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

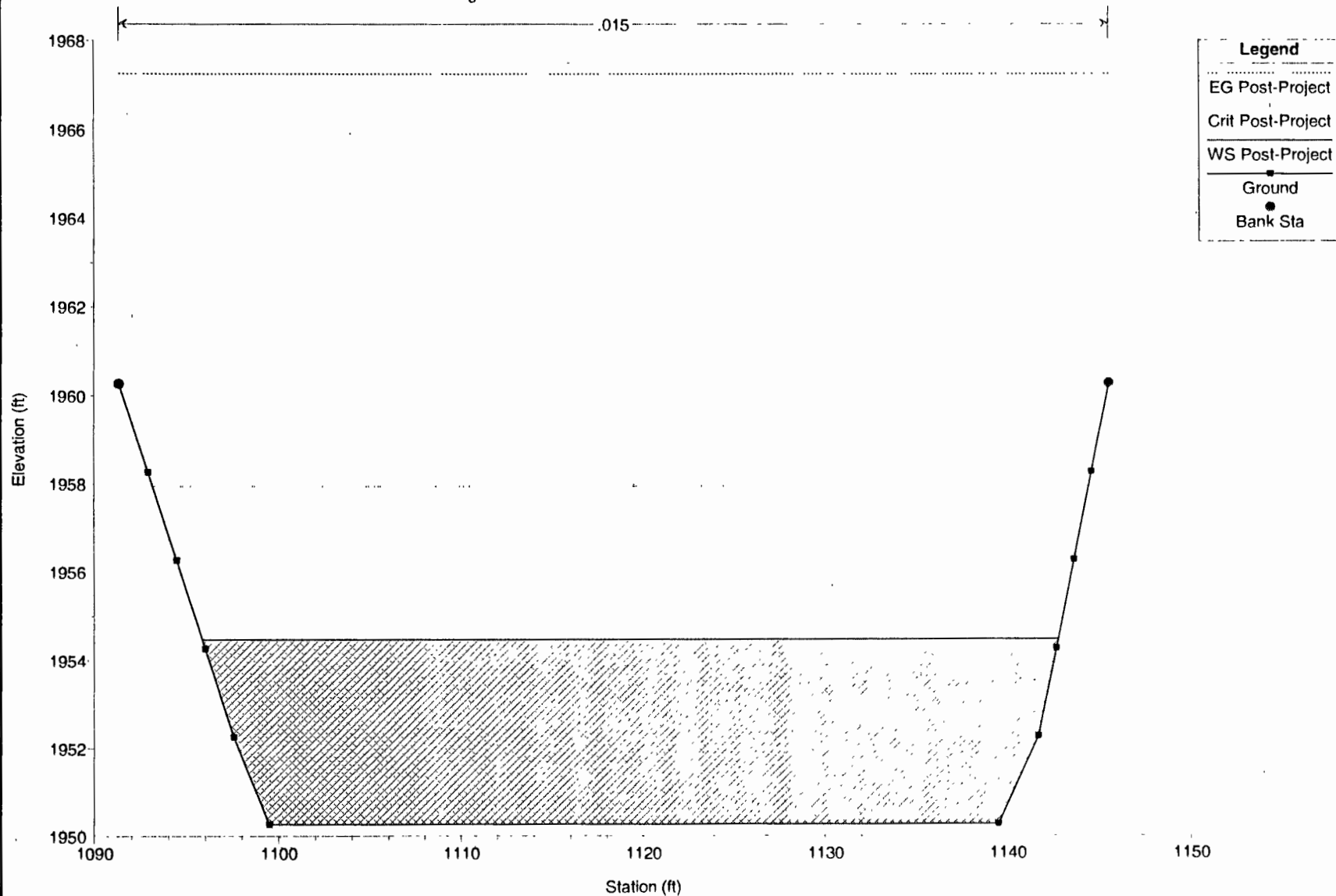
River = Flamingo Wash Reach = Phase II RS = 140 Phase I cross-section 140



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

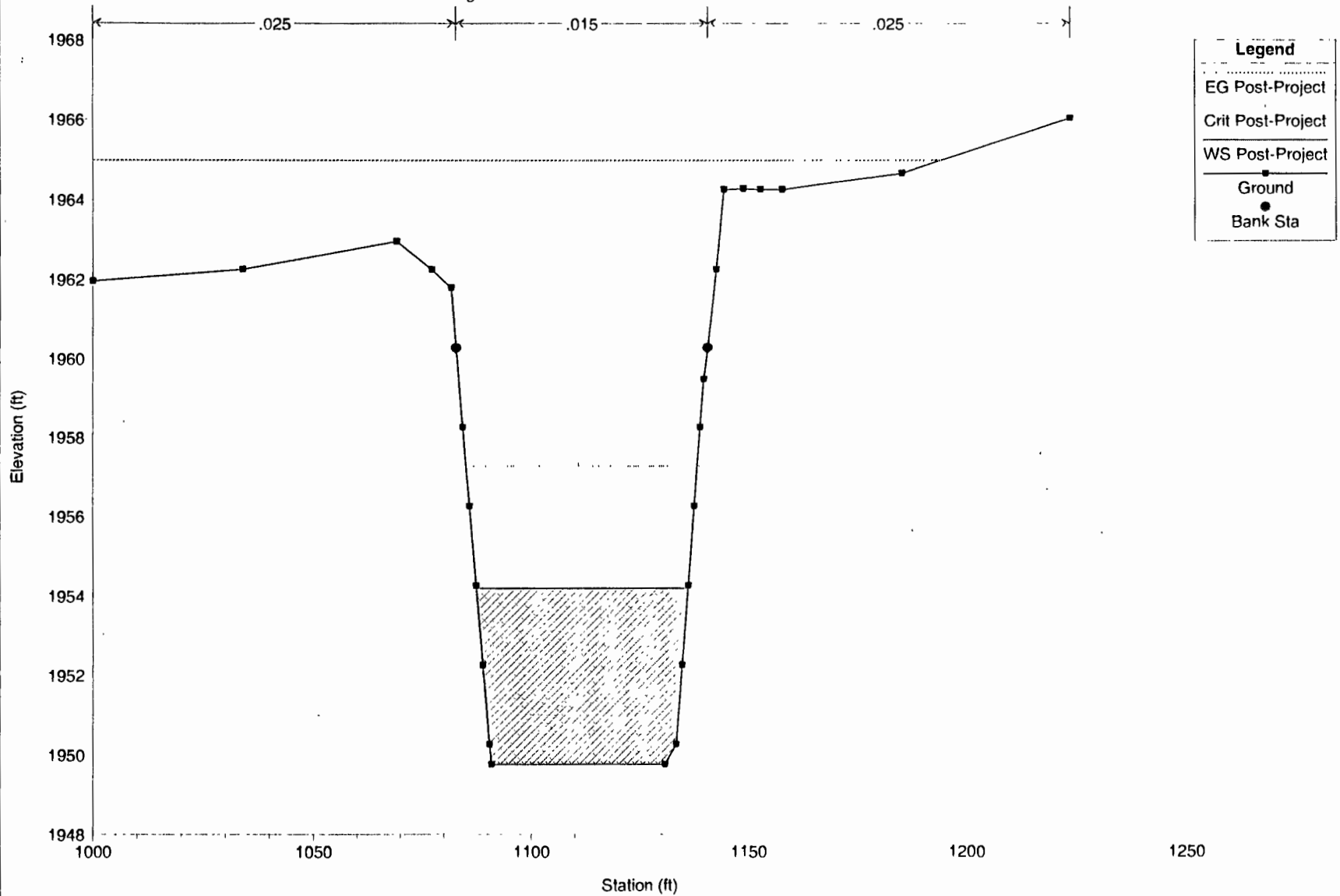
River = Flamingo Wash Reach = Phase II RS = 130 Phase I cross-section 130



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

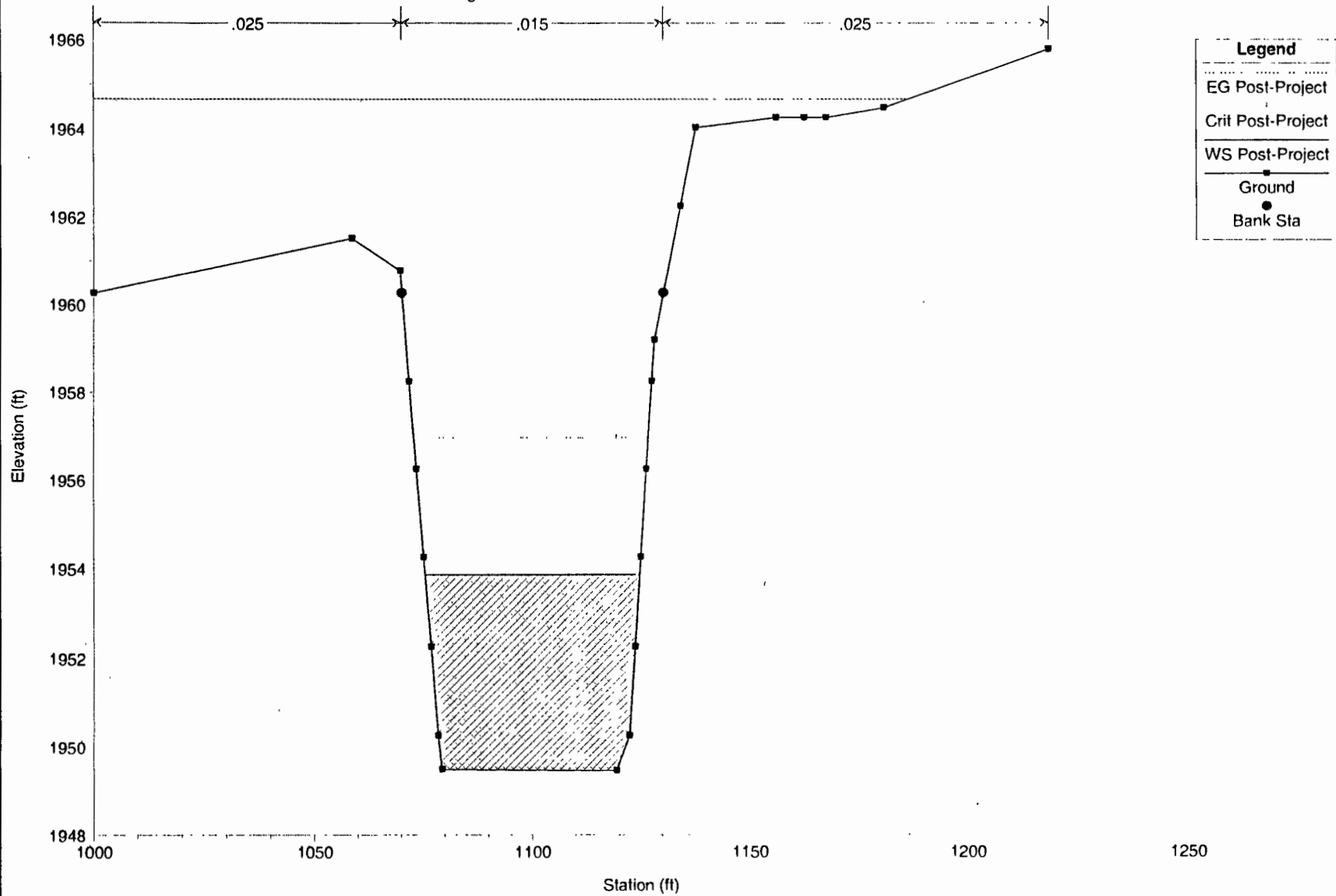
River = Flamingo Wash Reach = Phase II RS = 120 Phase I cross-section 120



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

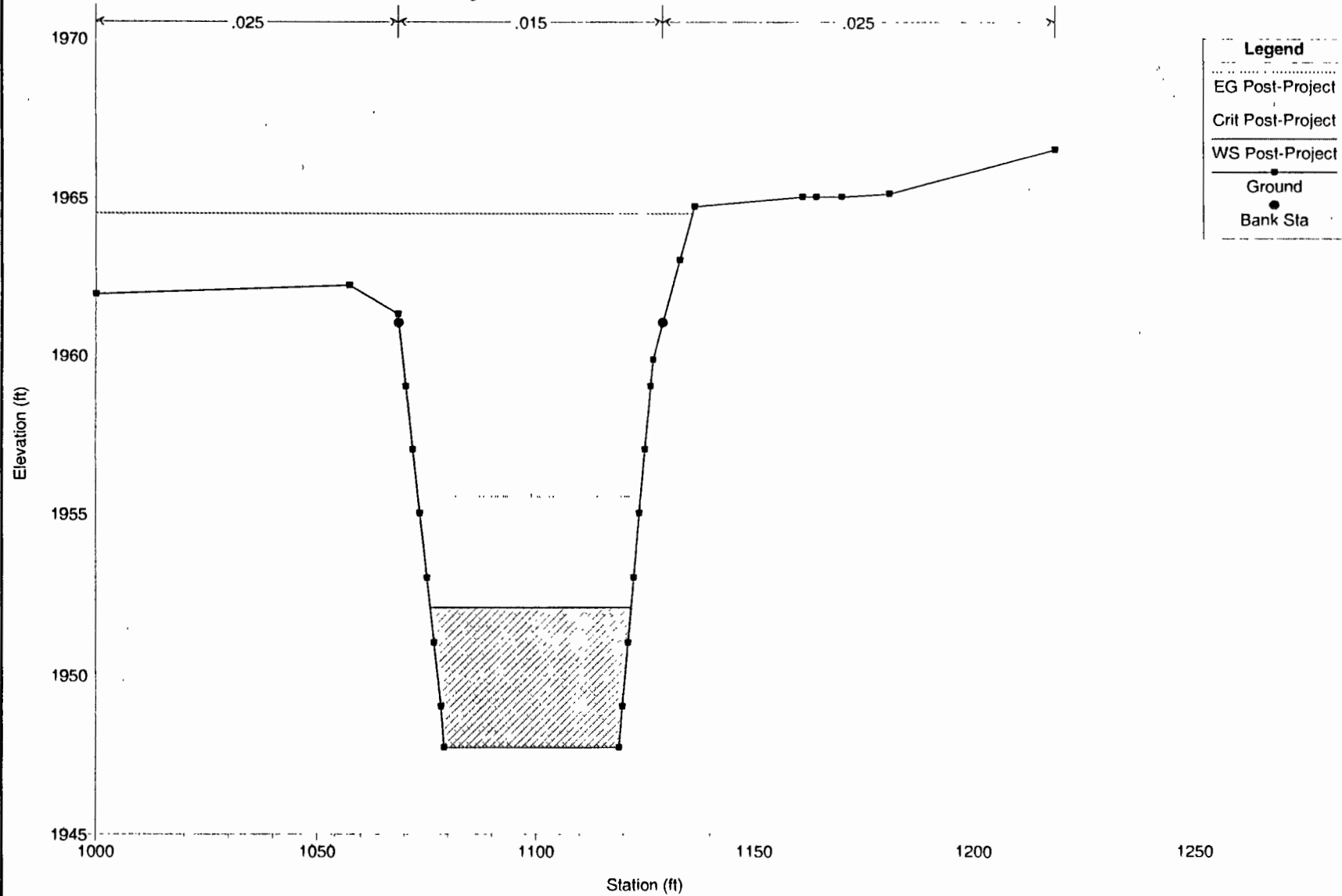
River = Flamingo Wash Reach = Phase II RS = 110 Phase I cross-section 110



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

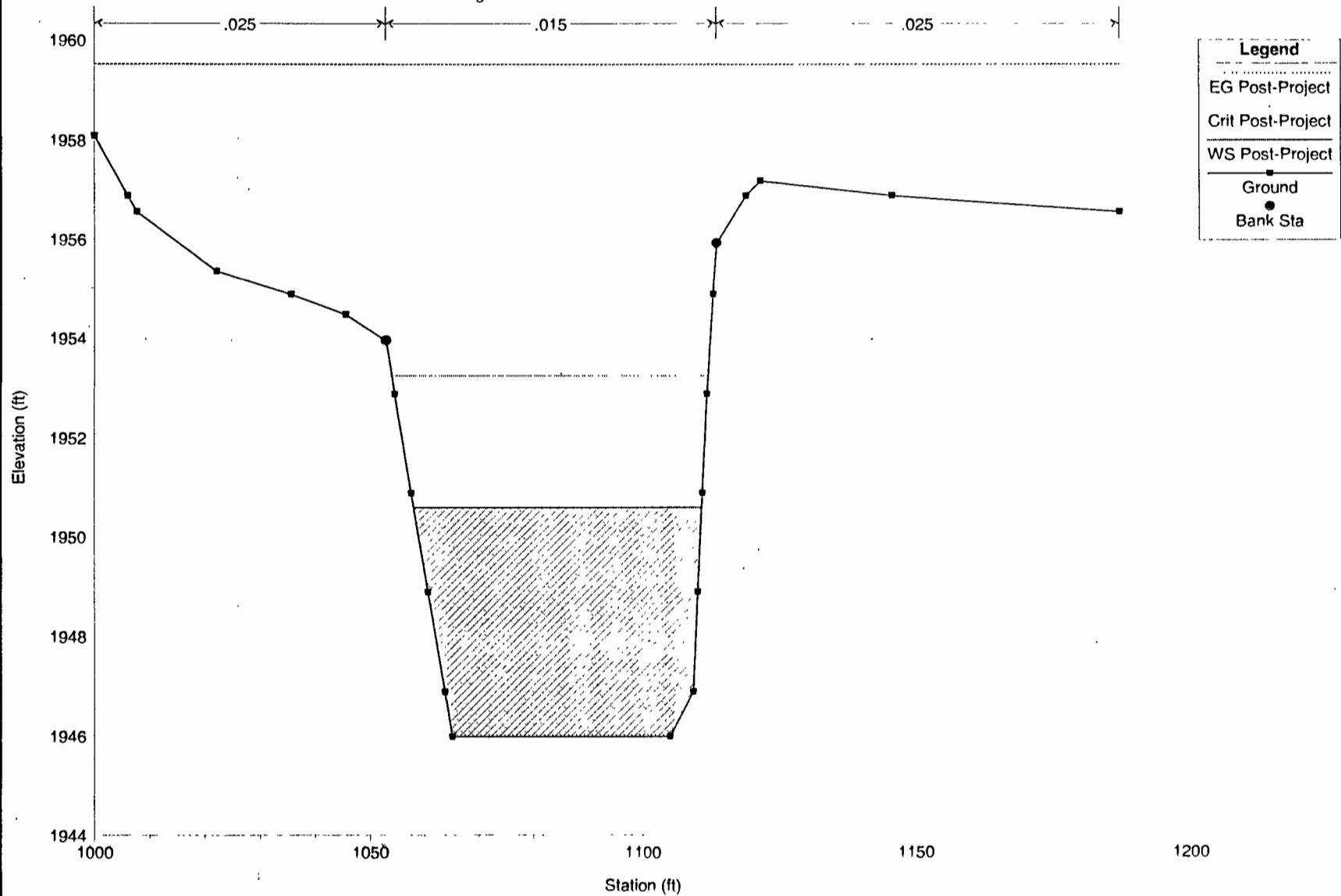
River = Flamingo Wash Reach = Phase II RS = 100 Phase 1 cross-section 100



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

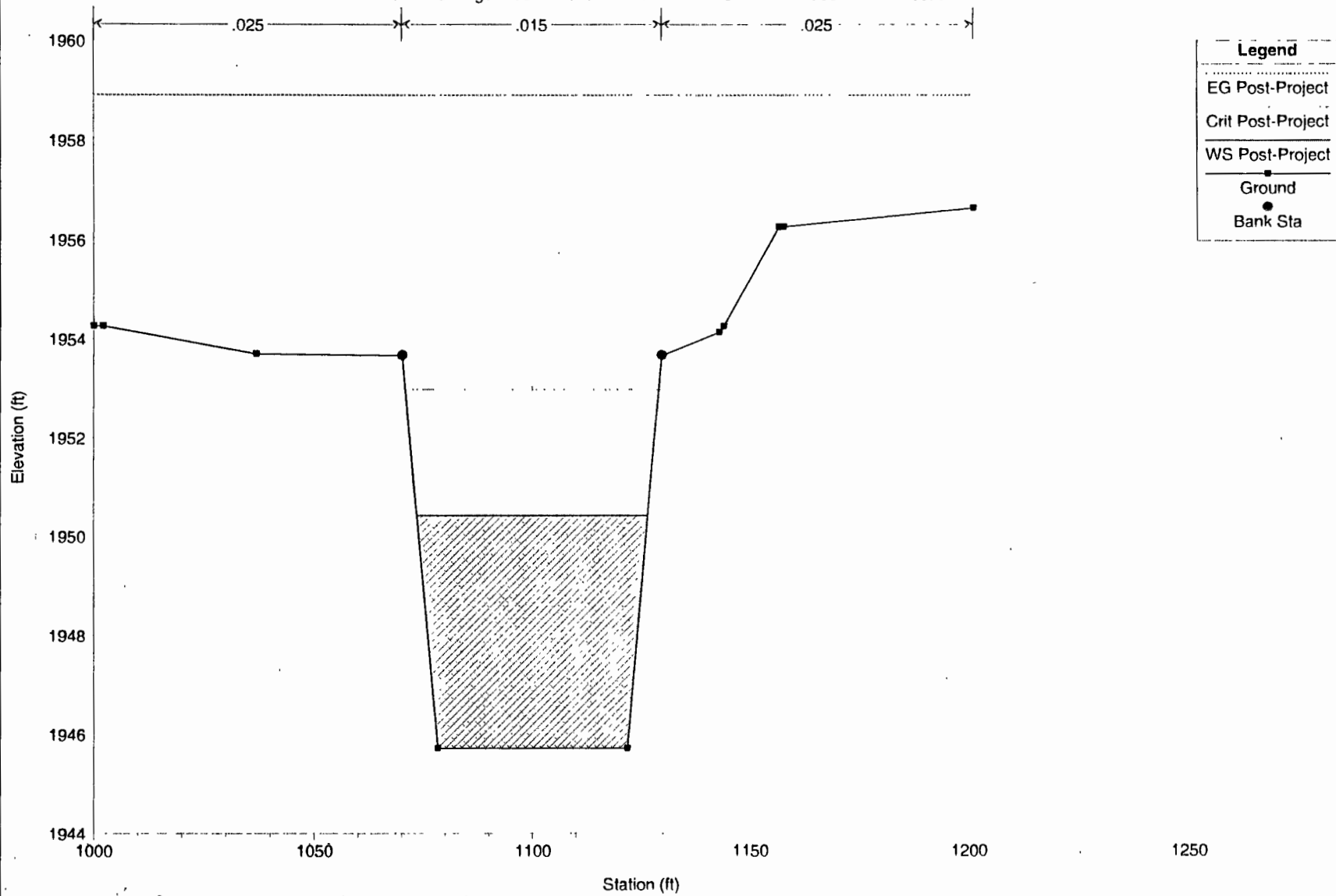
River = Flamingo Wash Reach = Phase II RS = 90 Phase 1 cross-section 90



fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

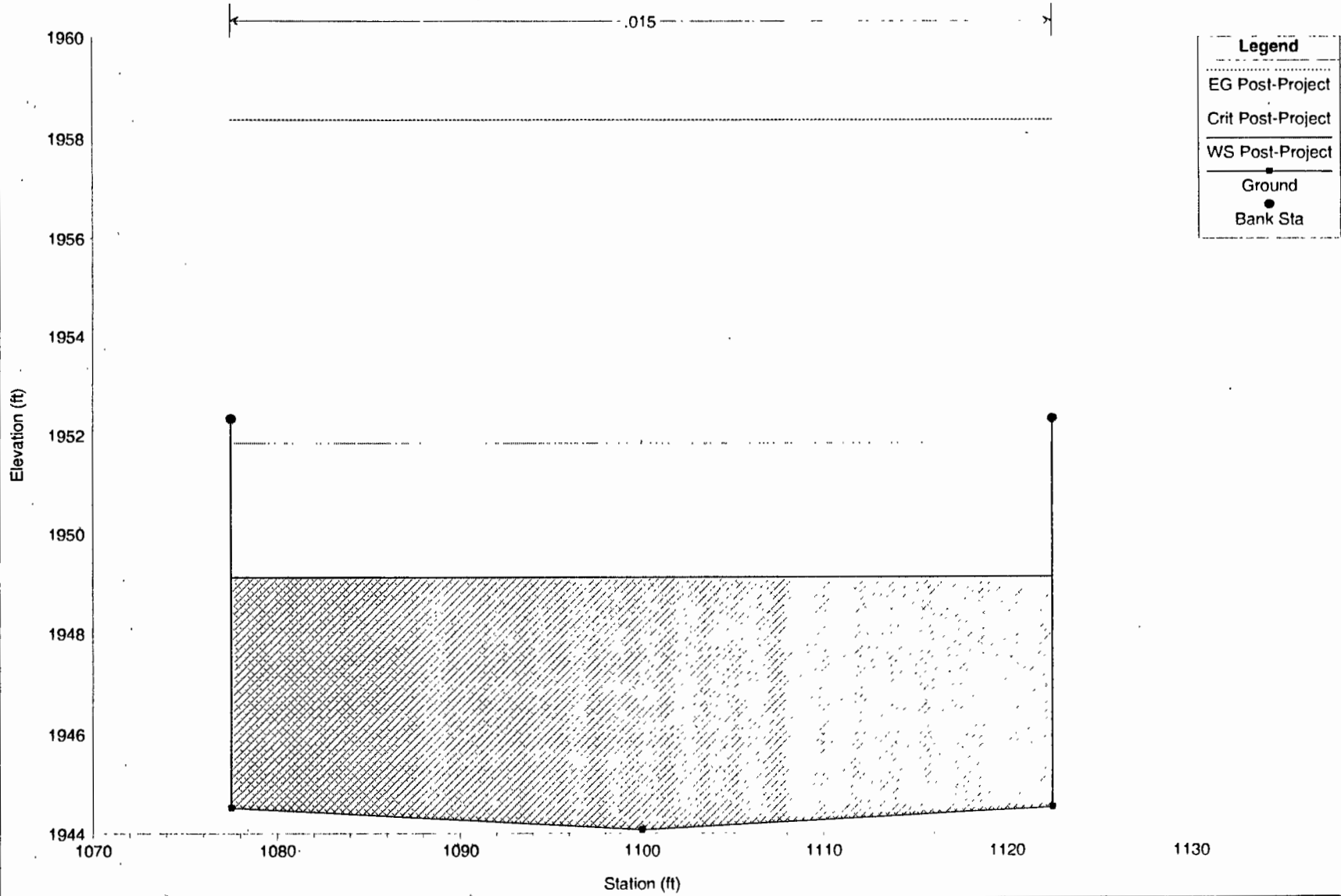
River = Flamingo Wash Reach = Phase II RS = 81 Phase 1 cross-section 81

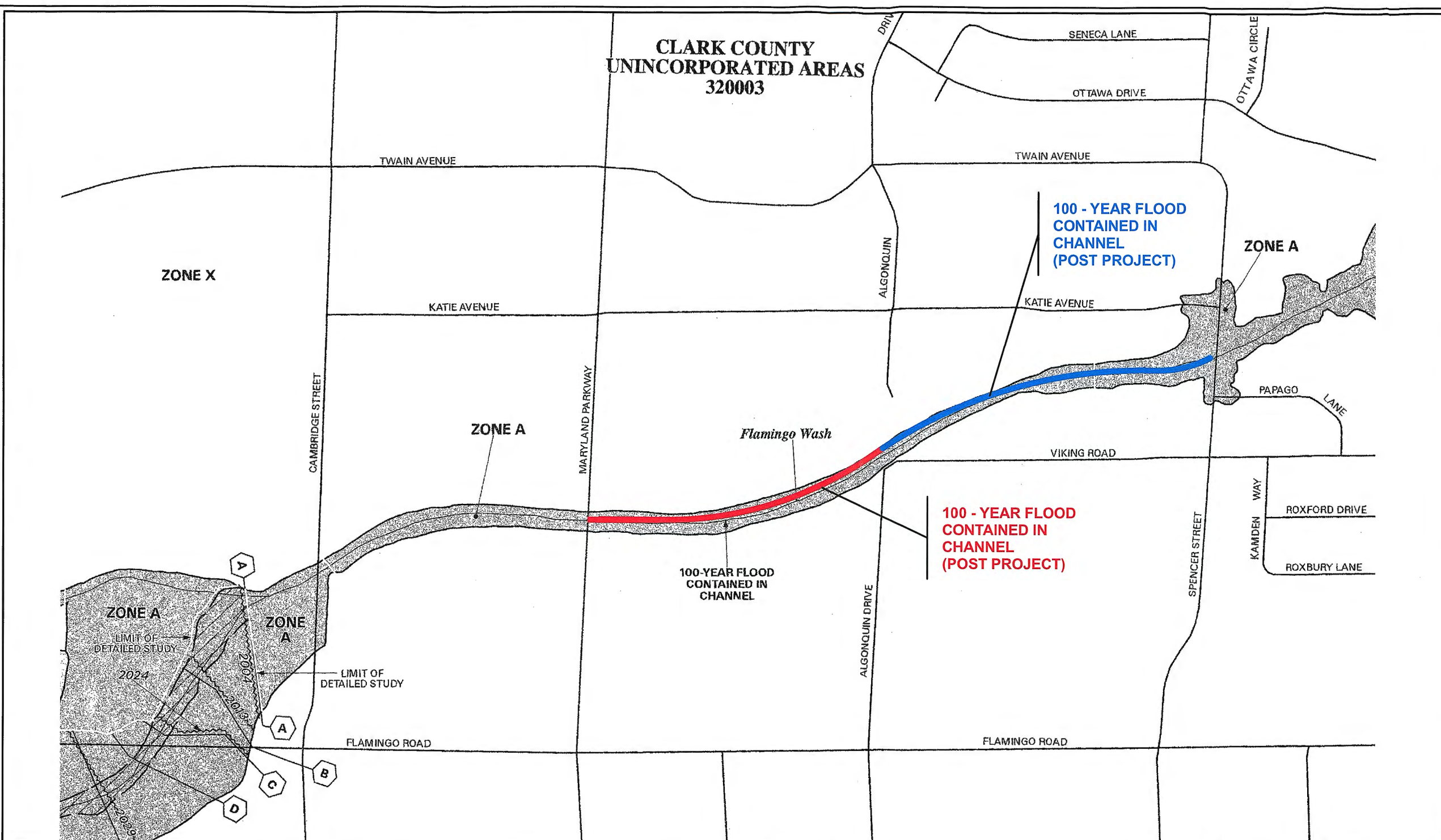


fla_post Plan: Post-Project 12/7/2004 7:38:08 AM

Geom: Post-Project Flow: Post-Project

River = Flamingo Wash Reach = Phase II RS = 75 Phase 1 cross-section 75





PANEL 2557 E

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2557 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:			
COMMUNITY:	NUMBER	PANEL	SHEET
CLARK COUNTY, UNINCORPORATED AREAS	320003	2557	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
32003C2557 E

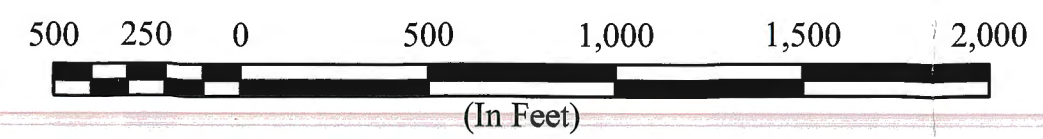
MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency



-  **Proposed Flood Zone (Phase II)**
-  **Flood Zone (Phase I) Approved by FEMA**

GRAPHIC SCALE



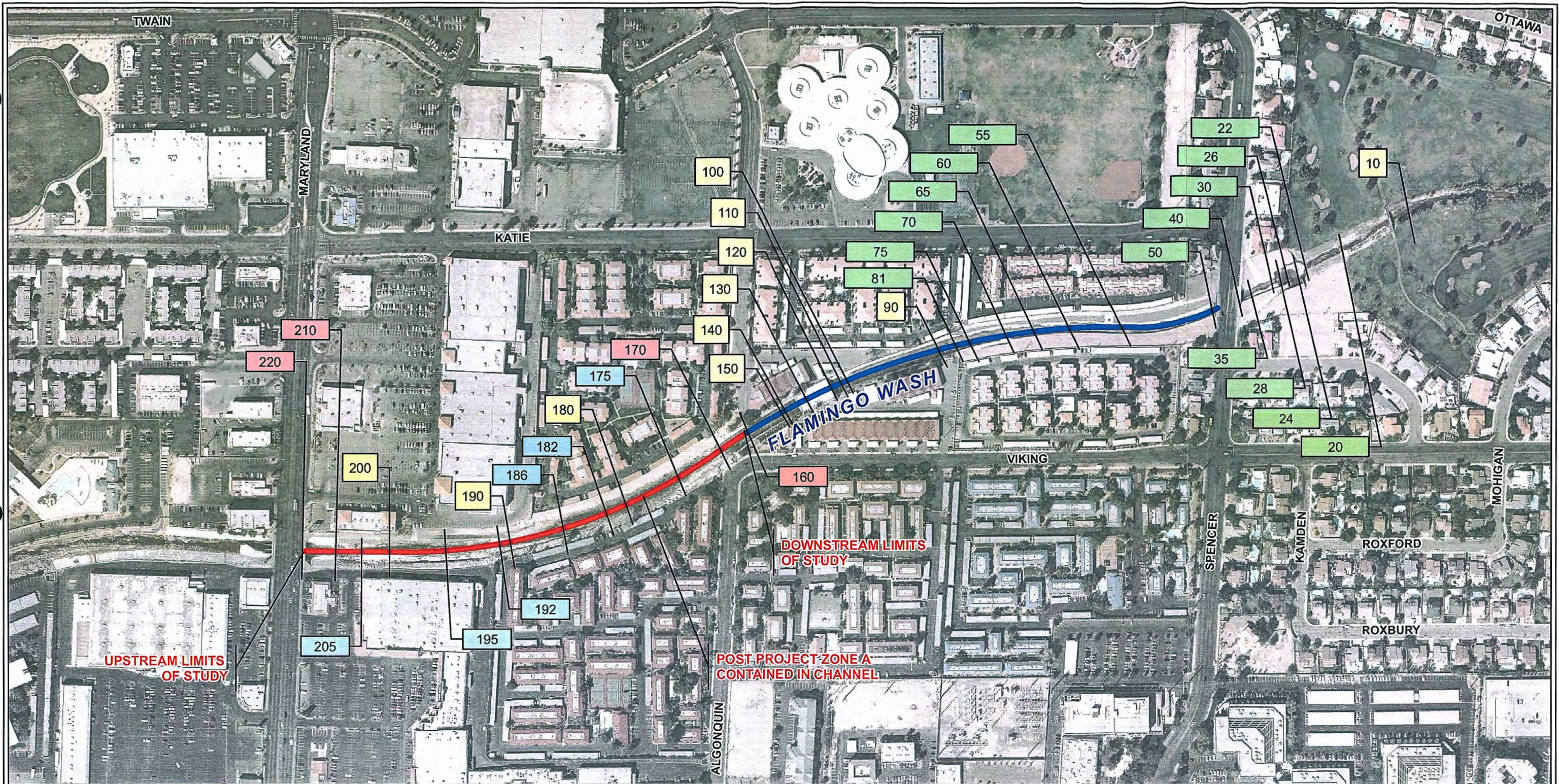
1 inch = 500 ft.

FIGURE 4

**ANNOTATED
POST PROJECT
FEMA FLOODZONE MAP**

PBS&J 2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200

ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES



AIR PHOTO COLLECTED SPRING, 2004

NOTES

1. THE VERTICAL CONTROL IS BASED ON THE NGVD 29 AND HORIZONTAL CONTROL IS BASED ON THE NAVD 83, UTILIZING CLARK COUNTY MONUMENTS.
2. THE CORRECTION FACTOR FROM NGVD 29 TO NAVD 88 IS +2.26 ft. THE HECRAS MODEL CROSS-SECTION ELEVATIONS ARE BASED ON NAVD 88.
3. PLAN MODIFIED FROM "FLAMINGO WASH FIS-RESTDY IMPERIAL PALACE TO SPENCER STREET CROSS SECTION EXHIBIT" PREPARED BY G.C. WALLACE INC. DATED 11-11-1997.
4. THE HYDRAULIC ANALYSIS AND ASSOCIATED FLOODZONE DELINEATIONS COMPLETED FOR THIS CLOMR ARE BASED ON THE PROPOSED CHANNEL IMPROVEMENT PLANS AND ASSOCIATED CROSS-SECTIONS SHOWN ON THIS MAP.

I HEREBY CERTIFY THAT THE INFORMATION USED TO PREPARE THIS CLOMR IS IN SUBSTANTIAL CONFORMANCE WITH THE PROPOSED CHANNEL IMPROVEMENT PLANS LOCATED IN APPENDIX E.

Matthew S. Baird
MATTHEW S. BAIRD, NV 13684

12/9/04
DATE



(In Feet)

1 inch = 300 ft.

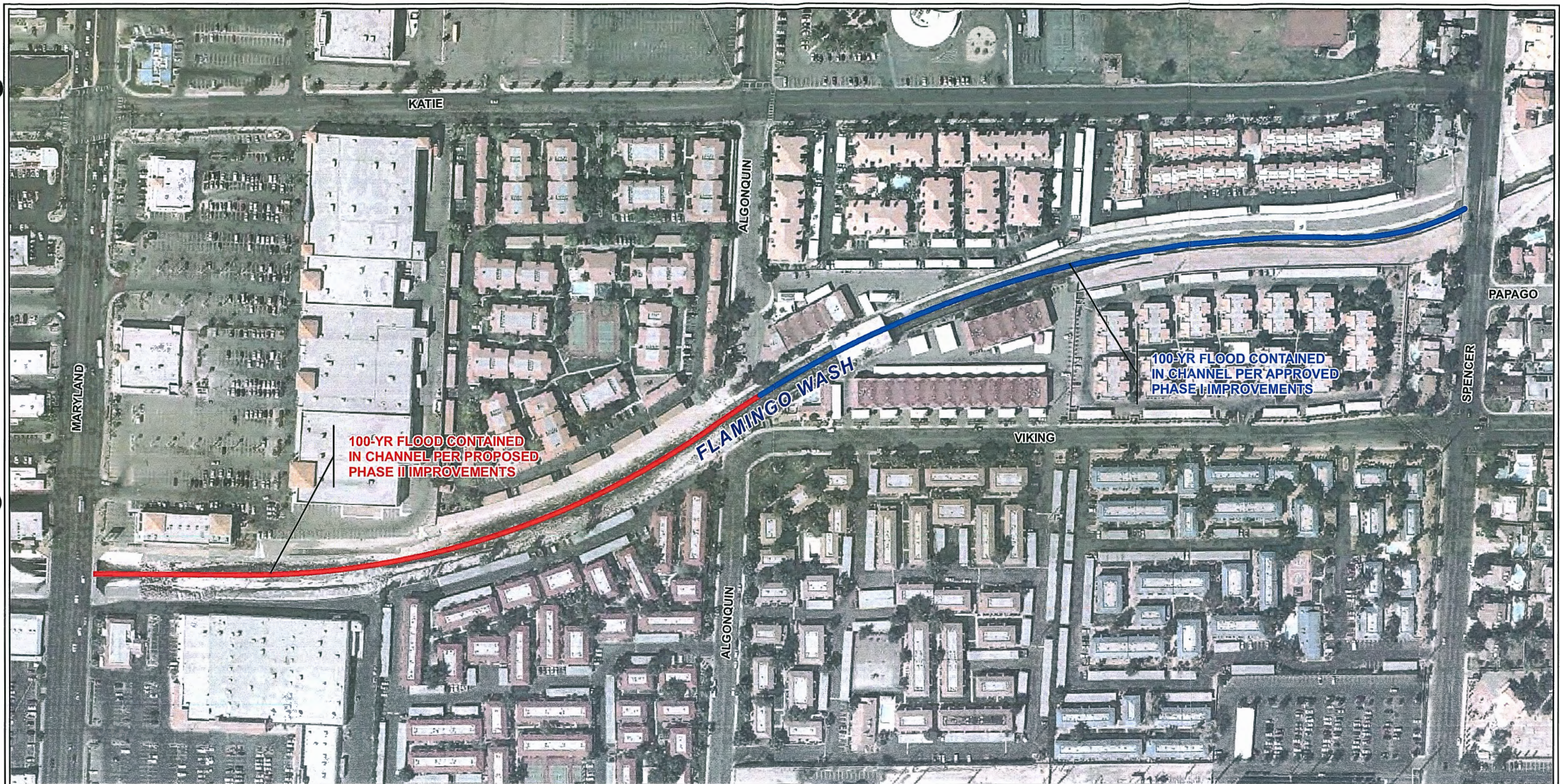
- 150 FLAMINGO WASH FIS RESTUDY CROSS SECTION (TYP)
- 130 FLAMINGO WASH FIS RESTUDY/POST PROJECT CONDITIONS CROSS SECTION (TYP)
- 130 POST PROJECT CONDITIONS CROSS SECTION (TYP)
- 70 POST PROJECT CONDITIONS CROSS SECTION (PREVIOUS LOMR PHASE I)

WORKMAP

FLAMINGO WASH AT
MARYLAND PARKWAY
FIGURE 5

PBS&J 2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tel: 702-263-7275
Fax: 702-263-7200

ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES



NOTES

1. THE VERTICAL CONTROL IS BASED ON THE NGVD 29 AND HORIZONTAL CONTROL IS BASED ON THE NAVD 83, UTILIZING CLARK COUNTY MONUMENTS.
2. THE CORRECTION FACTOR FROM NGVD 29 TO NAVD 88 IS +2.26 ft. THE HECRAS MODEL CROSS-SECTION ELEVATIONS ARE BASED ON NAVD 88.
3. PLAN MODIFIED FROM "FLAMINGO WASH FIS-RE STUDY IMPERIAL PALACE TO SPENCER STREET CROSS SECTION EXHIBIT" PREPARED BY G.C. WALLACE INC. DATED 11-11-1997.



1 inch = 200 ft.

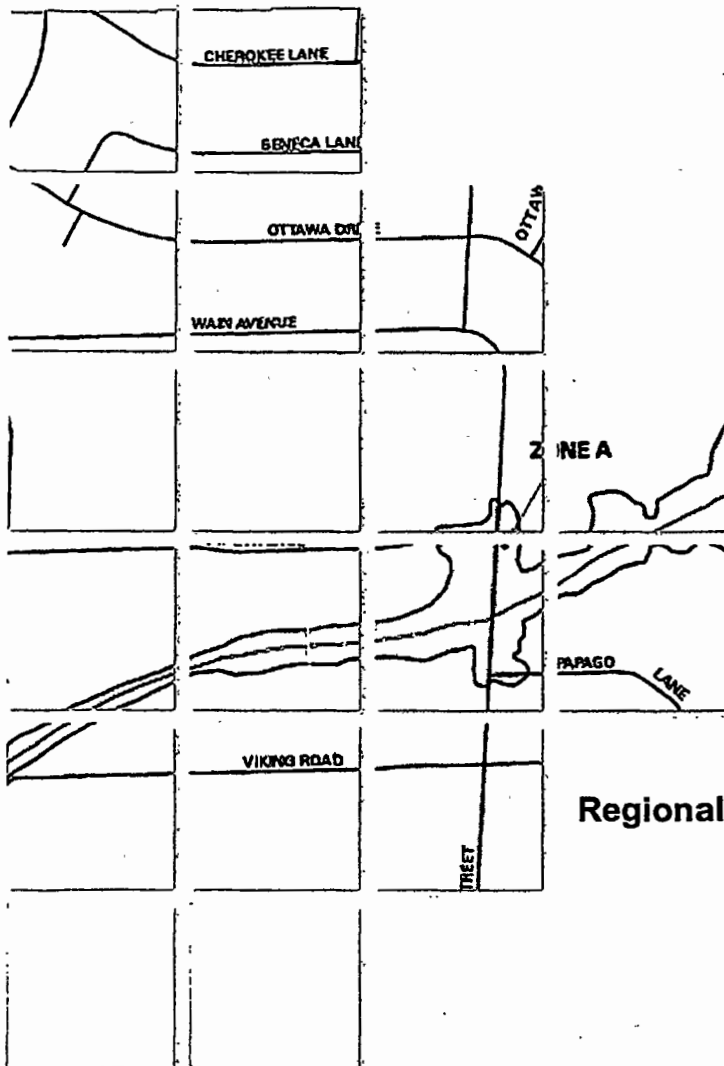
PROPOSED FLOODZONE

FLAMINGO WASH AT
MARYLAND PARKWAY
FIGURE 6

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200
ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES

**THE LOUIS BERGER GROUP INC. POST-PROJECT
CONDITIONS HEC-RAS OUTPUT FILE (NAVD 88)**

Request for Letter of Map Revision Flamingo Wash at Spencer Street Clark County, Nevada



Submitted to:

Clark County Regional Flood Control District



Submitted by:

The Louis Berger Group, Inc.
Las Vegas, Nevada



Revised
11/26/03

October 15, 2003

HEC-RAS Version 3.0.1 Mar 2001
 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
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  XXXXXX      XXXX      X      X      XXXXX
  
```

PROJECT DATA

Project Title: Flamingo Wash at Spencer
 Project File : 879_D_Spnc.prj
 Run Date and Time: 12/1/2003 9:57:57 AM

Project in English units

Project Description:

FLAMINGO WASH
 LETTER OF MAP REVISION
 EXISTING CHANNEL TO SPENCER
 STREET
 STARTING WSE = NORMAL DEPTH
 SUBCRITICAL RUN

PLAN DATA

Plan Title: Post Project
 Plan File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p03

Geometry Title: Post Project Geometry
 Geometry File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g03

Flow Title : Post Project

Plan Summary Information:

Number of: Cross Sections = 50 Multiple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 1

Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Post Project
Flow File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f02

Flow Data (cfs)

River	Reach	RS	PF 1
RIVER-1	Reach-1	180	5300
RIVER-1	Reach-1	50	5500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1	Critical	Normal S = .01

GEOMETRY DATA

Geometry Title: Post Project Geometry
Geometry File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g03

REACH: Reach-1 RS: 180

INPUT

Description:

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1972.26	1028.94	1971.67	1064.62	1970.62	1086	1970.89	1087.29	1972.26
1087.42	1972.36	1100.03	1972.26	1105.54	1972.23	1109.38	1970.26	1113.23	1968.26
1117.01	1966.26	1120.79	1964.26	1124.58	1962.26	1128.36	1960.26	1131.88	1958.41
1143	1959.06	1147.31	1958.26	1152.03	1957.33	1170.74	1958.26	1170.74	1958.19
1176.71	1960.26	1180.23	1961.75	1180.82	1962.26	1183.17	1964.26	1185.58	1966.26
1188.01	1968.26	1190.47	1970.26	1192.93	1972.26	1195.38	1974.26	1197.84	1976.26
1199.53	1977.56	1202.18	1978.26	1204.15	1978.79	1230.41	1980.26	1230.73	1980.32
1268.21	1981.86	1278.63	1982.26						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1105.54	.025	1192.93	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1105.54	1192.93		358.08	363.91	374.39	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1968.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.94	Wt. n-Val.		0.025	
W.S. Elev (ft)	1965.36	Reach Len. (ft)	358.08	363.91	374.39
Crit W.S. (ft)	1965.36	Flow Area (sq ft)		385.47	
E.G. Slope (ft/ft)	0.005479	Area (sq ft)		385.47	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	65.80	Top Width (ft)		65.80	
Vel Total (ft/s)	13.75	Avg. Vel. (ft/s)		13.75	
Max Chl Dpth (ft)	8.03	Hydr. Depth (ft)		5.86	
Conv. Total (cfs)	71600.3	Conv. (cfs)		71600.3	
Length Wtd. (ft)	363.91	Wetted Per. (ft)		69.77	
Min Ch El (ft)	1957.33	Shear (lb/sq ft)		1.89	
Alpha	1.00	Stream Power (lb/ft s)		25.98	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	19.82	0.07
C & E Loss (ft)		Cum SA (acres)	0.35	3.40	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 170

INPUT

Description:

Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-----	------	-----	------	-----	------	-----	------	-----	------

1023.53	1963.56	1025.98	1962.26	1029.63	1960.26	1033.27	1958.26	1036.91	1956.26
1039.96	1954.56	1078.78	1954.75	1090.15	1955.06	1091.24	1956.26	1093.09	1958.26
1094.94	1960.26	1096.8	1962.26	1098.54	1964.14	1098.85	1964.26	1103.45	1966.26
1107.87	1968.26	1112.15	1970.26	1112.6	1970.48	1119.73	1970.58		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1021.94	.015	1098.85	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1021.94	1098.85		98.31	97.13	96.38	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1965.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.015	
W.S. Elev (ft)	1963.89	Reach Len. (ft)	98.31	97.13	96.38
Crit W.S. (ft)	1961.31	Flow Area (sq ft)		575.14	
E.G. Slope (ft/ft)	0.000642	Area (sq ft)		575.14	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	75.51	Top Width (ft)		75.51	
Vel Total (ft/s)	9.22	Avg. Vel. (ft/s)		9.22	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		7.62	
Conv. Total (cfs)	209191.8	Conv. (cfs)		209191.8	
Length Wtd. (ft)	97.13	Wetted Per. (ft)		81.75	
Min Ch El (ft)	1954.56	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		2.60	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.37	15.81	0.07
C & E Loss (ft)	0.20	Cum SA (acres)	0.35	2.81	0.07

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: RIVER-1
REACH: Reach-1 RS: 160

INPUT

Description:

Station	Elevation	Data	num=	21					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1966.26	1020.85	1964.26	1022.9	1963.4	1024.28	1962.26	1026.68	1960.26
1029.05	1958.26	1031.39	1956.26	1033.69	1954.26	1033.96	1954.02	1074.55	1954.03
1074.73	1954.26	1076.3	1956.26	1077.86	1958.26	1079.44	1960.26	1081.05	1962.26
1081.97	1963.36	1085.8	1964.26	1091.98	1966.26	1097.23	1968.26	1098.86	1968.94

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1000 .025 1022.9 .015 1081.97 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1022.9 1081.97 119.51 114.85 110.97 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1964.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.29	Wt. n-Val.		0.015	
W.S. Elev (ft)	1961.61	Reach Len. (ft)	119.51	114.85	110.97
Crit W.S. (ft)	1961.61	Flow Area (sq ft)		363.92	
E.G. Slope (ft/ft)	0.002039	Area (sq ft)		363.92	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	55.47	Top Width (ft)		55.47	
Vel Total (ft/s)	14.56	Avg. Vel. (ft/s)		14.56	
Max Chl Dpth (ft)	7.59	Hydr. Depth (ft)		6.56	
Conv. Total (cfs)	117380.3	Conv. (cfs)		117380.3	
Length Wtd. (ft)	114.85	Wetted Per. (ft)		61.94	
Min Ch El (ft)	1954.02	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		10.89	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.37	14.76	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	2.67	0.07

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: RIVER-1
 REACH: Reach-1 RS: 150

INPUT

Description:

Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1967.66	1124.53	1966.51	1124.8	1966.26	1129.47	1964.26	1133.87	1962.26		
1135	1961.76	1136.46	1960.26	1138.43	1958.26	1140.4	1956.26	1142.4	1954.26		
1143.5	1952.76	1183.5	1952.76	1187.45	1954.26	1189.03	1956.26	1190.57	1958.26		
1192.09	1960.26	1193.6	1962.25	1193.68	1962.26	1198.04	1964.26	1202.42	1966.26		
1206.72	1968.26	1208.61	1969.15	1222.54	1969.43	1280.29	1968.65				

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1135	.015	1193.6	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1135	1193.6		1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1964.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1958.60	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1960.22	Flow Area (sq ft)		276.25	
E.G. Slope (ft/ft)	0.004649	Area (sq ft)		276.25	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	52.74	Top Width (ft)		52.74	
Vel Total (ft/s)	19.19	Avg. Vel. (ft/s)		19.19	
Max Chl Dpth (ft)	5.84	Hydr. Depth (ft)		5.24	
Conv. Total (cfs)	77729.7	Conv. (cfs)		77729.7	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		57.71	
Min Ch El (ft)	1952.76	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)		26.66	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.37	13.92	0.07
C & E Loss (ft)	0.24	Cum SA (acres)	0.35	2.53	0.07

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: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 140

INPUT

Description:

Station Elevation Data		num=	25						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1967.36	1109.48	1966.26	1112.94	1966.35	1117.49	1964.26	1121.87	1962.26
1123.53	1961.46	1124.74	1960.26	1126.67	1958.26	1128.54	1956.26	1130.26	1954.26
1131.84	1952.26	1132.5	1950.76	1172.5	1950.76	1175.19	1952.26	1176.29	1954.26
1177.52	1956.26	1178.95	1958.26	1180.42	1960.26	1181.8	1962.12	1182.12	1962.26
1186.57	1964.26	1191.03	1966.26	1195.47	1968.26	1197.34	1969.11	1258.33	1968.62

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1123.53	.015	1181.8	.025

1123.53 1181.8 57.23 55.76 56.76 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1964.07	Wt. n-Val.		0.015	
Vel Head (ft)	8.12	Reach Len. (ft)	57.23	55.76	56.76
W.S. Elev (ft)	1955.95	Flow Area (sq ft)		231.74	
Crit W.S. (ft)	1958.44	Area (sq ft)		231.74	
E.G. Slope (ft/ft)	0.007598	Flow (cfs)		5300.00	
Q Total (cfs)	5300.00	Top Width (ft)		48.52	
Top Width (ft)	48.52	Avg. Vel. (ft/s)		22.87	
Vel Total (ft/s)	22.87	Hydr. Depth (ft)		4.78	
Max Chl Dpth (ft)	5.19	Conv. (cfs)		60803.4	
Conv. Total (cfs)	60803.4	Wetted Per. (ft)		53.76	
Length Wtd. (ft)	55.76	Shear (lb/sq ft)		2.04	
Min Ch El (ft)	1950.76	Stream Power (lb/ft s)		46.76	
Alpha	1.00	Cum Volume (acre-ft)	0.37	13.91	0.07
Frctn Loss (ft)	0.01	Cum SA (acres)	0.35	2.52	0.07
C & E Loss (ft)	0.24				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 130

INPUT

Description:

Station Elevation Data		num=	24
Sta	Elev	Sta	Elev
1000	1965.26	1082.33	1964.26
1092.89	1958.26	1094.44	1956.26
1139.5	1950.26	1141.65	1952.26
1145.53	1960.26	1147.33	1962.26
1156.8	1966.26	1157.37	1966.73

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1000	.025	1091.34	.015
		1145.53	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1091.34	1145.53	125.29	125.31	125.61	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1963.64	Wt. n-Val.		0.015	
Vel Head (ft)	8.20				

Crit W.S. (ft)	1957.93	Flow Area (sq.ft)	230.61	
E.G. Slope (ft/ft)	0.007633	Area (sq ft)	230.61	
Q Total (cfs)	5300.00	Flow (cfs)	5300.00	
Top Width (ft)	48.12	Top Width (ft)	48.12	
Vel Total (ft/s)	22.98	Avg. Vel. (ft/s)	22.98	
Max Chl Dpth (ft)	5.18	Hydr. Depth (ft)	4.79	
Conv. Total (cfs)	60664.7	Conv. (cfs)	60664.7	
Length Wtd. (ft)	125.31	Wetted Per. (ft)	53.29	
Min Ch El (ft)	1950.26	Shear (lb/sq ft)	2.06	
Alpha	1.00	Stream Power (lb/ft s)	47.39	
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.37	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 120

INPUT

Description:

Station Elevation Data		num=	27								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1961.96	1034.06	1962.26	1069.3	1962.96	1077.37	1962.26	1081.8	1961.8		
1082.95	1960.26	1084.44	1958.26	1085.94	1956.26	1087.44	1954.26	1088.93	1952.26		
1090.43	1950.26	1090.88	1949.76	1130.88	1949.76	1133.47	1950.26	1134.85	1952.26		
1136.24	1954.26	1137.62	1956.26	1138.99	1958.26	1139.81	1959.48	1140.72	1960.26		
1142.7	1962.26	1144.46	1964.26	1148.81	1964.28	1152.73	1964.26	1157.77	1964.26		
1185.25	1964.66	1223.58	1966.04								

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1000	.025	1082.95	.015
		1140.72	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1082.95	1140.72		25.32	24.78	22.42	
						.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1962.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.55	Wt. n-Val.		0.015	
W.S. Elev (ft)	1954.99	Reach Len. (ft)	25.32	24.78	22.42
Crit W.S. (ft)	1957.27	Flow Area (sq ft)		240.42	
E.G. Slope (ft/ft)	0.006924	Area (sq ft)		240.42	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	49.85	Top Width (ft)		49.85	
Vel Total (ft/s)	22.05	Avg. Vel. (ft/s)		22.05	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		4.82	
Conv. Total (cfs)	63694.8	Conv. (cfs)		63694.8	
Length Wtd. (ft)	24.78	Wetted Per. (ft)		54.97	

Alpha	1.00	Stream Power (lb/ft s)	41.68	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.37	12.94 0.07
C & E Loss (ft)	0.20	Cum SA (acres)	0.35	2.32 0.07

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: RIVER-1
 REACH: Reach-1 RS: 110

INPUT

Description:

Station Elevation Data		num=	25								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1960.26	1058.72	1961.52	1069.8	1960.78	1070.23	1960.26	1071.86	1958.26		
1073.49	1956.26	1075.13	1954.26	1076.77	1952.26	1078.41	1950.26	1079.37	1949.49		
1119.37	1949.46	1122.31	1950.26	1123.63	1952.26	1124.96	1954.26	1126.29	1956.26		
1127.61	1958.26	1128.23	1959.2	1130.3	1960.26	1134.23	1962.26	1137.72	1964.04		
1156.11	1964.26	1162.57	1964.26	1167.55	1964.26	1180.81	1964.48	1218.4	1965.79		

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
1000	.025	1070.23	.015	1130.3	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr:	Expan.
	1070.23	1130.3		1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1962.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1954.60	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1956.96	Flow Area (sq ft)		237.36	
E.G. Slope (ft/ft)	0.007247	Area (sq ft)		237.36	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	50.33	Top Width (ft)		50.33	
Vel Total (ft/s)	22.33	Avg. Vel. (ft/s)		22.33	
Max Chl Dpth (ft)	5.14	Hydr. Depth (ft)		4.72	
Conv. Total (cfs)	62257.1	Conv. (cfs)		62257.1	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		55.09	
Min Ch El (ft)	1949.46	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)		43.53	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.37	12.80	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	2.29	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 100

INPUT

Description:

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1961.93	1057.4	1962.22	1068.55	1961.32	1068.7	1961.03	1070.39	1959.03
1071.98	1957.03	1073.58	1955.03	1075.17	1953.03	1076.75	1951.03	1078.32	1949.03
1079	1947.73	1119	1947.73	1119.77	1949.03	1121.07	1951.03	1122.37	1953.03
1123.68	1955.03	1124.99	1957.03	1126.31	1959.03	1126.86	1959.87	1129.14	1961.03
1133.08	1963.03	1136.43	1964.73	1161.01	1965.03	1164.12	1965.03	1169.92	1965.03
1180.79	1965.13	1218.41	1966.51						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1068.7	.015	1129.14	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1068.7	1129.14		346.14	342.73	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1962.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.46	Wt. n-Val.		0.015	
W.S. Elev (ft)	1952.70	Reach Len. (ft)	346.14	342.73	339.84
Crit W.S. (ft)	1955.55	Flow Area (sq ft)		214.74	
E.G. Slope (ft/ft)	0.009375	Area (sq ft)		214.74	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	46.72	Top Width (ft)		46.72	
Vel Total (ft/s)	24.68	Avg. Vel. (ft/s)		24.68	
Max Chl Dpth (ft)	4.97	Hydr. Depth (ft)		4.60	
Conv. Total (cfs)	54738.3	Conv. (cfs)		54738.3	
Length Wtd. (ft)	342.73	Wetted Per. (ft)		52.03	
Min Ch El (ft)	1947.73	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		59.62	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	12.80	0.07
C & E Loss (ft)	0.17	Cum SA (acres)	0.35	2.29	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 90

INPUT

Description:

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1958.08	1006.02	1956.88	1007.66	1956.56	1022.15	1955.35	1035.65	1954.88
1045.56	1954.48	1052.98	1953.95	1054.57	1952.88	1057.59	1950.88	1060.63	1948.88
1063.71	1946.88	1065.06	1945.98	1105.06	1945.98	1109.3	1946.88	1110.15	1948.88
1110.99	1950.88	1111.87	1952.88	1112.94	1954.88	1113.6	1955.91	1119.02	1956.88
1121.63	1957.18	1145.66	1956.88	1187.07	1956.55				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1052.98	.015	1113.6	.025

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	1052.98	1113.6	53.02	51.93	56.59	.1	.3	

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1958.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.88	Wt. n-Val.		0.015	
W.S. Elev (ft)	1950.86	Reach Len. (ft)	53.02	51.93	56.59
Crit W.S. (ft)	1953.25	Flow Area (sq ft)		235.27	
E.G. Slope (ft/ft)	0.007910	Area (sq ft)		235.27	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	53.35	Top Width (ft)		53.35	
Vel Total (ft/s)	22.53	Avg. Vel. (ft/s)		22.53	
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		4.41	
Conv. Total (cfs)	59592.8	Conv. (cfs)		59592.8	
Length Wtd. (ft)	51.93	Wetted Per. (ft)		57.54	
Min Ch El (ft)	1945.98	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft.s)		45.48	
Frctn Loss (ft)	2.95	Cum Volume (acre-ft)	0.37	11.03	0.07
C & E Loss (ft)	0.47	Cum SA (acres)	0.35	1.90	0.07

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: RIVER-1
REACH: Reach-1 RS: 81

INPUT

Description: Beginnig of Phase 1 Improvements

Station	Elevation	Data	num=	12					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1954.26	1002.13	1954.26	1036.88	1953.71	1070.25	1953.68	1078.25	1945.72
1121.75	1945.72	1129.75	1953.68	1142.98	1954.14	1143.96	1954.26	1156.72	1956.26
1157.77	1956.26	1201.02	1956.64						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1000 .025 1070.25 .015 1129.75 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1070.25 1129.75 50 50 50 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1958.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.58	Wt. n-Val.		0.015	
W.S. Elev (ft)	1950.67	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1952.99	Flow Area (sq ft)		239.88	
E.G. Slope (ft/ft)	0.007413	Area (sq ft)		239.88	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	53.45	Top Width (ft)		53.45	
Vel Total (ft/s)	22.09	Avg. Vel. (ft/s)		22.09	
Max Chl Dpth (ft)	4.95	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	61556.8	Conv. (cfs)		61556.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		57.53	
Min Ch El (ft)	1945.72	Shear (lb/sq ft)		1.93	
Alpha	1.00	Stream Power (lb/ft s)		42.63	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.37	10.74	0.07
C & E Loss (ft)	0.09	Cum SA (acres)	0.35	1.83	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 75

INPUT

Description:

Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1077.5 1952.32 1077.5 1944.52 1100 1944.07 1122.5 1944.52 1122.5 1952.32

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1077.5 .025 1077.5 .015 1122.5 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1077.5 1122.5 151.76 151.76 151.76 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1957.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.43	Wt. n-Val.		0.015	
W.S. Elev (ft)	1949.35	Reach Len. (ft)	151.76	151.76	151.76
Crit W.S. (ft)	1951.85	Flow Area (sq ft)		227.51	

Q Total (cfs)	5300.00	Flow (cfs)	5300.00
Top Width (ft)	45.00	Top Width (ft)	45.00
Vel Total (ft/s)	23.30	Avg. Vel. (ft/s)	23.30
Max Chl Dpth (ft)	5.28	Hydr. Depth (ft)	5.06
Conv. Total (cfs)	58308.1	Conv. (cfs)	58308.1
Length Wtd. (ft)	151.76	Wetted Per. (ft)	54.67
Min Ch El (ft)	1944.07	Shear (lb/sq ft)	2.15
Alpha	1.00	Stream Power (lb/ft s)	50.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.37 10.47 0.07
C & E Loss (ft)	0.08	Cum SA (acres)	0.35 1.78 0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 70

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1077.5	1949.6	1077.5	1941.8
1100	1941.35	1122.5	1941.8
1122.5	1949.6		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1077.5	.025	1077.5	.015
1122.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1077.5	1122.5		100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2156.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.98	Wt. n-Val.		0.015	
W.S. Elev (ft)	1946.22	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	1949.12	Flow Area (sq ft)		209.11	
E.G. Slope (ft/ft)	0.010727	Area (sq ft)		209.11	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	25.35	Avg. Vel. (ft/s)		25.35	
Max Chl Dpth (ft)	4.87	Hydr. Depth (ft)		4.65	
Conv. Total (cfs)	51173.2	Conv. (cfs)		51173.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		53.85	
Min Ch El (ft)	1941.35	Shear (lb/sq ft)		2.60	
Alpha	1.00	Stream Power (lb/ft s)		65.91	
Frctn Loss (ft)	1.42	Cum Volume (acre-ft)	0.37	9.71	0.07
C & E Loss (ft)	0.15	Cum SA (acres)	0.35	1.62	0.07

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: RIVER-1
REACH: Reach-1 RS: 65

INPUT

Description:

Station	Elevation	Data	num=	5					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1082.5	1947.71	1082.5	1939.91	1100	1939.56	1117.5	1939.91	1117.5	1947.71

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
1082.5	.025	1082.5	.015	1117.5	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1082.5	1117.5		100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1955.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.97	Wt. n-Val.		0.015	
W.S. Elev (ft)	1946.04	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	1948.66	Flow Area (sq ft)		220.55	
E.G. Slope (ft/ft)	0.007546	Area (sq ft)		220.55	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	24.03	Avg. Vel. (ft/s)		24.03	
Max Chl Dpth (ft)	6.48	Hydr. Depth (ft)		6.30	
Conv. Total (cfs)	61013.1	Conv. (cfs)		61013.1	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		47.26	
Min Ch El (ft)	1939.56	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)		52.83	
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	0.37	9.22	0.07
C & E Loss (ft)	0.30	Cum SA (acres)	0.35	1.53	0.07

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: RIVER-1
REACH: Reach-1 RS: 60

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1082.5	1947.48	1082.5	1938.48
1100	1938.13	1117.5	1938.48
1117.5	1938.48	1117.5	1947.48

Manning's n Values

num=		3
Sta	n Val	Sta
1082.5	.025	1082.5
1117.5	.015	1117.5
	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff. Contr.	Expan.
1082.5	1117.5	166.19	166.19	166.19	.1	.3	

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1954.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.78	Wt. n-Val.		0.015	
W.S. Elev (ft)	1944.34	Reach Len. (ft)	166.19	166.19	166.19
Crit W.S. (ft)	1947.22	Flow Area (sq ft)		211.19	
E.G. Slope (ft/ft)	0.008588	Area (sq ft)		211.19	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	25.10	Avg. Vel. (ft/s)		25.10	
Max Chl Dpth (ft)	6.21	Hydr. Depth (ft)		6.03	
Conv. Total (cfs)	57190.8	Conv. (cfs)		57190.8	
Length Wtd. (ft)	166.19	Wetted Per. (ft)		46.73	
Min Ch El (ft)	1938.13	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		60.82	
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	0.37	8.73	0.07
C & E Loss (ft)	0.08	Cum SA (acres)	0.35	1.45	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 55

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1082.5	1945.1	1082.5	1936.1
1100	1935.75	1117.5	1936.1
1117.5	1936.1	1117.5	1945.1

Manning's n Values

num=		3
Sta	n Val	Sta
1082.5	.025	1082.5
1117.5	.015	1117.5
	.025	

1082.5 1117.5 290.11 288.11 286.11 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1952.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1941.66	Reach Len. (ft)	290.11	288.11	286.11
Crit W.S. (ft)	1944.85	Flow Area (sq.ft)		200.83	
E.G. Slope (ft/ft)	0.009985	Area (sq.ft)		200.83	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	26.39	Avg. Vel. (ft/s)		26.39	
Max Chl Dpth (ft)	5.91	Hydr. Depth (ft)		5.74	
Conv. Total (cfs)	53040.5	Conv. (cfs)		53040.5	
Length Wtd. (ft)	288.11	Wetted Per. (ft)		46.13	
Min Ch El (ft)	1935.75	Shear (lb/sq ft)		2.71	
Alpha	1.00	Stream Power (lb/ft s)		71.61	
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)	0.37	7.94	0.07
C & E Loss (ft)	0.10	Cum SA (acres)	0.35	1.32	0.07

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: RIVER-1
REACH: Reach-1 RS: 50

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1942.6	1093.5	1943.16	1100.84	1942.75	1115.98	1942.71	1129.89	1942.1
1182.5	1940.98	1182.5	1931.98	1200	1931.63	1217.5	1931.98	1217.5	1940.98
1239.96	1943.1	1254.01	1943.3	1350.42	1943.74				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1182.5	.015	1217.5	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1182.5	1217.5	101	99	97	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1000	1182.5	1943.63	1217.5	1350.42	1943.63

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1949.35	Wt. n-Val.		0.015	
Vel Head (ft)	11.86	Reach Len. (ft)	0.10	0.10	0.10
W.S. Elev (ft)	1937.49	Flow Area (sq ft)		199.05	
Crit W.S. (ft)	1940.95	Area (sq ft)		199.05	
E.G. Slope (ft/ft)	0.011043	Flow (cfs)		5500.00	
Q Total (cfs)	5500.00	Top Width (ft)		35.00	
Top Width (ft)	35.00	Avg. Vel. (ft/s)		27.63	
Vel Total (ft/s)	27.63	Hydr. Depth (ft)		5.69	
Max Chl Dpth (ft)	5.86	Conv. (cfs)		52337.3	
Conv. Total (cfs)	52337.3	Wetted Per. (ft)		46.03	
Length Wtd. (ft)	0.10	Shear (lb/sq ft)		2.98	
Min Ch El (ft)	1931.63	Stream Power (lb/ft s)		82.38	
Alpha	1.00	Cum Volume (acre-ft)	0.37	6.62	0.07
Frctn Loss (ft)	3.03	Cum SA (acres)	0.35	1.08	0.07
C & E Loss (ft)	0.10				

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 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.

BRIDGE RIVER: RIVER-1
REACH: Reach-1 RS: 45

INPUT
Description: Bridge #1

Distance from Upstream XS = .1
Deck/Roadway Width = 98.8
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates

num=	6								
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1000	1943.8	1941.63	1182.5	1943.8	1941.63	1182.5	1943.8	1941.63	
1217.5	1943.8	1941.63	1217.5	1943.8	1941.63	1350.42	1943.8	1941.63	

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	13						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
1000	1942.6	1093.5	1943.16	1100.84	1942.75	1115.98	1942.71	1129.89	1942.1	
1182.5	1940.98	1182.5	1931.98	1200	1931.63	1217.5	1931.98	1217.5	1940.98	
1239.96	1943.1	1254.01	1943.3	1350.42	1943.74					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1182.5	.015	1217.5	.025

1182.5 1217.5 .1 .3

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
1000 1182.5 1943.63 1217.5 1350.42 1943.63

Downstream Deck/Roadway Coordinates
num= 6
Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
1000 1943.8 1941.63 1132.5 1943.8 1941.63 1132.5 1943.8 1941.63
1167.5 1943.8 1941.63 1167.5 1943.8 1941.63 1350.42 1943.8 1941.63

Downstream Bridge Cross Section Data
Station Elevation Data num= 13
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
1000 1940.65 1090.13 1940.8 1104.02 1941.12 1132.5 1941.12 1132.5 1931.12
1150 1930.77 1167.5 1931.12 1167.5 1941.12 1206.88 1941.12 1232.32 1941.12
1242.6 1941.35 1251.47 1941.95 1256.84 1943.35

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
1000 .025 1132.5 .015 1167.5 .025

Bank Sta: Left Right Coeff Contr. Expan.
1132.5 1167.5 .1 .3

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
1000 1132.5 1943.77 1167.5 1256.84 1943.77

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 1943.13
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
Momentum Cd = 1.2
Selected Low Flow Methods = Momentum

High Flow Method

Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .8006408
Max Low Cord = 1941.63

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth
inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #PF 1

Opening : Single BR

E.G. US. (ft)	1947.50	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1937.49	E.G. Elev (ft)	1949.35	1947.49
Q Total (cfs)	5500.00	W.S. Elev (ft)	1937.49	1936.99
Q Bridge (cfs)	5500.00	Crit W.S. (ft)	1940.97	1940.11
Q Weir (cfs)		Max Chl Dpth (ft)	5.86	6.22
Weir Sta Lft (ft)		Vel Total (ft/s)	27.63	26.01
Weir Sta Rgt (ft)		Flow Area (sq ft)	199.05	211.44
Weir Submerg		Froude # Chl	2.04	1.87
Weir Max Depth (ft)		Specif Force (cu ft)	5285.78	5219.15
Min El Weir Flow (ft)	1943.81	Hydr Depth (ft)	5.69	6.04
Min El Prs (ft)	1941.63	W.P. Total (ft)	46.03	46.74
Delta EG (ft)	0.00	Conv. Total (cfs)	52337.3	57291.1
Delta WS (ft)	0.51	Top Width (ft)	35.00	35.00
BR Open Area (sq ft)	343.88	Frctn Loss (ft)		
BR Open Vel (ft/s)	27.63	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	2.98	2.60
Br Sel Method	Momentum	Power Total (lb/ft s)	82.38	67.71

Warning: The cross section had to be extended vertically during the critical depth calculations.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

Warning: The cross section had to be extended vertically during the critical depth calculations.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: RIVER-1

REACH: Reach-1 RS: 40

INPUT

Description:

Station	Elevation	Data	num=	13							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1940.65	1090.13	1940.8	1104.02	1941.12	1132.5	1941.12	1132.5	1931.12		
1150	1930.77	1167.5	1931.12	1167.5	1941.12	1206.88	1941.12	1232.32	1941.12		
1242.6	1941.35	1251.47	1941.95	1256.84	1943.35						

Manning's n Values num= 3

1000 .025 1132.5 .015 1167.5 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1132.5 1167.5 15 15 15
Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
1000 1132.5 1943.77 1167.5 1256.84 1943.77

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1947.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.51	Wt. n-Val.		0.015	
W.S. Elev (ft)	1936.99	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	1940.10	Flow Area (sq ft)		211.41	
E.G. Slope (ft/ft)	0.009220	Area (sq ft)		211.41	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	26.02	Avg. Vel. (ft/s)		26.02	
Max Chl Dpth (ft)	6.22	Hydr. Depth (ft)		6.04	
Conv. Total (cfs)	57280.7	Conv. (cfs)		57280.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		46.74	
Min Ch El (ft)	1930.77	Shear (lb/sq ft)		2.60	
Alpha	1.00	Stream Power (lb/ft s)		67.73	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	6.15	0.07
C & E Loss (ft)		Cum SA (acres)	0.35	1.00	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 35

INPUT

Description:

Station Elevation Data num= 5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
1082.5 1940.99 1082.5 1930.99 1100 1930.64 1117.5 1930.99 1117.5 1940.99

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
1082.5 .025 1082.5 .015 1117.5 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1082.5 1117.5 102 102 102 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1947.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.51	Wt. n-Val.		0.015	
W.S. Elev (ft)	1936.86	Reach Len. (ft)	102.00	102.00	102.00

E.G. Slope (ft/ft)	0.009220	Area (sq ft)	211.41		
Q Total (cfs)	5500.00	Flow (cfs)	5500.00		
Top Width (ft)	35.00	Top Width (ft)	35.00		
Vel Total (ft/s)	26.02	Avg. Vel. (ft/s)	26.02		
Max Chl Dpth (ft)	6.22	Hydr. Depth (ft)	6.04		
Conv. Total (cfs)	57280.7	Conv. (cfs)	57280.7		
Length Wtd. (ft)	102.00	Wetted Per. (ft)	46.74		
Min Ch El (ft)	1930.64	Shear (lb/sq ft)	2.60		
Alpha	1.00	Stream Power (lb/ft s)	67.73		
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.37	6.08	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.99	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 30

INPUT

Description: Begining of Energy Dissipator

Station	Elevation	num=	5
Sta	Elev	Sta	Elev
1075	1940.25	1075	1930.25
1100	1929.75	1125	1930.25
1125	1940.25		

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.015
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125	2.49	2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1946.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1933.95	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1937.21	Flow Area (sq ft)		197.23	
E.G. Slope (ft/ft)	0.015283	Area (sq ft)		197.23	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	27.89	Avg. Vel. (ft/s)		27.89	
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		3.94	
Conv. Total (cfs)	44488.9	Conv. (cfs)		44488.9	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		57.40	
Min Ch El (ft)	1929.75	Shear (lb/sq ft)		3.28	
Alpha	1.00	Stream Power (lb/ft s)		91.43	
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	0.37	5.60	0.07
C & E Loss (ft)	0.16	Cum SA (acres)	0.35	0.89	0.07

Warning: The velocity head has changed by more than 0.5 ft since the last calculation.

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: RIVER-1
REACH: Reach-1 RS: 29.6*

INPUT

Description:

Station Elevation Data		num=		.5					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.3	1075	1929.2	1100	1928.7	1125	1929.2	1125	1940.3

Manning's n Values		num=		3			
Sta	n Val	Sta	n Val	Sta	n Val		
1075	.025	1075	.04	1125	.025		

Bank Sta:	Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
	1075	1125	2.49	2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1945.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.10	Wt. n-Val.		0.040	
W.S. Elev (ft)	1932.74	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1936.16	Flow Area (sq ft)		189.37	
E.G. Slope (ft/ft)	0.123543	Area (sq ft)		189.37	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	29.04	Avg. Vel. (ft/s)		29.04	
Max Chl Dpth (ft)	4.04	Hydr. Depth (ft)		3.79	
Conv. Total (cfs)	15647.8	Conv. (cfs)		15647.8	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		57.08	
Min. Ch El (ft)	1928.70	Shear (lb/sq ft)		25.59	
Alpha	1.00	Stream Power (lb/ft s)		743.11	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.37	5.59	0.07
C & E Loss (ft)	0.10	Cum SA (acres)	0.35	0.89	0.07

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: RIVER-1
REACH: Reach-1 RS: 29.2*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.36	1075	1928.16
1100	1927.66	1125	1928.16
1125	1940.36		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.04
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1945.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.84	Wt. n-Val.		0.040	
W.S. Elev (ft)	1931.59	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1935.13	Flow Area (sq ft)		184.20	
E.G. Slope (ft/ft)	0.134844	Area (sq ft)		184.20	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	29.86	Avg. Vel (ft/s)		29.86	
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)		3.68	
Conv. Total (cfs)	14977.8	Conv. (cfs)		14977.8	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		56.88	
Min Ch El (ft)	1927.66	Shear (lb/sq ft)		27.26	
Alpha	1.00	Stream Power (lb/ft s)		814.03	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.37	5.58	0.07
C & E Loss (ft)	0.07	Cum SA (acres)	0.35	0.89	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 28.8*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.41	1075	1927.11
1100	1926.61	1125	1927.11
1125	1940.41		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.04
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		2.49	2.49	.1	.3

CROSS SECTION OUTPUT

Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1945.02	Wt. n-Val.		0.040	
Vel Head (ft)	14.56	Reach Len. (ft)	2.49	2.49	2.49
W.S. Elev (ft)	1930.45	Flow Area (sq ft)		179.59	
Crit W.S. (ft)	1934.07	Area (sq ft)		179.59	
E.G. Slope (ft/ft)	0.146092	Flow (cfs)		5500.00	
Q Total (cfs)	5500.00	Top Width (ft)		50.00	
Top Width (ft)	50.00	Avg. Vel. (ft/s)		30.63	
Vel Total (ft/s)	30.63	Hydr. Depth (ft)		3.59	
Max Chl Dpth (ft)	3.84	Conv. (cfs)		14389.6	
Conv. Total (cfs)	14389.6	Wetted Per. (ft)		56.69	
Length Wtd. (ft)	2.49	Shear (lb/sq ft)		28.89	
Min Ch El (ft)	1926.61	Stream Power (lb/ft s)		884.81	
Alpha	1.00	Cum Volume (acre-ft)	0.37	5.57	0.07
Frctn Loss (ft)	0.35	Cum SA (acres)	0.35	0.88	0.07
C & E Loss (ft)	0.07				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION
REACH: Reach-1

RIVER: RIVER-1
RS: 28.4*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.47	1075	1926.07
1100	1925.57	1125	1926.07
1125	1940.47		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.04
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		2.49	2.49	.1	.3

CROSS SECTION OUTPUT

Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1944.57	Wt. n-Val.		0.040	
Vel Head (ft)	15.24	Reach Len. (ft)	2.49	2.49	2.49
W.S. Elev (ft)	1929.33	Flow Area (sq ft)		175.56	
Crit W.S. (ft)	1933.03	Area (sq ft)		175.56	
E.G. Slope (ft/ft)	0.156972	Flow (cfs)		5500.00	
Q Total (cfs)	5500.00	Top Width (ft)		50.00	
Top Width (ft)	50.00	Avg. Vel. (ft/s)		31.33	
Vel Total (ft/s)	31.33				
Max Chl Dpth (ft)	3.75				

Conv. Total (cfs)	13882.0	Conv. (cfs)	13882.0		
Length Wtd. (ft)	2.49	Wetted Per. (ft)	56.53		
Min Ch El (ft)	1925.57	Shear (lb/sq.ft)	30.43		
Alpha	1.00	Stream Power (lb/ft s)	953.41		
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.37	5.56	0.07
C & E Loss (ft)	0.07	Cum SA (acres)	0.35	0.88	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 28

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.52	1075	1925.02	1100	1924.52	1125	1925.02
						1125	1940.52

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		12 12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1944.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.17	Wt. n-Val.		0.015	
W.S. Elev (ft)	1928.18	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1931.98	Flow Area (sq.ft)		170.43	
E.G. Slope (ft/ft)	0.024248	Area (sq.ft)		170.43	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	32.27	Avg. Vel. (ft/s)		32.27	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	35320.0	Conv. (cfs)		35320.0	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		56.33	
Min Ch El (ft)	1924.52	Shear (lb/sq.ft)		4.58	
Alpha	1.00	Stream Power (lb/ft s)		147.82	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.37	5.55	0.07
C & E Loss (ft)	0.09	Cum SA (acres)	0.35	0.88	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION
REACH: Reach-1

RIVER: RIVER-1
RS: 27.6666*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.48	1075	1924.98
1100	1924.48	1125	1924.98
1125	1940.48		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.015
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		12	12	.1	3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1943.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	15.76	Wt. n-Val.		0.015	
W.S. Elev (ft)	1928.18	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1931.94	Flow Area (sq ft)		172.66	
E.G. Slope (ft/ft)	0.023270	Area (sq ft)		172.66	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	31.85	Avg. Vel. (ft/s)		31.85	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		3.45	
Conv. Total (cfs)	36054.8	Conv. (cfs)		36054.8	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		56.42	
Min Ch El (ft)	1924.48	Shear (lb/sq ft)		4.45	
Alpha	1.00	Stream Power (lb/ft s)		141.63	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.37	5.50	0.07
C & E Loss (ft)	0.12	Cum SA (acres)	0.35	0.87	0.07

CROSS SECTION
REACH: Reach-1

RIVER: RIVER-1
RS: 27.3333*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.45	1075	1924.95
1100	1924.45	1125	1924.95
1125	1940.45		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.015
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.76	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1931.91	Flow Area (sq ft)		652.82	
E.G. Slope (ft/ft)	0.000408	Area (sq ft)		652.82	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.42	Avg. Vel. (ft/s)		8.42	
Max Chl Dpth (ft)	13.31	Hydr. Depth (ft)		13.06	
Conv. Total (cfs)	272139.1	Conv. (cfs)		272139.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		75.62	
Min Ch El (ft)	1924.45	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.85	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	5.39	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.85	0.07

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 27.*

INPUT

Description:

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
1075 1940.41 1075 1924.91 1100 1924.41 1125 1924.91 1125 1940.41		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
1075 .025 1075 .015 1125 .025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.76	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)		Flow Area (sq ft)		654.80	
E.G. Slope (ft/ft)	0.000405	Area (sq ft)		654.80	

Top Width (ft)	50.00	Top Width (ft)	50.00		
Vel Total (ft/s)	8.40	Avg. Vel. (ft/s)	8.40		
Max Chl Dpth (ft)	13.35	Hydr. Depth (ft)	13.10		
Conv. Total (cfs)	273327.6	Conv. (cfs)	273327.6		
Length Wtd. (ft)	12.00	Wetted Per. (ft)	75.70		
Min Ch El (ft)	1924.41	Shear (lb/sq ft)	0.22		
Alpha	1.00	Stream Power (lb/ft s)	1.84		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	5.21	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.84	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 26.6666*

INPUT

Description:

Station Elevation Data		num=	5				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.37	1075	1924.87	1100	1924.37	1125	1924.87
						1125	1940.37

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.76	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)		Flow Area (sq ft)		656.79	
E.G. Slope (ft/ft)	0.000401	Area (sq ft)		656.79	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	13.39	Hydr. Depth (ft)		13.14	
Conv. Total (cfs)	274520.8	Conv. (cfs)		274520.8	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		75.78	
Min Ch El (ft)	1924.37	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.82	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	5.03	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.82	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 26.3333*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.34	1075	1924.84
1100	1924.34	1125	1924.84
1125	1940.34		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.015
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.75	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)		Flow Area (sq ft)		658.22	
E.G. Slope (ft/ft)	0.000399	Area (sq ft)		658.22	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)		8.36	
Max Chl Dpth (ft)	13.41	Hydr. Depth (ft)		13.16	
Conv. Total (cfs)	275378.1	Conv. (cfs)		275378.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		75.84	
Min Ch El (ft)	1924.34	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.81	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.84	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.81	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 26

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.3	1075	1924.8
1100	1924.3	1125	1924.8
1125	1940.3		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.015
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.75	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)		Flow Area (sq ft)		660.21	
E.G. Slope (ft/ft)	0.000395	Area (sq ft)		660.21	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.33	Avg. Vel. (ft/s)		8.33	
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)		13.20	
Conv. Total (cfs)	276569.8	Conv. (cfs)		276569.8	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		75.92	
Min Ch El (ft)	1924.30	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		1.79	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.66	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.80	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 25.3333*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1075	1940.41	1075	1924.97
1100	1924.47	1125	1924.97
1125	1940.41		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1075	.025	1075	.018
1125	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.018	
W.S. Elev (ft)	1937.72	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)		Flow Area (sq ft)		649.77	
E.G. Slope (ft/ft)	0.000596	Area (sq ft)		649.77	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.46	Avg. Vel. (ft/s)		8.46	
Max Chl Dpth (ft)	13.25	Hydr. Depth (ft)		13.00	
Conv. Total (cfs)	225260.9	Conv. (cfs)		225260.9	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		75.50	
Min Ch El (ft)	1924.47	Shear (lb/sq ft)		0.32	
Alpha	1.00				

Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.65	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.80	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 24.6666*

INPUT

Description:

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
1075 1940.51 1075 1925.13 1100 1924.63 1125 1925.13 1125 1940.51		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
1075 .025 1075 .022 1125 .025		

Bank Sta: Left Right	Lengths: Left Channel Right	Coeff Contr.	Expan.
1075 1125	1 1 1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.		0.022	
W.S. Elev (ft)	1937.68	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)		Flow Area (sq ft)		639.81	
E.G. Slope (ft/ft)	0.000931	Area (sq ft)		639.81	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.60	Avg. Vel. (ft/s)		8.60	
Max Chl Dpth (ft)	13.05	Hydr. Depth (ft)		12.80	
Conv. Total (cfs)	180256.7	Conv. (cfs)		180256.7	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		75.10	
Min Ch El. (ft)	1924.63	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		4.26	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.63	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.79	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 24

INPUT

Description: End of Energy Dissipator

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
1075 1940.62 1075 1925.3 1100 1924.8 1125 1925.3 1125 1940.62		

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.025	1125	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1075	1125		6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.025	
W.S. Elev (ft)	1937.63	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		629.08	
E.G. Slope (ft/ft)	0.001262	Area (sq ft)		629.08	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.74	Avg. Vel. (ft/s)		8.74	
Max Chl Dpth (ft)	12.83	Hydr. Depth (ft)		12.58	
Conv. Total (cfs)	154807.4	Conv. (cfs)		154807.4	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		74.67	
Min Ch El (ft)	1924.80	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		5.80	
Frcn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	4.62	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	0.79	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 23.6*

INPUT

Description:

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
1072.45 1940.47 1078.45 1925.21 1100 1924.78 1121.55 1925.21 1127.55 1940.47		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
1072.45 .025 1072.45 .025 1127.55 .025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1072.45	1127.55		6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.025	
W.S. Elev (ft)	1937.48	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		597.38	
E.G. Slope (ft/ft)	0.001362	Area (sq ft)		597.38	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	

Top Width (ft)	52.75	Top Width (ft)	52.75		
Vel Total (ft/s)	9.21	Avg. Vel. (ft/s)	9.21		
Max Chl Dpth (ft)	12.70	Hydr. Depth (ft)	11.32		
Conv. Total (cfs)	149016.4	Conv. (cfs)	149016.4		
Length Wtd. (ft)	6.00	Wetted Per. (ft)	69.48		
Min Ch El (ft)	1924.78	Shear (lb/sq ft)	0.73		
Alpha	1.00	Stream Power (lb/ft s)	6.73		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	4.53	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.79	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 23.2*

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1069.9	1940.32	1081.9	1925.13	1100	1924.76	1118.1	1925.13	1130.1	1940.32

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
1069.9	.025	1069.9	.025	1130.1	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1069.9	1130.1		6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.48	Wt. n-Val.		0.025	
W.S. Elev (ft)	1937.30	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		564.06	
E.G. Slope (ft/ft)	0.001578	Area (sq ft)		564.06	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.42	Top Width (ft)		55.42	
Vel Total (ft/s)	9.75	Avg. Vel. (ft/s)		9.75	
Max Chl Dpth (ft)	12.54	Hydr. Depth (ft)		10.18	
Conv. Total (cfs)	138445.2	Conv. (cfs)		138445.2	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		67.22	
Min Ch El (ft)	1924.76	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)		8.06	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	4.45	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.78	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 22.8*

INPUT

Description:

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1067.35	1940.17	1085.35	1925.04	1100	1924.75	1114.65	1925.04	1132.65	1940.17

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1067.35	.025	1067.35	.025	1132.65	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1067.35	1132.65		6	6		.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.68	Wt. n-Val.		0.025	
W.S. Elev (ft)	1937.06	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		528.17	
E.G. Slope (ft/ft)	0.001943	Area (sq ft)		528.17	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	57.89	Top Width (ft)		57.89	
Vel Total (ft/s)	10.41	Avg. Vel. (ft/s)		10.41	
Max Chl Dpth (ft)	12.31	Hydr. Depth (ft)		9.12	
Conv. Total (cfs)	124770.0	Conv. (cfs)		124770.0	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		66.66	
Min Ch El (ft)	1924.75	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)		10.01	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	4.38	0.07
C & E Loss (ft)	0.03	Cum SA (acres)	0.35	0.77	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 22.4*

INPUT

Description:

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1064.8	1940.02	1088.8	1924.95	1100	1924.73	1111.2	1924.95	1135.2	1940.02

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1064.8	.025	1064.8	.025	1135.2	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1064.8	1135.2		6	6		.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.99	Wt. n-Val.		0.025	
W.S. Elev (ft)	1936.71	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		485.93	
E.G. Slope (ft/ft)	0.002564	Area (sq ft)		485.93	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	59.85	Top Width (ft)		59.85	
Vel Total (ft/s)	11.32	Avg. Vel. (ft/s)		11.32	
Max Chl Dpth (ft)	11.98	Hydr. Depth (ft)		8.12	
Conv. Total (cfs)	108627.4	Conv. (cfs)		108627.4	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		66.62	
Min Ch El (ft)	1924.73	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)		13.21	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.37	4.31	0.07
C. & E Loss (ft)	0.13	Cum SA (acres)	0.35	0.76	0.07

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: RIVER-1
REACH: Reach-1 RS: 22

INPUT

Description:

Station	Elevation	Data	num=	5
Sta	Elev	Sta	Elev	Sta Elev Sta Elev Sta Elev
1062.25	1939.865	1092.25	1924.865	1100 1924.71 1107.75 1924.865 1137.75 1939.865

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
1062.25	.025	1062.25	.025
1137.75	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1062.25	1137.75		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF.1

E.G. Elev (ft)	1938.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.33	Wt. n-Val.		0.025	
W.S. Elev (ft)	1935.21	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1935.21	Flow Area (sq ft)		375.72	
E.G. Slope (ft/ft)	0.005464	Area (sq ft)		375.72	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	56.89	Top Width (ft)		56.89	
Vel Total (ft/s)	14.64	Avg. Vel. (ft/s)		14.64	

Max Chl Dpth (ft)	10.50	Hydr. Depth (ft)	6.60
Conv. Total (cfs)	74407.0	Conv. (cfs)	74407.0
Length Wtd. (ft)	12.00	Wetted Per. (ft)	61.78
Min Ch El (ft)	1924.71	Shear (lb/sq ft)	2.07
Alpha	1.00	Stream Power (lb/ft s)	30.37
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37
C & E Loss (ft)	0.00	Cum SA (acres)	0.35

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: 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: RIVER-1
 REACH: Reach-1 RS: 21.8*

INPUT
 Description:
 Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1062.46	1939.5	1091.8	1924.84	1100	1924.67	1108.2	1924.84	1137.54	1939.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1062.46	.025	1062.46	.025	1137.54	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1062.46	1137.54		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1.

E.G. Elev (ft)	1938.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.91	Wt. n-Val		0.025	
W.S. Elev (ft)	1934.50	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1935.03	Flow Area (sq ft)		346.57	
E.G. Slope (ft/ft)	0.006822	Area (sq ft)		346.57	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.07	Top Width (ft)		55.07	
Vel Total (ft/s)	15.87	Avg. Vel. (ft/s)		15.87	
Max Chl Dpth (ft)	9.83	Hydr. Depth (ft)		6.29	
Conv. Total (cfs)	66590.1	Conv. (cfs)		66590.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		59.63	
Min Ch El (ft)	1924.67	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		39.28	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	4.15	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 21.6*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1062.68	1939.14	1091.34	1924.81
1100	1924.64	1108.66	1924.81
1137.32	1939.14		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1062.68	.025	1062.68	.025
1137.32	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
1062.68	1137.32		12	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.30	Wt. n-Val.		0.025	
W.S. Elev (ft)	1934.85	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.85	Flow Area (sq ft)		377.06	
E.G. Slope (ft/ft)	0.005452	Area (sq ft)		377.06	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	57.49	Top Width (ft)		57.49	
Vel Total (ft/s)	14.59	Avg. Vel. (ft/s)		14.59	
Max Chl Dpth (ft)	10.21	Hydr. Depth (ft)		6.56	
Conv. Total (cfs)	74485.8	Conv. (cfs)		74485.8	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		62.23	
Min Ch El (ft)	1924.64	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)		30.08	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	4.05	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.72	0.07

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: 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: RIVER-1
 REACH: Reach-1

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1062.9	1938.78	1090.89	1924.78

Manning's n Values

num= 3

Sta	n Val	Sta	n Val
1062.9	.025	1062.9	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1062.9	1137.1		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.87	Wt. n-Val.		0.025	
W.S. Elev (ft)	1934.16	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.68	Flow Area (sq. ft)		348.51	
E.G. Slope (ft/ft)	0.006777	Area (sq. ft)		348.51	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.73	Top Width (ft)		55.73	
Vel Total (ft/s)	15.78	Avg. Vel. (ft/s)		15.78	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		6.25	
Conv. Total (cfs)	66811.7	Conv. (cfs)		66811.7	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		60.17	
Min Ch El (ft)	1924.60	Shear (lb/sq ft)		2.45	
Alpha	1.00	Stream Power (lb/ft s)		38.68	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	3.95	0.07
C & E Loss (ft)	0.06	Cum SA (acres)	0.35	0.71	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION
REACH: Reach-1RIVER: RIVER-1
RS: 21.2*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1063.11	1938.41	1090.43	1924.75

Manning's n Values

num= 3

Sta	n Val	Sta	n Val
1063.11	.025	1063.11	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff. Contr.	Expan.
	1063.11	1136.89		12	12	1	3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.30	Wt. n-Val.		0.025	
W.S. Elev (ft)	1934.48	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.48	Flow Area (sq ft)		377.56	
E.G. Slope (ft/ft)	0.005479	Area (sq ft)		377.56	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	58.07	Top Width (ft)		58.07	
Vel Total (ft/s)	14.57	Avg. Vel. (ft/s)		14.57	
Max Chl Dpth (ft)	9.92	Hydr. Depth (ft)		6.50	
Conv. Total (cfs)	74301.3	Conv. (cfs)		74301.3	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		62.67	
Min Ch El (ft)	1924.56	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)		30.02	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	3.85	0.07
C & E Loss (ft)	0.17	Cum SA (acres)	0.35	0.69	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 21.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1063.32	1938.05	1089.97	1924.73	1100	1924.52	1110.03	1924.73	1136.68	1938.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1063.32	.025	1063.32	.025	1136.68	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1063.32	1136.68		12	12	1	3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.82	Wt. n-Val.		0.025	
W.S. Elev (ft)	1933.84	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.33	Flow Area (sq ft)		350.82	
E.G. Slope (ft/ft)	0.006724	Area (sq ft)		350.82	

Top Width (ft)	56.51	Top Width (ft)	56.51
Vel Total (ft/s)	15.68	Avg. Vel. (ft/s)	15.68
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)	6.21
Conv. Total (cfs)	67072.1	Conv. (cfs)	67072.1
Length Wtd. (ft)	12.00	Wetted Per. (ft)	60.81
Min Ch El (ft)	1924.52	Shear (lb/sq ft)	2.42
Alpha	1.00	Stream Power (lb/ft s)	37.97
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37
C & E Loss (ft)	0.05	Cum SA (acres)	0.35
			0.07
			0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 20.8*

INPUT

Description:

Station Elevation Data		num=	5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
1063.54	1937.69	1089.52	1924.7	1100	1924.49	1110.48	1924.7	1136.46	1937.69	

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
1063.54	.025	1063.54	.025	1136.46	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1063.54	1136.46		12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.08	Wt. n-Val.		0:025	
W.S. Elev (ft)	1933.46	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.17	Flow Area (sq ft)		339.35	
E.G. Slope (ft/ft)	0.007402	Area (sq ft)		339.35	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	56.00	Top Width (ft)		56.00	
Vel Total (ft/s)	16.21	Avg. Vel. (ft/s)		16.21	
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)		6.06	
Conv. Total (cfs)	63925.5	Conv. (cfs)		63925.5	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		60.15	
Min Ch El (ft)	1924.49	Shear (lb/sq ft)		2.61	
Alpha	1.00	Stream Power (lb/ft s)		42.26	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.37	3.65	0.07
C & E Loss (ft)	0.03	Cum SA (acres)	0.35	0.66	0.07

CROSS SECTION
REACH: Reach-1

RIVER: RIVER-1
RS: 20.6*

INPUT

Description:

Station Elevation Data		num=		5	
Sta	Elev	Sta	Elev	Sta	Elev
1063.76	1937.32	1089.06	1924.67	1100	1924.45
				1110.94	1924.67
				1136.24	1937.32

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1063.76	.025	1063.76	.025	1136.24	.025

Bank Sta:	Left	Right	Lengths:		Left Channel	Right	Coeff Contr.	Expan.
	1063.76	1136.24			12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.29	Wt. n-Val.		0.025	
W.S. Elev (ft)	1933.14	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.00	Flow Area (sq ft)		330.99	
E.G. Slope (ft/ft)	0.007973	Area (sq ft)		330.99	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.74	Top Width (ft)		55.74	
Vel Total (ft/s)	16.62	Avg. Vel. (ft/s)		16.62	
Max Chl Dpth (ft)	8.69	Hydr. Depth (ft)		5.94	
Conv. Total (cfs)	61595.6	Conv. (cfs)		61595.6	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		59.75	
Min Ch El (ft)	1924.45	Shear (lb/sq ft)		2.76	
Alpha	1.00	Stream Power (lb/ft s)		45.82	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.37	3.56	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.65	0.07

CROSS SECTION
REACH: Reach-1

RIVER: RIVER-1
RS: 20.4*

INPUT

Description:

Station Elevation Data		num=		5	
Sta	Elev	Sta	Elev	Sta	Elev
1063.97	1936.96	1088.61	1924.64	1100	1924.41
				1111.39	1924.64
				1136.03	1936.96

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1063.97	.025	1063.97	.025	1136.03	.025

Bank Sta: Left Right Lengths: Left Channel Right

1063.97 1136.03

12

12

12

.1

.3

CROSS SECTION OUTPUT

Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1937.31	Wt. n-Val.		0.025	
Vel Head (ft)	4.45	Reach Len. (ft)	12.00	12.00	12.00
W.S. Elev (ft)	1932.86	Flow Area (sq ft)		325.02	
Crit W.S. (ft)	1933.84	Area (sq ft)		325.02	
E.G. Slope (ft/ft)	0.008434	Flow (cfs)		5500.00	
Q Total (cfs)	5500.00	Top Width (ft)		55.66	
Top Width (ft)	55.66	Avg. Vel. (ft/s)		16.92	
Vel Total (ft/s)	16.92	Hydr. Depth (ft)		5.84	
Max Chl Dpth (ft)	8.45	Conv. (cfs)		59887.4	
Conv. Total (cfs)	59887.4	Wetted Per. (ft)		59.55	
Length Wtd. (ft)	12.00	Shear (lb/sq ft)		2.87	
Min Ch El (ft)	1924.41	Stream Power (lb/ft s)		48.64	
Alpha	1.00	Cum Volume (acre-ft)	0.37	3.47	0.07
Frctn Loss (ft)	0.10	Cum SA (acres)	0.35	0.63	0.07
C & E Loss (ft)	0.02				

CROSS SECTION
REACH: Reach-1RIVER: RIVER-1
RS: 20.2*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
1064.19	1936.6	1088.15	1924.61

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
1064.19	.025	1064.19	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1064.19	1135.81		12	12	.1	.3

CROSS SECTION OUTPUT

Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1937.19	Wt. n-Val.		0.025	
Vel Head (ft)	4.57	Reach Len. (ft)	12.00	12.00	12.00
W.S. Elev (ft)	1932.62	Flow Area (sq ft)		320.47	
Crit W.S. (ft)	1933.69	Area (sq ft)		320.47	
E.G. Slope (ft/ft)	0.008827	Flow (cfs)		5500.00	
Q Total (cfs)	5500.00	Top Width (ft)		55.69	
Top Width (ft)	55.69	Avg. Vel. (ft/s)		17.16	
Vel Total (ft/s)	17.16	Hydr. Depth (ft)		5.75	
Max Chl Dpth (ft)	8.23				

Length Wtd. (ft)	12.00	Wetted Per. (ft)	59.48		
Min Ch El (ft)	1924.38	Shear (lb/sq ft)	2.97		
Alpha	1.00	Stream Power (lb/ft s)	50.96		
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.37	3.38	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	0.61	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 20

INPUT
 Description: End of Phase 1 Improvements
 Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1064.4	1936.236	1087.7	1924.586	1100	1924.34	1112.3	1924.586	1135.6	1936.236

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1064.4	.025	1064.4	.025	1135.6	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1064.4	1135.6	382.58	367.78	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.68	Wt. n-Val.		0.025	
W.S. Elev (ft)	1932.39	Reach Len. (ft)	382.58	367.78	346.32
Crit W.S. (ft)	1933.54	Flow Area (sq ft)		316.95	
E.G. Slope (ft/ft)	0.009166	Area (sq ft)		316.95	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.83	Top Width (ft)		55.83	
Vel Total (ft/s)	17.35	Avg. Vel. (ft/s)		17.35	
Max Chl Dpth (ft)	8.05	Hydr. Depth (ft)		5.68	
Conv. Total (cfs)	57447.6	Conv. (cfs)		57447.6	
Length Wtd. (ft)		Wetted Per. (ft)		59.52	
Min Ch El (ft)	1924.34	Shear (lb/sq ft)		3.05	
Alpha	1.00	Stream Power (lb/ft s)		52.88	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.37	3.30	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	0.60	0.07

CROSS SECTION RIVER: RIVER-1
 REACH: Reach-1 RS: 10

INPUT
 Description:
 Station Elevation Data num= 32

1000	1937.36	1049.49	1936.26	1095.06	1934.26	1144.27	1932.26	1220.49	1930.39
1220.83	1930.26	1228.41	1928.26	1235.7	1926.26	1237.99	1925.61	1249.9	1924.26
1252.38	1923.96	1254.61	1924.26	1271.01	1926.26	1272.95	1926.49	1279.8	1927.8
1285.65	1928.26	1306.65	1930.26	1322.46	1932.26	1329.96	1933.29	1344.12	1934.26
1372.27	1936.26	1402.27	1938.26	1409.32	1938.72	1418.36	1939.14	1426.01	1940.26
1436.49	1941.26	1496.07	1942.26	1580.86	1943.11	1671.03	1944.26	1677.54	1944.52
1685.16	1944.66	1718.9	1946.26						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.035	1220.49	.03	1306.65	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1220.49	1306.65		0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

	1934.25	Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1934.25	Wt. n-Val.	0.035	0.030	0.035
Vel Head (ft)	1.82	Reach Len. (ft)			
W.S. Elev (ft)	1932.43	Flow Area (sq ft)	84.57	463.60	18.60
Crit W.S. (ft)	1932.43	Area (sq ft)	84.57	463.60	18.60
E.G. Slope (ft/ft)	0.005458	Flow (cfs)	274.31	5164.19	61.51
Q Total (cfs)	5500.00	Top Width (ft)	80.40	86.16	17.05
Top Width (ft)	183.61	Avg. Vel. (ft/s)	3.24	11.14	3.31
Vel Total (ft/s)	9.70	Hydr. Depth (ft)	1.05	5.38	1.09
Max Chl Dpth (ft)	8.47	Conv. (cfs)	3712.8	69898.9	832.5
Conv. Total (cfs)	74444.3	Wetted Per. (ft)	80.43	87.29	17.18
Length Wtd. (ft)		Shear (lb/sq ft)	0.36	1.81	0.37
Min Ch El (ft)	1923.96	Stream Power (lb/ft s)	1.16	20.16	1.22
Alpha	1.24	Cum Volume (acre-ft)			
Frctn Loss (ft)		Cum SA (acres)			
C & E Loss (ft)					

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.

SUMMARY OF MANNING'S N VALUES

River: RIVER-1

Reach	River Sta.	n1	n2	n3

Reach-1	180	.03	.025	.03
Reach-1	170	.025	.015	.025
Reach-1	160	.025	.015	.025
Reach-1	150	.025	.015	.025
Reach-1	140	.025	.015	.025
Reach-1	130	.025	.015	.025
Reach-1	120	.025	.015	.025
Reach-1	110	.025	.015	.025
Reach-1	100	.025	.015	.025
Reach-1	90	.025	.015	.025
Reach-1	81	.025	.015	.025
Reach-1	75	.025	.015	.025
Reach-1	70	.025	.015	.025
Reach-1	65	.025	.015	.025
Reach-1	60	.025	.015	.025
Reach-1	55	.025	.015	.025
Reach-1	50	.025	.015	.025
Reach-1	45			
		Bridge		
Reach-1	40	.025	.015	.025
Reach-1	35	.025	.015	.025
Reach-1	30	.025	.015	.025
Reach-1	29.6*	.025	.04	.025
Reach-1	29.2*	.025	.04	.025
Reach-1	28.8*	.025	.04	.025
Reach-1	28.4*	.025	.04	.025
Reach-1	28	.025	.015	.025
Reach-1	27.6666*	.025	.015	.025
Reach-1	27.3333*	.025	.015	.025
Reach-1	27.*	.025	.015	.025
Reach-1	26.6666*	.025	.015	.025
Reach-1	26.3333*	.025	.015	.025
Reach-1	26	.025	.015	.025
Reach-1	25.3333*	.025	.018	.025
Reach-1	24.6666*	.025	.022	.025
Reach-1	24	.025	.025	.025
Reach-1	23.6*	.025	.025	.025
Reach-1	23.2*	.025	.025	.025
Reach-1	22.8*	.025	.025	.025
Reach-1	22.4*	.025	.025	.025
Reach-1	22	.025	.025	.025
Reach-1	21.8*	.025	.025	.025
Reach-1	21.6*	.025	.025	.025
Reach-1	21.4*	.025	.025	.025
Reach-1	21.2*	.025	.025	.025
Reach-1	21.*	.025	.025	.025
Reach-1	20.8*	.025	.025	.025
Reach-1	20.6*	.025	.025	.025
Reach-1	20.4*	.025	.025	.025
Reach-1	20.2*	.025	.025	.025

Reach-1	20	.025	.025	.025
Reach-1	10	.035	.03	.035

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	180	358.08	363.91	374.39
Reach-1	170	98.31	97.13	96.38
Reach-1	160	119.51	114.85	110.97
Reach-1	150	1	1	1
Reach-1	140	57.23	55.76	56.76
Reach-1	130	125.29	125.31	125.61
Reach-1	120	25.32	24.78	22.42
Reach-1	110	1	1	1
Reach-1	100	346.14	342.73	339.84
Reach-1	90	53.02	51.93	56.59
Reach-1	81	50	50	50
Reach-1	75	151.76	151.76	151.76
Reach-1	70	100	100	100
Reach-1	65	100	100	100
Reach-1	60	166.19	166.19	166.19
Reach-1	55	290.11	288.11	286.11
Reach-1	50	101	99	97
Reach-1	45	Bridge		
Reach-1	40	15	15	15
Reach-1	35	102	102	102
Reach-1	30	2.49	2.49	2.49
Reach-1	29.6*	2.49	2.49	2.49
Reach-1	29.2*	2.49	2.49	2.49
Reach-1	28.8*	2.49	2.49	2.49
Reach-1	28.4*	2.49	2.49	2.49
Reach-1	28	12	12	12
Reach-1	27.6666*	12	12	12
Reach-1	27.3333*	12	12	12
Reach-1	27.*	12	12	12
Reach-1	26.6666*	12	12	12
Reach-1	26.3333*	12	12	12
Reach-1	26	1	1	1
Reach-1	25.3333*	1	1	1
Reach-1	24.6666*	1	1	1
Reach-1	24	6	6	6
Reach-1	23.6*	6	6	6
Reach-1	23.2*			

Reach-1	22.8*	6	6	6
Reach-1	22.4*	6	6	6
Reach-1	22	12	12	12
Reach-1	21.8*	12	12	12
Reach-1	21.6*	12	12	12
Reach-1	21.4*	12	12	12
Reach-1	21.2*	12	12	12
Reach-1	21.*	12	12	12
Reach-1	20.8*	12	12	12
Reach-1	20.6*	12	12	12
Reach-1	20.4*	12	12	12
Reach-1	20.2*	12	12	12
Reach-1	20	382.58	367.78	346.32
Reach-1	10	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	180	.1	.3
Reach-1	170	.1	.3
Reach-1	160	.1	.3
Reach-1	150	.1	.3
Reach-1	140	.1	.3
Reach-1	130	.1	.3
Reach-1	120	.1	.3
Reach-1	110	.1	.3
Reach-1	100	.1	.3
Reach-1	90	.1	.3
Reach-1	81	.1	.3
Reach-1	75	.1	.3
Reach-1	70	.1	.3
Reach-1	65	.1	.3
Reach-1	60	.1	.3
Reach-1	55	.1	.3
Reach-1	50	.1	.3
Reach-1	45	Bridge	
Reach-1	40	.1	.3
Reach-1	35	.1	.3
Reach-1	30	.1	.3
Reach-1	29.6*	.1	.3
Reach-1	29.2*	.1	.3
Reach-1	28.8*	.1	.3

Reach-1	28	.1	.3
Reach-1	27.6666*	.1	.3
Reach-1	27.3333*	.1	.3
Reach-1	27.*	.1	.3
Reach-1	26.6666*	.1	.3
Reach-1	26.3333*	.1	.3
Reach-1	26	.1	.3
Reach-1	25.3333*	.1	.3
Reach-1	24.6666*	.1	.3
Reach-1	24	.1	.3
Reach-1	23.6*	.1	.3
Reach-1	23.2*	.1	.3
Reach-1	22.8*	.1	.3
Reach-1	22.4*	.1	.3
Reach-1	22	.1	.3
Reach-1	21.8*	.1	.3
Reach-1	21.6*	.1	.3
Reach-1	21.4*	.1	.3
Reach-1	21.2*	.1	.3
Reach-1	21.*	.1	.3
Reach-1	20.8*	.1	.3
Reach-1	20.6*	.1	.3
Reach-1	20.4*	.1	.3
Reach-1	20.2*	.1	.3
Reach-1	20	.1	.3
Reach-1	10	.1	.3

Profile Output Table - CHECKRAS

Reach Enc Sta R	River Sta Right	Froude Sta Eff	# Chl Min Ch El	Top Left Stagn	Wdth Act Right Stagn	Conv. Total (ft) (cfs)	Prof Delta WS (ft)	Left Sta Eff (ft)	Enc Sta L (ft)	Center Station
Reach-1 1149.24	180		1184.50	1.00	65.80	71600.3		1118.70		
Reach-1 1060.40	170		1098.30	0.59	75.51	209191.8		1022.79		
Reach-1 1052.44	160		1080.53	1.00	55.47	117380.3		1025.06		
Reach-1 1164.30	150		1190.83	1.48	52.74	77729.7		1138.09		
Reach-1 1152.67	140		1177.33	1.84	48.52	60803.4		1128.81		
Reach-1 1118.44	130		1143.20	1.85	48.12	60664.7		1095.08		
Reach-1 1111.84	120			1.77	49.85	63694.8		1086.89		

Reach-1	110		1.81	50.33	62257.1	1074.85
1100.27		1125.19	1949.46			
Reach-1	100		2.03	46.72	54738.3	1075.43
1098.92		1122.16	1947.73			
Reach-1	90		1.89	53.35	59592.8	1057.63
1083.29		1110.98	1945.98			
Reach-1	81		1.84	53.45	61556.8	1073.28
1100.00		1126.72	1945.72			
Reach-1	75		1.83	45.00	58308.1	1077.50
1100.00		1122.50	1944.07			
Reach-1	70		2.07	45.00	51173.2	1077.50
1100.00		1122.50	1941.35			
Reach-1	65		1.69	35.00	61013.1	1082.50
1100.00		1117.50	1939.56			
Reach-1	60		1.80	35.00	57190.8	1082.50
1100.00		1117.50	1938.13			
Reach-1	55		1.94	35.00	53040.5	1082.50
1100.00		1117.50	1935.75			
Reach-1	50		2.04	35.00	52337.3	1182.50
1200.00		1217.50	1931.63			
Reach-1	45	BR U	2.04	35.00	52337.3	1182.50
1200.00		1217.50	1931.63			
Reach-1	45	BR D	1.87	35.00	57291.1	1132.50
1150.00		1167.50	1930.77			
Reach-1	40		1.87	35.00	57280.7	1132.50
1150.00		1167.50	1930.77			
Reach-1	35		1.87	35.00	57280.7	1082.50
1100.00		1117.50	1930.64			
Reach-1	30		2.47	50.00	44488.9	1075.00
1100.00		1125.00	1929.75			
Reach-1	29.6*		2.63	50.00	15647.8	1075.00
1100.00		1125.00	1928.70			
Reach-1	29.2*		2.74	50.00	14977.8	1075.00
1100.00		1125.00	1927.66			
Reach-1	28.8*		2.85	50.00	14389.6	1075.00
1100.00		1125.00	1926.61			
Reach-1	28.4*		2.95	50.00	13882.0	1075.00
1100.00		1125.00	1925.57			
Reach-1	28		3.08	50.00	35320.0	1075.00
1100.00		1125.00	1924.52			
Reach-1	27.6666*		3.02	50.00	36054.8	1075.00
1100.00		1125.00	1924.48			
Reach-1	27.3333*		0.41	50.00	272139.1	1075.00
1100.00		1125.00	1924.45			
Reach-1	27.*		0.41	50.00	273327.6	1075.00
1100.00		1125.00	1924.41			
Reach-1	26.6666*		0.41	50.00	274520.8	1075.00
1100.00		1125.00	1924.37			

1100.00		1125.00	1924.34			
Reach-1	26		0.40	50.00	276569.8	1075.00
1100.00		1125.00	1924.30			
Reach-1	25.3333*		0.41	50.00	225260.9	1075.00
1100.00		1125.00	1924.47			
Reach-1	24.6666*		0.42	50.00	180256.7	1075.00
1100.00		1125.00	1924.63			
Reach-1	24		0.43	50.00	154807.4	1075.00
1100.00		1125.00	1924.80			
Reach-1	23.6*		0.48	52.75	149016.4	1073.63
1100.00		1126.38	1924.78			
Reach-1	23.2*		0.54	55.42	138445.2	1072.29
1100.00		1127.71	1924.76			
Reach-1	22.8*		0.61	57.89	124770.0	1071.05
1100.00		1128.95	1924.75			
Reach-1	22.4*		0.70	59.85	108627.4	1070.08
1100.00		1129.92	1924.73			
Reach-1	22		1.00	56.89	74407.0	1071.56
1100.00		1128.45	1924.71			
Reach-1	21.8*		1.11	55.07	66590.1	1072.47
1100.00		1127.53	1924.67			
Reach-1	21.6*		1.00	57.49	74485.8	1071.26
1100.00		1128.74	1924.64			
Reach-1	21.4*		1.11	55.73	66811.7	1072.14
1100.00		1127.87	1924.60			
Reach-1	21.2*		1.01	58.07	74301.3	1070.96
1100.00		1129.04	1924.56			
Reach-1	21.*		1.11	56.51	67072.1	1071.75
1100.00		1128.25	1924.52			
Reach-1	20.8*		1.16	56.00	63925.5	1072.00
1100.00		1128.00	1924.49			
Reach-1	20.6*		1.20	55.74	61595.6	1072.13
1100.00		1127.87	1924.45			
Reach-1	20.4*		1.23	55.66	59887.4	1072.17
1100.00		1127.83	1924.41			
Reach-1	20.2*		1.26	55.69	58541.5	1072.15
1100.00		1127.85	1924.38			
Reach-1	20		1.28	55.83	57447.6	1072.09
1100.00		1127.91	1924.34			
Reach-1	10		0.85	183.61	74444.3	1140.09
1263.57		1323.70	1923.96			

HEC-RAS Plan: Post River: RIVER-1 Reach: Reach-1 Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Chl El (ft)	W/S Elev (ft)	Crit W/S (ft)	E/G Elev (ft)	E/G Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	180	PF 1	5300.00	1957.33	1965.36	1965.36	1968.30	0.005479	13.75	385.47	65.80	1.00
Reach-1	170	PF 1	5300.00	1954.56	1963.89	1961.31	1965.20	0.000642	9.22	575.14	75.51	0.59
Reach-1	160	PF 1	5300.00	1954.02	1961.61	1961.61	1964.90	0.002039	14.56	363.92	55.47	1.00
Reach-1	150	PF 1	5300.00	1952.76	1958.60	1960.22	1964.32	0.004649	19.19	276.25	52.74	1.48
Reach-1	140	PF 1	5300.00	1950.76	1955.95	1958.44	1964.07	0.007598	22.87	231.74	48.52	1.84
Reach-1	130	PF 1	5300.00	1950.26	1955.44	1957.93	1963.64	0.007633	22.98	230.61	48.12	1.85
Reach-1	120	PF 1	5300.00	1949.76	1954.99	1957.27	1962.54	0.006924	22.05	240.42	49.85	1.77
Reach-1	110	PF 1	5300.00	1949.46	1954.60	1956.96	1962.34	0.007247	22.33	237.36	50.33	1.81
Reach-1	100	PF 1	5300.00	1947.73	1952.70	1955.55	1962.16	0.009375	24.68	214.74	46.72	2.03
Reach-1	90	PF 1	5300.00	1945.98	1950.86	1953.25	1958.74	0.007910	22.53	235.27	53.35	1.89
Reach-1	81	PF 1	5300.00	1945.72	1950.67	1952.99	1958.25	0.007413	22.09	239.88	53.45	1.84
Reach-1	75	PF 1	5300.00	1944.07	1949.35	1951.85	1957.78	0.008262	23.30	227.51	45.00	1.83
Reach-1	70	PF 1	5300.00	1941.35	1946.22	1949.12	1956.20	0.010727	25.35	209.11	45.00	2.07
Reach-1	65	PF 1	5300.00	1939.56	1946.04	1948.66	1955.00	0.007546	24.03	220.55	35.00	1.69
Reach-1	60	PF 1	5300.00	1938.13	1944.34	1947.22	1954.12	0.008588	25.10	211.19	35.00	1.80
Reach-1	55	PF 1	5300.00	1935.75	1941.66	1944.85	1952.48	0.009985	26.39	200.83	35.00	1.94
Reach-1	50	PF 1	5500.00	1931.63	1937.49	1940.95	1949.35	0.011043	27.63	199.05	35.00	2.04
Reach-1	45		Bridge									
Reach-1	40	PF 1	5500.00	1930.77	1936.99	1940.10	1947.50	0.009220	26.02	211.41	35.00	1.87
Reach-1	35	PF 1	5500.00	1930.64	1936.86	1939.97	1947.37	0.009220	26.02	211.41	35.00	1.87
Reach-1	30	PF 1	5500.00	1929.75	1933.95	1937.21	1946.02	0.015283	27.89	197.23	50.00	2.47
Reach-1	29.6'	PF 1	5500.00	1928.70	1932.74	1936.16	1945.84	0.123543	29.04	189.37	50.00	2.63
Reach-1	29.2'	PF 1	5500.00	1927.66	1931.59	1935.13	1945.44	0.134844	29.86	184.20	50.00	2.74
Reach-1	28.8'	PF 1	5500.00	1926.61	1930.45	1934.07	1945.02	0.146092	30.63	179.59	50.00	2.85
Reach-1	28.4'	PF 1	5500.00	1925.57	1929.33	1933.03	1944.57	0.156972	31.33	175.56	50.00	2.95
Reach-1	28	PF 1	5500.00	1924.52	1928.18	1931.98	1944.35	0.024248	32.27	170.43	50.00	3.08
Reach-1	27.6666'	PF 1	5500.00	1924.48	1928.18	1931.94	1943.94	0.023270	31.85	172.66	50.00	3.02
Reach-1	27.3333'	PF 1	5500.00	1924.45	1937.76	1931.91	1938.86	0.000408	8.42	652.82	50.00	0.41
Reach-1	27	PF 1	5500.00	1924.41	1937.76		1938.85	0.000405	8.40	654.80	50.00	0.41
Reach-1	26.6666'	PF 1	5500.00	1924.37	1937.76		1938.85	0.000401	8.37	656.79	50.00	0.41
Reach-1	26.3333'	PF 1	5500.00	1924.34	1937.75		1938.84	0.000399	8.36	658.22	50.00	0.41
Reach-1	26	PF 1	5500.00	1924.30	1937.75		1938.83	0.000395	8.33	660.21	50.00	0.40
Reach-1	25.3333'	PF 1	5500.00	1924.47	1937.72		1938.83	0.000596	8.46	649.77	50.00	0.41
Reach-1	24.6666'	PF 1	5500.00	1924.83	1937.68		1938.82	0.000931	8.60	639.81	50.00	0.42
Reach-1	24	PF 1	5500.00	1924.80	1937.63		1938.82	0.001262	8.74	629.08	50.00	0.43
Reach-1	23.6'	PF 1	5500.00	1924.78	1937.48		1938.80	0.001362	9.21	597.38	52.75	0.48
Reach-1	23.2'	PF 1	5500.00	1924.76	1937.30		1938.77	0.001578	9.75	564.06	55.42	0.54
Reach-1	22.8'	PF 1	5500.00	1924.75	1937.06		1938.74	0.001943	10.41	528.17	57.89	0.61
Reach-1	22.4'	PF 1	5500.00	1924.73	1936.71		1938.70	0.002564	11.32	485.93	59.85	0.70
Reach-1	22	PF 1	5500.00	1924.71	1935.21	1935.21	1938.54	0.005464	14.64	375.72	56.89	1.00
Reach-1	21.8'	PF 1	5500.00	1924.67	1934.50	1935.03	1938.41	0.006822	15.87	346.57	55.07	1.11
Reach-1	21.6'	PF 1	5500.00	1924.64	1934.85	1934.85	1938.16	0.005452	14.59	377.06	57.49	1.00

HEC-RAS Plan Post River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	P.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	21.4	PF 1	5500.00	1924.60	1934.16	1934.68	1938.03	0.006777	15.78	348.51	55.73	1.11
Reach-1	21.2	PF 1	5500.00	1924.56	1934.48	1934.48	1937.78	0.005479	14.57	377.56	58.07	1.01
Reach-1	21.0	PF 1	5500.00	1924.52	1933.84	1934.33	1937.66	0.006724	15.68	350.82	56.51	1.11
Reach-1	20.8	PF 1	5500.00	1924.49	1933.46	1934.17	1937.54	0.007402	16.21	339.35	56.00	1.16
Reach-1	20.6	PF 1	5500.00	1924.45	1933.14	1934.00	1937.42	0.007973	16.62	330.99	55.74	1.20
Reach-1	20.4	PF 1	5500.00	1924.41	1932.86	1933.84	1937.31	0.008434	16.92	325.02	55.66	1.23
Reach-1	20.2	PF 1	5500.00	1924.38	1932.62	1933.69	1937.19	0.008827	17.16	320.47	55.69	1.26
Reach-1	20.0	PF 1	5500.00	1924.34	1932.39	1933.54	1937.07	0.009166	17.35	316.95	55.83	1.28
Reach-1	10.0	PF 1	5500.00	1923.96	1932.43	1932.43	1934.25	0.005458	11.14	566.77	183.61	0.85

HEC-RAS Unit: Post River: RIVER-1 Reach: Reach-1 Profile: PF 1

Reach	River Sta	Profile	E.G. US (ft)	Min El Prs (ft)	BR Open Area (sq ft)	Prs @ WS (ft)	Q Total (cfs)	Min El Weir Flow (ft)	Q Weir (cfs)	Delta EG (ft)
Reach-1	45	PF 1	1947.50	1941.63	343.88	1937.49	5500.00	1943.81		0.00

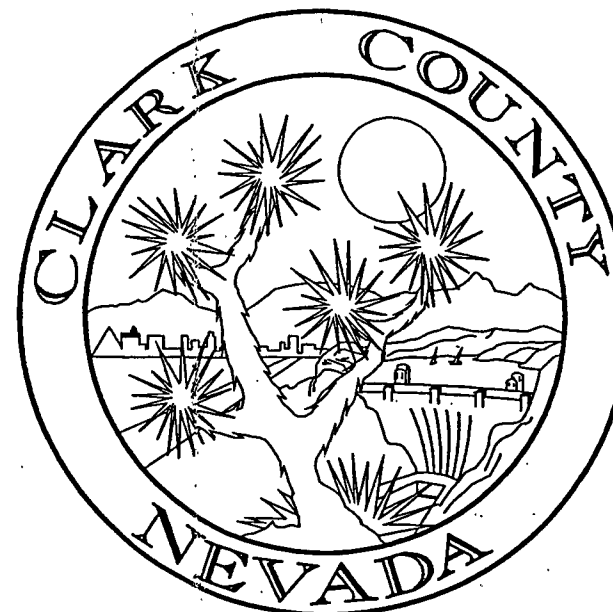
DEPARTMENT OF PUBLIC WORKS

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- S-7 TYPICAL CHANNEL SECTION (WITH SPLASH GUARD)
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- S-17 TYPICAL BRIDGE ABUTMENT SECTION

County Commissioners

Chip Maxfield, Chairman
Myrna Williams, Vice Chairman
Yvonne Atkinson Gates
Mark James
Rory Reid
Mary J. Kincaid-Chauncey
Bruce L. Woodbury



"Progress as Promised"

DECEMBER 2003 100% SUBMITTAL IMPROVEMENT PLANS FOR FLAMINGO WASH MARYLAND PARKWAY TO SPENCER STREET PHASE II CLARK COUNTY, NEVADA FUNDED BY CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

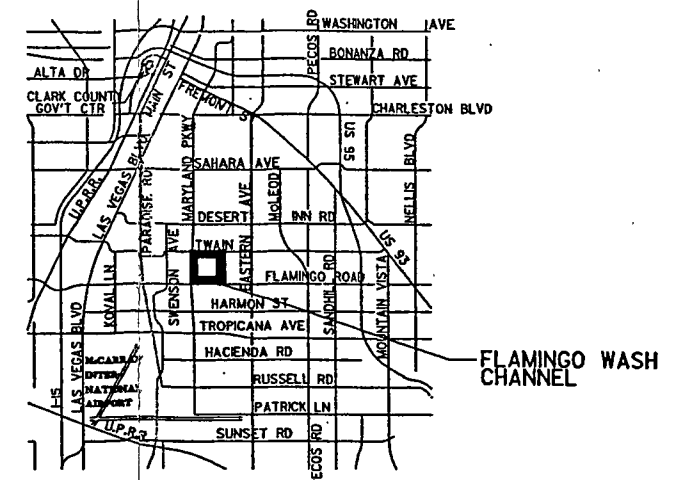
DESIGNED BY:



MWH

Los Vegas
Nevada

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



Vicinity Map
NOT TO SCALE

County Manager

Thom Reilly

Director of Public Works

Approved:

M.J. Manning, P.E.

Clark County Regional Flood Control District

General Manager /Chief Engineer

Approved:

Gale Wm. Fraser, II, P.E.

MARCH ADV
DEC. 30 - ADV. PHASE III

AGENCY			DEPARTMENT OF PUBLIC WORKS			REVISIONS			DATE		
PLANS REVIEWED BY			BY			NUMBER	DESCRIPTION				
SPRINT			DEPUTY DIRECTOR								
LAS VEGAS VALLEY WATER DISTRICT			COMMUNITY DEVELOPMENT DIVISION								
SOUTHWEST GAS COMPANY			CONSTRUCTION MANAGEMENT DIVISION								
NEVADA POWER COMPANY, DISTRIBUTION			DESIGN ENGINEERING DIVISION								
NEVADA POWER COMPANY, TRANSMISSION			MAINTENANCE MANAGEMENT DIVISION								
CLARK COUNTY WATER RECLAMATION DISTRICT			TRAFFIC MANAGEMENT DIVISION								
COX COMMUNICATIONS LAS VEGAS, INC.			COUNTY SURVEYOR'S OFFICE								
SPRINT											

C-1

L-1646B

QUANTITIES

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT
105.01	Quality Control		LS
107.01	Traffic Control		LS
109.01	Construction Conflicts & Additional Work		DAY
109.02	Historical Owner Caused Delay Allowance		DAY
109.03	Historical Owner Caused Delay Allowance		DAY
200.01	Mobilization		LS
201.01	Clearing & Grubbing		LS
201.02	Remove Trees		EA
201.03	Remove Shrubs		EA
202.01	Remove Sidewalk	300	LF
202.02	Remove Curb and Gutter	60	LF
202.03	Remove Concrete Valley Gutter	1,466	LF
202.04	Remove Fence	97	LF
202.05	Remove Concrete Side Slope		LS
202.06	Remove Concrete Apron		LS
202.07	Remove Riprap		LS
202.08	Remove Grouted Riprap		LS
202.09	Remove Gabions		LS
202.10	Remove Concrete Channel		LS
202.11	Station 30+97.58 to Station 34+49.57		LS
202.12	Remove Concrete Outlet Structure		LS
203.01	Channel Excavation	3,380	CY
203.02	Compacted Backfill	2,400	CY
203.03	Selected Borrow	17,000	CY
209.01	Drain Backfill	2,585	CY
212.01	Road Mulch	970	CY
217.01	De-watering		LS
302.01	Type I Aggregate Base	1,000	CY
402.01	Plantmix Bituminous Surface Pavement Replacement	720	TON
402.02	Plantmix Bituminous Surface Maintenance Road / Trail	475	TON
502.01	Concrete Channel Transition Station 30+97.58 to Station 34+49.57		LS
502.02	40' Wide Rectangular Concrete Channel Station 34+49.57 to Station 45+05.33	1,363	LF
502.03	Concrete Channel Transition Station 45+05.33 to Station 48+85.33		LS
502.04	Channel Access Ramp		LS
502.05	Channel Floor Ramp	2	EA
502.06	Concrete Inflow Apron Station 44+32.42, South Side		LS
502.07	Concrete Inflow Apron Station 43+39.81, South Side		LS
502.08	Concrete Inflow Apron and Ramp Access Station 42+28.00, North Side		LS
502.09	Concrete Inflow Apron Station 39+94.24, South Side		LS
502.10	Concrete Inflow Apron Station 38+79.00, North Side		LS
502.11	Concrete Inflow Channel Station 32+40.00, South Side		LS
502.12	Concrete Apron at Bridge Access Station 32+28.00, South Side		LS
502.13	Concrete Inflow Apron Station 31+77.93, South Side		LS
502.14	Concrete Inflow Apron Station 31+66.88, North Side		LS
606.01	12' Wide by 40' Simple Span Bridge Structure		LS
603.01	18" Storm Drain Pipe	17	LF
603.02	24" Storm Drain Pipe	21	LF
603.03	Class III 30" Reinforced Concrete Pipe	64	LF
603.04	Class III 36" Reinforced Concrete Pipe	70	LF
603.05	Class III 48" Reinforced Concrete Pipe	52	LF
603.06	Class III 60" Reinforced Concrete Pipe	44	LF
603.07	Class III 66" Reinforced Concrete Pipe	308	LF
603.08	Class III 72" Reinforced Concrete Pipe	605	LF
604.01	30" CMP	14	LF
609.01	17" Type "DM" Drop Inlet	1	EA
609.02	24.5" Type "DM" Drop Inlet	1	EA
609.03	42" Type "DM" Drop Inlet	2	EA
609.04	Type III Manhole	2	EA
609.05	Pre-Cast Manhole	4	EA
609.06	Manhole Structure No. 1	1	EA
609.07	Manhole Structure No. 2	1	EA
609.08	Manhole Structure No. 3	1	EA
609.09	Manhole Structure No. 4	1	EA
613.01	Cross Gutter	1,466	SF
613.02	16' Commercial Driveway	168	SF
613.03	24' Commercial Driveway	224	SF
613.04	1" Type Curb and Gutter	60	LF
613.05	"A" Curb	38	LF
613.06	Concrete Sidewalk	300	SF
616.01	Post and Cable Railing	1,456	LF
616.02	6' Chain Link Fence	173	LF
616.03	4' Chain Link Fence with Top Rail	1,595	LF
616.04	16' Chain Link Double Swing Gate		EA
616.05	5' Chain Link Single Swing Gate		EA
622.01	Replace 6-inch ACP with 6-inch DIP	3	EA
622.02	Replace 8-inch PVC with 8-inch DIP	1	LS
622.03	Replace 8-inch ACP with 8-inch DIP	1	LS
633.01	Non-Reflective Pavement Markers	36	EA
633.02	Reflective Pavement Markers	12	EA
637.01	Dust Control		LS

Enough?

Review to be done with LVVWD

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE UNIFORM STANDARD DRAWINGS AND "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" CLARK COUNTY AREA, NEVADA LATEST EDITION AND DEPARTMENT OF PUBLIC WORKS CLARK COUNTY, NEVADA, "IMPROVEMENT STANDARDS 1983, REVISED MAY 1990," UNLESS OTHERWISE SPECIFIED BY NOTE ON THE PLANS AND/OR SPECIAL PROVISIONS. THE IMPROVEMENT STANDARDS WILL HEREINAFTER BE REFERRED TO AS "CLARK COUNTY STANDARD DRAWINGS".

2. TRAFFIC SIGNAL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS" CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA VOLUME 1 LATEST EDITION.

3. WHENEVER ANY ITEM OF WORK IS SPECIFIED FOR CONSTRUCTION IN ACCORDANCE WITH "UNIFORM STANDARD DRAWINGS" IT WILL BE A REFERENCE TO THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS" CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA 1988.

4. ALL UTILITIES SHOWN ARE BELIEVED TO BE ACCURATELY LOCATED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL UTILITIES LIKELY TO BE AFFECTED. THE CONTRACTOR SHALL DETERMINE THE LOCATION AND DEPTH OF SUSPECTED UTILITY INTERFERENCES, AND SHALL FURNISH INFORMATION ON THE SAME TO THE ENGINEER, NOT LESS THAN TEN (10) DAYS PRIOR TO THE ANTICIPATED IMPACT OF THESE SUSPECTED INTERFERENCES ON HIS WORK. IF CONFLICTS EXIST, THE CONTRACTOR WILL IMMEDIATELY CONTACT THE ENGINEER AND PROVIDE THE ENGINEER WITH ALL THE NECESSARY DATA SUCH AS ELEVATIONS, HORIZONTAL LOCATIONS, ETC., AND PROVIDE THE ENGINEER WITH SKETCHES INDICATING THE PROPOSED IMPROVEMENT AND THE UTILITY CONFLICT. THE ENGINEER WILL EXAMINE AND REVIEW ALL THE DATA AND SKETCHES PROVIDED, AND WILL PROVIDE THE CONTRACTOR WITH AN ALTERNATIVE DESIGN WITHIN FIVE (5) DAYS AFTER RECEIPT OF DATA AND SKETCHES.

5. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO BEGINNING CONSTRUCTION.

6. THE SPRINT CENTRAL TELEPHONE COMPANY SHALL BE RESPONSIBLE FOR THE ADJUSTMENT OF TELEPHONE MANHOLES AND RELOCATIONS OF TELEPHONE POLES AND UNDERGROUND TELEPHONE LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.

GENERAL NOTES

- THE NEVADA POWER COMPANY SHALL BE RESPONSIBLE FOR THE RELOCATION OF UNDERGROUND OR OVERHEAD POWER LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL LAS VEGAS VALLEY WATER DISTRICT FACILITIES AND CLARK COUNTY SANITATION DISTRICT MANHOLES AS INDICATED ON THE PLANS OR IN THE SPECIAL PROVISIONS UNLESS OTHERWISE INDICATED.
- THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALL, FENCES, SIGNS, STRUCTURES, LIGHTS OR ANY OTHER IMPROVEMENTS OUTSIDE THE RIGHT-OF-WAY EXCEPT WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OR AS DIRECTED BY THE ENGINEER.
- EXACT LOCATIONS OF ALL SAWCUT LINES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER. THOSE SAWCUTS THAT ARE LONGITUDINAL TO THE ROADWAY MAY BE WHEEL CUT WITH EQUIPMENT AS APPROVED BY THE ENGINEER. ALL OTHER SAWCUTS SHALL BE MADE BY A ROTARY SAW.
- IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING REQUIRED TO REMAIN, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
- CONTRACTOR MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION, OPERATIONS UNIT AT (702) 455-7514 FOR LOCATIONS OF STREET LIGHTING, TRAFFIC SIGNALS, LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM (LACTS) INTERCONNECT CABLE AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG (UNDERGROUND SERVICE ALERT) AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE THE CONTRACTOR OF LIABILITY FOR CLARK COUNTY FACILITIES.

LVVWD STANDARD NOTES

LVVWD PROJECT # 26695

- NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATIONS SUPPORT CENTER (258-7700) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
- ALL WORK SHALL CONFORM TO LVVWD'S STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
- ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2, SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
- A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
- ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
- ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
- ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
- THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATER LINE AND SANITARY OR STORM SEWER LINE CROSS:
 - POTABLE WATER SUPPLY QUALITY MATERIAL.
 - ENCASEMENT, WITH FOUR (4) INCH CONCRETE MINIMUM.
 - SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE.
 EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MARK A MINIMUM 10 FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
- WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
- ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
- THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3552 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
- CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM SUNDAY THROUGH THURSDAY. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEES BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEES MUST HAVE PRIOR LVVWD APPROVAL.
- ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

Do Be Rechecked
Annotated?

LVVWD DATE:

ABBREVIATIONS

ABC	AGGREGATE BASE COURSE	MN	MINIMUM
AC	ACRE	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
ACP	ASBESTOS CEMENT PIPE	NTS	NOT TO SCALE
AGG	AGGREGATE	OC	ON CENTER
APPROX	APPROXIMATELY	OD	OUTSIDE DIAMETER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	OF	OUTER FACE
AWWA	AMERICAN WATER WORKS ASSOCIATION	OH	OVERHEAD POWERLINE
BC	BACK OF CURB	PBS	PLANTMIX BITUMINOUS SURFACE
BOT	BOTTOM	PC	POINT OF CURVATURE
BSW	BACK OF SIDEWALK	PE	POLYETHYLENE
C	CONDUIT	PI	POINT OF INTERSECTION
CC	CLARK COUNTY	POB	PROPERTY LINE OR PLATE
CCRFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT	POE	POINT OF BEGINNING
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	PT	POINT OF TANGENCY
CAG	CURB AND GUTTER	PVC	POLY VINYL CHLORIDE
CL	CENTERLINE	PVMT	PAVEMENT
CLR	CLEARANCE	R	RADIUS
CLSM	CONTROLLED LOW STRENGTH MATERIAL	RCB	REINFORCED CONCRETE BOX
CMP	CORRUGATED METAL PIPE	RCP	REINFORCED CONCRETE PIPE
CMU	CONCRETE MASONRY UNITS	REINF	REINFORCED
COMM DWY	COMMERCIAL DRIVEWAY	ROFC	RATE OF FLOW CONTROL
CONC	CONCRETE	RP	RADIUS POINT
CONST	CONSTRUCTION OR CONSTRUCT	RT	RIGHT
CONT	CONTINUOUS	R/W	RIGHT-OF-WAY
CY	CUBIC YARD	S	SLOPE
DI	DROP INLET	SC	SCALE
DIA	DIAMETER	SCH	SCHEDULE
DIAG	DIAGONAL	SD	STORM DRAIN
DP	DUCTILE IRON PIPE	SF	SQUARE FEET
DWG	DRAWING	SM	SMALLER
DWT	DRIVEWAY	SPA	SPACED
EA	EACH	SPEC'S	PROJECT SPECIFICATIONS
EF	EACH FACE	SSMH	SANITARY SEWER MANHOLE
ELEV	ELEVATION	STA	STATION
EOP	END OF PROJECT	STD	STANDARD
EP	EDGE OF PAVEMENT	STL	STEEL
EW	EACH WAY	SW	SIDEWALK
EXST	EXISTING	SWG	SOUTHWEST GAS
FB	FINISHED GRADE	T	TELEPHONE
FL	FLOW LINE	TBSW	TOP BACK OF SIDEWALK
FND	FOUND	TC	TOP OF CURB
FW	FLAMINGO WASH	T.C.E.	TEMPORARY CONSTRUCTION EASEMENT
G	NATURAL GAS	TH	TEST HOLE
GB	GRADE BREAK	TOS	TOE OF SLOPE
H	WALL HEIGHT	TP	TOP OF PIPE
HDPPE	HIGH DENSITY POLY ETHYLENE	TRANS	TRANSITION
HPS	HIGH PRESSURE SOOLIM	TRAP	TRAP
I	INSIDE DIAMETER	TR	TRAPEZOIDAL
IF	INNER FACE	TY	TYPICAL
INVT	INVERT	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
L	LENGTH	VC	VERTICAL CURVE
LF	LINEAR FEET	VCP	VITRIFIED CLAY PIPE
LLH	LONG LEG HORIZONTAL	VG	VALLEY GUTTER
LS	LUMP SUM	VPC	VERTICAL POINT OF CURVE
LT	LEFT	VPI	VERTICAL POINT OF INTERSECTION
LVVWD	LAS VEGAS VALLEY WATER DISTRICT	W	WATER
MAT'L	MATERIAL	W.L.	WATER LINE
MAX	MAXIMUM	WS	WATER SURFACE
MH	MANHOLE		

BASIS OF BEARING

NORTH 02° 51' 17" EAST BEING THE WEST LINE OF THE SOUTHWEST 1/4 OF SECTION 14, TOWNSHIP 23 SOUTH, RANGE 61 EAST, M.D.M., AS SHOWN PER MARYLAND PLAZA RECORDED IN BOOK 68 PAGE 75 OF PLATS.

BENCHMARKS

CLARK COUNTY BENCHMARK NO. 6CH4SWN6 DESCRIBED AS: RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, EAST SIDE OF MARYLAND PKWY. AT THE NORTH SIDE OF THE FLAMINGO WASH.

EL 1988.79 FEET (NAVD-88)
EL 606.183 (METERS)

CLARK COUNTY FIRE DEPARTMENT DATE:

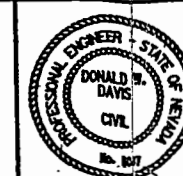


LEGEND

	REMOVAL ITEM, CONSTRUCTION ITEM, TRAFFIC ITEM
	CENTERLINE W/STATION
	RIGHT-OF-WAY LINE
	PROPERTY LINE
	TEMPORARY CONSTRUCTION EASEMENT
	PROPOSED RIGHT-OF-WAY LINE
	PROPOSED 250 W HPS STREETLIGHT
	PROPOSED 400 W HPS STREETLIGHT
	EXISTING/PROPOSED/FUTURE DROP INLET
	EXISTING/PROPOSED CURB & GUTTER
	EXISTING/PROPOSED UNDERGROUND UTILITY
	EXISTING/PROPOSED/ADJUST MANHOLE
	EXISTING/PROPOSED/ADJUST PULLBOX
	EXISTING/PROPOSED/ADJUST WATER OR GAS VALVE
	EXISTING/PROPOSED EDGE OF PAVEMENT
	EXISTING/PROPOSED DRIVEWAY
	EXISTING BLOCKWALL/FENCE
	EXISTING/PROPOSED ELEVATION
	CURVE DATA NOTATION
	EXISTING TELEPHONE AND/OR POWER POLE
	EXISTING/PROPOSED FIRE HYDRANT
	EXISTING/PROPOSED SERVICE PESTEDA
	PAYEMENT TRANSITION
	EXISTING MAILBOX
	BENCHMARK
	POT HOLE NUMBER
	EXISTING/ADJUST WATER METER
	SAWCUT LINE
	EXISTING/PROPOSED CONTROLLER CABINET
	EXISTING/PROPOSED SIDEWALK RAMP
	TOP OF SLOPE
	FULL SLOPE
	CUT SLOPE
	DAYLIGHT LINE
	CHAIN LINK FENCE
	SECTION/DETAIL
	POST & CABLE RAIL

FLAMINGO WASH

BENCHMARK, GENERAL & CONSTRUCTION NOTES,
BASIS OF BEARING, LEGEND & ABBREVIATIONS,
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



DESIGNED BY: MKW
DRAWN BY: AIM
CHECKED BY: DWD
DATE: 11/21/2003

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK: NONE

SHEET No

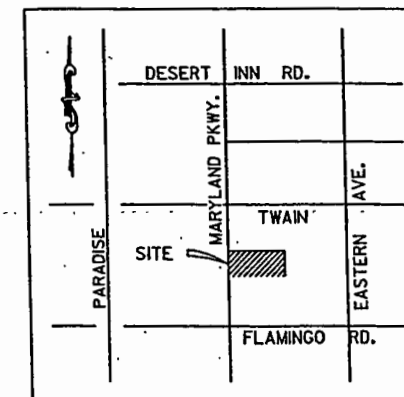
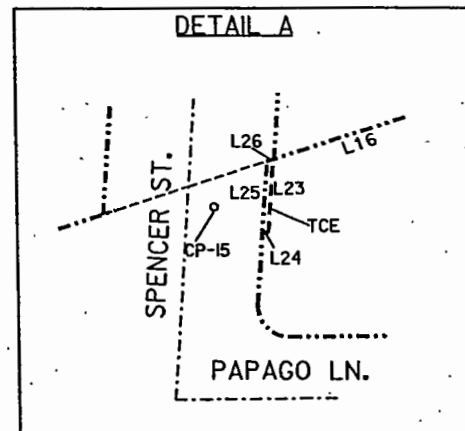
C-2

L-1646B

CURVE DATA			
CURVE	RADIUS	LENGTH	DELTA
C1	1310.00'	489.13'	21° 23' 35"
C2	1410.00'	407.28'	16° 33' 00"
C3	1050.00'	315.14'	17° 11' 47"
C4	2140.00'	455.01'	12° 10' 56"
C5	2155.00'	700.55'	18° 37' 33"
C6	945.00'	255.77'	15° 30' 27"
C7	1055.00'	53.38'	02° 53' 57"
C8	2045.00'	465.41'	13° 02' 23"
C9	2060.00'	610.03'	16° 58' 01"
C10	15.00'	23.57'	89° 57' 57"
C11	15.00'	23.56'	90° 00' 00"

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S 02° 51' 43" W	14.87'
L2	S 03° 19' 08" E	12.16'
L3	S 87° 08' 43" E	50.00'
L4	N 65° 34' 30" E	37.22'
L5	N 49° 32' 43" E	41.48'
L6	N 03° 48' 11" E	63.99'
L7	N 71° 49' 35" E	113.76'
L8	S 71° 49' 35" W	112.14'
L9	N 03° 48' 11" E	9.95'
L10	S 89° 39' 06" W	184.44'
L11	S 88° 01' 23" W	72.71'
L12	S 46° 16' 40" W	72.84'
L13	S 58° 09' 36" W	13.25'
L14	S 89° 38' 42" W	18.57'
L15	N 71° 49' 35" E	135.00'
L16	S 71° 49' 35" W	135.00'
L17	S 71° 49' 35" W	43.26'
L18	N 71° 49' 35" E	43.26'
L19	N 04° 12' 07" E	24.20'
L20	S 04° 12' 07" E	13.99'
L21	N 29° 11' 58" W	109.01'
L22	N 71° 49' 35" E	118.13'
L23	S 04° 12' 07" W	35.99'
L24	N 85° 47' 53" W	3.00'
L25	N 04° 12' 07" E	34.75'
L26	N 71° 49' 35" E	3.24'
L27	S 87° 08' 43" E	68.80'
L28	N 00° 08' 09" W	30.91'
L29	S 02° 49' 14" W	34.61'
L30	S 02° 51' 17" W	80.74'
L31	S 86° 30' 43" W	11.82'
L32	N 87° 08' 43" W	8.26'
L33	N 02° 51' 17" E	82.01'

COORDINATE LIST (PROJECT COORDINATES)				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
NO.1	10000.000	10000.000		WELL/B CAP PLS 7641
NO.3	7223.529	9861.545		WELL/B CAP PLS 7755
NO.5	8611.891	9930.779		BRASS CAP PLS 7004
NO.8	9305.948	9965.390		PK NAIL
NO.9	9313.777	11359.949		ALUM. CAP PLS 7704
HV-5	8966.865	11339.831	1967.95	ALUM. CAP PLS 3161
HV-7	9433.812	12906.635	1943.93	PK NAIL
HV-8	8838.029	12879.973	1947.19	PK NAIL
CP-12	9314.5673	12912.094		PK NAIL
CP-15	9003.703	12891.140		PK NAIL
NO.138	8629.617	12850.935		ALUM. CAP PLS 7004
NO.139	8628.659	12709.137		ALUM. CAP
NO.140	8631.506	13130.707		ALUM. CAP PLS 4046
NO.141	9344.964	12756.306		ALUM. CAP PLS 7004



VICINITY MAP
NOT TO SCALE

- LEGEND
- PROPERTY LINE
 - - - RIGHT-OF-WAY
 - - - CENTERLINE
 - o = POINTS AS SHOWN ON MAP

FLAMINGO WASH

HORIZONTAL & VERTICAL CONTROL PLAN I
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: EB
DRAWN BY: SB
CHECKED BY: EB
DATE: 3/5/2002

SCALE
HORIZ: 1" = 100'
VERT: -
FIELD BOOK BAI-90

SHEET No

C-3

L-1646B

BASIS OF BEARINGS

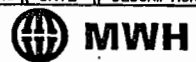
NORTH 02° 51' 17" EAST BEING THE WEST LINE OF THE SOUTHWEST QUARTER OF SECTION 14, TOWNSHIP 21 SOUTH, RANGE 61 EAST, M.D.M., AS SHOWN PER MARYLAND PLAZA RECORDED IN BOOK 68 PAGE 75 OF PLATS.

BENCH MARK

CLARK CO. NO. 6CII-14SWW6
RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, EAST SIDE OF MARYLAND PKWY. AT NORTH SIDE OF FLAMINGO WASH.
ELEVATION: 606.183 (M) 1988.785 (F)

REV No DATE DESCRIPTION

APPROVED



MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010

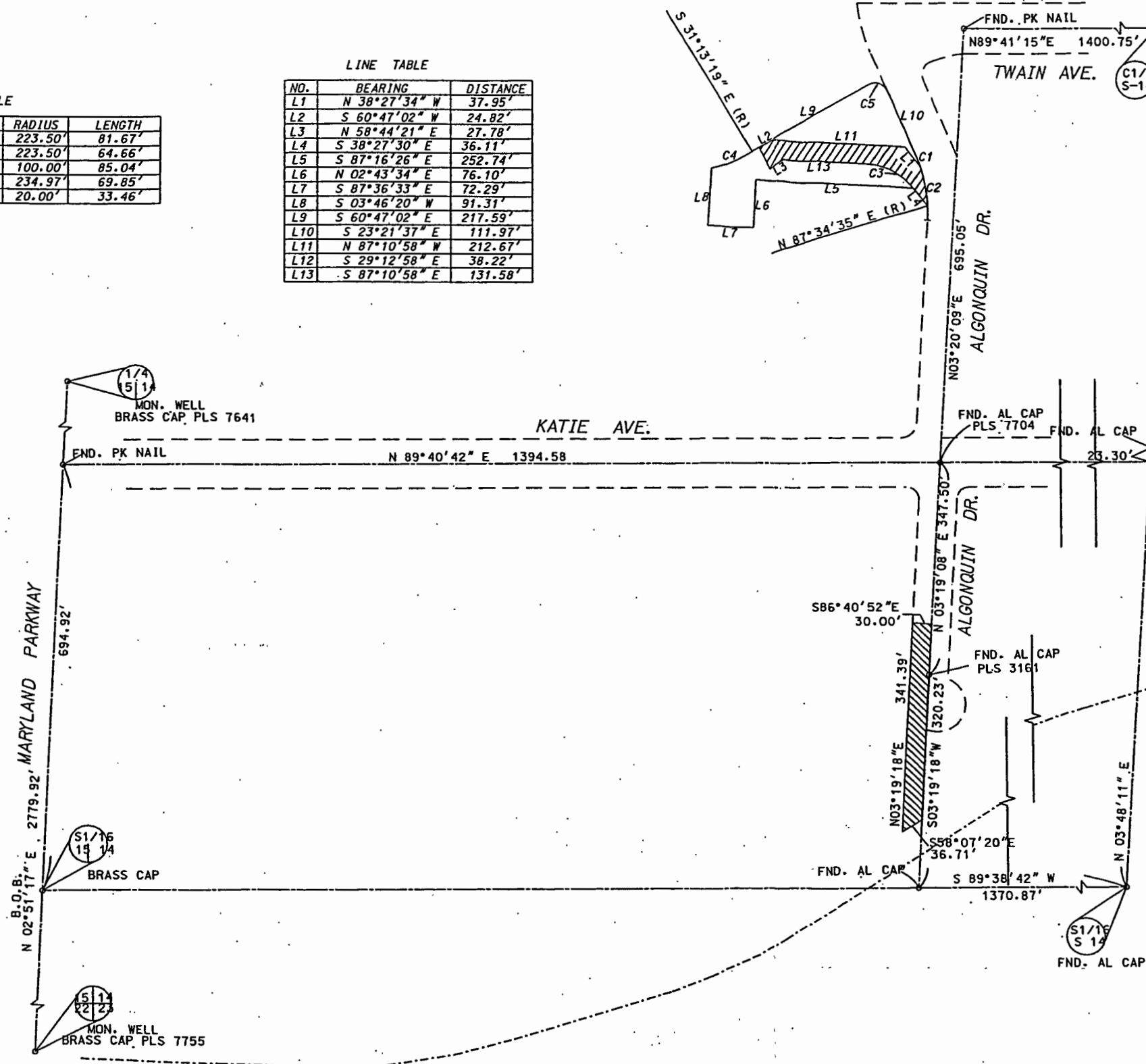


CURVE TABLE

NO.	DELTA	RADIUS	LENGTH
C1	20°56'12"	223.50'	81.67'
C2	16°34'38"	223.50'	64.66'
C3	48°43'28"	100.00'	85.04'
C4	17°01'55"	234.97'	69.85'
C5	95°51'21"	20.00'	33.46'

LINE TABLE

NO.	BEARING	DISTANCE
L1	N 38°27'34" W	37.95'
L2	S 60°47'02" W	24.82'
L3	N 58°44'21" E	27.78'
L4	S 38°27'30" E	36.11'
L5	S 87°16'26" E	252.74'
L6	N 02°43'34" E	76.10'
L7	S 87°36'33" E	72.29'
L8	S 03°46'20" W	91.31'
L9	S 60°47'02" E	217.59'
L10	S 23°21'37" E	111.97'
L11	N 87°10'58" W	212.67'
L12	S 29°12'58" E	38.22'
L13	S 87°10'58" E	131.58'



What does HATCHED Area Represent?

BASIS OF BEARINGS

NORTH 02°51'17" EAST BEING THE WEST LINE OF THE SOUTHWEST QUARTER OF SECTION 14, TOWNSHIP 21 SOUTH, RANGE 6 EAST, M.D.M., AS SHOWN PER MARYLAND PLAZA RECORDED IN BOOK 68 PAGE 75 OF PLATS.

BENCH MARK

CLARK CO. NO. 6CII-14SWW6
RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, EAST SIDE OF MARYLAND PKWY. AT NORTH SIDE OF FLAMINGO WASH.
ELEVATION: 606.183 (M) 1988.785 (F)

FLAMINGO WASH

HORIZONTAL & VERTICAL CONTROL PLAN II
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: EB
DRAWN BY: SB
CHECKED BY: EB
DATE: 12/5/2003

SCALE
HORIZ: 1" = 100'
VERT: -
FIELD BOOK BAI-90

SHEET No
C-3
L-1646B

08-DEC-2003

g:\cadd\flamingo_wash\Plat\phase2\civil\c-03a.dgn

REV NO	DATE	DESCRIPTION	APPROVED
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			



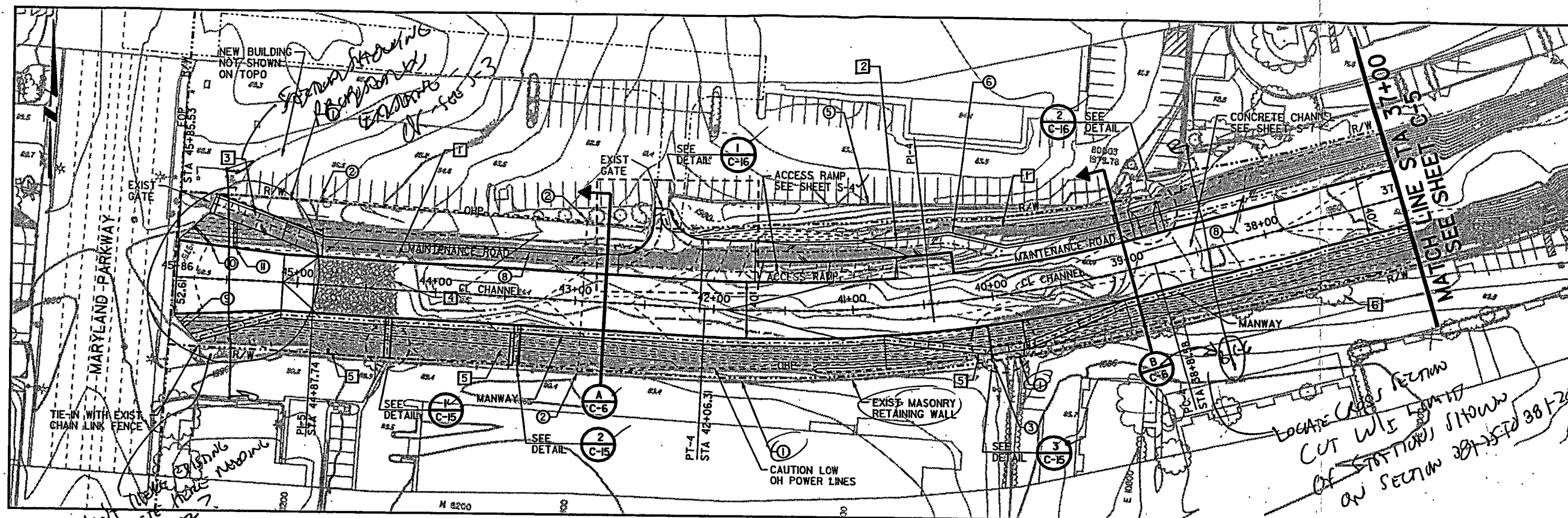
MWH

3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010

18.15
56.25
18.25
75.00

08-DEC-2003

g:\copw\flamingo_wash\plansheets\002\phase2\CIVIL\0-04.dgn



NOTES:

- 1 PROTECT IN-PLACE CHAIN LINK FENCE / MASONRY WALL
- 2 PROTECT IN-PLACE POWER POLE
- 3 PROTECT IN-PLACE POWER POLE & ELECTRICAL VAULT
- 4 INSTALL POST & CABLE RAILING & FENCE & RAILING ALONG TOP OF WALLS, SEE SECTIONS ON SHEETS C-6 & C-7
- 5 PROTECT IN-PLACE MASONRY RETAINING WALL & FENCE
- 6 PROTECT IN-PLACE MASONRY RETAINING WALL ALONG MAINTENANCE ROAD
- 7 INSTALL LADDERS PER DETAIL C-1
- 8 INSTALL AC PAVEMENT SEE SECTIONS ON SHEETS C-6 & C-7
- 9 EXTEND 60" RCP SEE SHEET S-3
- 10 EXTEND 18" RCP SEE SHEET S-3
- 11 EXTEND 30" CMP SEE SHEET S-3

- 1 REMOVE GABION SLOPE PROTECTION ON NORTH SIDE OF CHANNEL BETWEEN STA 44+88 AND 38+00.
- 2 REMOVE EXIST ASPHALT
- 3 REMOVE SIDE SLOPE CONCRETE ON NORTH SIDE
- 4 REMOVE EXIST RIPRAP
- 5 REMOVE EXIST GROUTED RIPRAP
- 6 REMOVE TREE

CONTROL POINTS

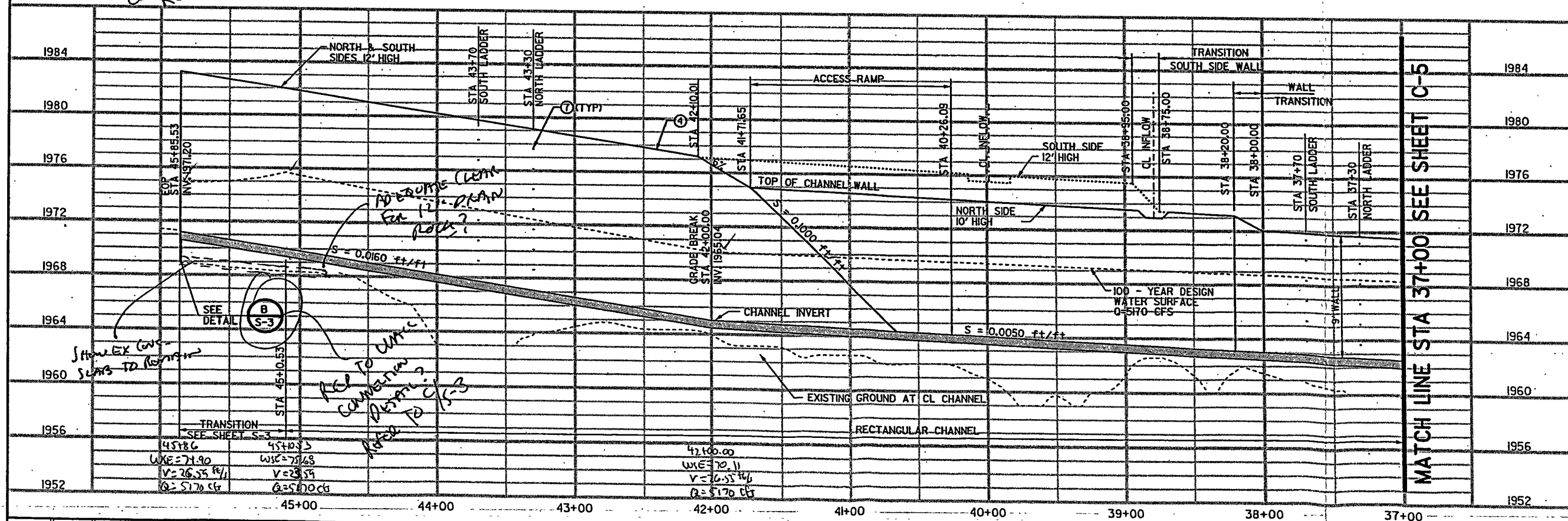
	NORTHING	EASTING
PC-4	N 8,372.774	E 10,669.040
PI-4	N 8,325.497	E 10,512.201
PT-4	N 8,330.732	E 10,348.476
PI-5	N 8,339.726	E 10,067.193

CURVE DATA

CURVE NO.	PI-4
△	18° 36' 21"
R	1000.00ft
L	324.73ft
T	163.81ft

Call
before you
Overhead

Call
before you
Dig.



FLAMINGO WASH

CHANNEL PLAN & PROFILE,

STA 45+85.53 TO STA 37+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

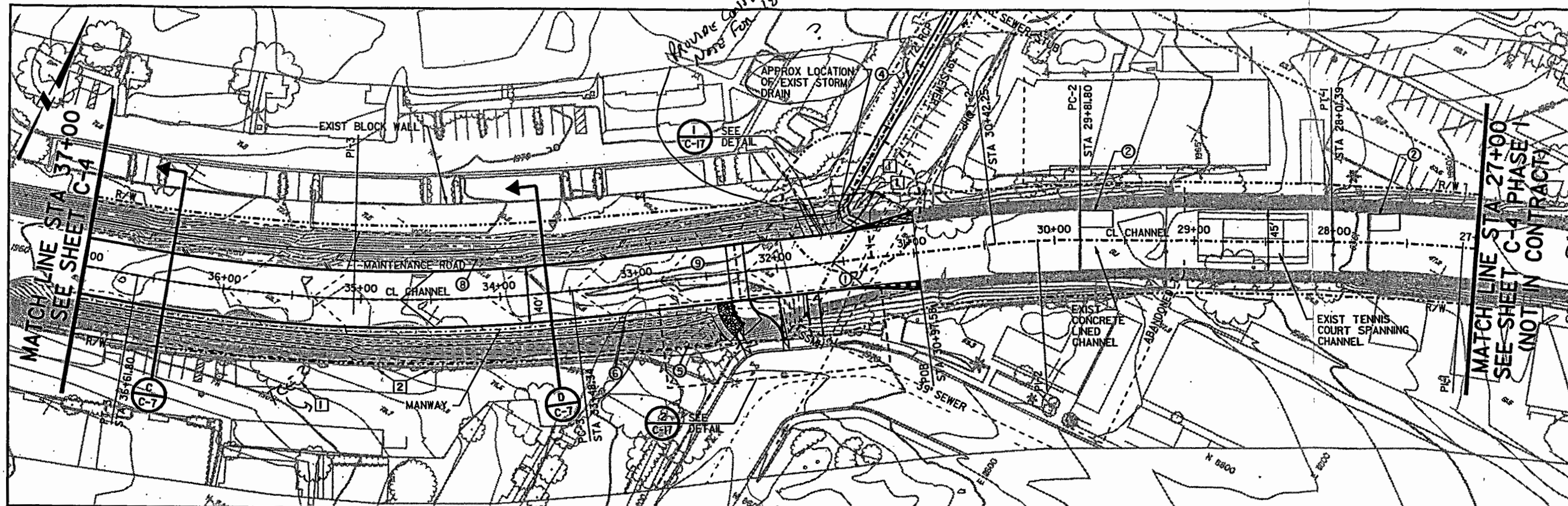
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: MKW
DRAWN BY: MKW
CHECKED BY: DWD
DATE: 11/25/2003

SCALE	SHEET No
HORIZ: 1" = 40'	C-4
VERT: 1" = 4'	
FIELD BOOK: NONE	

REV No	DATE	DESCRIPTION	APPROVED

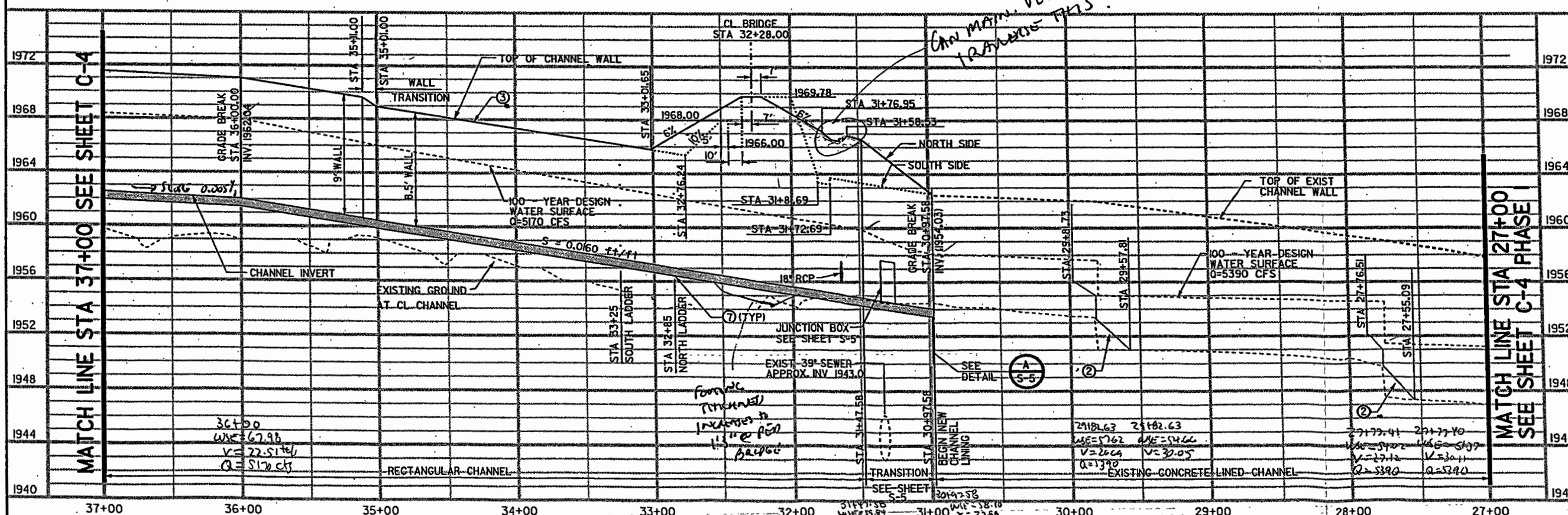
MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



- NOTES:**
- 1 REMOVE AND REPLACE CONCRETE CHANNEL, SEE SHEET S-5
 - 2 INSTALL RAMPS, SEE SHEET S-6
 - 3 INSTALL POST AND CABLE RAILING & FENCE AND RAILING ALONG TOP OF WALLS, SEE SECTIONS ON SHEETS C-6 & C-7
 - 4 STORM DRAIN, SEE SHEETS C-10 THROUGH C-14
 - 5 BEGIN MANWAY, STATION 32+68.14
 - 6 MANWAY ANGLE POINT, STATION 33+12.15
 - 7 INSTALL LADDERS PER DETAIL
 - 8 INSTALL AC PAVEMENT SEE SECTIONS ON SHEETS C-6 & C-7
 - 9 INSTALL PEDESTRIAN BRIDGE SEE SHEET S-15
 - 1 REMOVE TREE
 - 2 REMOVE SHRUBS

CONTROL POINTS

	NORTHING	EASTING
PI-1	N 8,885.331	E 11,716.547
PT-1	N 8,844.547	E 11,633.571
PC-2	N 8,764.968	E 11,471.661
PI-2	N 8,751.618	E 11,444.500
PT-2	N 8,735.089	E 11,419.147
POB	N 8,704.873	E 11,372.801
PC-3	N 8,567.927	E 11,162.743
PI-3	N 8,481.745	E 11,030.551
PT-3	N 8,436.202	E 10,879.46



CURVE DATA

CURVE NO.	PI-1
△	8° 48' 42"
R	1200.00ft
L	184.55ft
T	92.46ft

CURVE DATA

CURVE NO.	PI-2
△	6° 55' 40"
R	500.00ft
L	60.46ft
T	30.26ft

CURVE DATA

CURVE NO.	PI-3
△	16° 19' 39"
R	1100.00ft
L	313.47ft
T	157.80ft

Call
before you
Overhead

Call
before you
Dig.

REV NO	DATE	DESCRIPTION	APPROVED

MWH

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LAS VEGAS, NV 89102
(702) 878-8010



FLAMINGO WASH

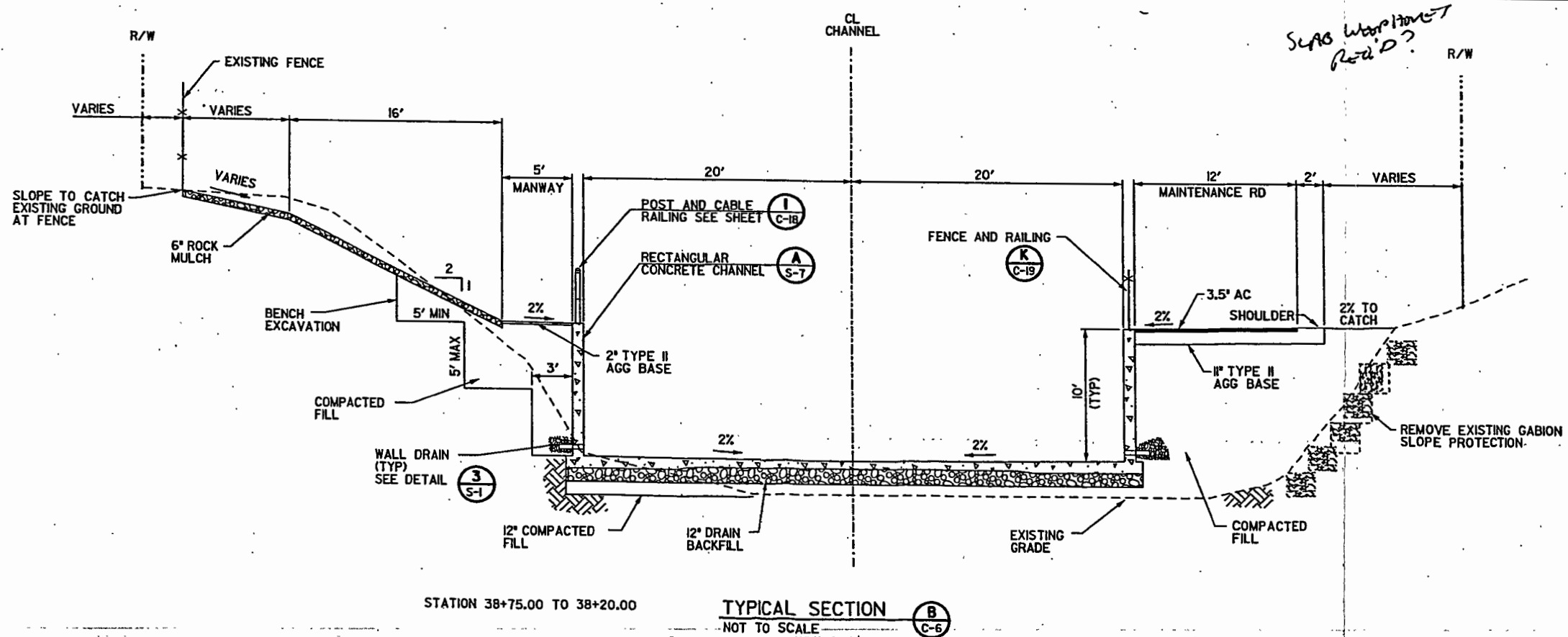
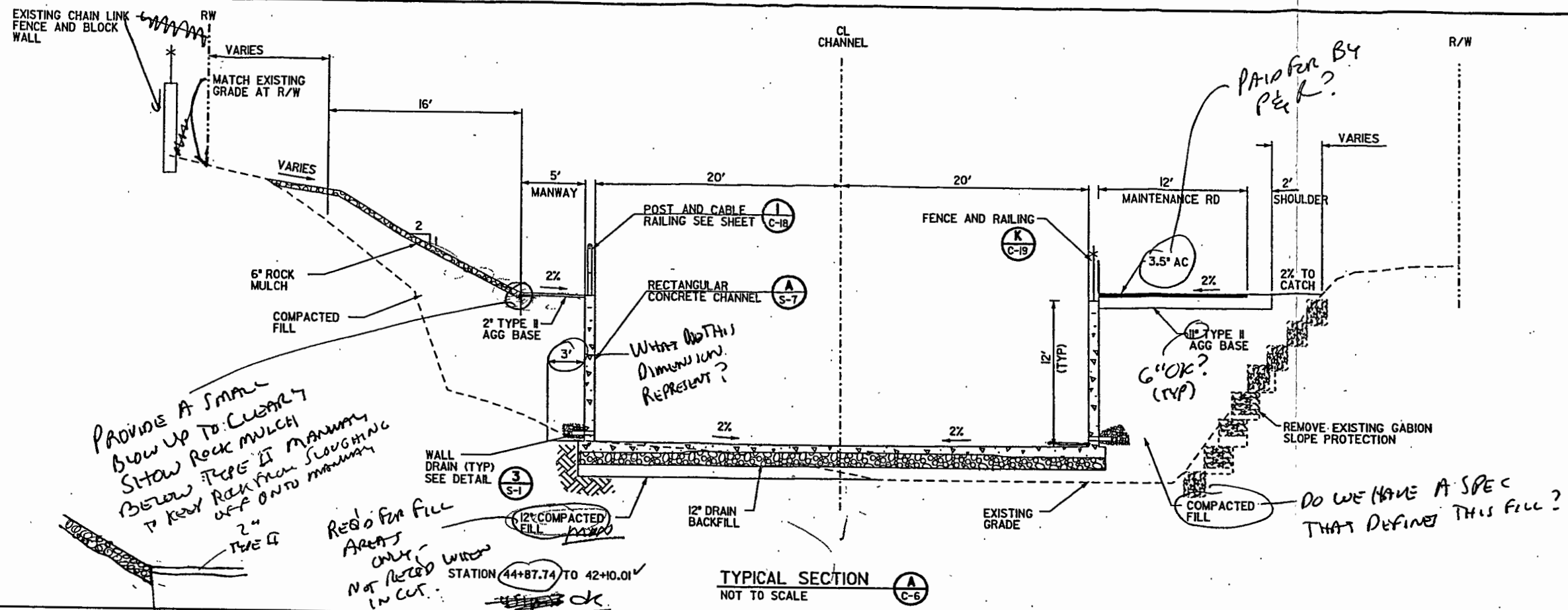
CHANNEL PLAN & PROFILE, STA 37+00.00 TO STA 27+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY:	MKW
DRAWN BY:	MKW
CHECKED BY:	DWD
DATE:	11/25/2003

SCALE	HORIZ: 1" = 40'	VERT: 1" = 4'	FIELD BOOK	NONE
SHEET No				
C-5				
L-1646B				



FLAMINGO WASH

CHANNEL SECTIONS & DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: MKW
DRAWN BY: MKW
CHECKED BY: DWD
DATE: 11/21/2003

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK: NONE

SHEET No
C-6
L-1646B

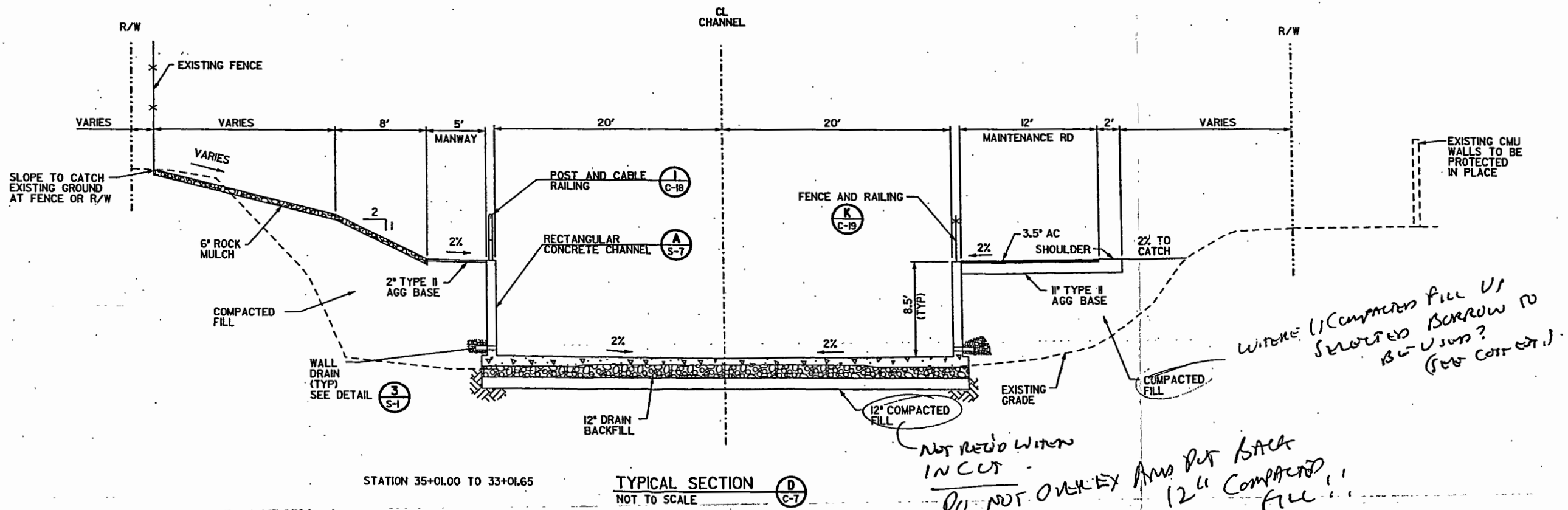
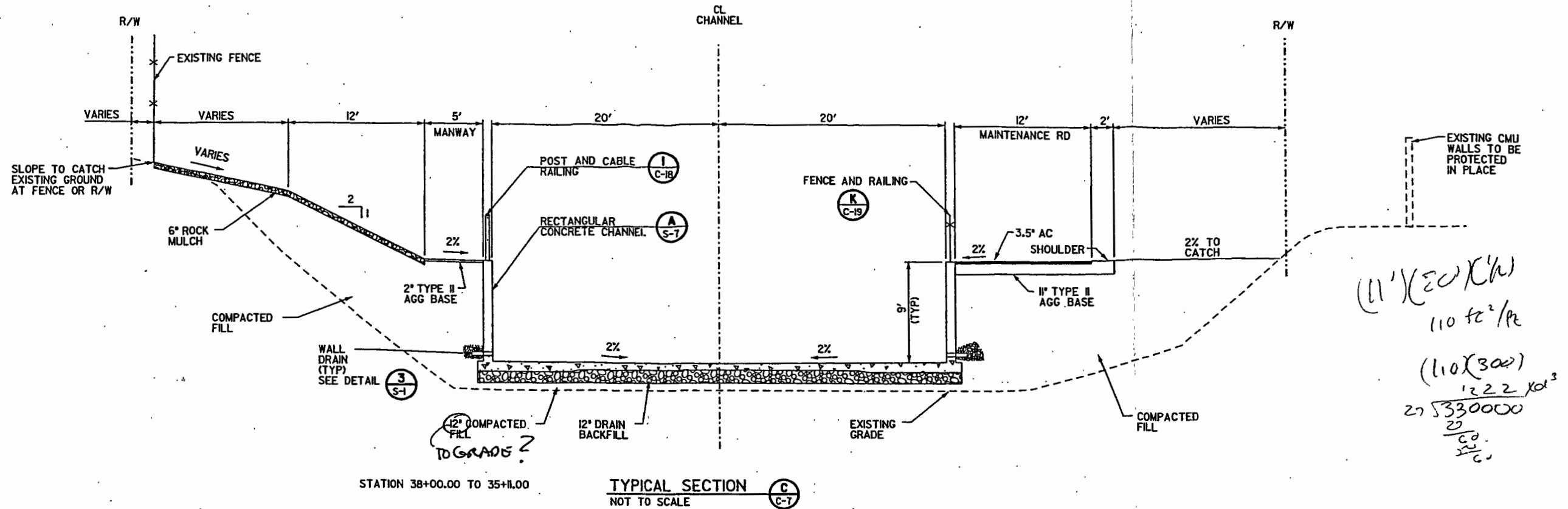
08-DEC-2003
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REV No	DATE	DESCRIPTION	APPROVED



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3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010





REV No	DATE	DESCRIPTION	APPROVED

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3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



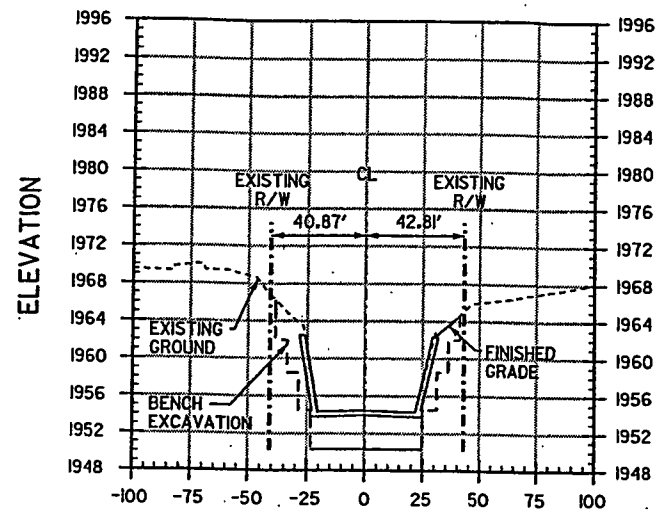
FLAMINGO WASH CHANNEL SECTIONS & DETAILS CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

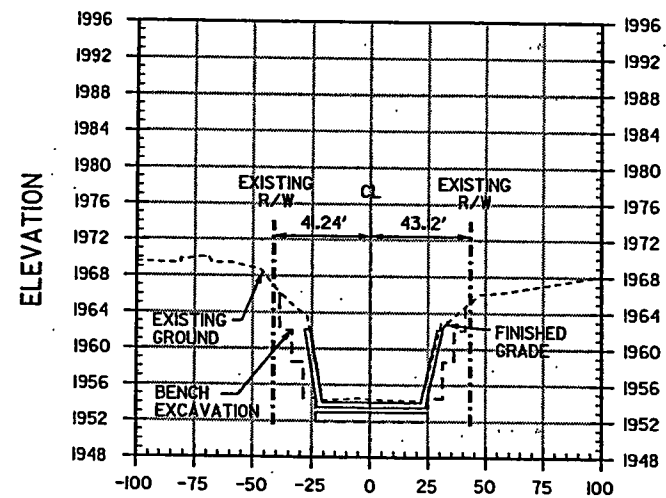
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DRAWN BY:	AIM
CHECKED BY:	DWD
DATE:	11/21/2003

SCALE	HORIZ: NONE
VERT: NONE	FIELD BOOK: NONE

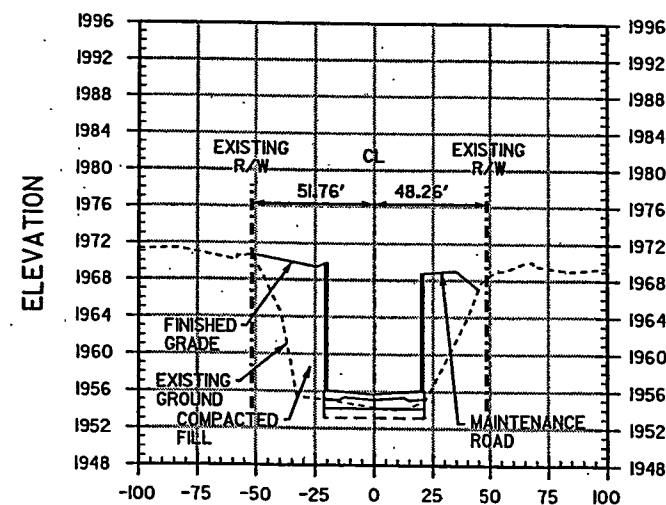
SHEET No
C-7
L-1646B



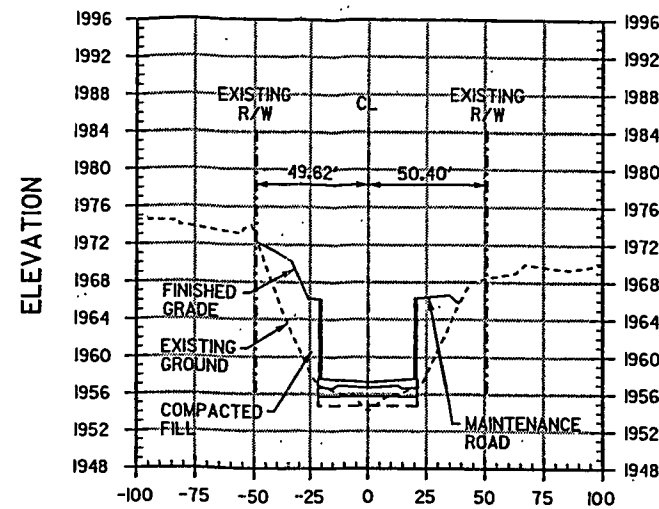
30+98



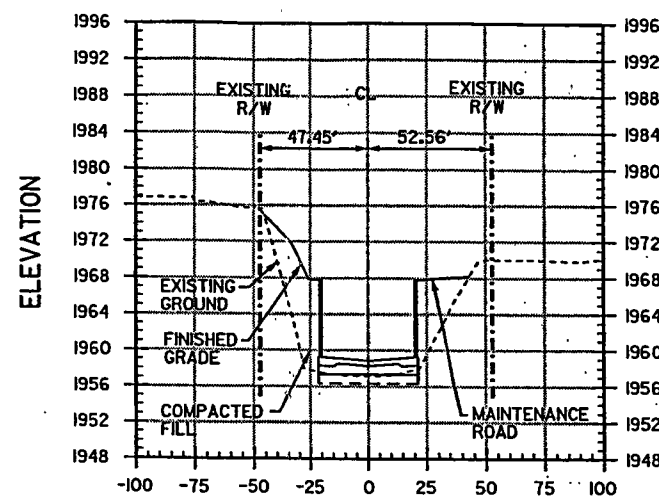
31+00



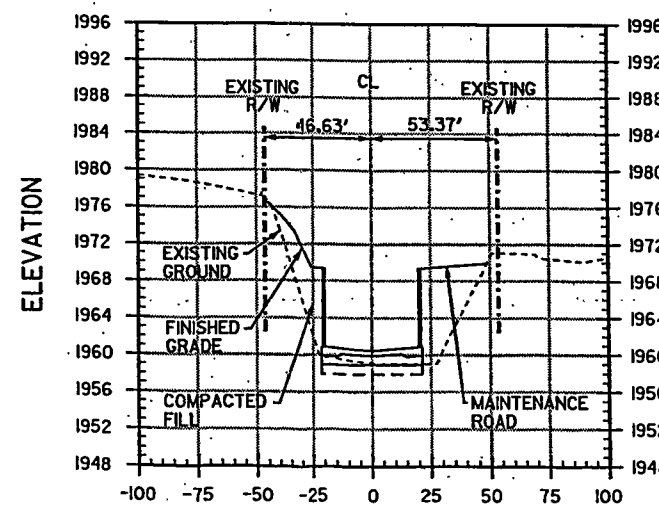
32+00



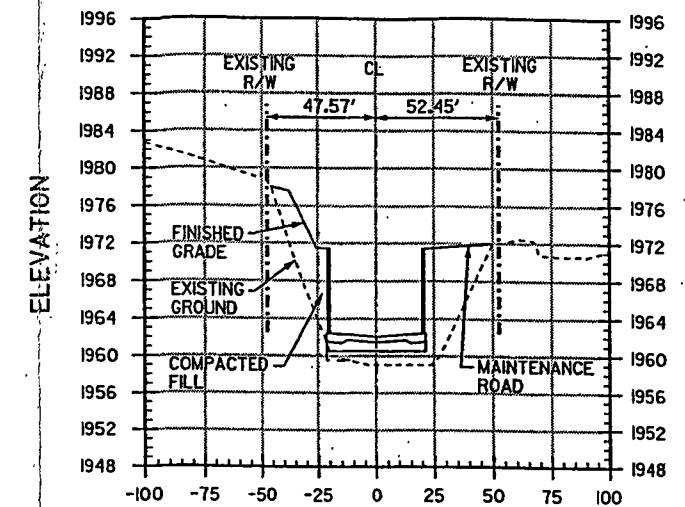
33+00



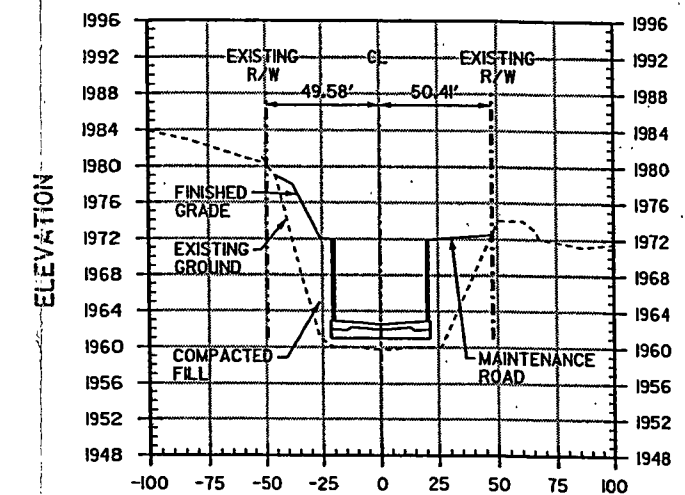
34+00



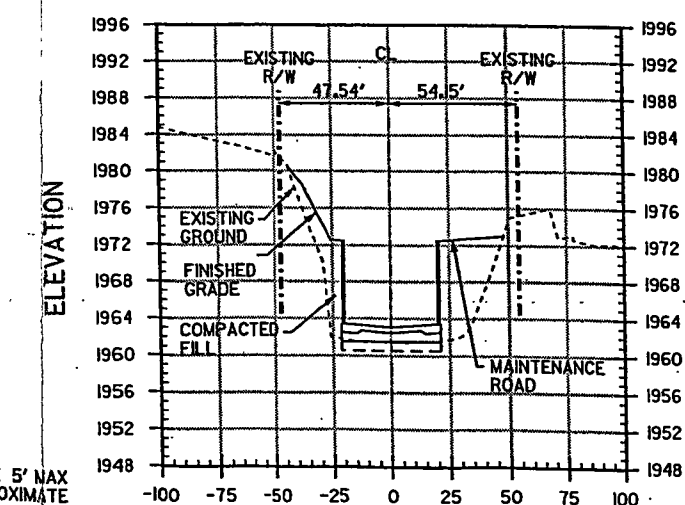
35+00



36+00



37+00



38+00

- NOTE:
1. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
 2. CONTRACTOR SHALL BENCH EXCAVATE 5' MAX HEIGHT AND 5' MIN WIDTH FROM APPROXIMATE STA 38+35 TO STA 39+85.
 3. ALL OTHER SECTIONS THAT REQUIRE BENCH EXCAVATION THE CONTRACTOR SHALL CONFORM TO 4' MAX HEIGHT AND 5' MIN WIDTH.

08-DEC-2003
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REV No	DATE	DESCRIPTION	APPROVED



MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



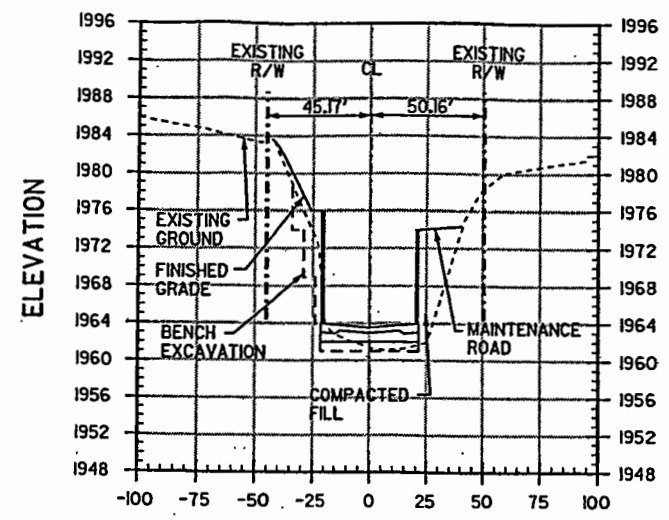
FLAMINGO WASH CHANNEL CROSS SECTIONS STA 30+98.00 TO STA 38+00.00 CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

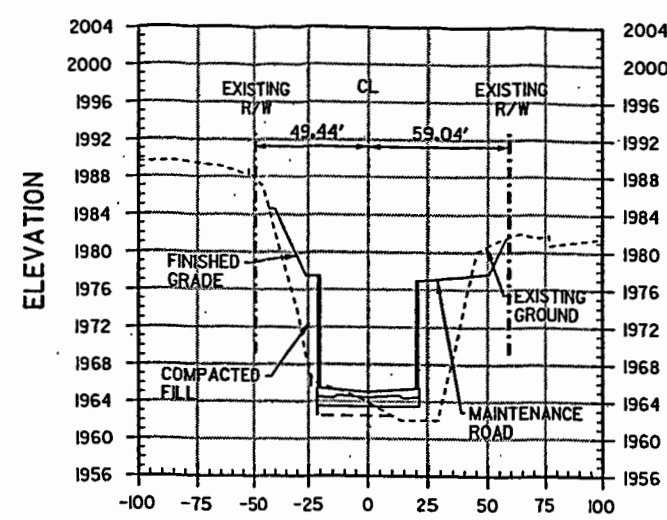
DESIGNED BY: MKW
DRAWN BY: AIM
CHECKED BY: DWD
DATE: 11/25/2003

SCALE
HORIZ: 1" = 40'
VERT: 1" = 10'
FIELD BOOK: NONE

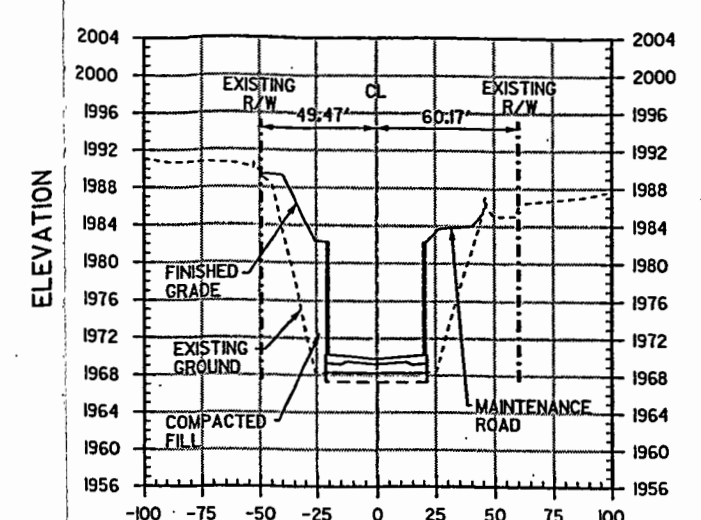
SHEET No
C-8
L-1646B



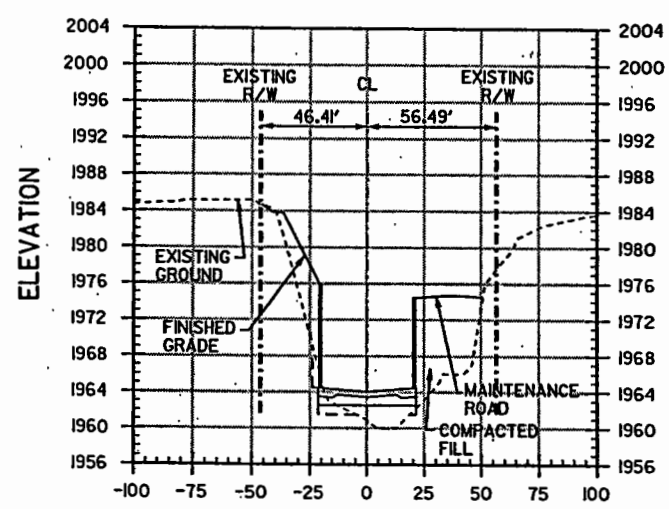
39+00



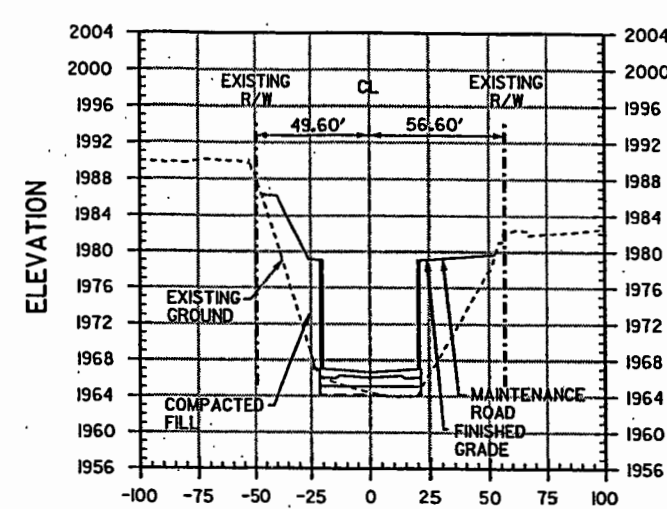
42+00



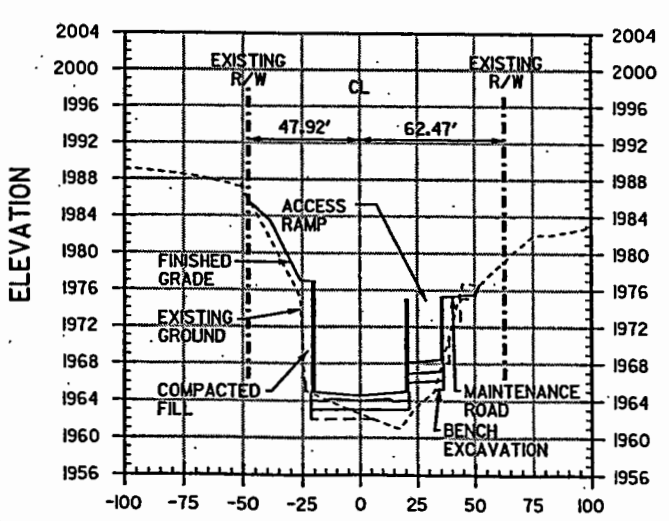
45+00



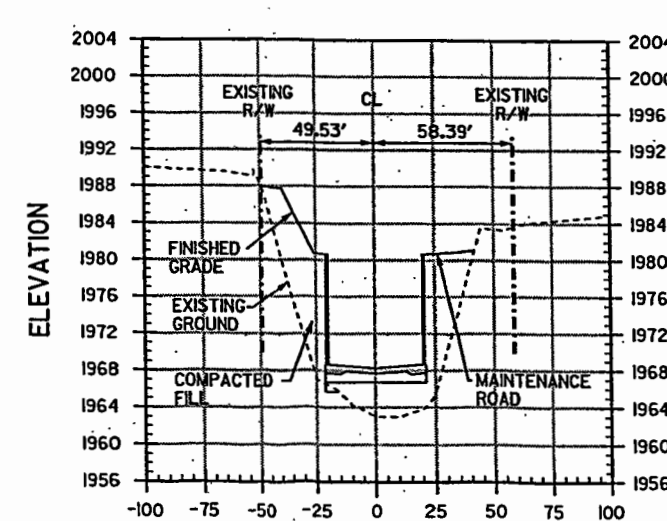
40+00



43+00



41+00



44+00

- NOTE:
1. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
 2. CONTRACTOR SHALL BENCH EXCAVATE 5' MAX HEIGHT AND 5' MIN WIDTH FROM APPROXIMATE STA 38+35 TO STA 39+85.
 3. ALL OTHER SECTIONS THAT REQUIRE BENCH EXCAVATION THE CONTRACTOR SHALL CONFORM TO 4' MAX HEIGHT AND 5' MIN WIDTH.

08-DEC-2003
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REV No	DATE	DESCRIPTION	APPROVED

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



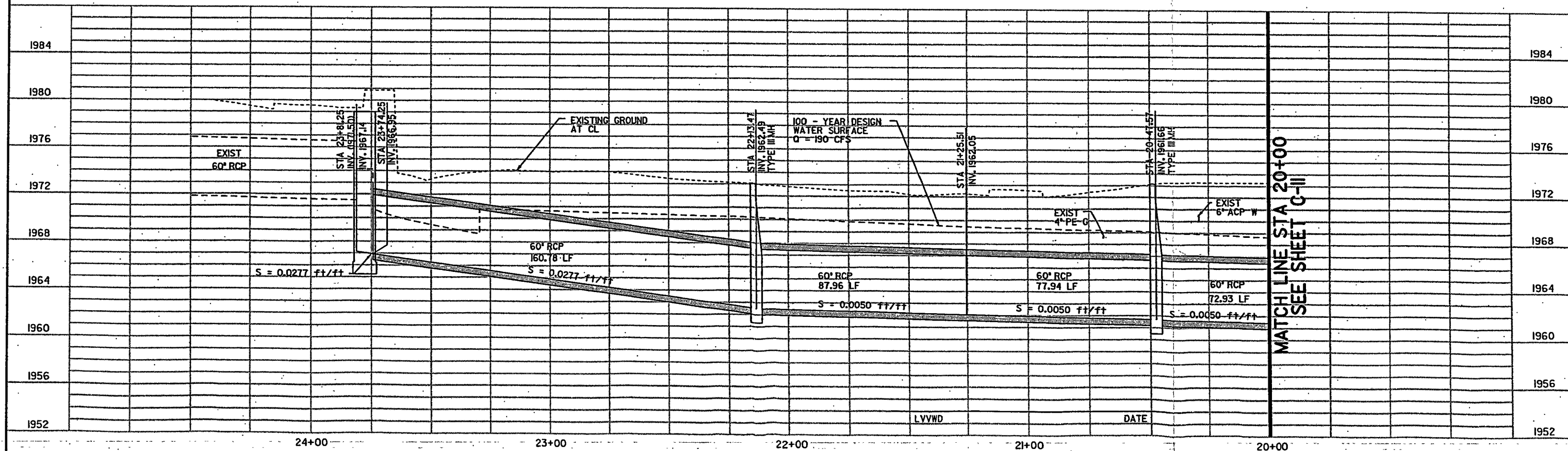
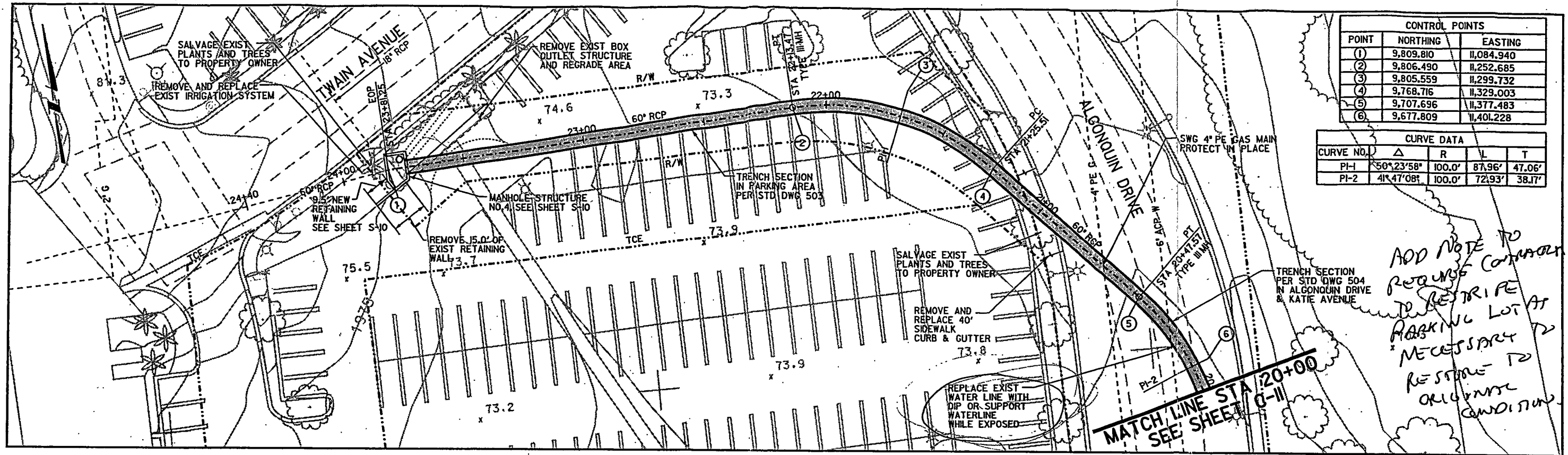
FLAMINGO WASH

CHANNEL CROSS SECTIONS

STA 39+00.00 TO STA 45+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY:	MKW	SCALE	HORIZ: 1" = 40'	SHEET No
DRAWN BY:	AIM		VERT: 1" = 10'	C-9
CHECKED BY:	DWD		FIELD BOOK: NONE	
DATE:	11/25/2003			L-1646B



08-DEC-2003
C:\cpc\Flamingo-wash\Plan\sheet\100%phase2\Civil\c-10.dgn

REV

NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY

FLAMINGO WASH

STORM DRAIN PLAN & PROFILE,
STA 23+81.25 TO STA 20+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: MKW
DRAWN BY: MKW
CHECKED BY: DWD
DATE: 11/25/2003

SCALE

HORIZ: 1" = 20'
VERT: 1" = 4'

FIELD BOOK: NONE

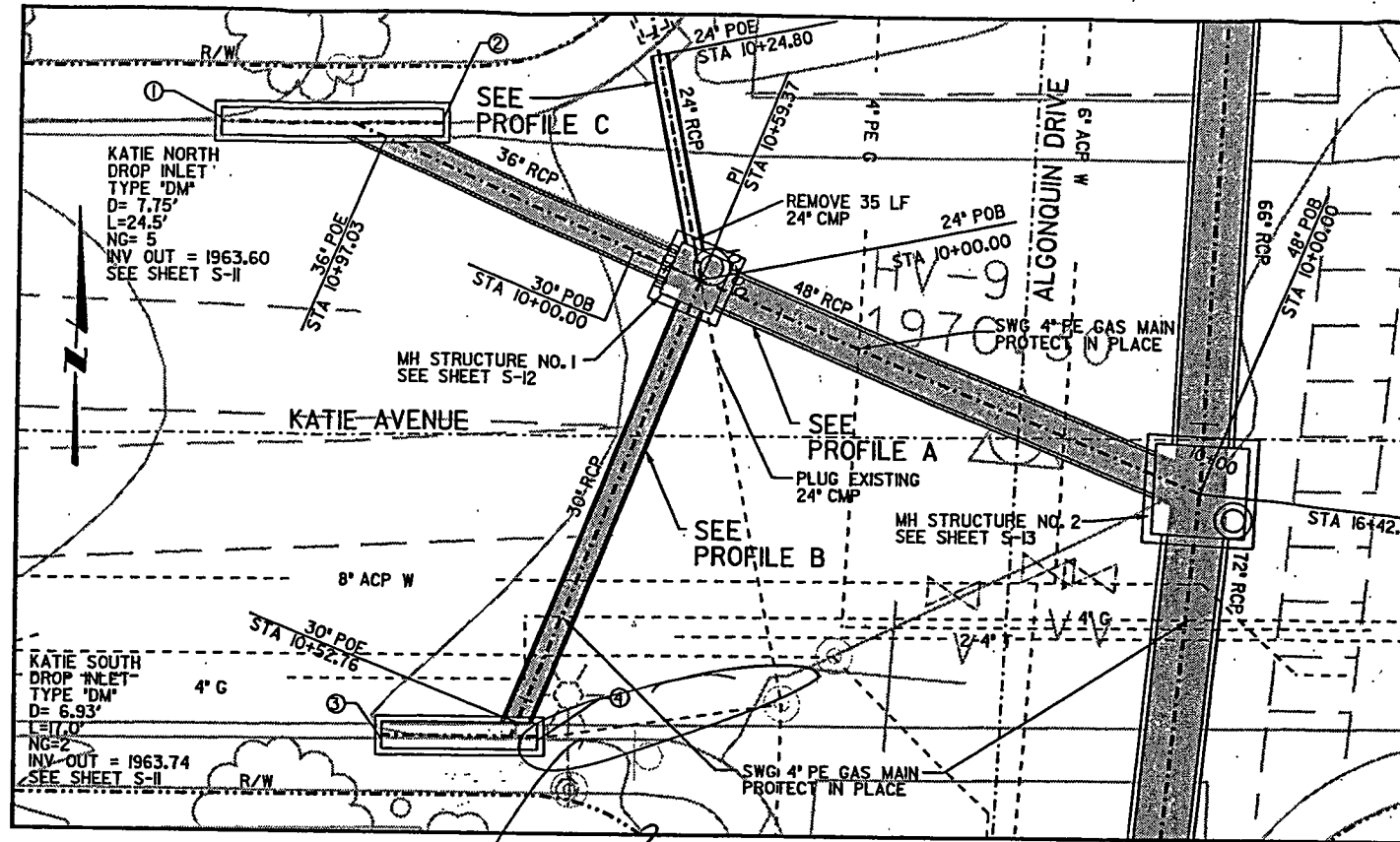
MWH

3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010

SHEET No

C-10

L-1646B



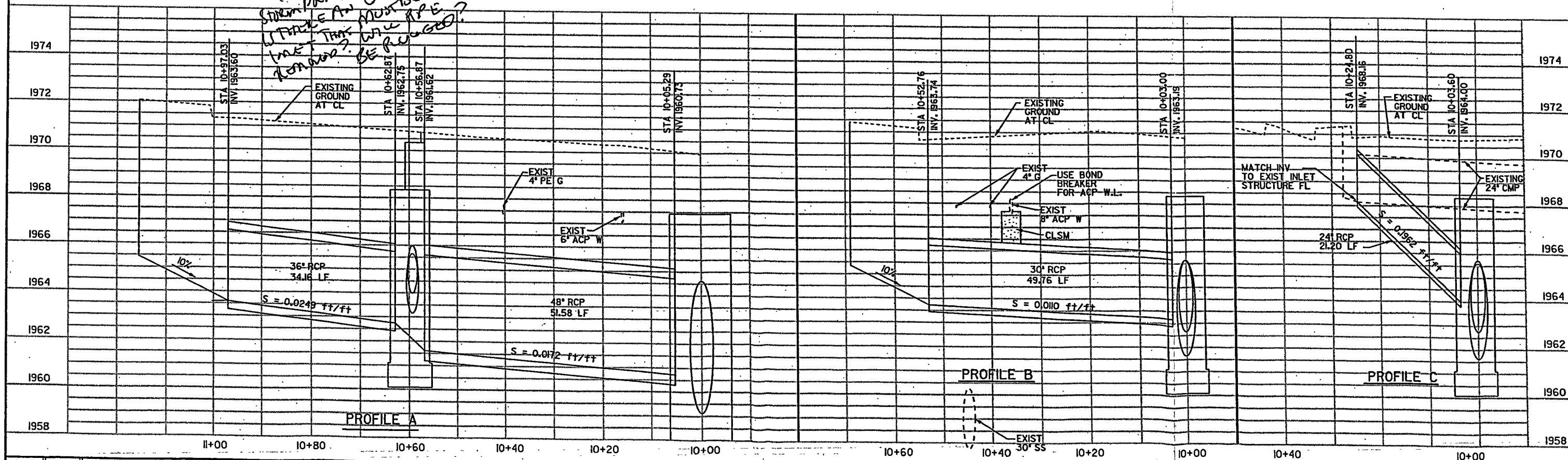
CONTROL POINTS		
POINT NO.	NORTHING	EASTING
1	9,347.185	11,272.273
2	9,347.322	11,296.772
3	9,280.018	11,290.584
4	9,280.080	11,307.584

OK TO LOCATE INLET BUT PROVIDES NO THE FOR CATERPILLARS.

*Approved [Signature]
Provided in Junction
Structure Details*

LVVWD

DATE



REV No	DATE	DESCRIPTION	APPROVED

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



FLAMINGO WASH STORM DRAIN LATERALS PLAN & PROFILES A, B & C CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: MKW
DRAWN BY: MKW
CHECKED BY: DWD
DATE: 11/25/2003

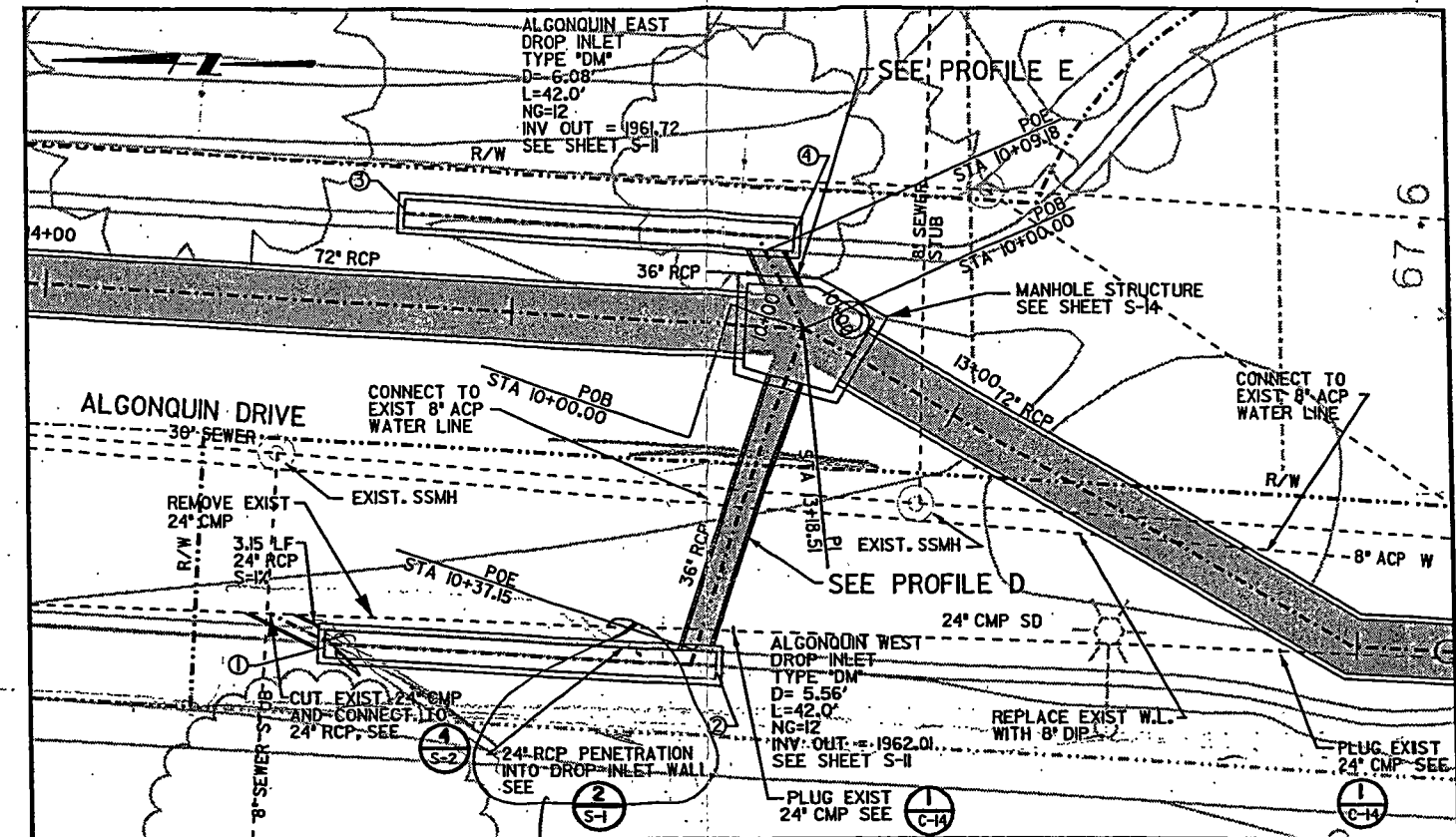
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HORIZ: 1" = 10'
VERT: 1" = 2'
FIELD BOOK: NONE

SHEET No
C-13
L-1646B

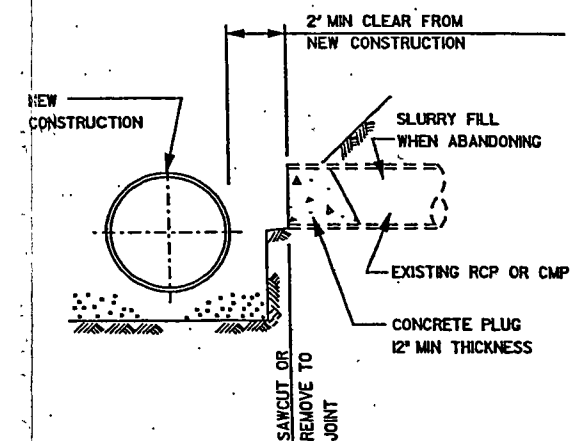
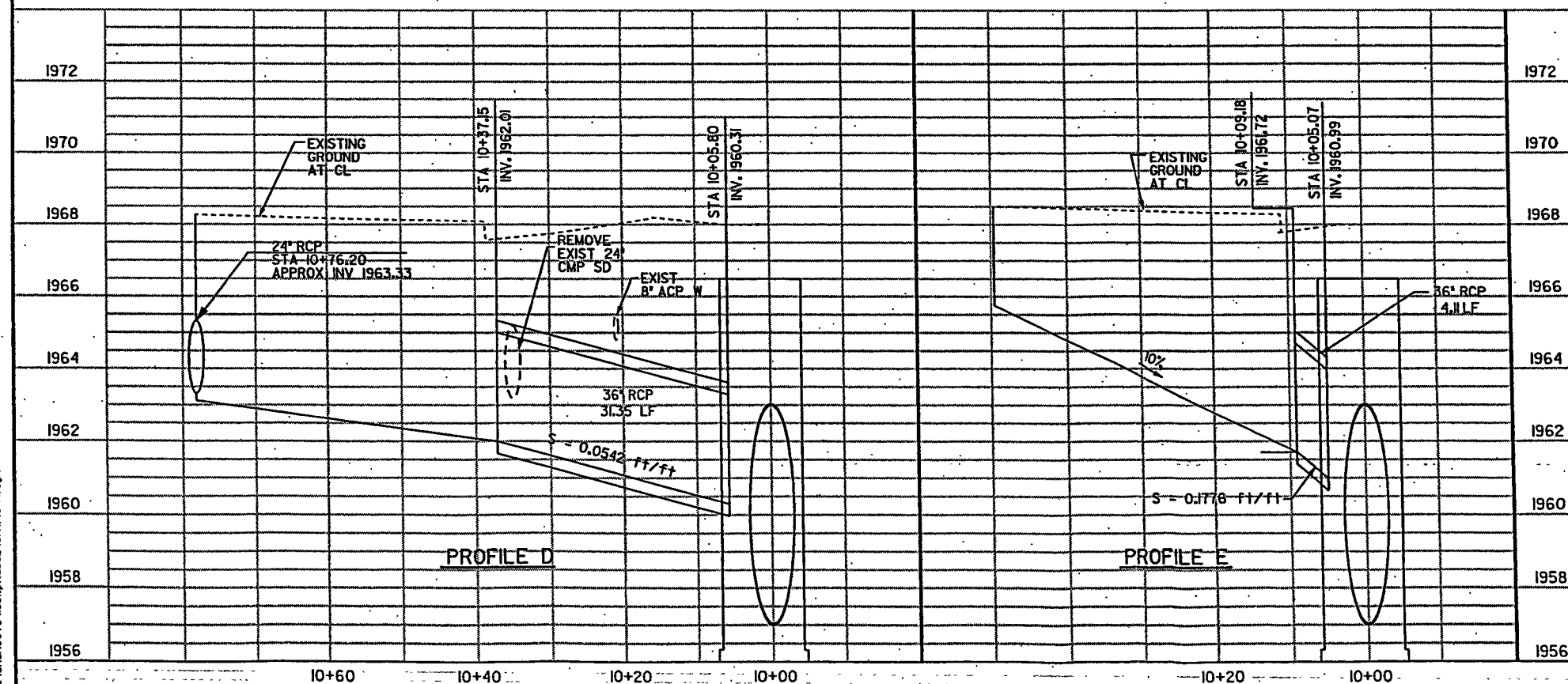
WHEN A WATER LINE IS LESS THAN EIGHTEEN (18) INCHES ABOVE A SEWER OR STORM DRAIN LINE OR ANYTIME A WATER LINE IS BELOW A SEWER OR STORM DRAIN LINE THE FOLLOWING PROVISIONS SHALL APPLY:

- 1) A REASONABLE EFFORT MUST BE MADE TO PLACE WATER AND SEWER PIPELINE JOINTS AN EQUAL DISTANCE FROM THE CROSSING POINT. THIS REQUIREMENT DOES NOT APPLY TO WELDED JOINTS.
- 2) A MINIMUM VERTICAL SEPARATION OF SIX (6) INCHES MUST BE MAINTAINED AND STRUCTURAL SUPPORT IN THE FORM OF A CEMENT SLURRY ENCASEMENT WHICH WILL EXTEND UPWARD FROM THE SEWER/STORM DRAIN LINE TO THE SPRINGLINE OF THE WATER LINE.
- 3) THE CROSSING SHALL BE CONSTRUCTED USING ONE OF THE FOLLOWING OPTIONS:
 - A) THE SEWER LINE MUST BE CONSTRUCTED OF WATER SUPPLY QUALITY MATERIALS MEETING THE AWWA STANDARDS.
 - B) THE SEWER OR WATER LINE SHALL BE TOTALLY ENCASED BY A MINIMUM FOUR (4) INCH THICK, 300 PSICEMENT SLURRY, A DISTANCE OF TEN FEET ON EACH SIDE OF THE CROSSING MIDPOINT. THIS OPTION IS NOT AVAILABLE FOR ACP.
 - C) THE SEWER OR WATER LINE SHALL BE INSTALLED IN A SLEEVE OF WATER QUALITY PIPE OR STANDARD CASING, WITHOUT JOINTS, TEN FEET ON EACH SIDE.

CONTROL POINTS		
POINT NO.	NORTHING	EASTING
①	9,036.864	11,321.682
②	8,994.940	11,319.159
③	9,027.903	11,368.412
④	8,985.986	11,365.767



LVVWD _____ DATE _____



① C-14
CONCRETE PLUG
NOT TO SCALE

08-DEC-2003
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REV NO.	DATE	DESCRIPTION	APPROVED

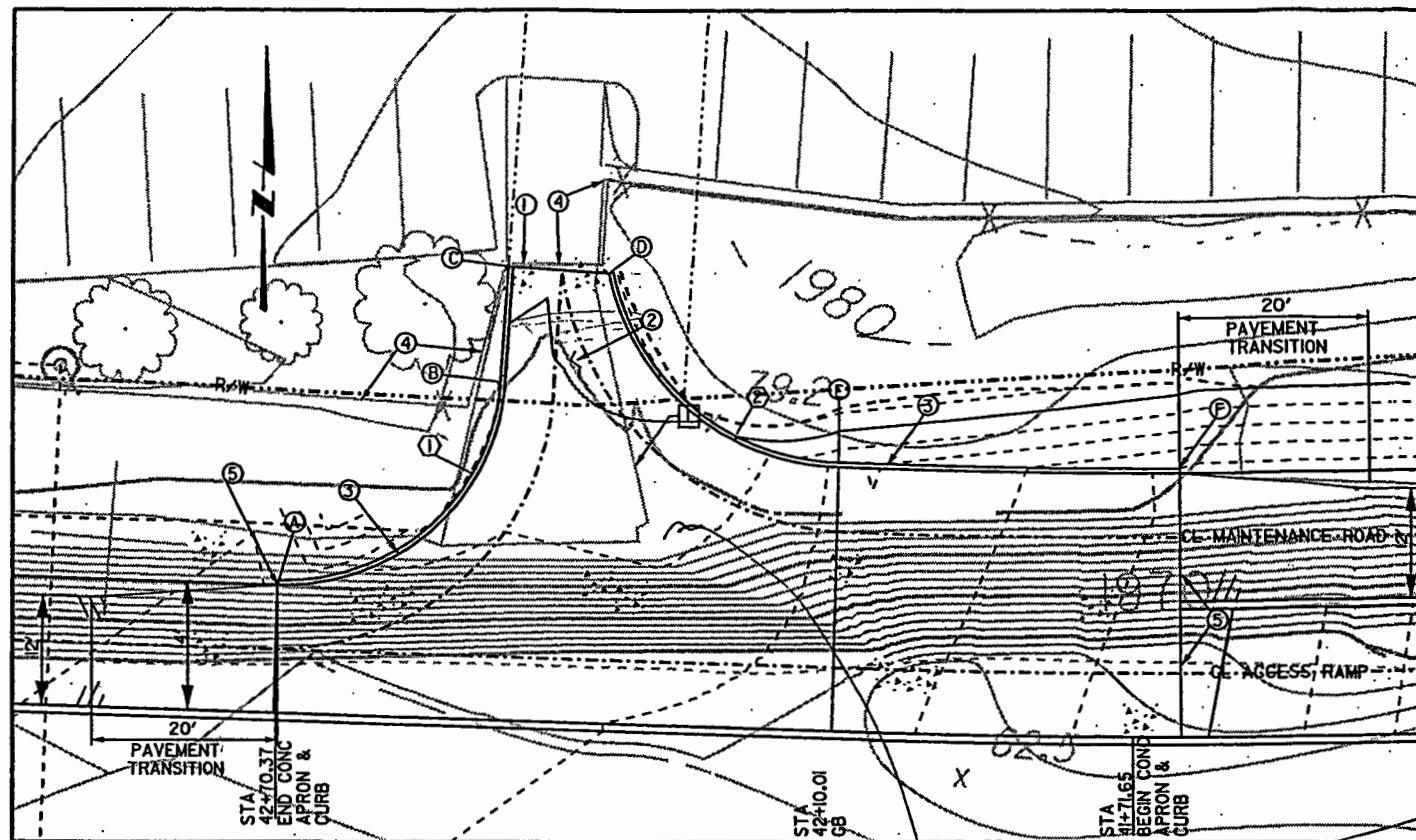
MWH
 3014 WEST CHARLESTON BLVD
 LAS VEGAS, NV 89102
 (702) 878-8010



FLAMINGO WASH
 STORM DRAIN LATERALS
 PLAN & PROFILES D & E
 CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

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 NOT FOR CONSTRUCTION

DESIGNED BY:	MKW	SCALE	HORIZ: 1" = 10'	SHEET No	C-1
DRAWN BY:	MKW	VERT: 1" = 2'	FIELD BOOK	NONE	
CHECKED BY:	DWD	DATE:	11/25/2003	L-1646B	



CONCRETE INFLOW APRON STATION 42+25.68 DETAIL

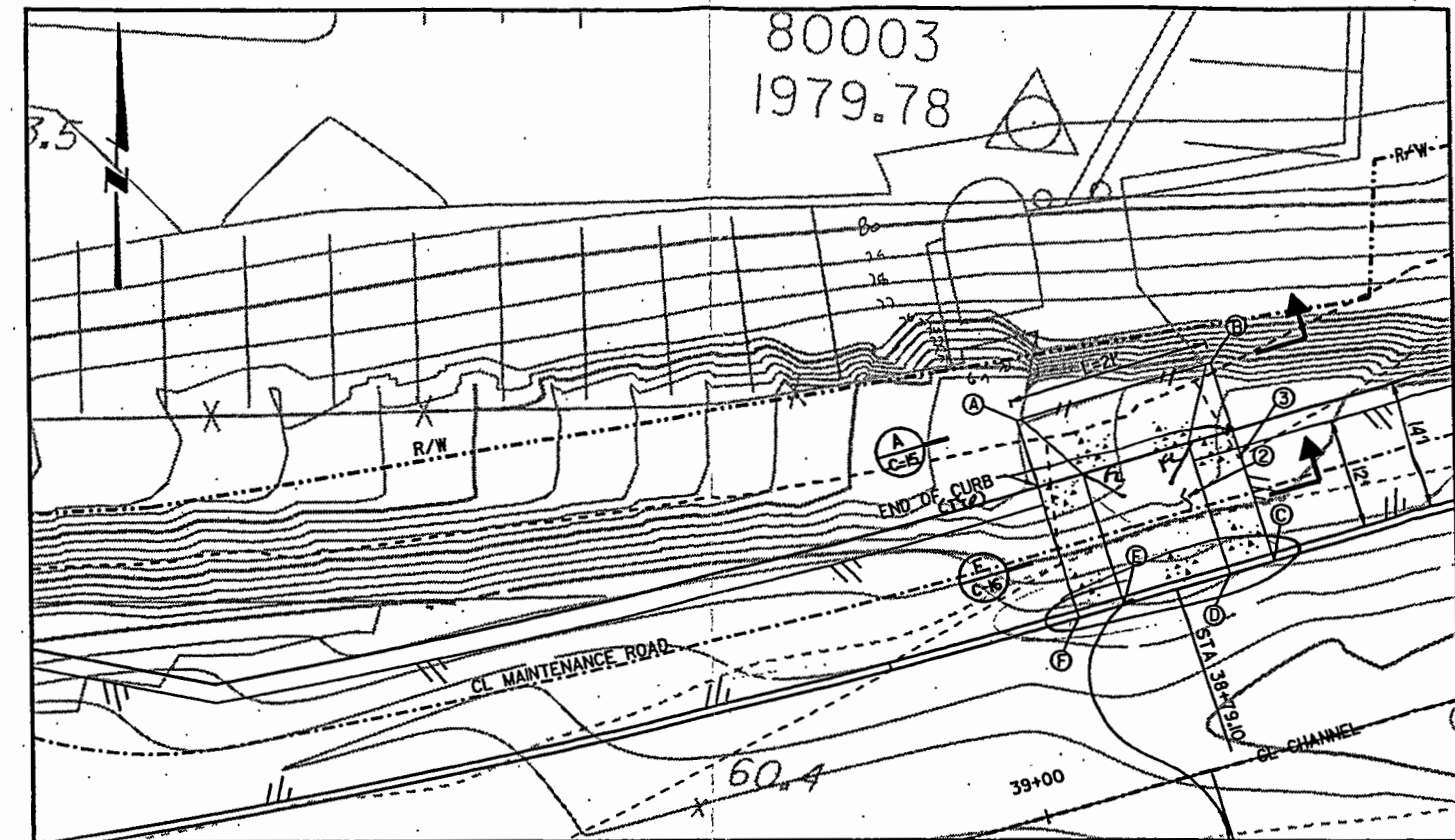
- ① SAWCUT & MATCH EXISTING GRADE
- ② 6" CONCRETE APRON SEE SECTION
- ③ 6" CURB SEE SECTION
- ④ PROTECT IN PLACE EXIST CHAIN LINK FENCE AND GATE
- ⑤ END 6" CONCRETE APRON

④ REMOVE EXISTING CONCRETE APRON

CONTROL POINTS			
POINT NO.	NORTHING	EASTING	ELEVATION
①	8,368.0943	10,285.5773	1979.3500
②	8,389.6466	10,309.4534	1979.9400
③	8,402.0687	10,310.3273	1981.0400
④	8,401.5749	10,321.8142	1981.2000
⑤	8,380.9906	10,346.4016	1978.2800
⑥	8,380.4097	10,383.0769	1975.9800

CURVE DATA				
CURVE NO.	Δ	R	L	T
①	87.8061°	23.1921ft	35.5420ft	22.3207ft
②	76.2889°	25.9586ft	34.5637ft	20.3867ft

Why does this apron need to be concrete? Can't we use AC here with Type A curbs?

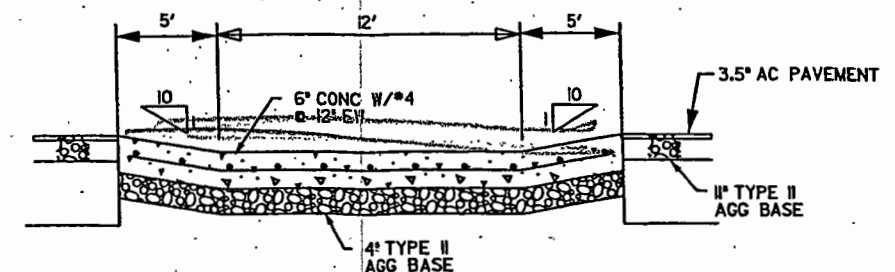


CONCRETE INFLOW APRON STATION 38+79.10 DETAIL

- ① SAWCUT AND MATCH EXISTING GRADE
- ② 6" CONCRETE APRON
- ③ 6" CURB

POINT NO.	NORTHING	EASTING	ELEVATION
①	8,411.0198	10,648.6806	1975.31
②	8,417.2881	10,669.7504	1974.91
③	8,395.7574	10,675.9898	1973.78
④	8,394.3836	10,671.4323	1973.31
⑤	8,390.9082	10,659.8804	1973.37
⑥	8,389.3992	10,654.7572	1973.89

CHAIN LINK FENCE PROPOSED HERE - PROVIDE SPECIAL DESIGN TO ALLOW FOR TO PASS ROADWAY IMPROVED



SECTION NTS

08-DEC-2003

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FLAMINGO WASH CIVIL DETAILS 2

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

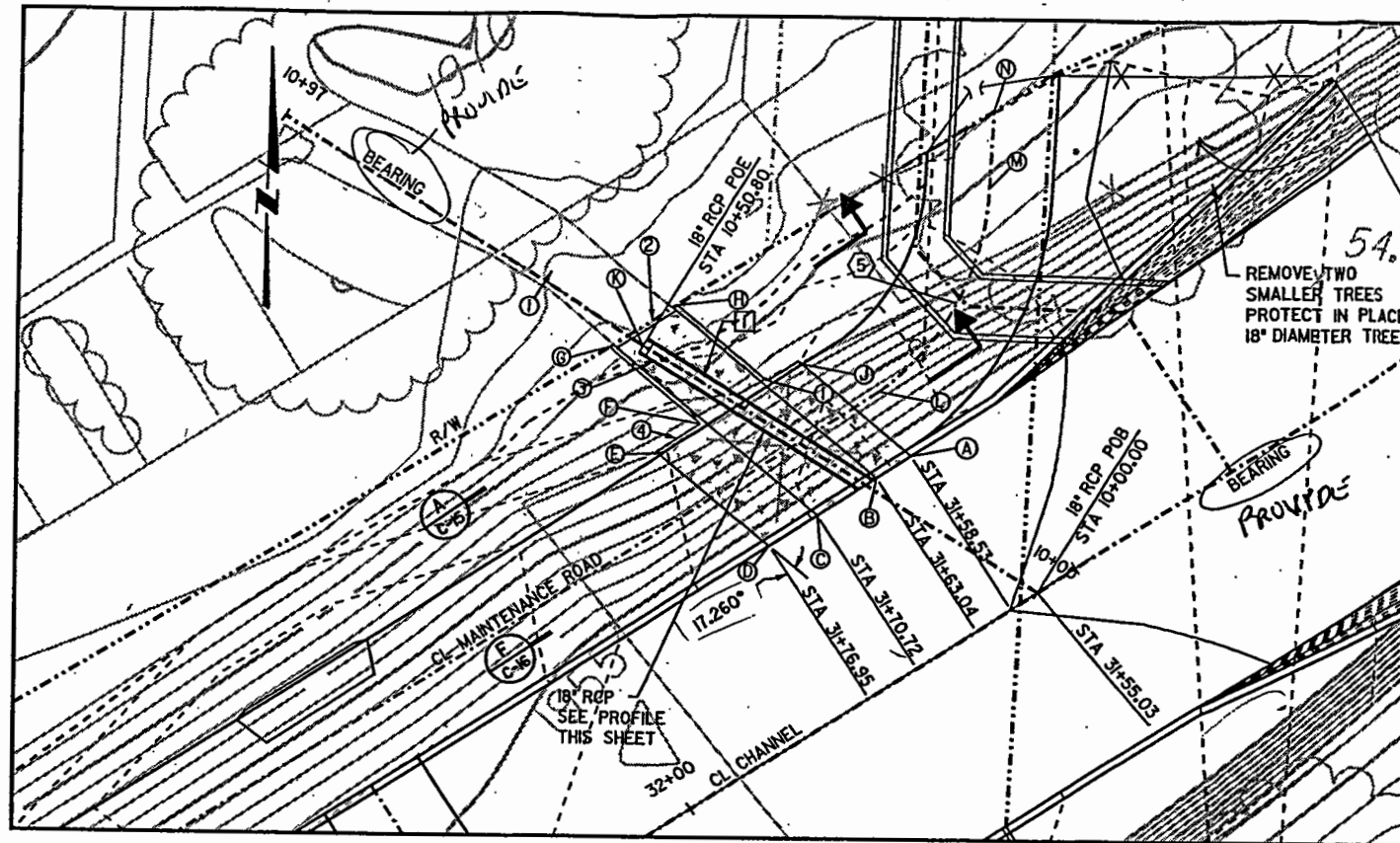
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: MKW
DRAWN BY: MKW
CHECKED BY: DWD
DATE: 11/25/2003

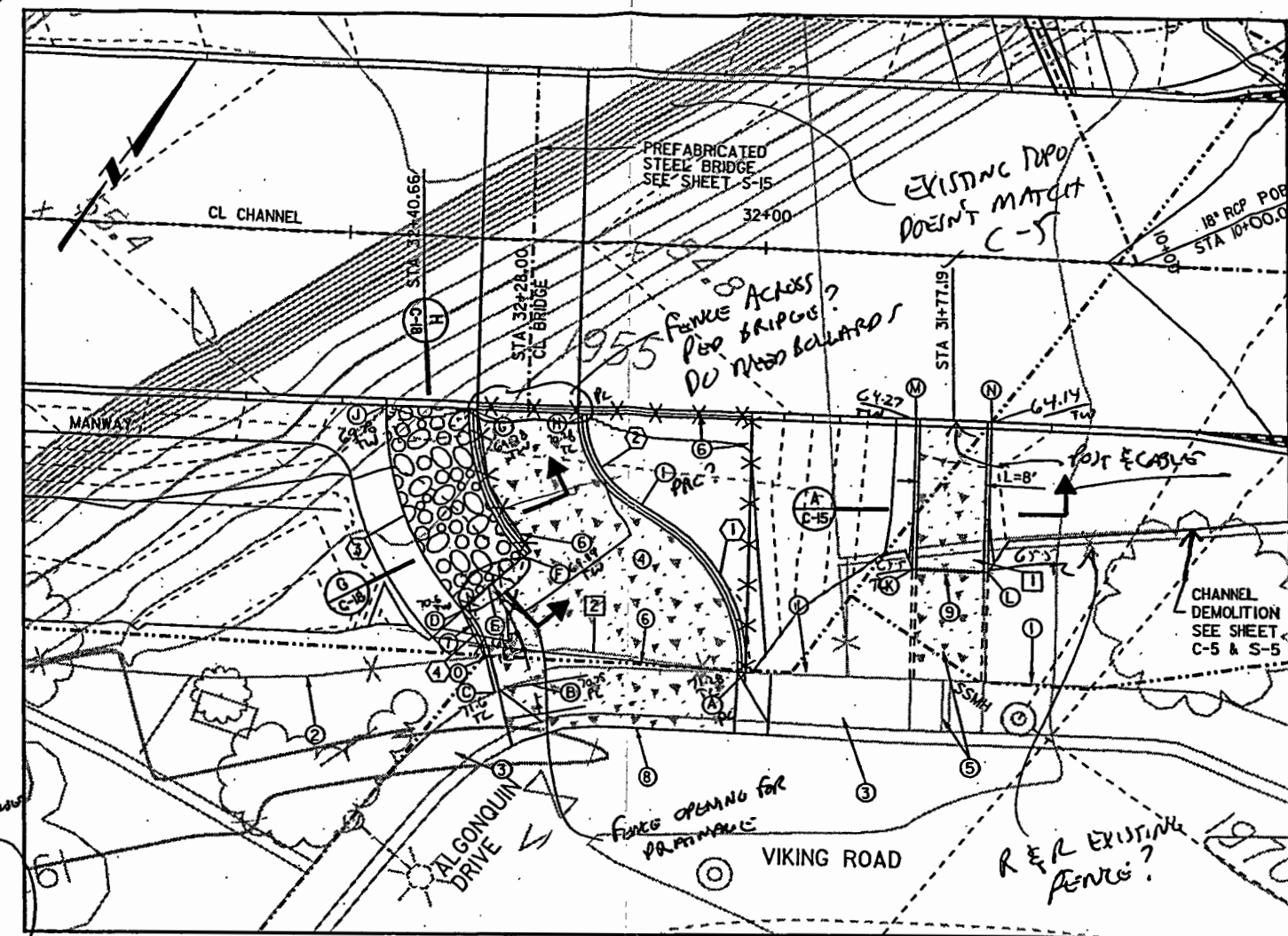
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FIELD BOOK:	NONE	

C-16

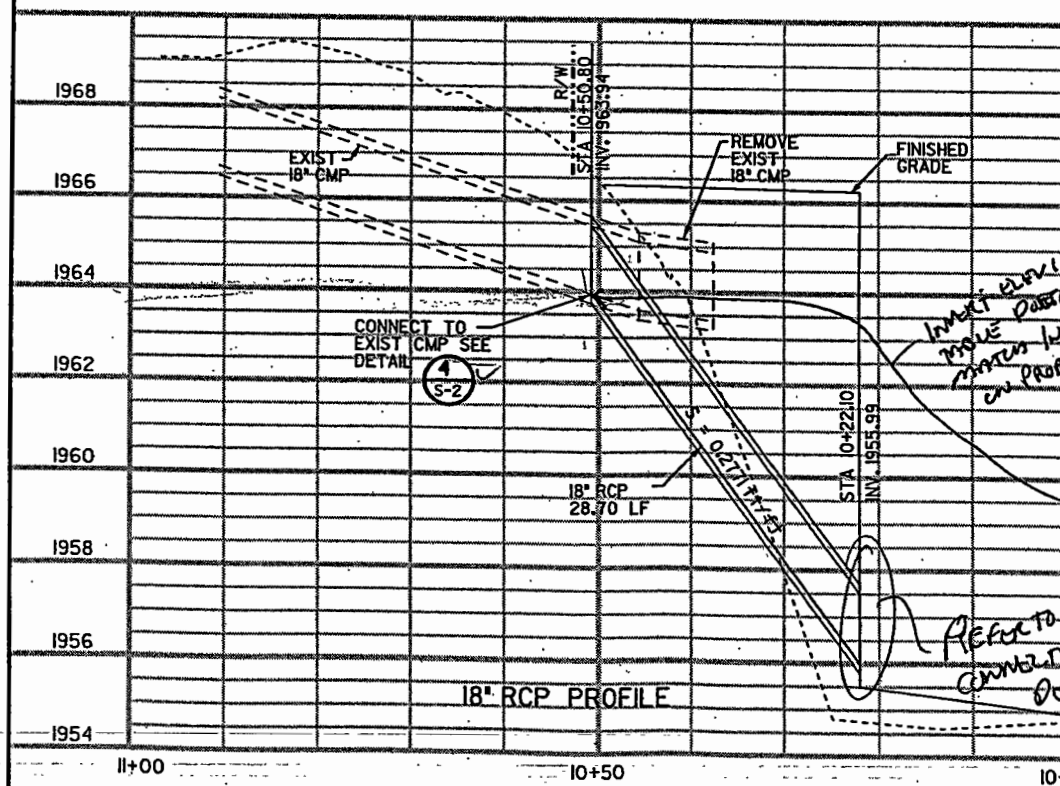
L-1646B



CONCRETE INFLOW APRON STATION 31+66.88 DETAIL



CONCRETE INFLOW APRON STATION 32+19.84 DETAIL



- ① EXIST CONC APRON
- ② SAWCUT EXIST CONC APRON
- ③ 6\"/>

CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	DESC
(A)	N 8,696.3423	E 11,310.8230	1968.85	TW
(B)	N 8,685.8775	E 11,307.0423	1966.42	FL
(C)	N 8,681.6858	E 11,300.6128	1966.54	FL
(D)	N 8,678.2831	E 11,295.3935	1967.14	TW
(E)	N 8,688.5261	E 11,283.0286	1967.54	TC
(F)	N 8,691.6429	E 11,287.8094	1967.44	TC
(G)	N 8,699.9937	E 11,277.7286	1967.50	TC
(H)	N 8,704.6319	E 11,285.1866	1967.50	TC
(I)	N 8,696.4064	E 11,295.1160	1964.36	TC
(J)	N 8,698.5853	E 11,298.4581	1967.23	TC
(K)	N 8,700.2073	E 11,281.4613	1967.23	INV
(L)	N 8,695.3891	E 11,307.2885		PT
(M)	N 8,717.6018	E 11,319.1453		PC
(N)	N 8,726.0522	E 11,319.6296		PC

CURVE DATA				
CURVE NO.	Δ	R	L	T
(1)	67° 24' 09"	21.5354	25.3342	14.3335
(2)	65° 59' 52"	12.0972	13.9344	7.7890
(3)	43° 28' 01"	36.0972	27.3848	14.2748
(4)	29° 05' 22"	12.8990	6.5489	3.347
(5)	49° 37' 31"	30	25.9838	13.87

- ① PROTECT IN PLACE EXIST WALL.
- ② PROTECT IN PLACE EXIST CHAIN LINK FENCE.
- ③ PROTECT IN PLACE EXIST SW.
- ④ 6\"/>

CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	DESC
(A)	N 8,604.7303	E 11,314.5658	1971.28	TC
(B)	N 8,588.1732	E 11,295.2483	1970.75	FL
(C)	N 8,585.4279	E 11,291.5839	1971.60	TC
(D)	N 8,591.5142	E 11,282.5392	1970.60	TW
(E)	N 8,595.9471	E 11,283.3424	1969.75	FL
(F)	N 8,601.2737	E 11,284.7256	1969.89	TW
(G)	N 8,612.3716	E 11,269.0620	1969.78	TW
(H)	N 8,620.0175	E 11,280.7898	1970.28	TC
(I)	N 8,614.6793	E 11,292.8368	1970.63	TC
(J)	N 8,606.9103	E 11,260.6850	1969.78	TW
(K)	N 8,627.0071	E 11,323.9048	(1965.51)	TC
(L)	N 8,631.9116	E 11,331.4511	(1965.51)	TC
(M)	N 8,642.5254	E 11,313.7878	1964.27	TW
(N)	N 8,647.4411	E 11,321.3267	1964.14	TW
(O)	N 8,588.4751	E 11,288.2609		TC

FLAMINGO WASH CIVIL DETAILS 3

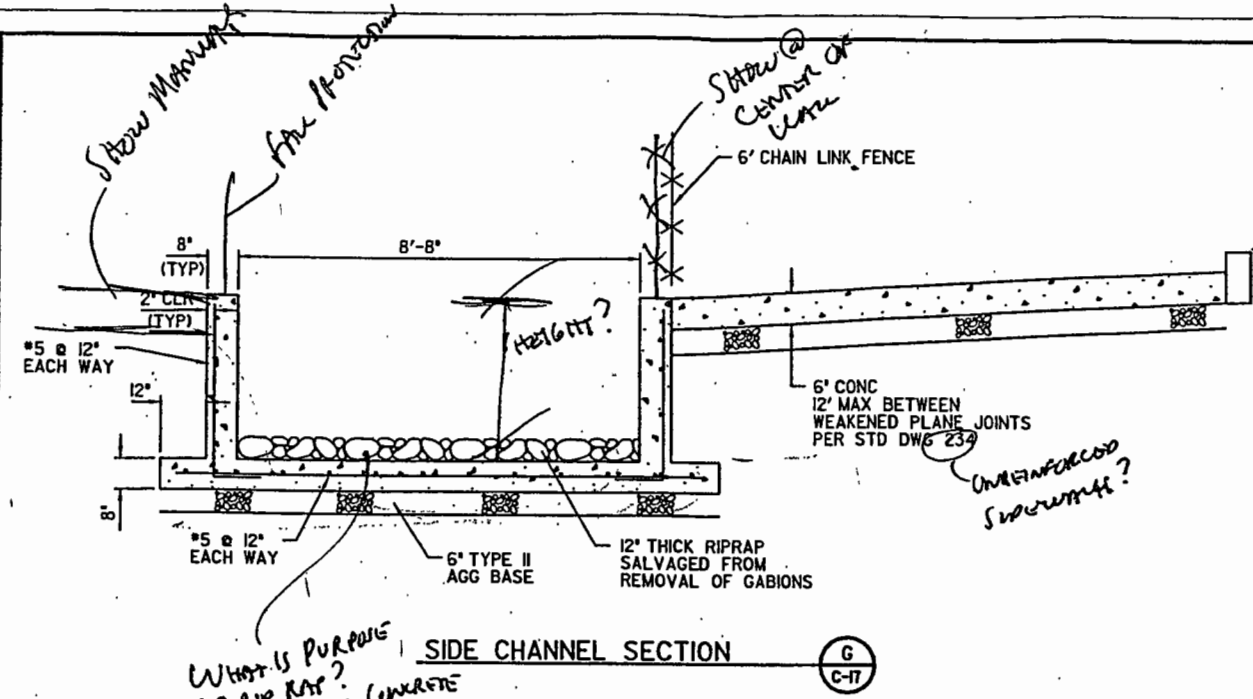
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

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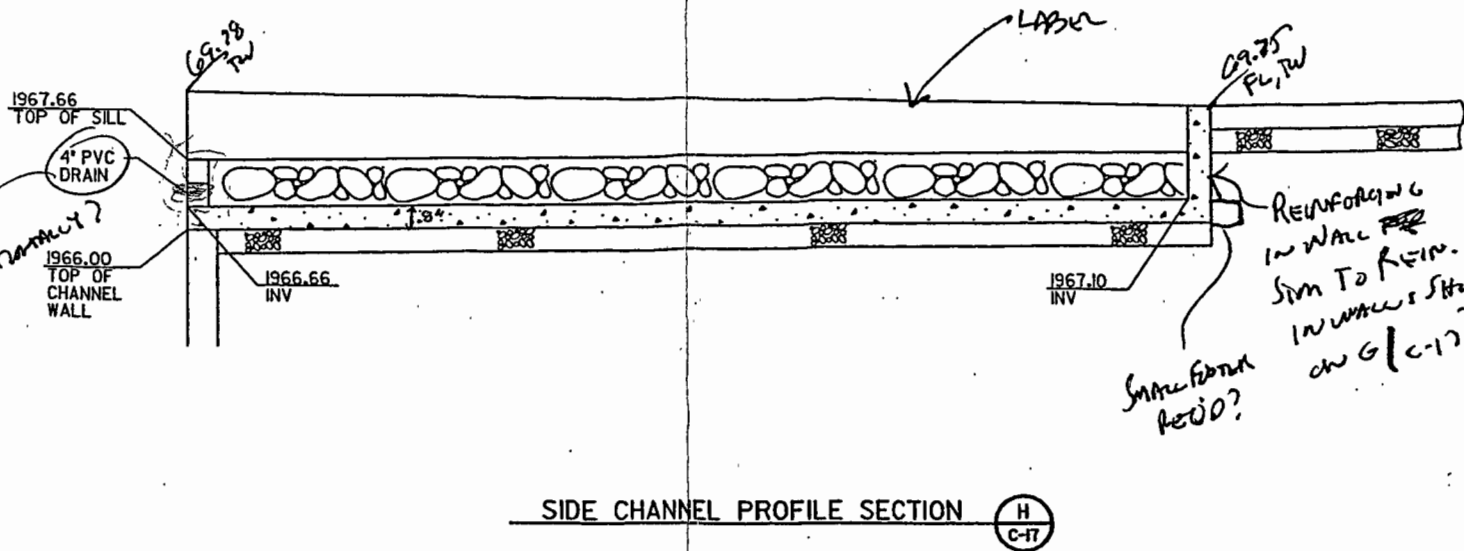
DESIGNED BY: MKW
DRAWN BY: MKW
CHECKED BY: DWD
DATE: 11/25/2003

SCALE
HORIZ: 1" = 10'
VERT: NONE
FIELD BOOK: NONE
SHEET No: C-1
L-1646B

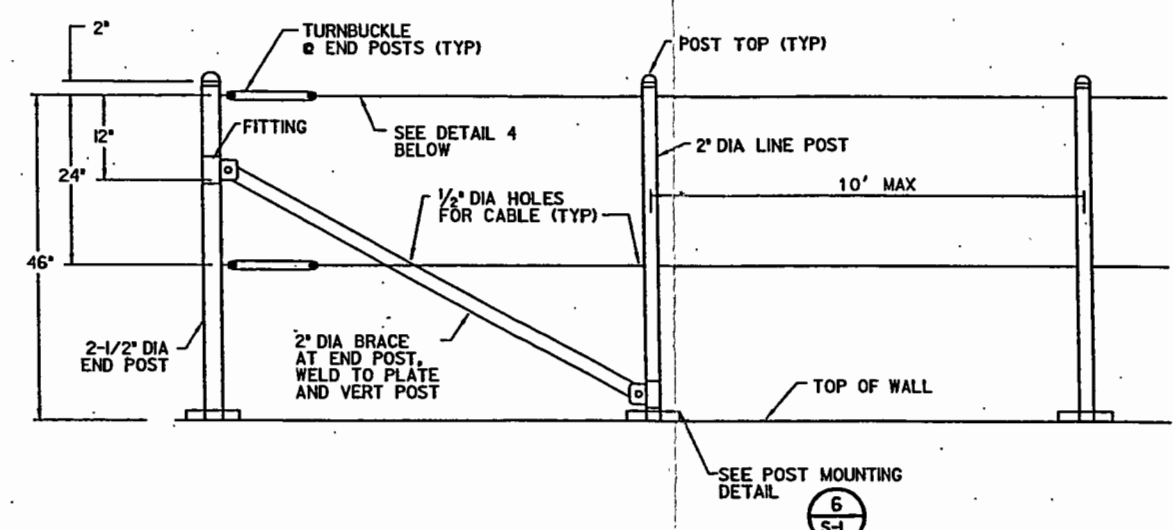
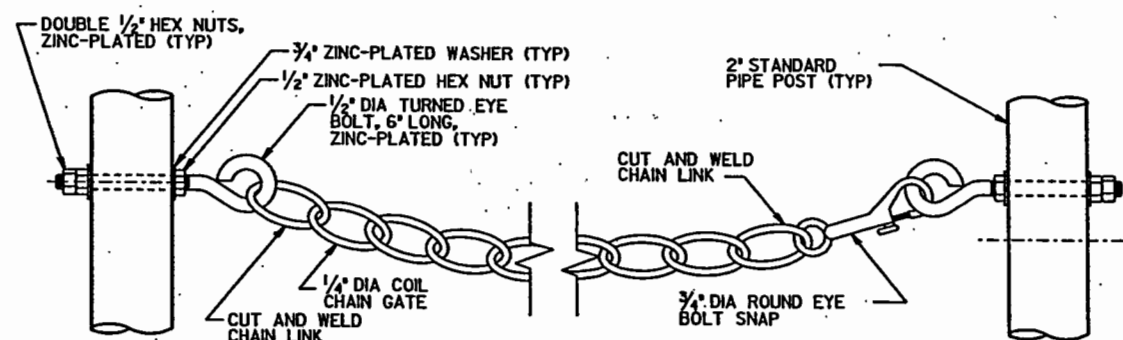




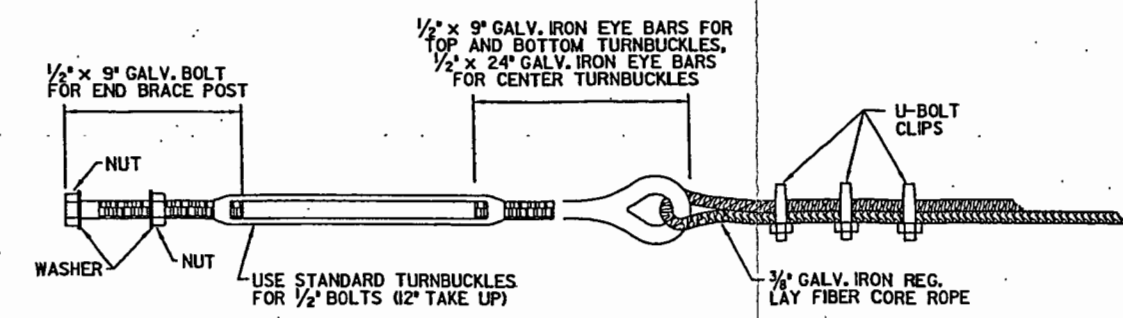
1 on 1?
Ladder
without Handrail?



What is purpose of rip rap?
Placing on concrete
Ladder will be
less stable.



- NOTES:
1. ALL POSTS SHALL BE SET PLUMB.
 2. RAILING POSTS AND FITTINGS SHALL BE HOT DIPPED GALVANIZED MALLEABLE, CAST IRON, OR PRESSED STEEL.
 3. CHAIN SAFETY GATES SHALL BE PROVIDED AT LADDER LOCATIONS SEE DETAIL 3 THIS SHEET



08-DEC-2003

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REV No	DATE	DESCRIPTION	APPROVED

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(702) 878-8010

FLAMINGO WASH

CIVIL DETAILS 4

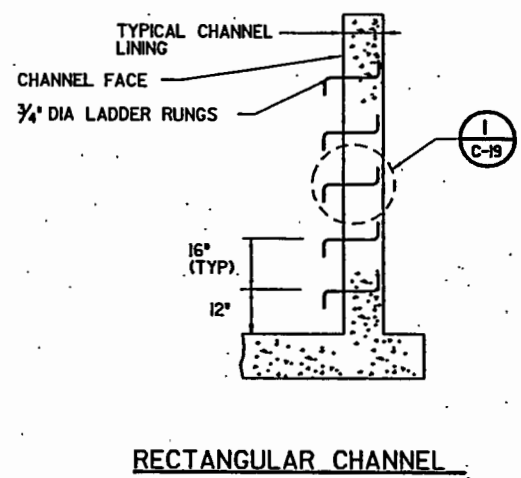
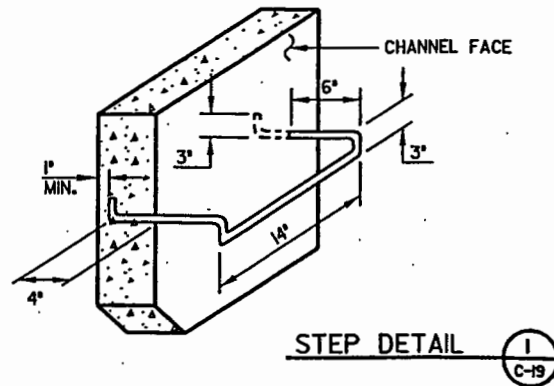
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

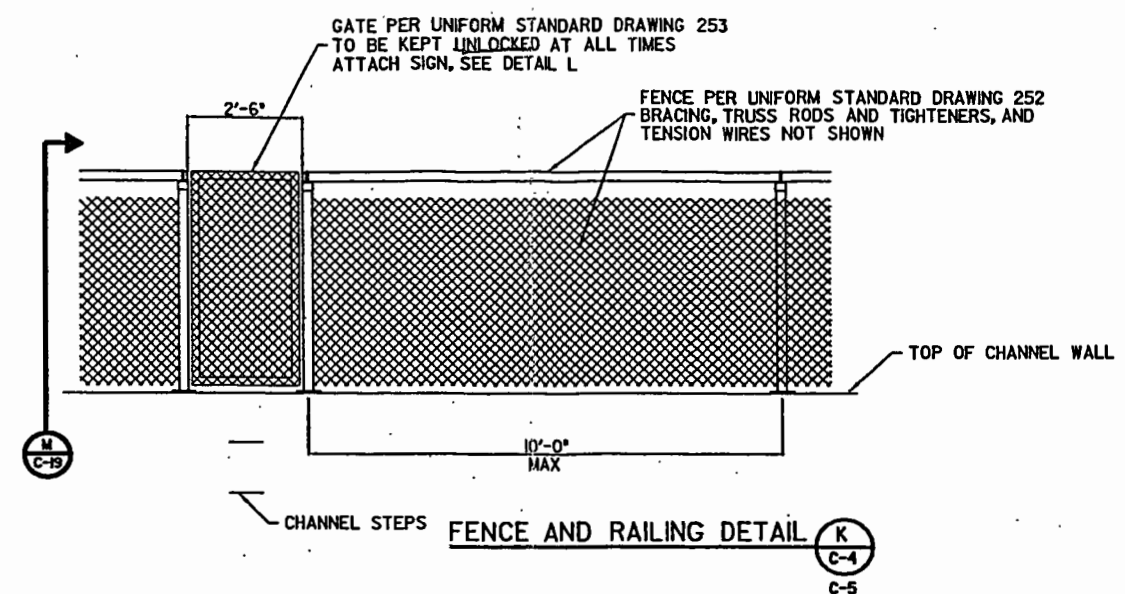
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CHECKED BY:	DWD	VERT:	NONE
DATE:	11/25/2003	FIELD BOOK:	NONE

C-18

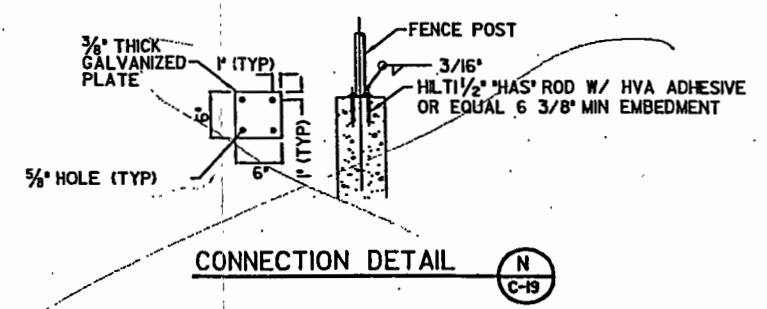
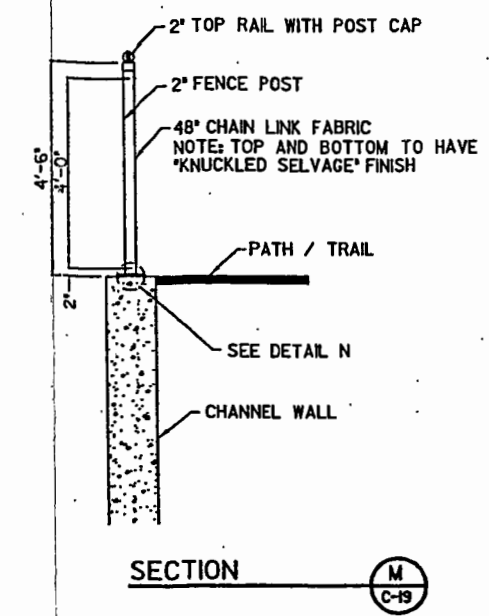
L-1646B



- NOTES:**
1. LADDER RUNGS TO BE CAST-IN-PLACE PER DETAIL FOR NEENAH FOUNDRY R-1982-F MANHOLE STEP OR EQUAL DRILLED AND EPOXIED IN PLACE WITH 4" EMBEDMENT
 2. THE LADDER SHALL BE MADE OF EITHER GALVANIZED STEEL OR SOME OTHER UV-RESISTANT MATERIAL.
 3. LADDERS SHALL BE PLACED IN PAIRS AND ARE SHOWN ON SHEET C-4 AND C-5.
 4. THE PAIRS SHALL BE LOCATED ON OPPOSITE SIDES OF THE CHANNEL AND WILL BE OFFSET BY APPROXIMATELY THE WIDTH OF THE CHANNEL BOTTOM.
 5. YELLOW STRIPES 18" WIDE SHALL BE PAINTED ON BOTH SIDES OF THE LADDER FROM BOTTOM OF CHANNEL TO T.O.W.
 6. SEE STRUCTURAL SECTIONS FOR SLAB REINFORCEMENT REQUIREMENTS
- LADDER DETAILS** J C-19



- NOTES:**
1. INSTALLATION TO BE PER UNIFORM STANDARD SPECIFICATIONS SECTIONS 616 AND 724, AND UNIFORM STANDARD DRAWINGS 252 & 253. SCHEDULE 80 GALVANIZED PIPE.
 2. ALL PIPE (POSTS, RAILS, AND BRACES) TO BE 2". USE THIS DESIGN ON NORTH SIDE OF CHANNEL ONLY.



NOTE:
TO BE INSTALLED AT ALL FENCE GATES

08-DEC-2003
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REV No	DATE	DESCRIPTION	APPROVED

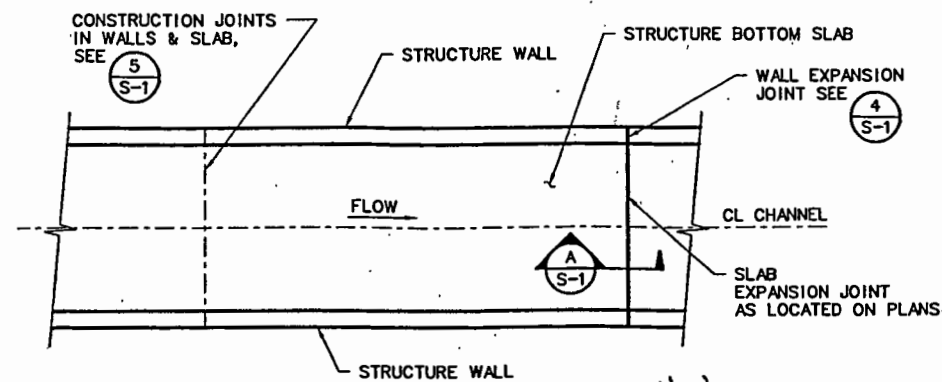
MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



FLAMINGO WASH
CIVIL DETAILS 5
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

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DESIGNED BY:	MKW	SCALE	HORIZ: NONE	SHEET No	C-19
DRAWN BY:	AIM	VERT: NONE			
CHECKED BY:	DWD	FIELD BOOK	NONE		
DATE:	11/25/2003				
					L-1646B



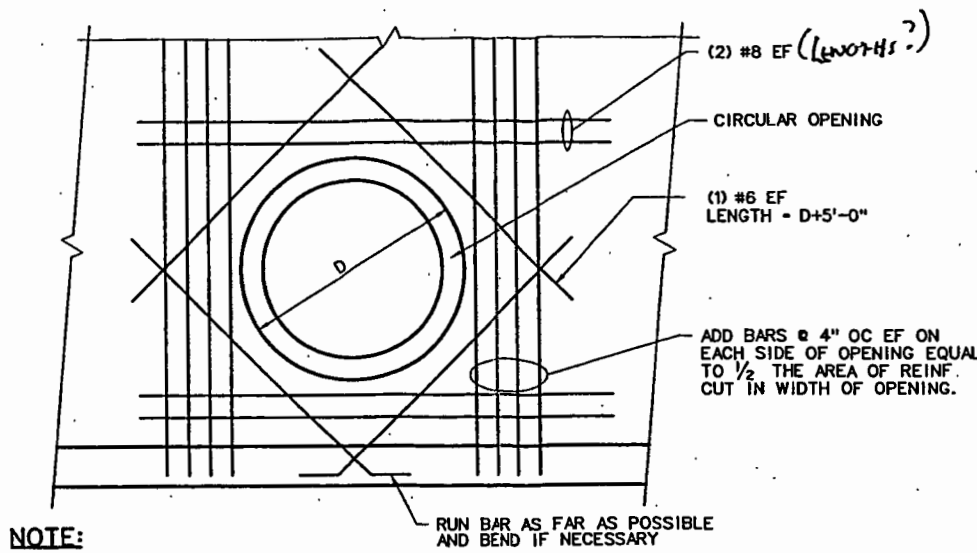
NOTES:

- CONSTRUCTION JOINTS MAY BE USED AT END OF DAY'S CONCRETE PLACEMENT AND AS REQUIRED BY CONTRACTOR IF APPROVED BY THE ENGINEER.
- CONSTRUCTION JOINTS MUST BE COINCIDENT WITH WEEPHOLE LOCATION.

Need to limit how close we can place to exp. jts.

TYPICAL PLAN VIEW FOR JOINTS IN OPEN CHANNEL

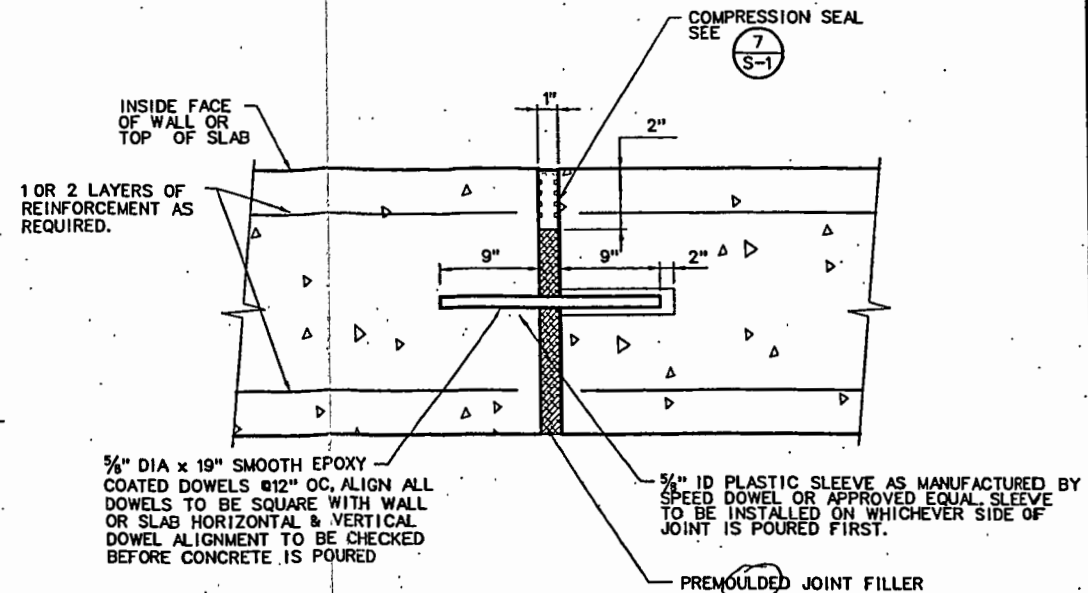
SCALE: NTS



NOTE:
ALL REINF SHOWN IS IN ADDITION TO NORMAL WALL REINF

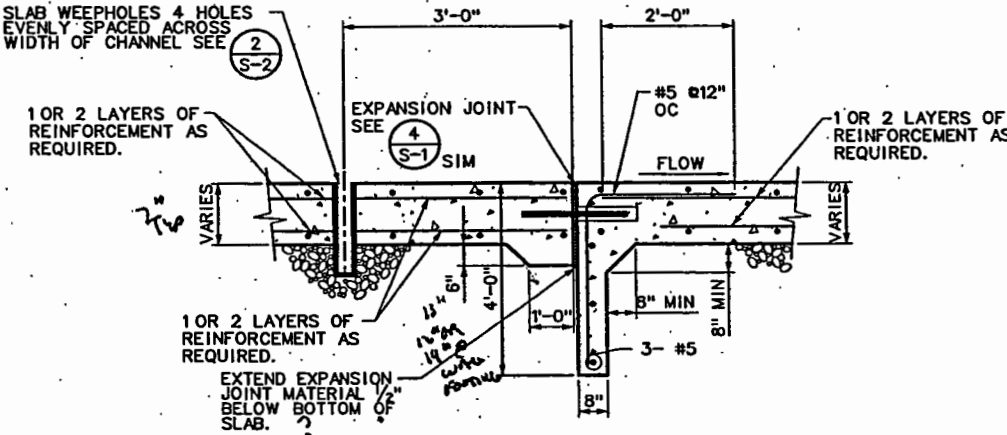
TYPICAL REINF AT PENETRATION IN CHANNEL OR MANHOLE STRUCTURE

SCALE: 1/2" = 1'-0"



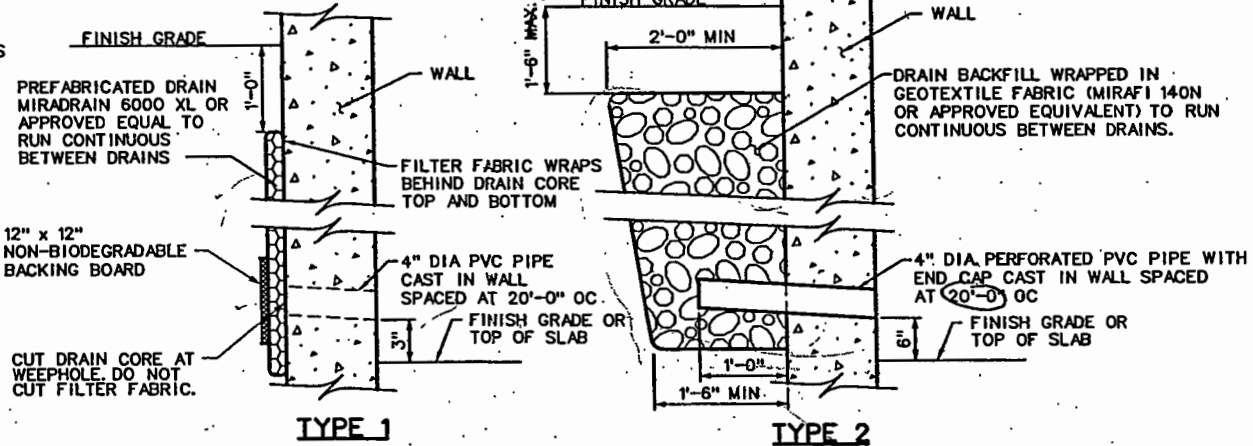
EXPANSION JOINT DETAIL AT WALL AND TOP SLAB

SCALE: NTS



EXPANSION JOINT SECTION AT BOTTOM SLAB

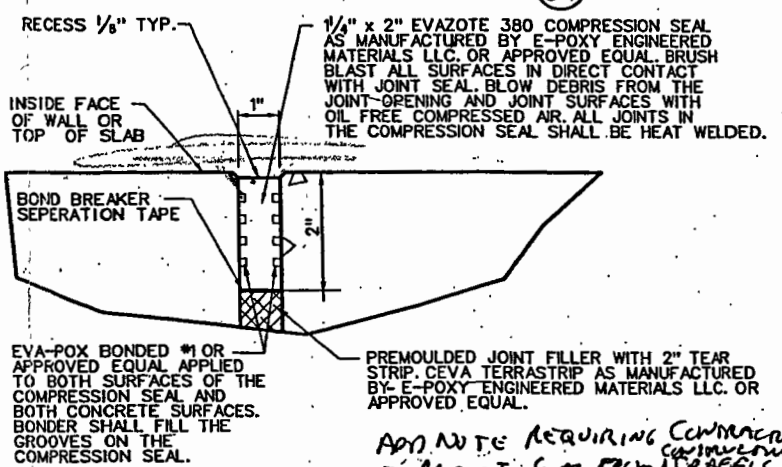
SCALE: NTS



NOTE:
CONTRACTOR SHALL CHOOSE EITHER TYPE 1 OR TYPE 2 WALL DRAIN FOR INSTALLATION AT LOCATIONS SHOWN ON PLANS AND IN WALL SECTIONS

WALL DRAIN TYPICAL DETAIL

SCALE: NTS

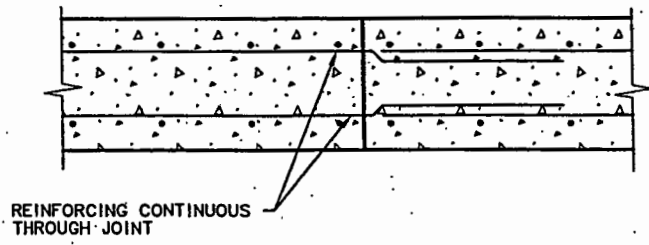


COMPRESSION SEAL DETAIL

SCALE: NTS

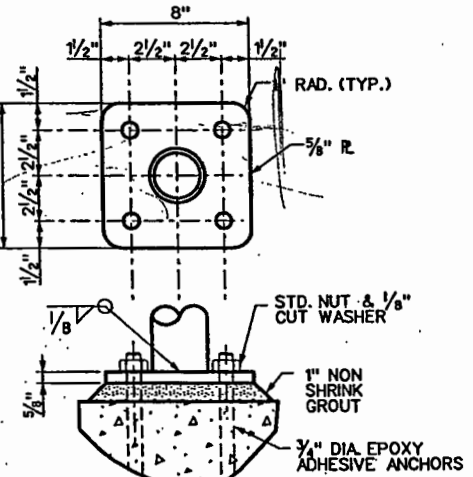
GENERAL STRUCTURAL NOTES:

- DESIGN CRITERIA: ACI 318-99, AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 16TH EDITION."
- DESIGN LIVE LOAD IS AASHTO HS20-44 TRUCK LOADING.
- PORTLAND CEMENT SHALL CONFORM TO ASTM C-150, TYPE V. AGGREGATE SHALL CONFORM TO ASTM C-33.
- ALL STRUCTURAL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI AT 28 DAYS.
- ALL REINFORCEMENT STEEL SHALL BE ASTM DESIGNATION A615 GRADE 60.
- COVERAGE FOR REINFORCING BARS EXCEPT WHERE OTHERWISE SHOWN SHALL BE 3" FOR CONCRETE PLACED AGAINST EARTH; 2" FOR OTHERS.
- USE 3/4" CHAMFER ON ALL EXPOSED CORNERS.
- ALL REINFORCING BAR LAP SPLICES SHALL CONFORM TO ACI 318-99.



WALL AND SLAB CONSTRUCTION JOINT DETAIL

SCALE: NTS



POST MOUNTING DETAIL

SCALE: NTS

**FLAMINGO WASH
GENERAL DETAILS**

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

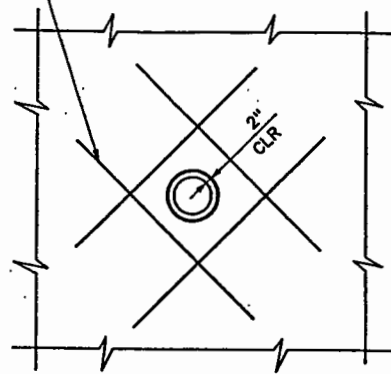
R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

REV No	DATE	DESCRIPTION	APPROVED

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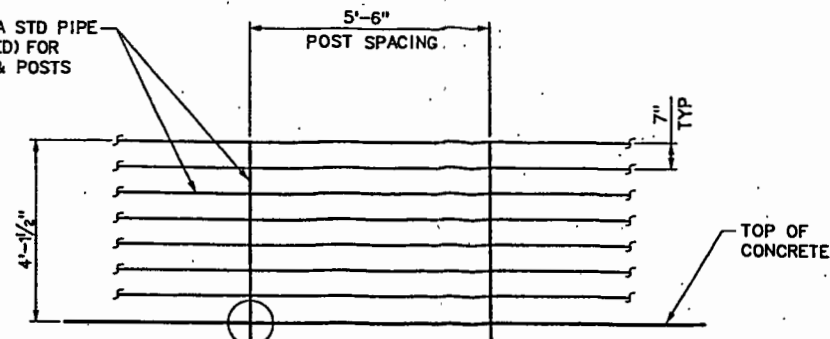
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DRAWN BY: ELY	VERT: AS SHOWN	
CHECKED BY:	FIELD BOOK: NONE	
DATE: 12/02/03		

ADD (4) #4x2'-6"
AT EACH WEEPHOLE
IN INVERT SLAB



PLAN

1/4" DIA STD PIPE
(PAINTED) FOR
RAILS & POSTS



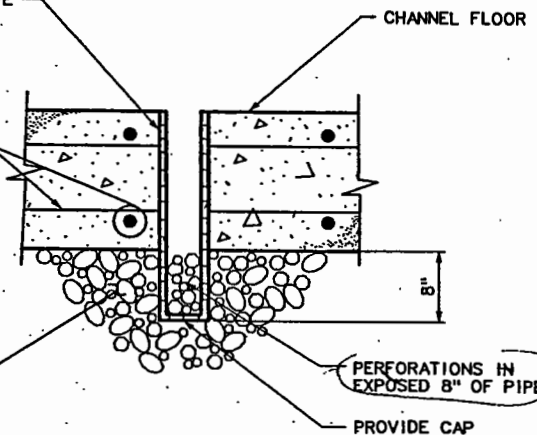
6
S-1

BARRIER RAIL DETAIL
SCALE: NTS

*Where is this
used on top of retaining
wall & connection
to ex. pipe @
downward man
(manhole ex)?*

4" DIA PVC SCH 40 PIPE
SET IN CONCRETE. TRIM
FLUSH WITH SURFACE

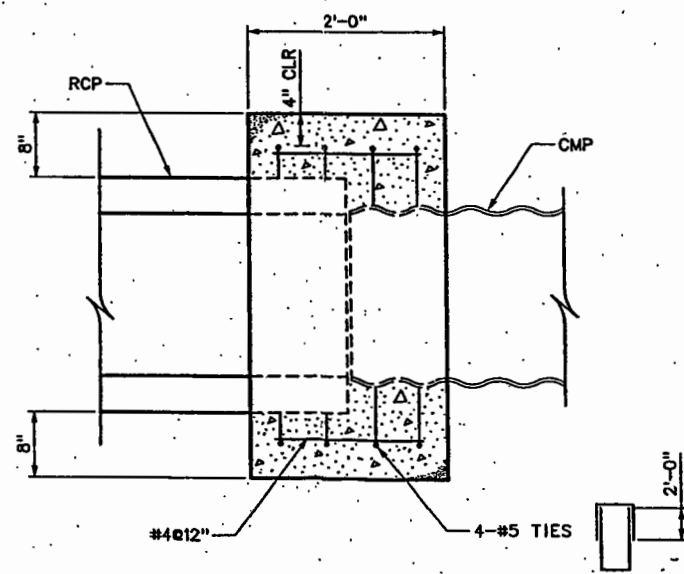
TRANSVERSE AND
LONGITUDINAL
REINFORCING



SECTION

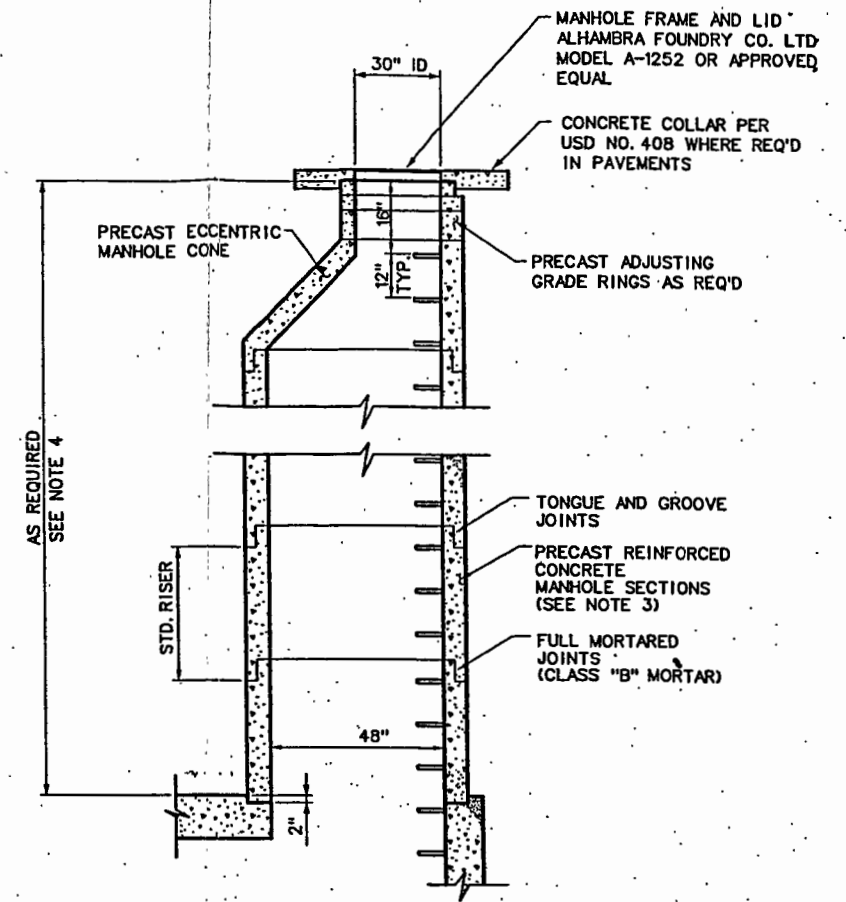
SLAB WEEPHOLE DETAIL
SCALE: NTS

2
S-2



CMP TO RCP CONNECTION
SCALE: NTS

4
S-2



AS REQUIRED
SEE NOTE 4

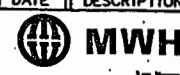
MANHOLE RISER
SCALE: NTS

1
S-2

NOTES:

1. REFERENCE USD NO. 403 FOR ITEMS NOT SHOWN
2. MANHOLE STEPS PER USD NO. 410
3. PRECAST MANHOLE RISER SECTIONS AND APPURTENANCES SHALL CONFORM TO ASTM C478
4. MANHOLE SECTION LENGTHS AND ARRANGEMENTS SHALL BE ARRANGED TO FIT MANHOLE DEPTH.

REV No	DATE	DESCRIPTION	APPROVED



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LAS VEGAS, NV. 89102
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FLAMINGO WASH
GENERAL DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

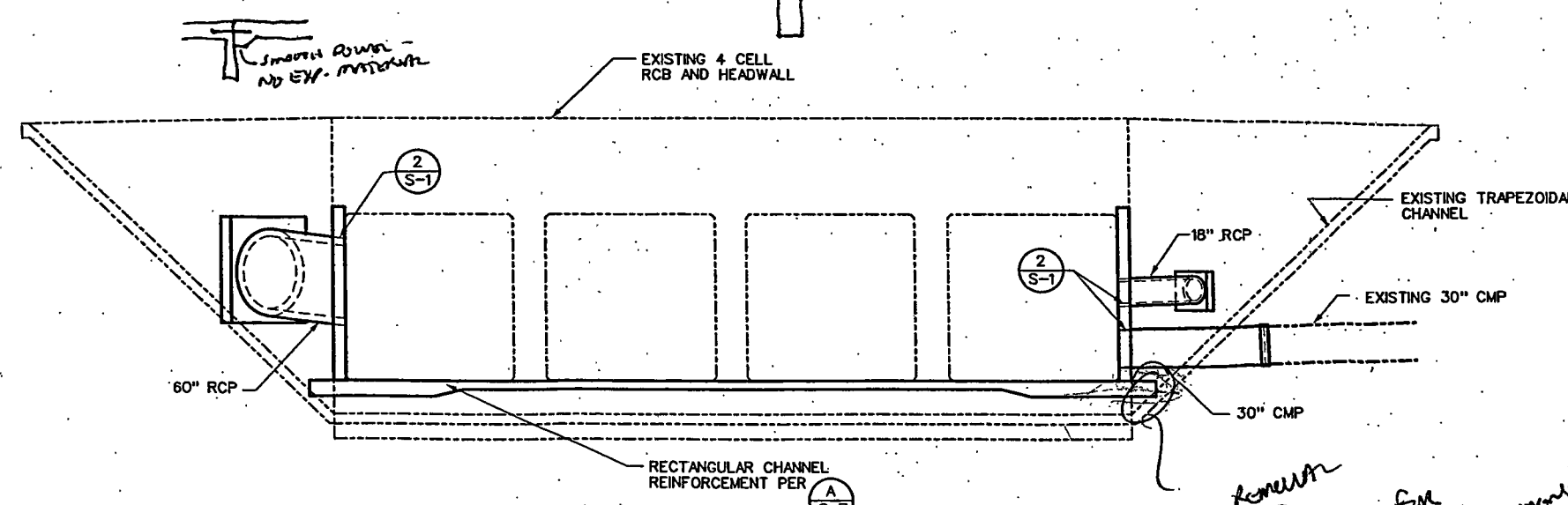
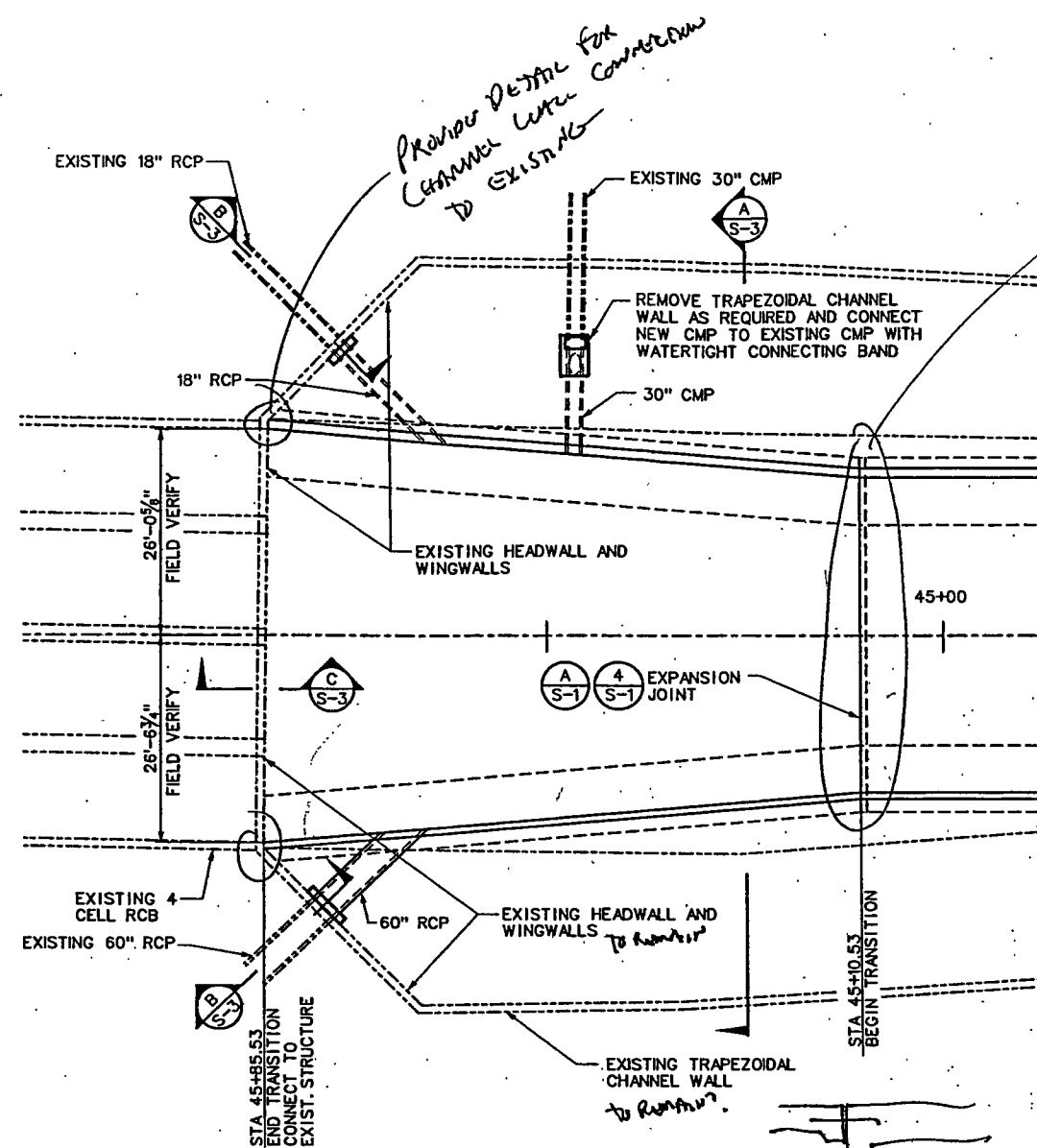
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: DWS
DRAWN BY: ELY
CHECKED BY: 12/02/03
DATE:

SCALE
HORIZ: AS SHOWN
VERT: AS SHOWN
FIELD BOOK NONE

SHEET No
S-2
L-1646B

R²H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 CRIER DRIVE SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070
00019-S2.DGN

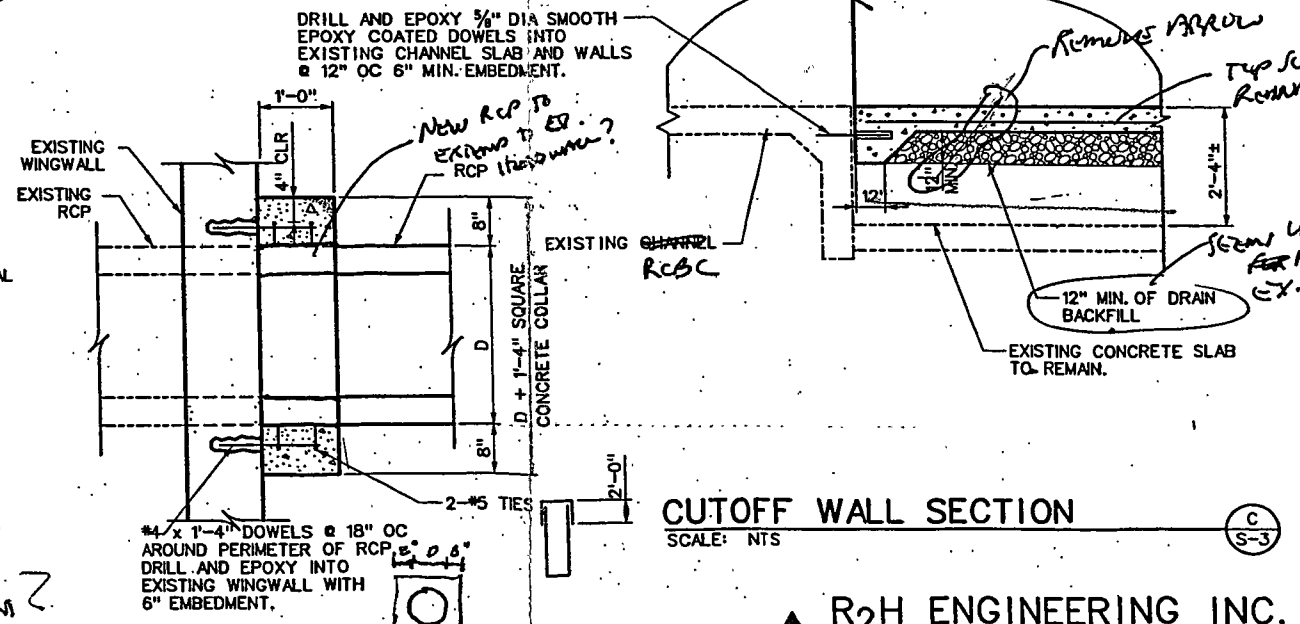


SECTION
SCALE: 3/16" = 1'-0"

EXPANSION JOINT W/ CUTOFF IS LOCATED ABOVE EXISTING CONCRETE CHANNEL TO REMAIN - CUT OFF WILL COMPACT W/ EX LIVING - SHOW LIMITS OF EXISTING LIVING REMOVAL OR TIE CUT OFF TO EX-CHANNEL LIVING -

CHANNEL TRANSITION PLAN
SCALE: 1/2" = 1'-0"

Can. Remove Decid? Reason for Adequate Drain Rock Placement?



RCP TO WALL CONNECTION
SCALE: NTS

CUTOFF WALL SECTION
SCALE: NTS

REV No	DATE	DESCRIPTION	APPROVED

Las Vegas, Nevada
 MONTGOMERY WATSON HARZA
 3080 WEST CHARLESTON BLVD
 LAS VEGAS, NEVADA 89102
 (702) 260-7000



FLAMINGO WASH
TRANSITION PLAN
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

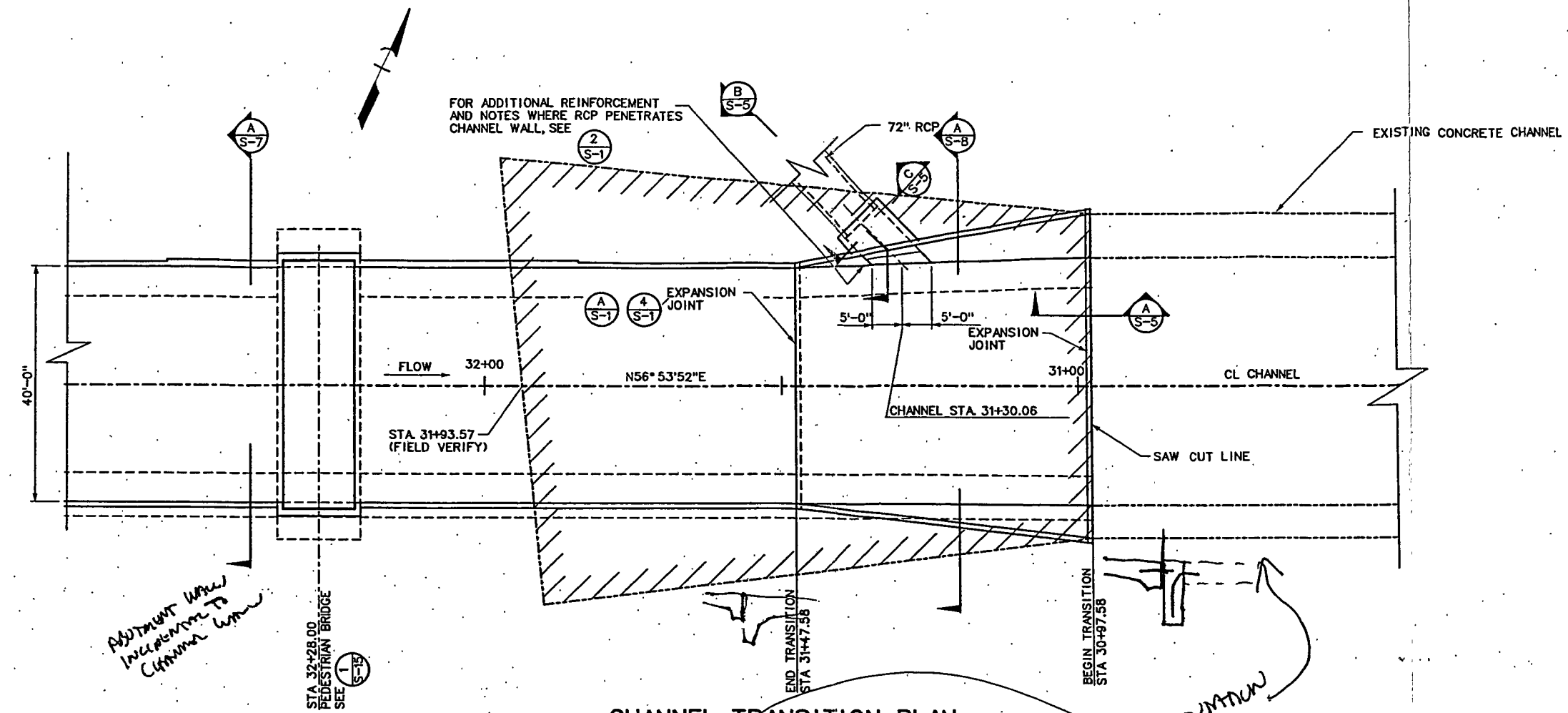
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY:	DWS
DRAWN BY:	ELY
CHECKED BY:	
DATE:	12/02/03

SCALE	SHEET No
HORIZ: AS SHOWN	S-3
VERT: AS SHOWN	
FIELD BOOK NONE	
	L-1646B

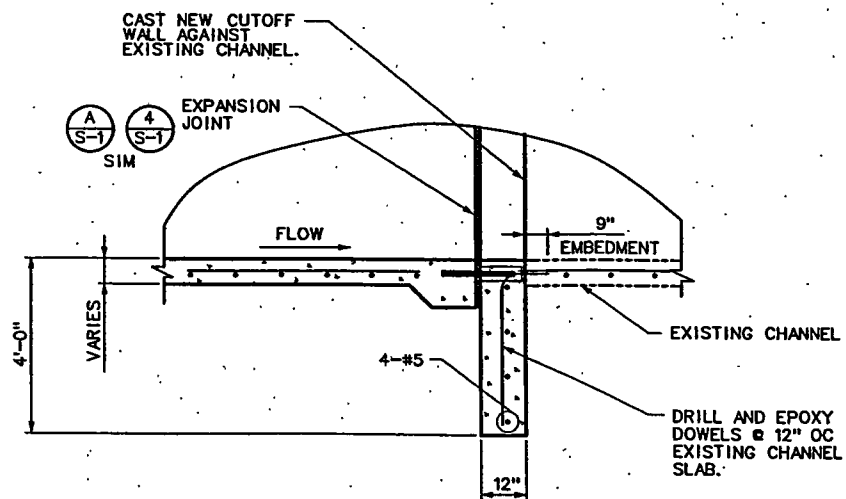
R2H ENGINEERING INC.
 CONSULTING STRUCTURAL ENGINEERS
 840 GRIER DRIVE, SUITE 320
 LAS VEGAS, NEVADA 89119
 PHONE (702) 260-7000
 FAX (702) 260-7070
 00019-S3.DGI

Exp 301112
 @ 154
 37+63.58
 36+09.58
 34+55.58
 33+01.58
 31+47.58



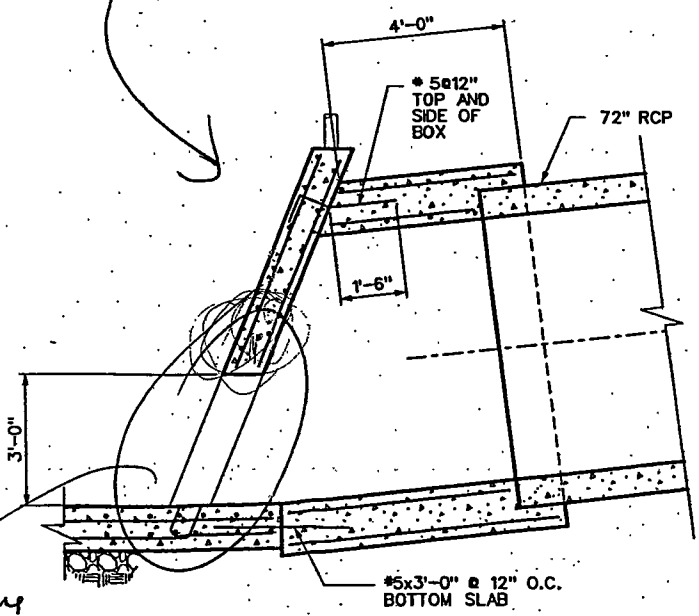
CHANNEL TRANSITION PLAN

SCALE: 1/2" = 1'-0"



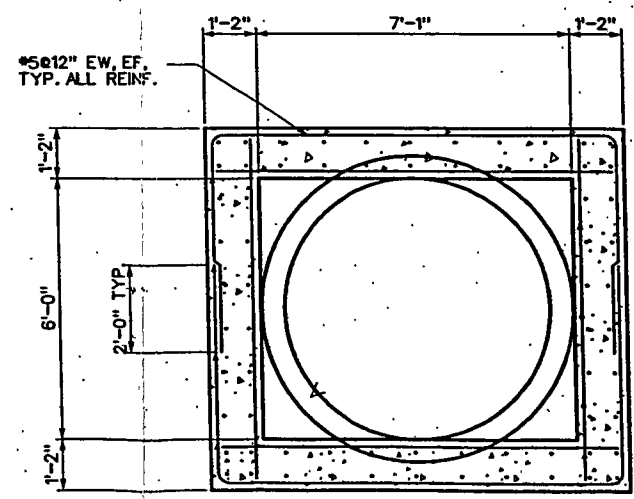
CUTOFF WALL SECTION

SCALE: NTS



JUNCTION BOX SECTION

SCALE: 1/2" = 1'-0"



SECTION

SCALE: 1/2" = 1'-0"

Need to clarify
 this opening -
 how wide?
 Add reinforcement
 req'd marks on
 of drawing.

Adequate
 hydraulic
 to pass flow.

REV No	DATE	DESCRIPTION	APPROVED



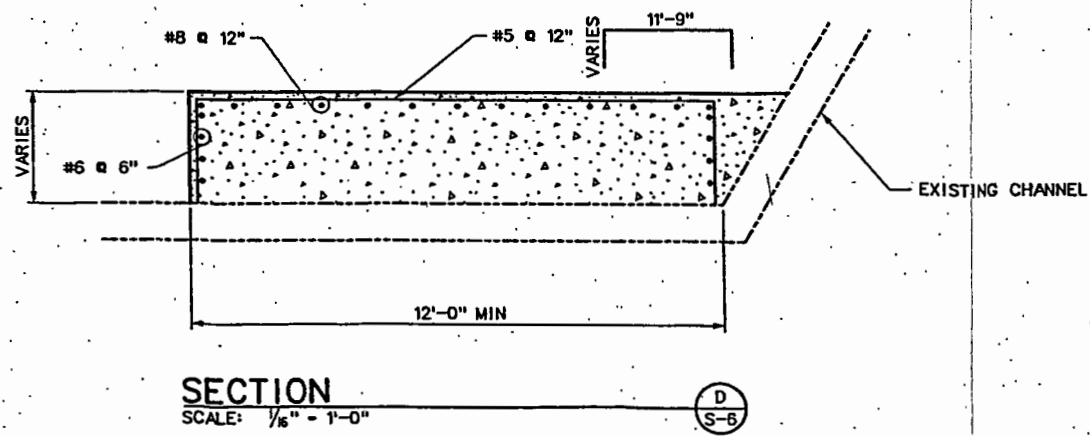
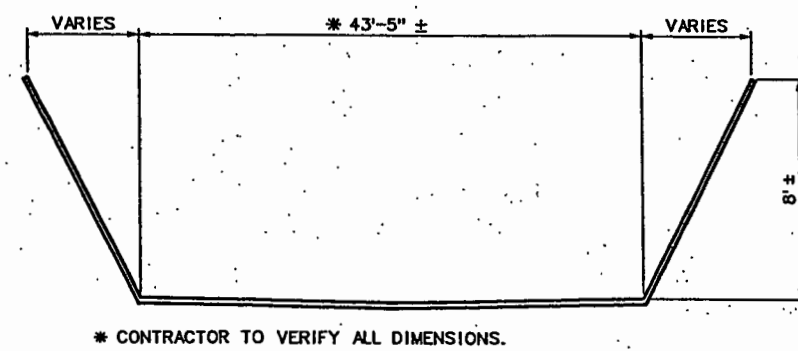
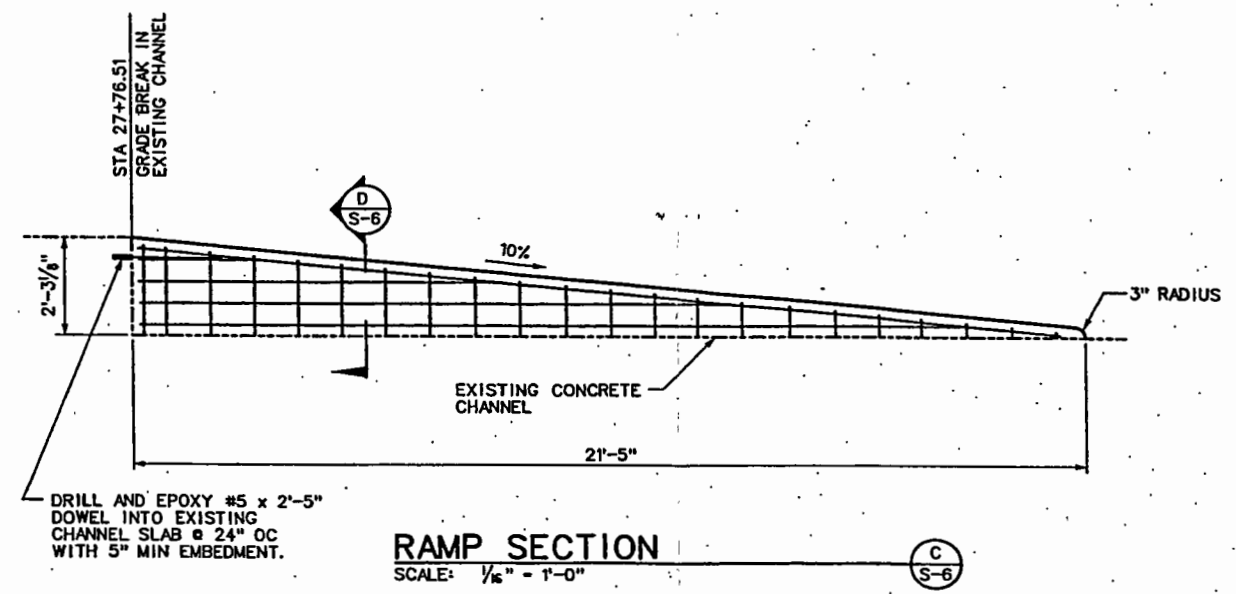
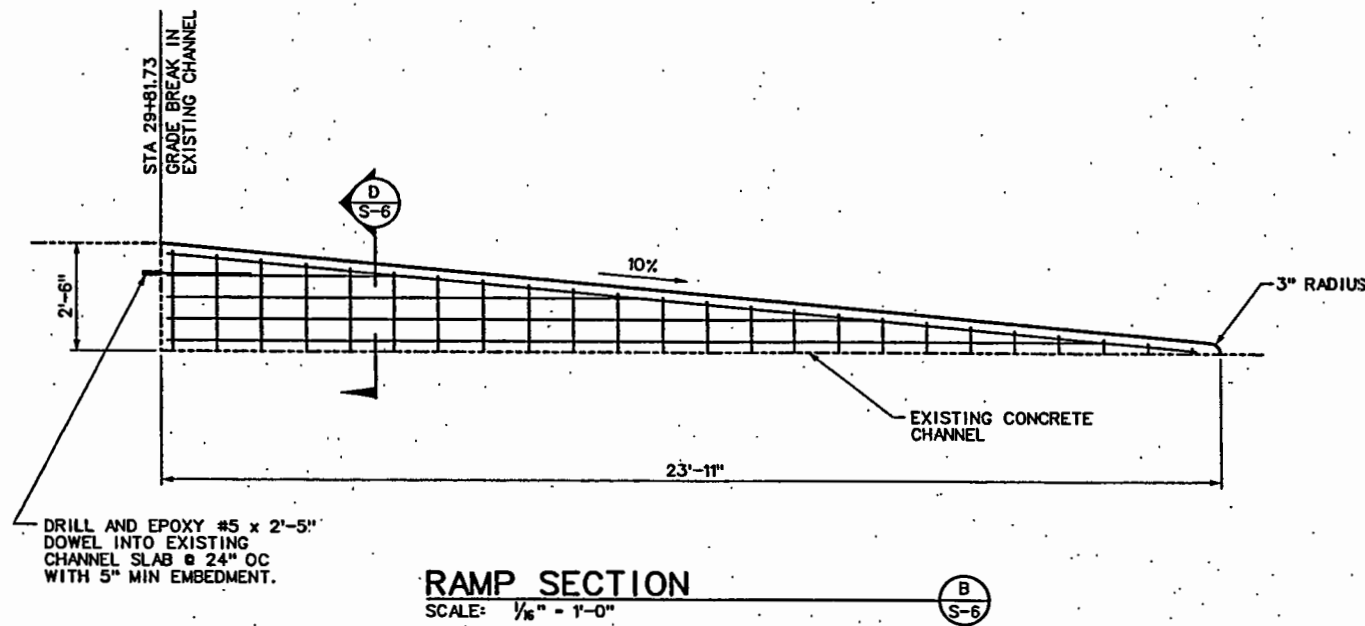
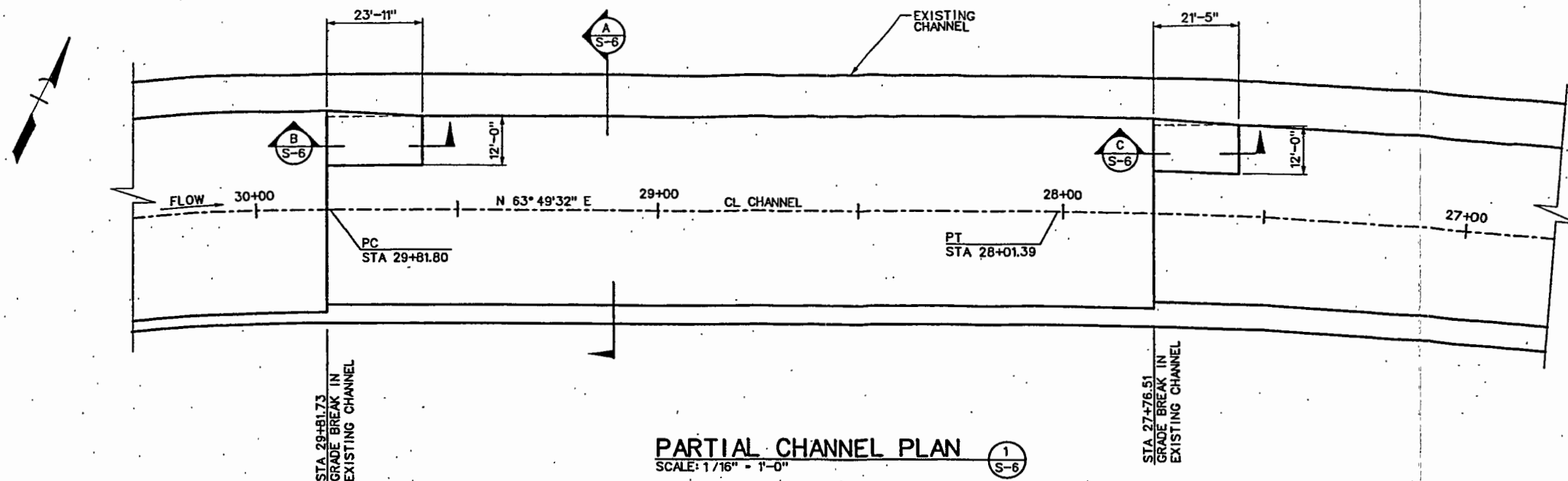
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS
 FLAMINGO WASH
 TRANSITION PLAN (WITH REMOVAL)

100% SUBMITTAL
 NOT FOR CONSTRUCTION

DESIGNED BY: DWS
 DRAWN BY: ELY
 CHECKED BY: 12/02/03
 DATE:

SCALE	SHEET No
HORIZ: AS SHOWN	S-5
VERT: AS SHOWN	
FIELD BOOK NONE	
	L-164-6B

R2H ENGINEERING INC.
 CONSULTING STRUCTURAL ENGINEERS
 840 GRIER DRIVE, SUITE 320
 LAS VEGAS, NEVADA 89119
 PHONE (702) 260-7000
 FAX (702) 260-7070



* CONTRACTOR TO VERIFY ALL DIMENSIONS.

REV No	DATE	DESCRIPTION	APPROVED

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



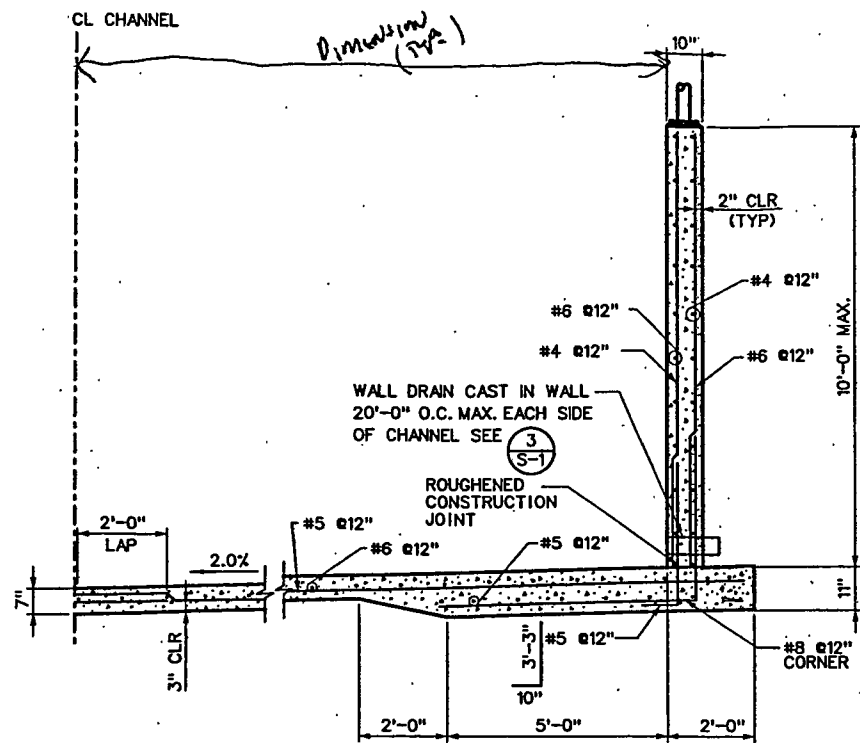
FLAMINGO WASH
SMALL RAMPS PLAN & SECTIONS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

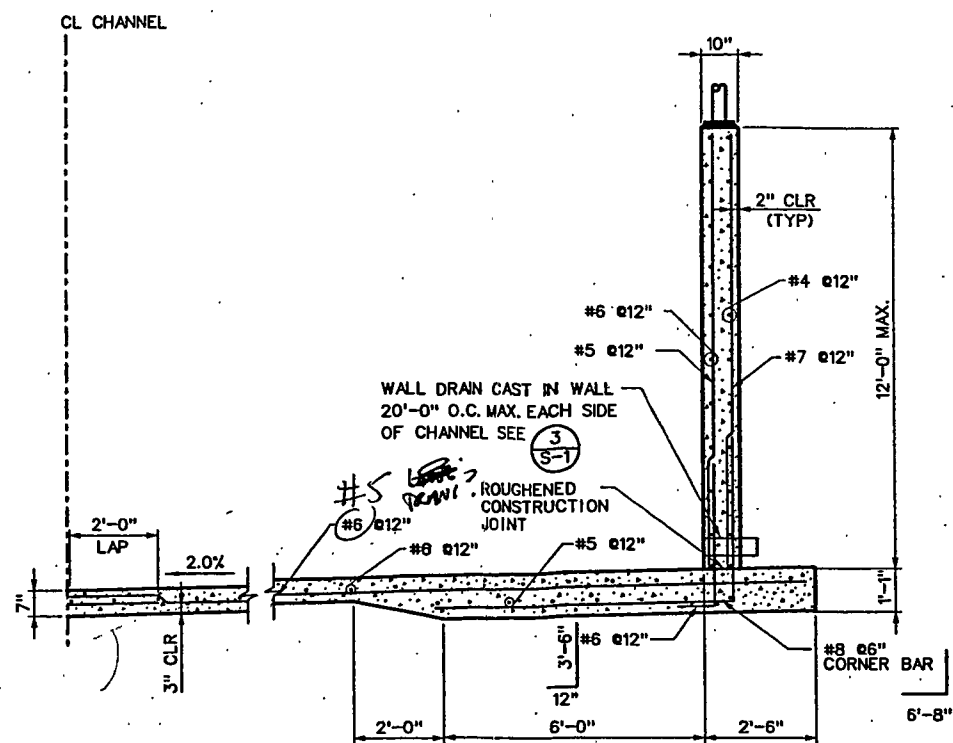
R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

00019-S6.DGN

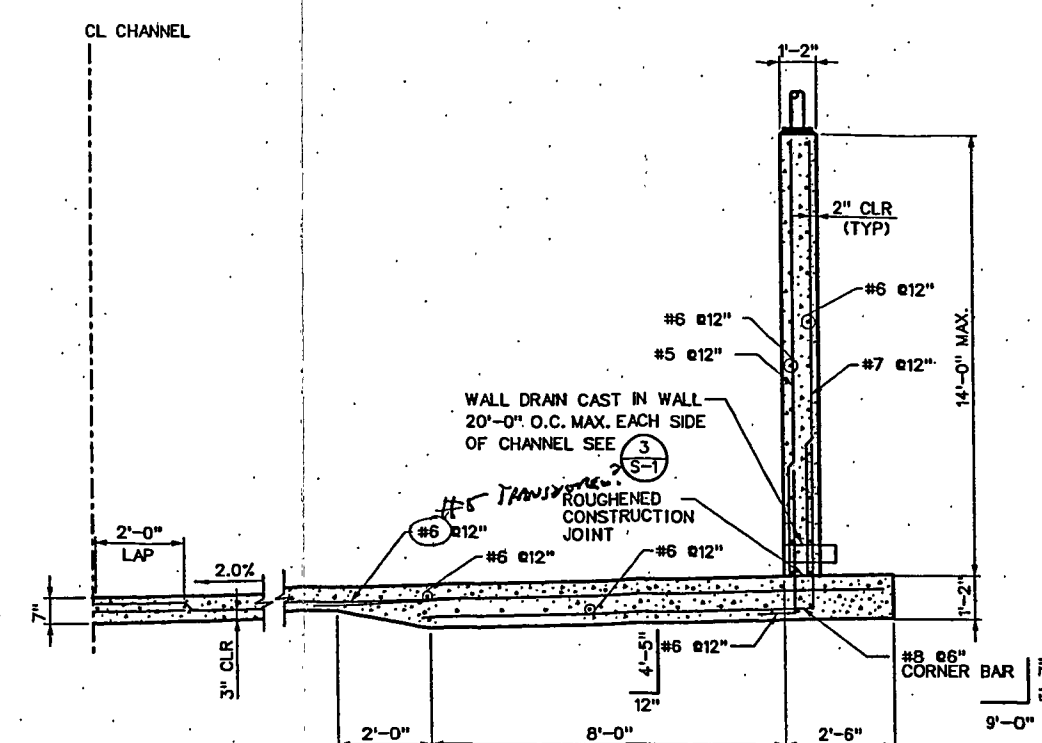
DESIGNED BY:	DWS	SCALE	HORIZ: AS SHOWN	SHEET No S-6
DRAWN BY:	ELY		VERT: AS SHOWN	
CHECKED BY:			FIELD BOOK: NONE	
DATE:	12/02/03			L-1646B



WALLS 10'-0" TALL OR LESS



WALLS 10'-0" TO 12'-0" TALL

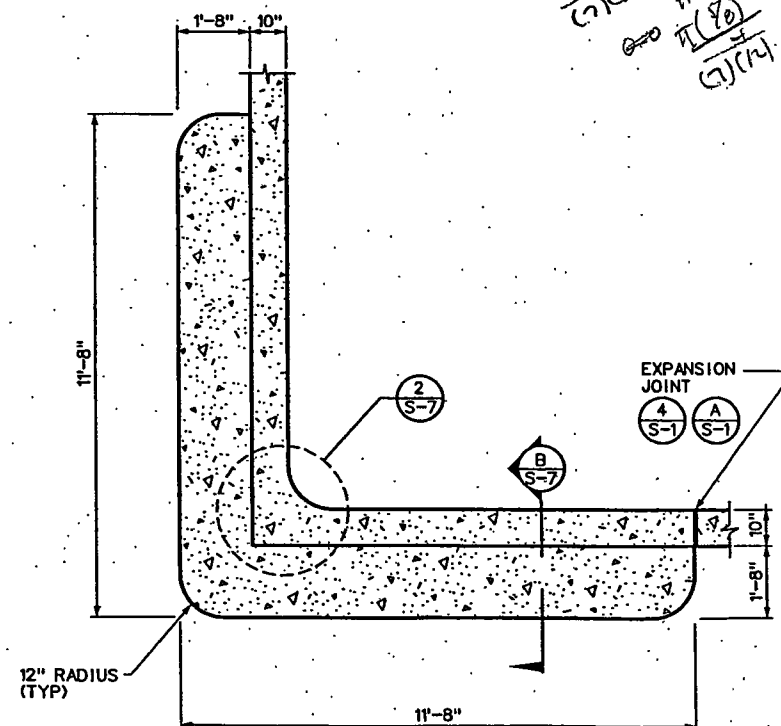


WALLS 12'-0" TO 14'-0" TALL

TYPICAL CHANNEL SECTION

SCALE: NTS

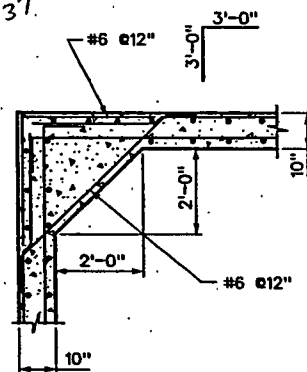
(A S-7)



SPLASH GUARD DETAIL

SCALE: NTS

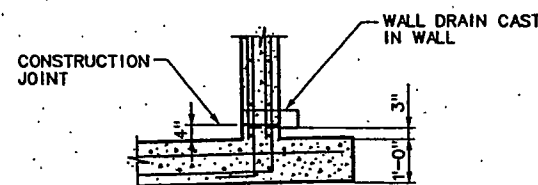
(1 S-7)



CORNER DETAIL

SCALE: NTS

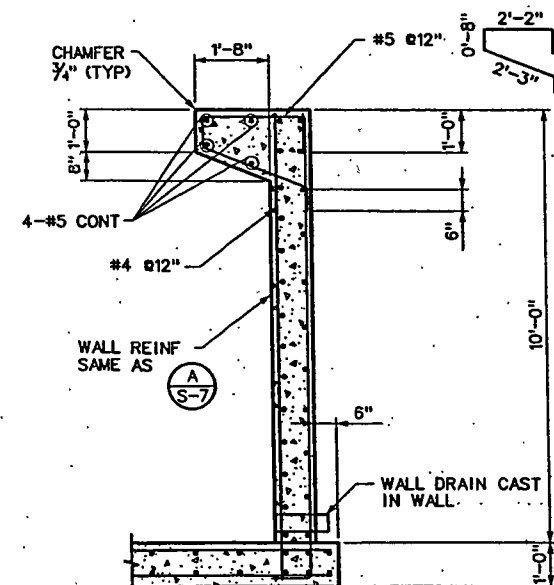
(2 S-7)



OPTIONAL WALL TO SLAB JOINT DETAIL

SCALE: 1/2" = 1'-0"

(3 S-7)



WALL SECTION

SCALE: NTS

(B S-7)

$\frac{\pi(12)^2}{4} = 0.0053$
 $\frac{\pi(12)^2}{4} = 0.0037$

R2H ENGINEERING INC.
 CONSULTING STRUCTURAL ENGINEERS
 840 GRIER DRIVE, SUITE 320
 LAS VEGAS, NEVADA 89119
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 FAX (702) 260-7070

00019-S7.DGN

REV No	DATE	DESCRIPTION	APPROVED



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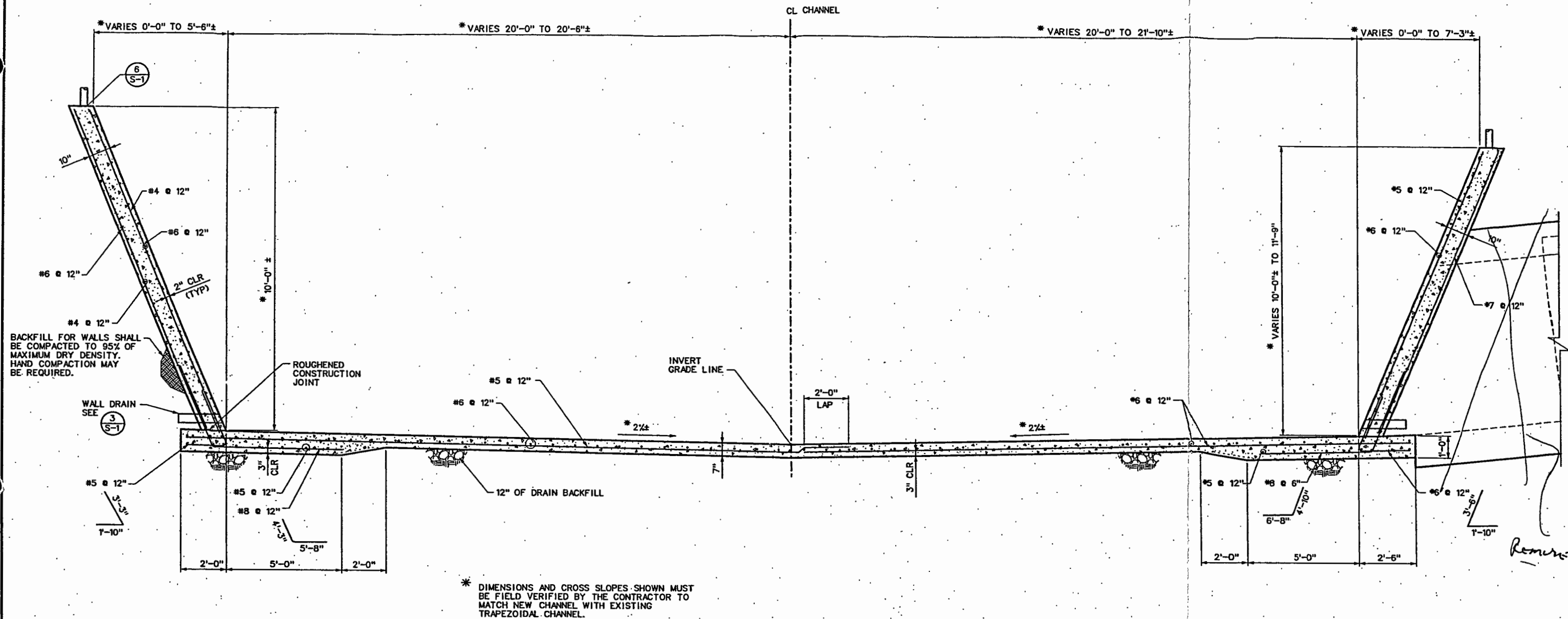
FLAMINGO WASH
 TYPICAL CHANNEL SECTION
 (WITH SPLASH GUARD)
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
 NOT FOR CONSTRUCTION

DESIGNED BY: DWS
 DRAWN BY: ELY
 CHECKED BY:
 DATE: 12/02/03

SCALE
 HORIZ: AS SHOWN
 VERT: AS SHOWN
 FIELD BOOK: NONE

SHEET No
S-7
 L-1646B



TRANSITION CHANNEL SECTION
SCALE: 1/2" = 1'-0" (A S-8)

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070
00019-SB.DGN

REV No	DATE	DESCRIPTION	APPROVED

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010

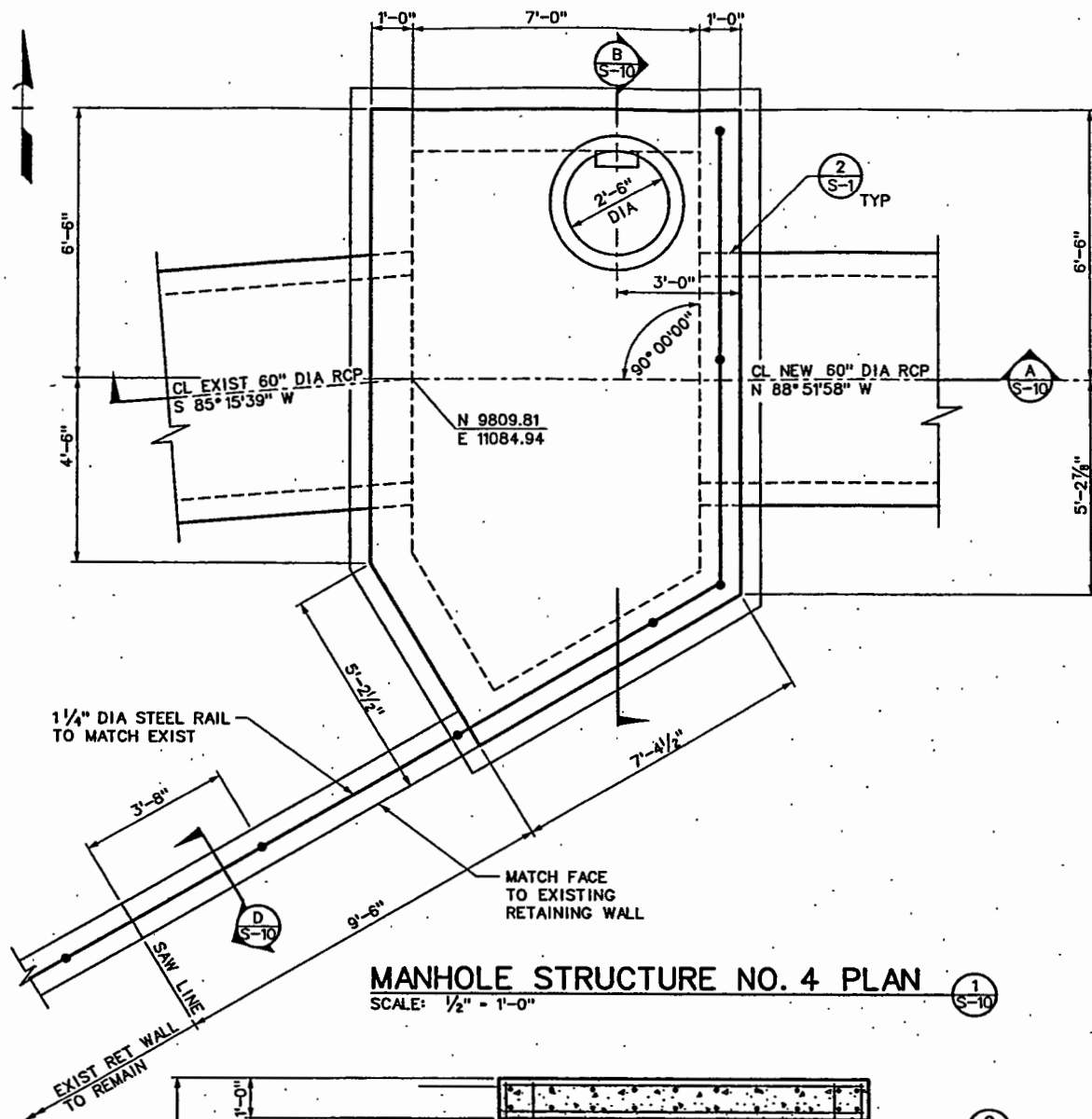


FLAMINGO WASH
TRANSITION SECTION
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

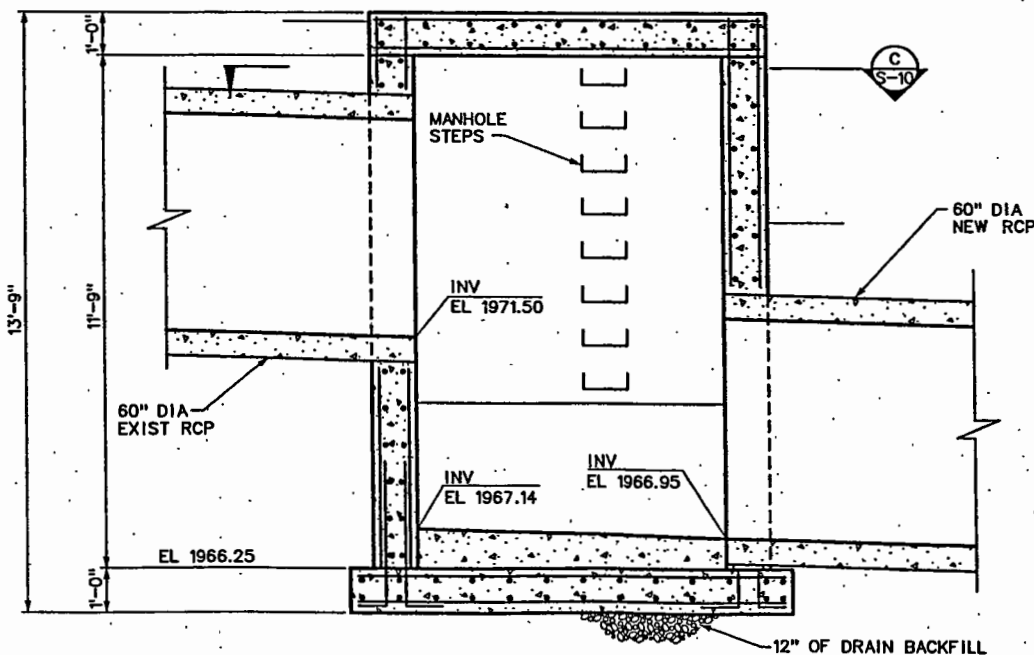
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: DWS
DRAWN BY: ELY
CHECKED BY: 12/02/03
DATE: 12/02/03

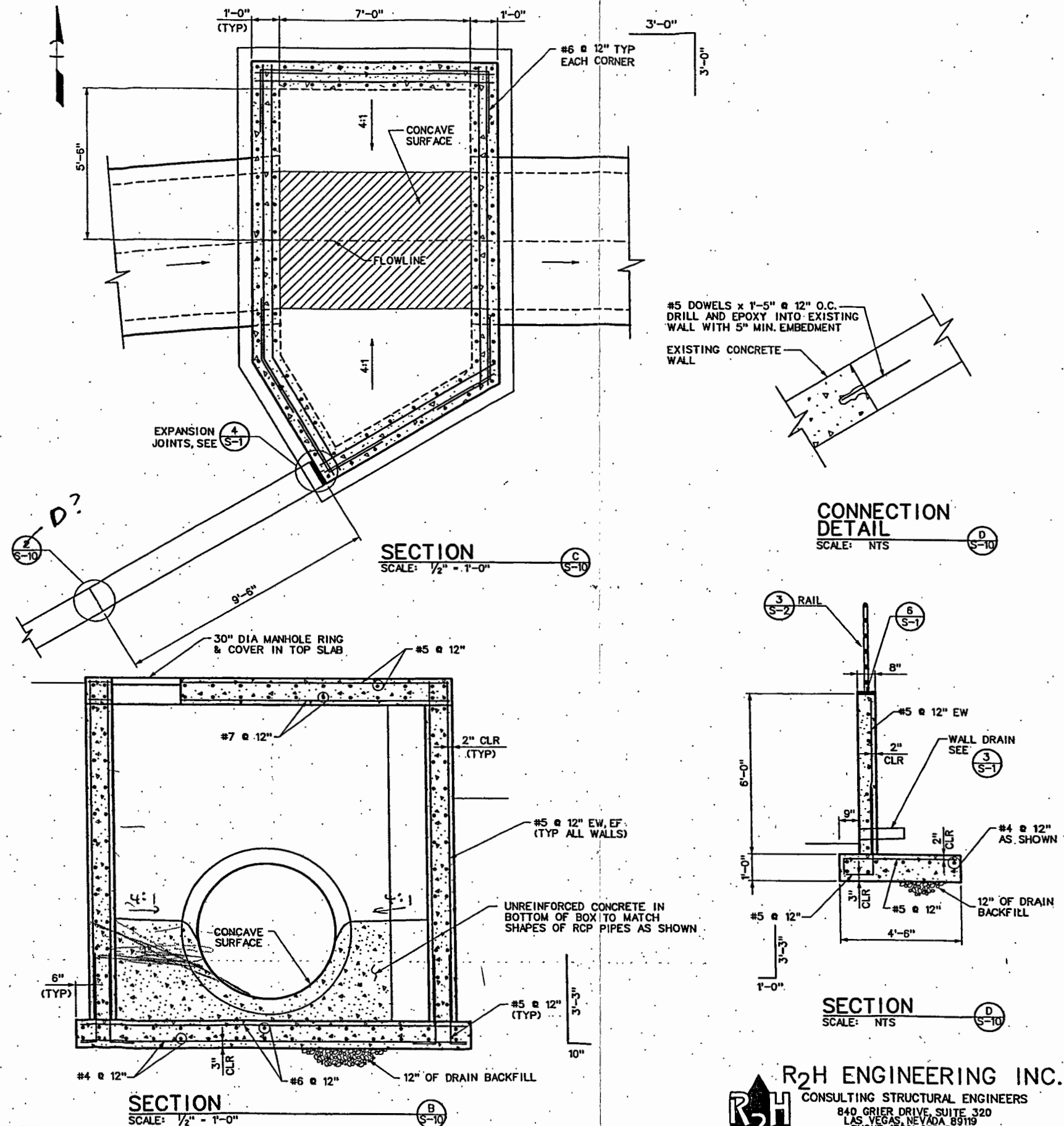
SCALE: HORIZ: AS SHOWN VERT: AS SHOWN FIELD BOOK: NONE
SHEET No: **S-8**
L-1646B



MANHOLE STRUCTURE NO. 4 PLAN
SCALE: 1/2" = 1'-0"

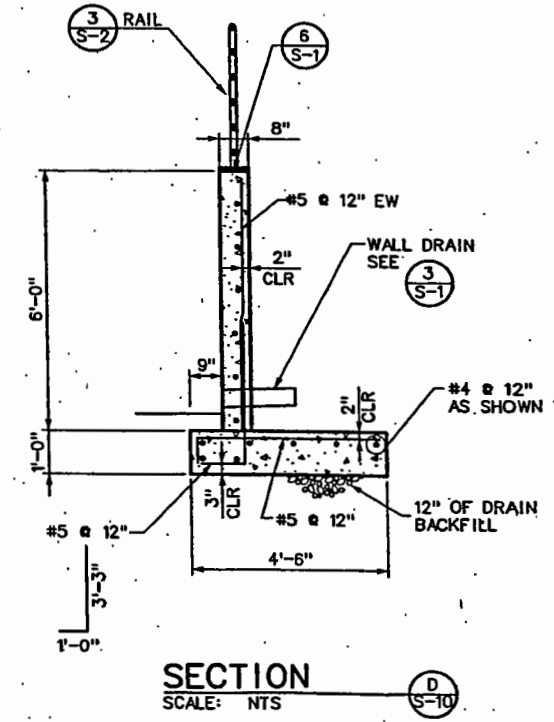


SECTION A-A
SCALE: 1/2" = 1'-0"



SECTION B-B
SCALE: 1/2" = 1'-0"

CONNECTION DETAIL
SCALE: NTS



SECTION C-C
SCALE: NTS

REV No	DATE	DESCRIPTION	APPROVED
1	12/02/03	DESIGNED BY: DWS	
2		DRAWN BY: ELY	
3		CHECKED BY:	
4		DATE: 12/02/03	



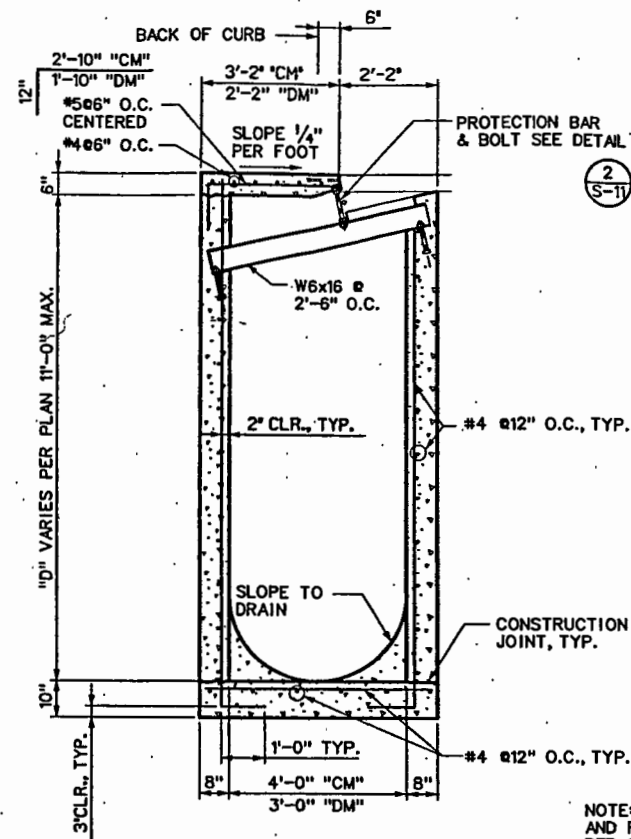
FLAMINGO WASH
MANHOLE STRUCTURE NO. 4
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: DWS	SCALE: HORIZ: AS SHOWN	SHEET No: S-10
DRAWN BY: ELY	VERT: AS SHOWN	
CHECKED BY:	FIELD BOOK: NONE	
DATE: 12/02/03		

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070
00019-S10.DWG

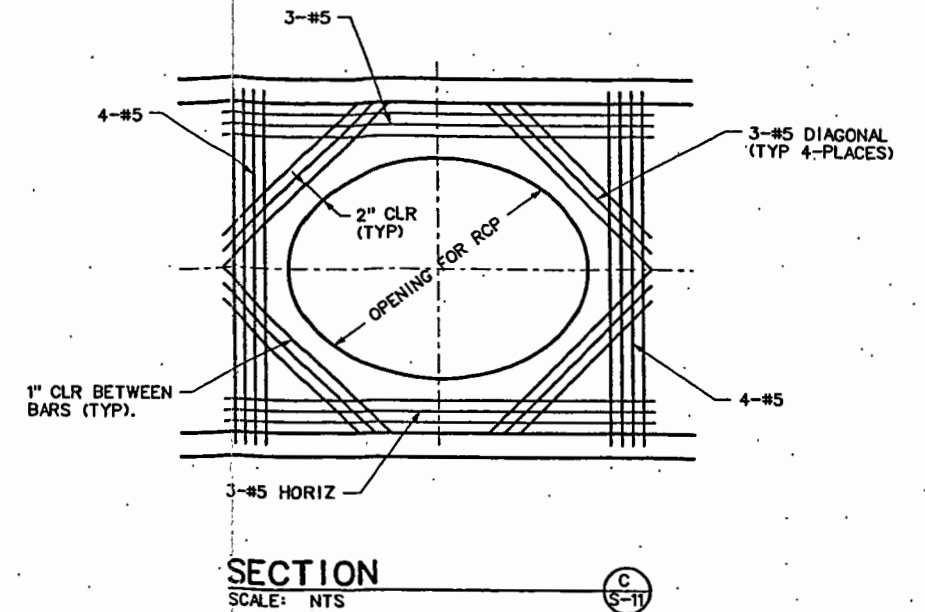
L-1646B



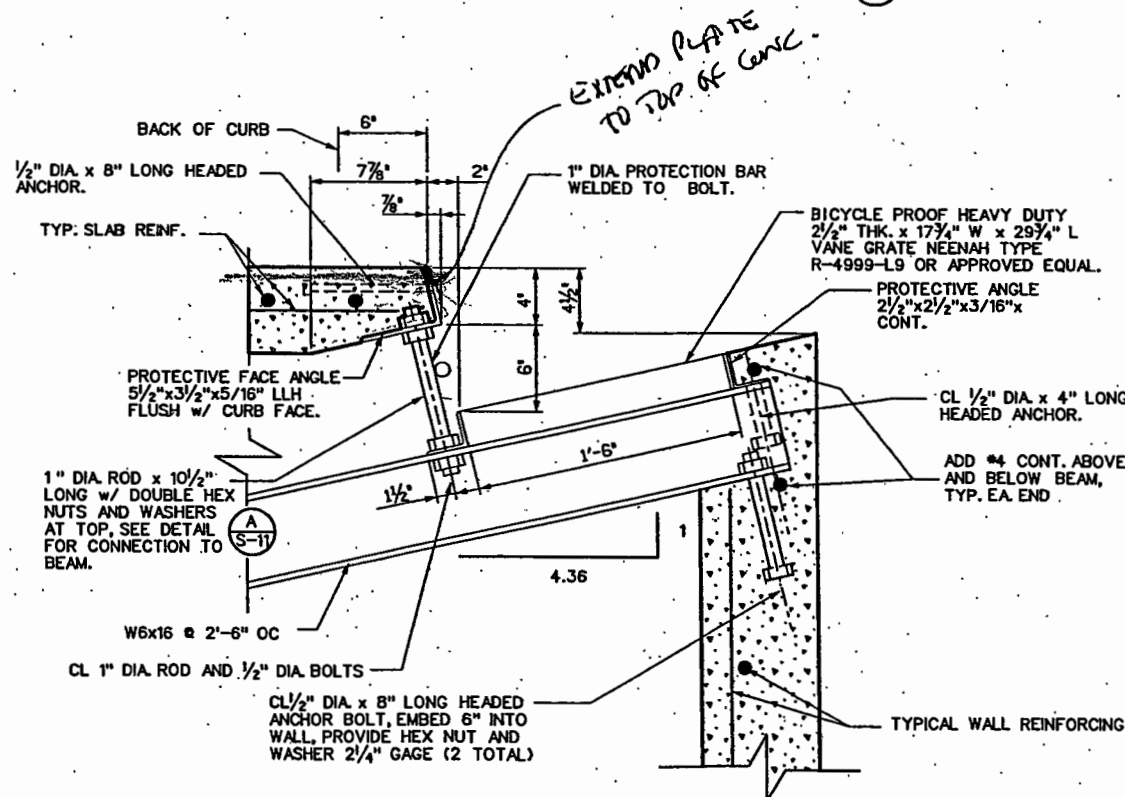
TYPE "DM" OR "CM" DROP INLET SECTION
SCALE: NTS

NOTES:

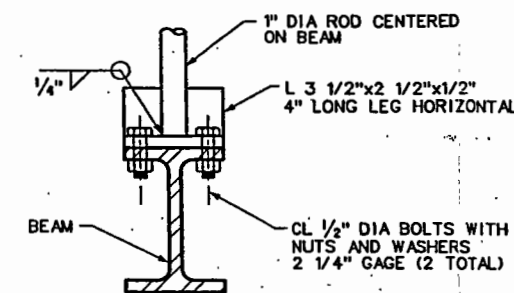
1. ALL EXPOSED METALS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
2. PROVIDE 1/2" (MIN) CLEARANCE ALL AROUND THE STEEL BEAM, DRY PACK AFTER INSTALLATION.
3. WHEN REQUIRED BY LENGTH OF OPENING, PLATE ANGLE MAY BE DELIVERED IN SECTIONS AND BUTT WELDED IN PLACE.
4. ALL GALVANIZING DAMAGED BY WELDING SHALL RECEIVE TWO COATS OF GALVALLOY OR EQUAL.
5. ANGLE ANCHORS SHALL BE EMBEDDED MIDPOINT IN EACH ENDWALL AND EVENLY SPACED (MAXIMUM SPACING OF 2").



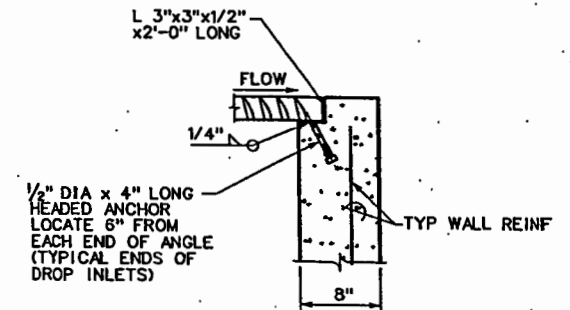
SECTION C
SCALE: NTS



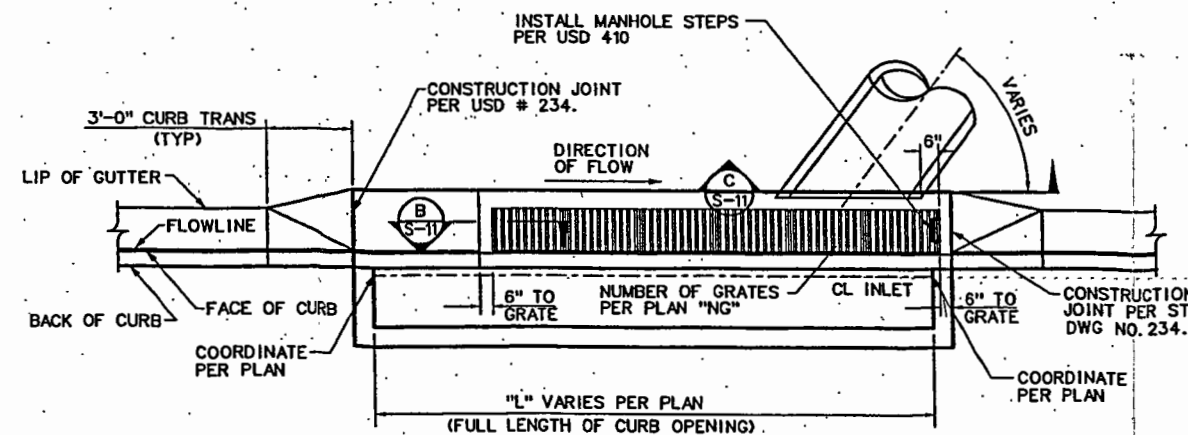
PROTECTIVE FACE AND ROD - DETAIL
SCALE: NTS



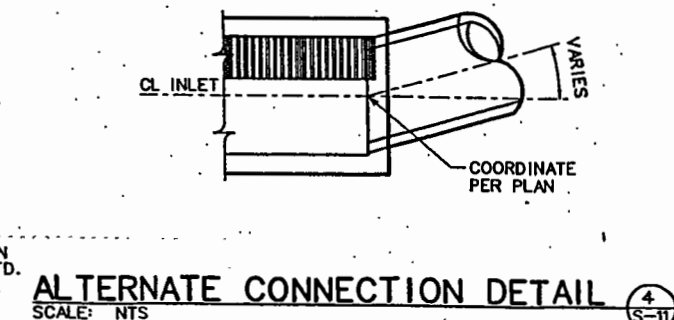
SECTION A
SCALE: NTS



SECTION B
SCALE: NTS



DROP INLET LAYOUT PLAN
SCALE: NTS



ALTERNATE CONNECTION DETAIL
SCALE: NTS

REV No	DATE	DESCRIPTION	APPROVED
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			



MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

FLAMINGO WASH
SECTIONS AND DETAILS

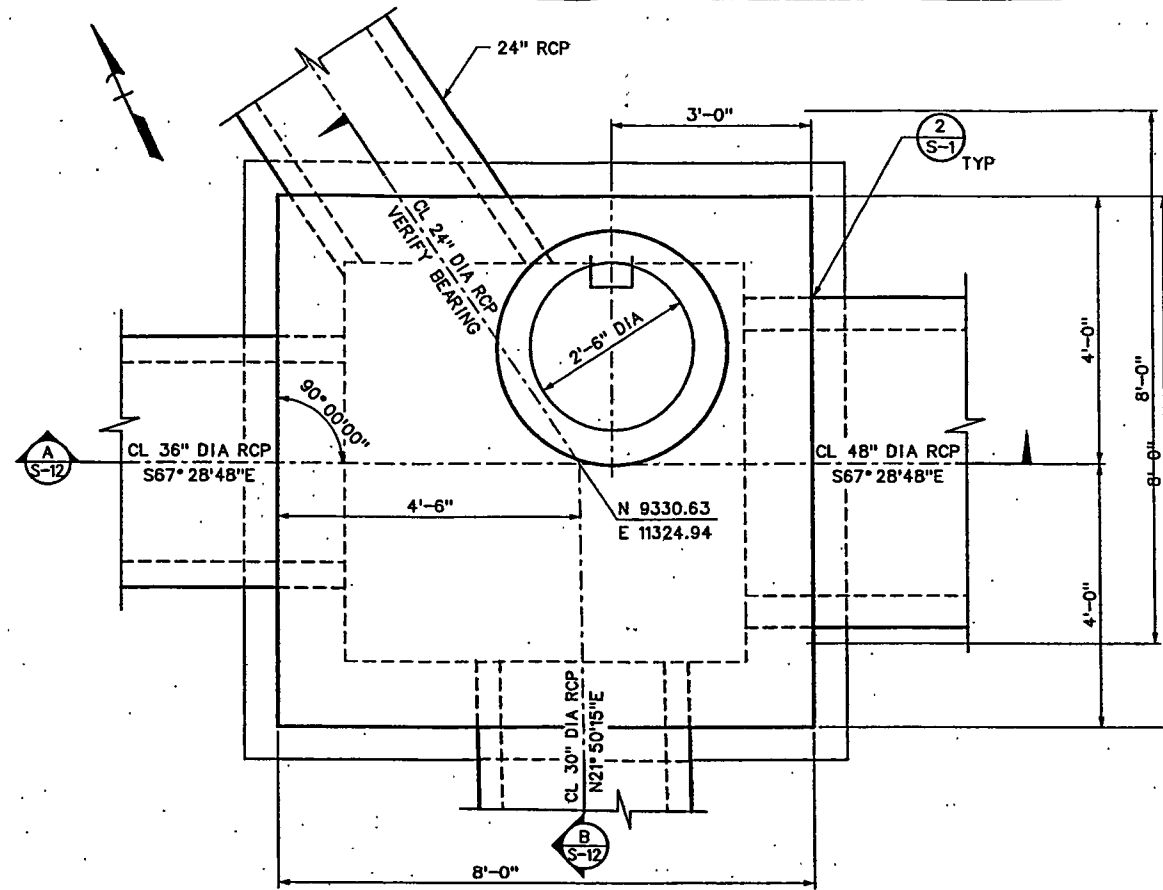
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: DWS
DRAWN BY: ELY
CHECKED BY:
DATE: 12/02/03



R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
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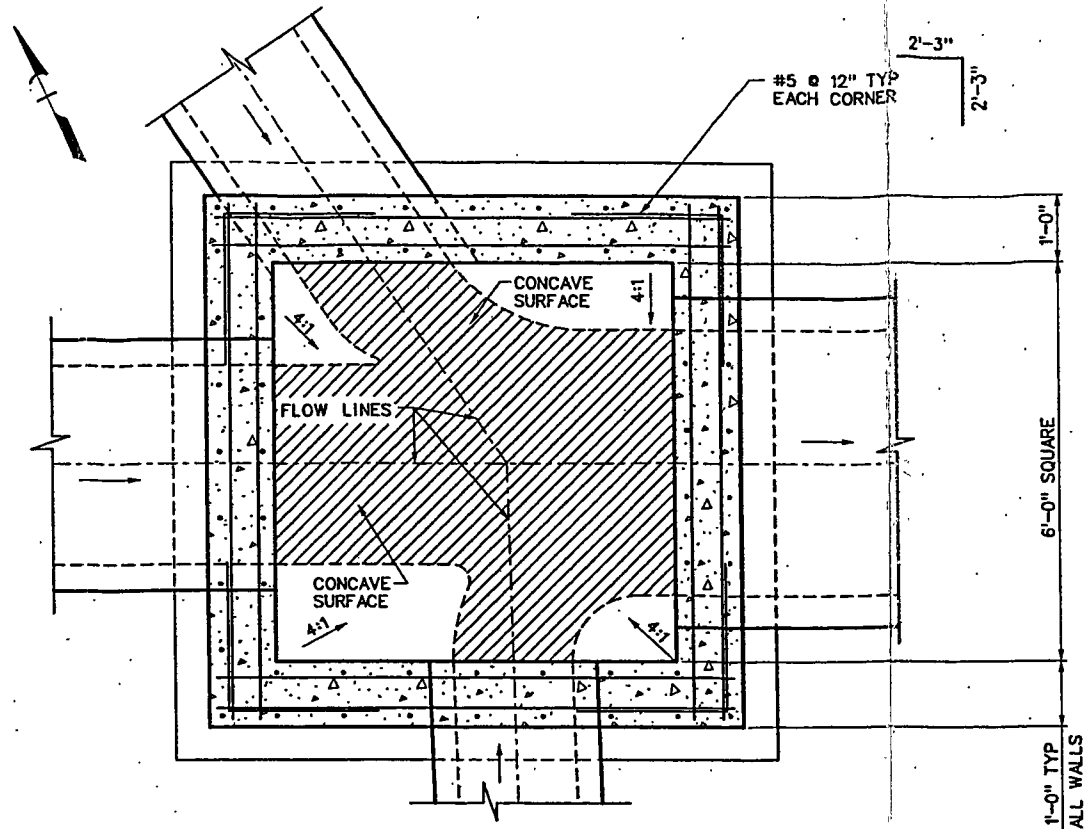
SCALE	SHEET No
HORIZ: AS SHOWN	S-11
VERT: AS SHOWN	
FIELD BOOK NONE	
	L-1646B



MANHOLE STRUCTURE NO. 1 PLAN

SCALE: 3/4" = 1'-0"

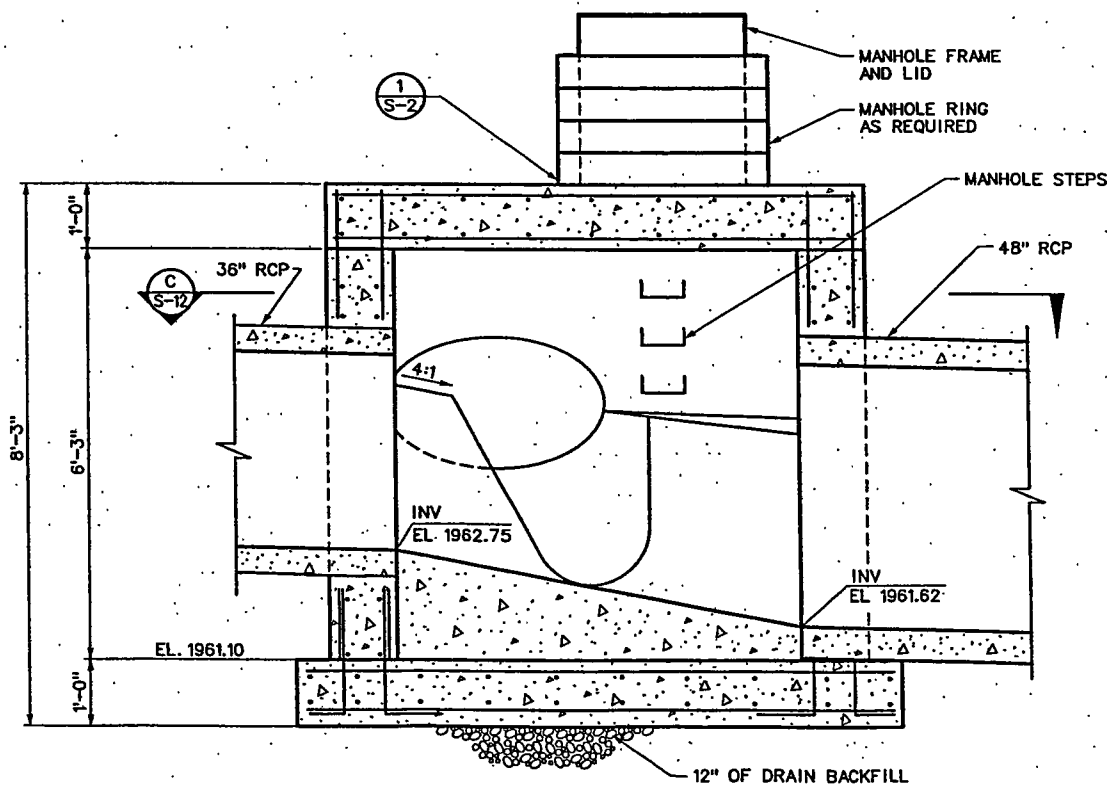
1
S-12



SECTION

SCALE: 3/4" = 1'-0"

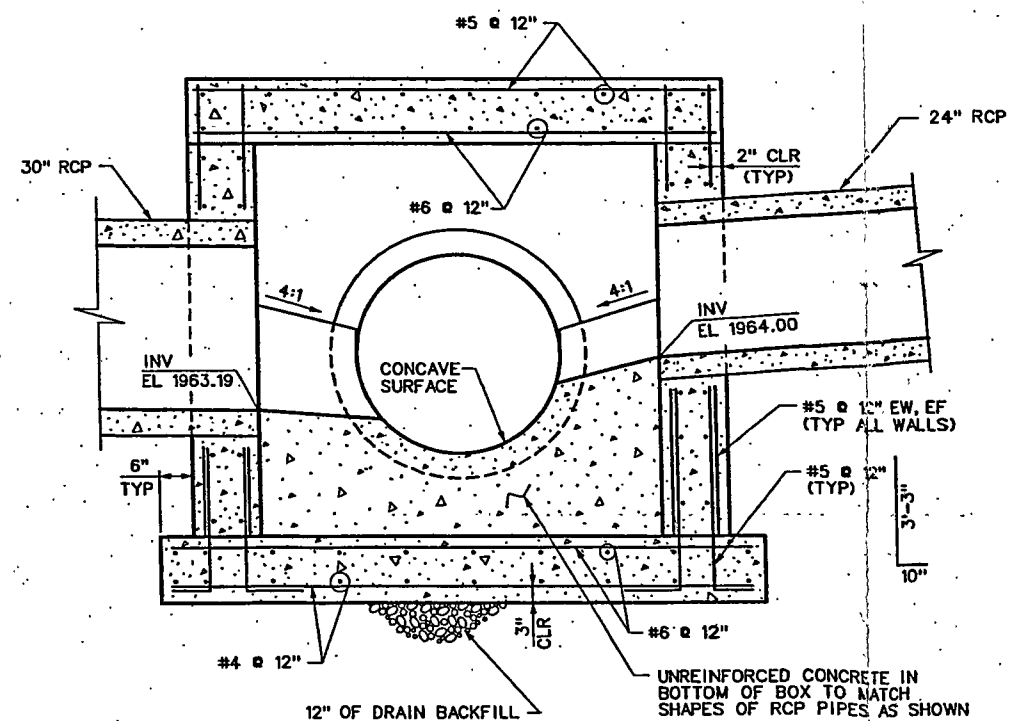
C
S-12



SECTION

SCALE: 3/4" = 1'-0"

A
S-12



SECTION

SCALE: 3/4" = 1'-0"

B
S-12

NOTE:

1 MANHOLE LIDS SHALL BE PROVIDED WITH THE LETTERING "CLARK COUNTY STORM DRAIN"

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070
00019-S12.DG

REV No	DATE	DESCRIPTION	APPROVED

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8018



FLAMINGO WASH

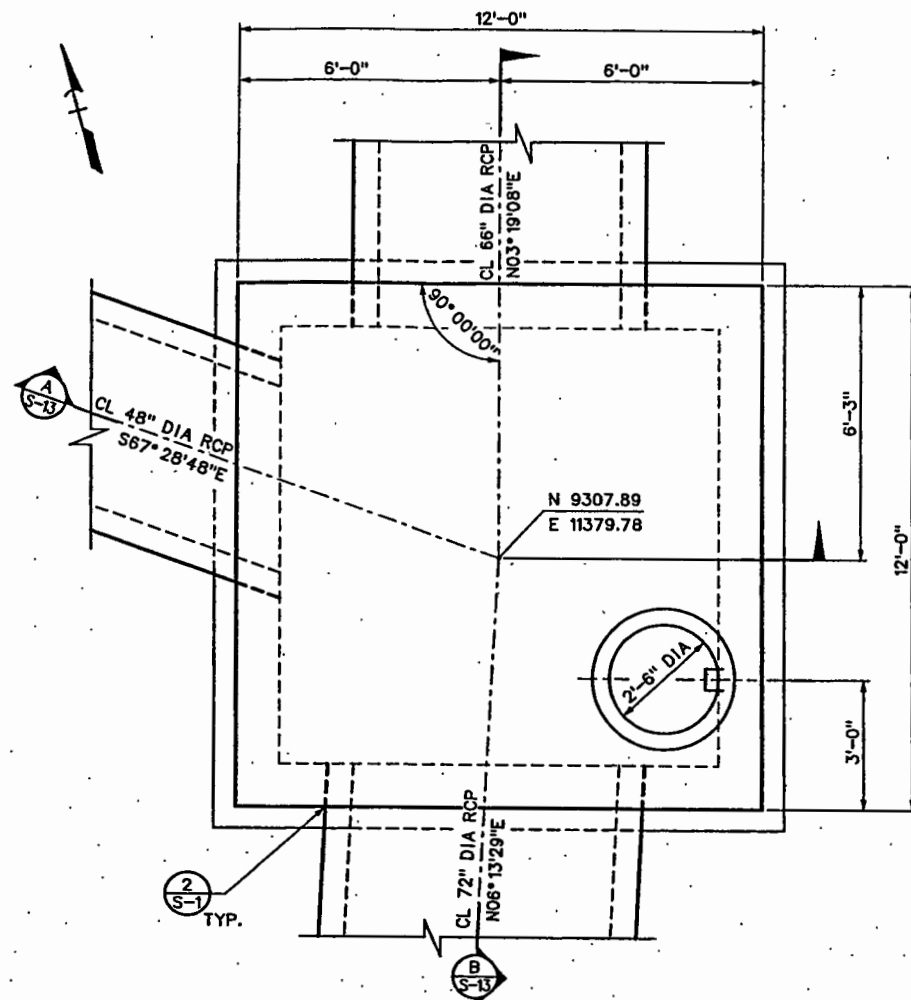
MANHOLE STRUCTURE NO. 1

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

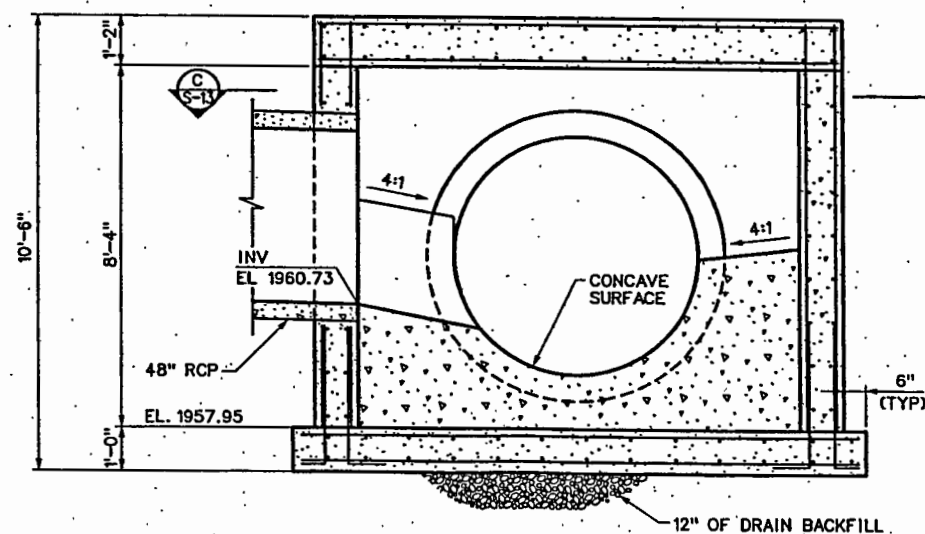
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: DWS
DRAWN BY: ELY
CHECKED BY: 12/02/03
DATE: 12/02/03

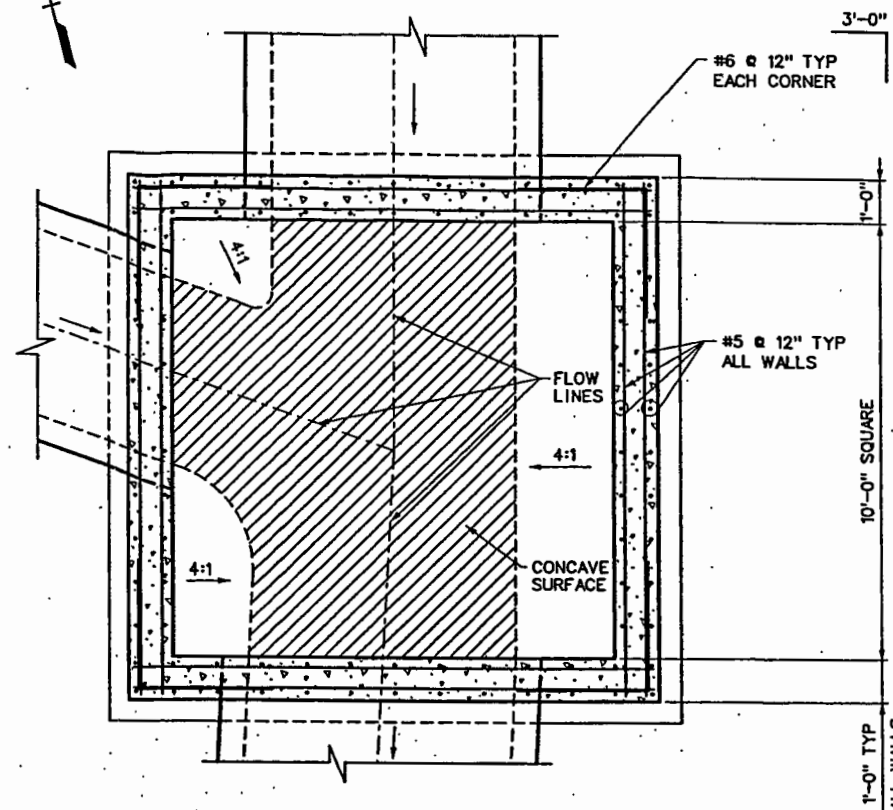
SCALE	SHEET No
HORIZ: AS SHOWN	S-12
VERT: AS SHOWN	
FIELD BOOK NONE	
	L-1646B



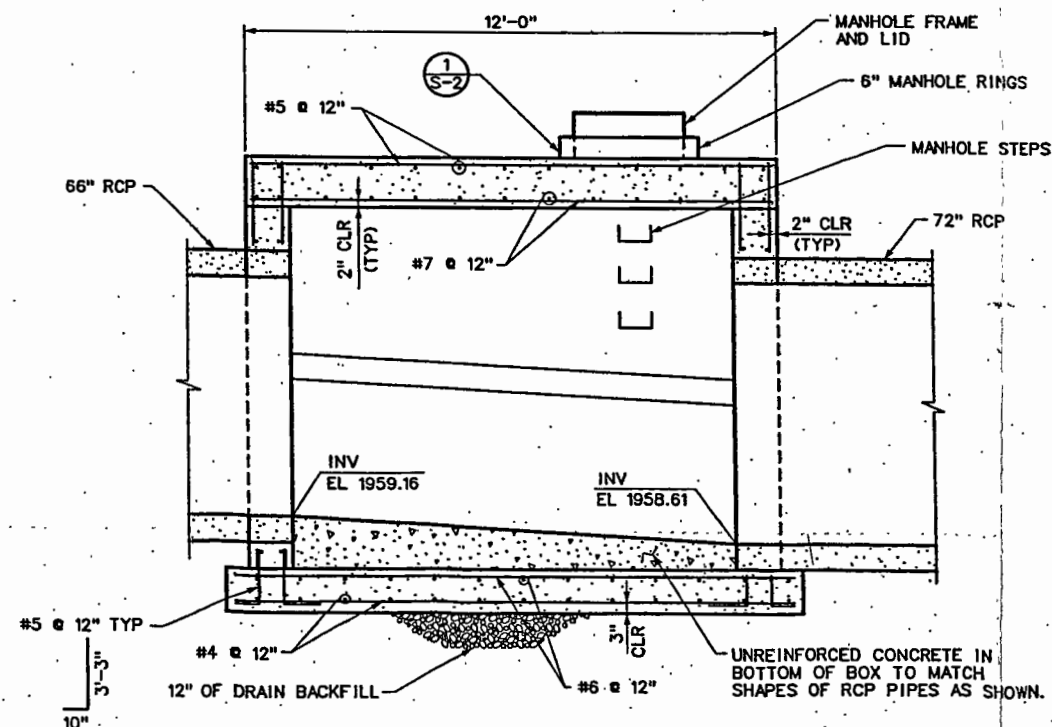
MANHOLE STRUCTURE NO. 2 PLAN
SCALE: 1/2" = 1'-0"



SECTION
SCALE: 1/2" = 1'-0"



SECTION
SCALE: 1/2" = 1'-0"



SECTION
SCALE: 1/2" = 1'-0"

NOTE:
1 MANHOLE LIDS SHALL BE PROVIDED
WITH THE LETTERING "CLARK
COUNTY STORM DRAIN"

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

FLAMINGO WASH
MANHOLE STRUCTURE NO. 2
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

REV No	DATE	DESCRIPTION	APPROVED

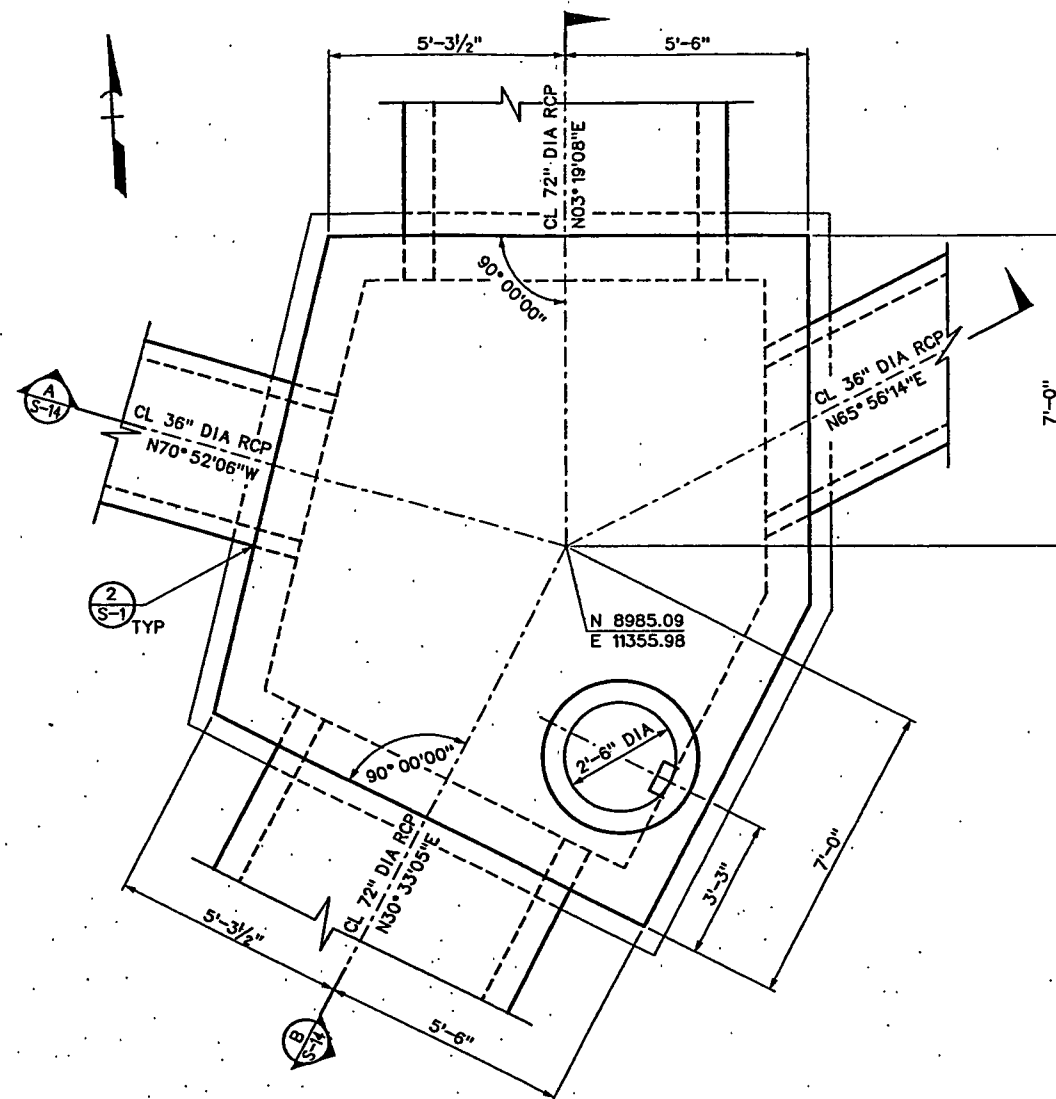
MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



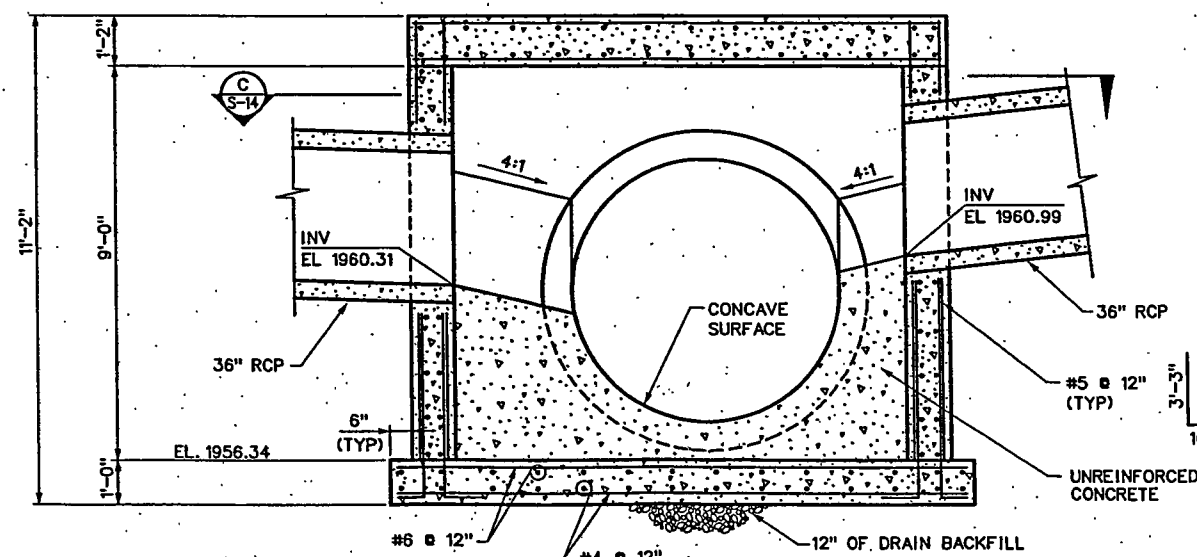
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY: DWS
DRAWN BY: ELY
CHECKED BY:
DATE: 12/02/03

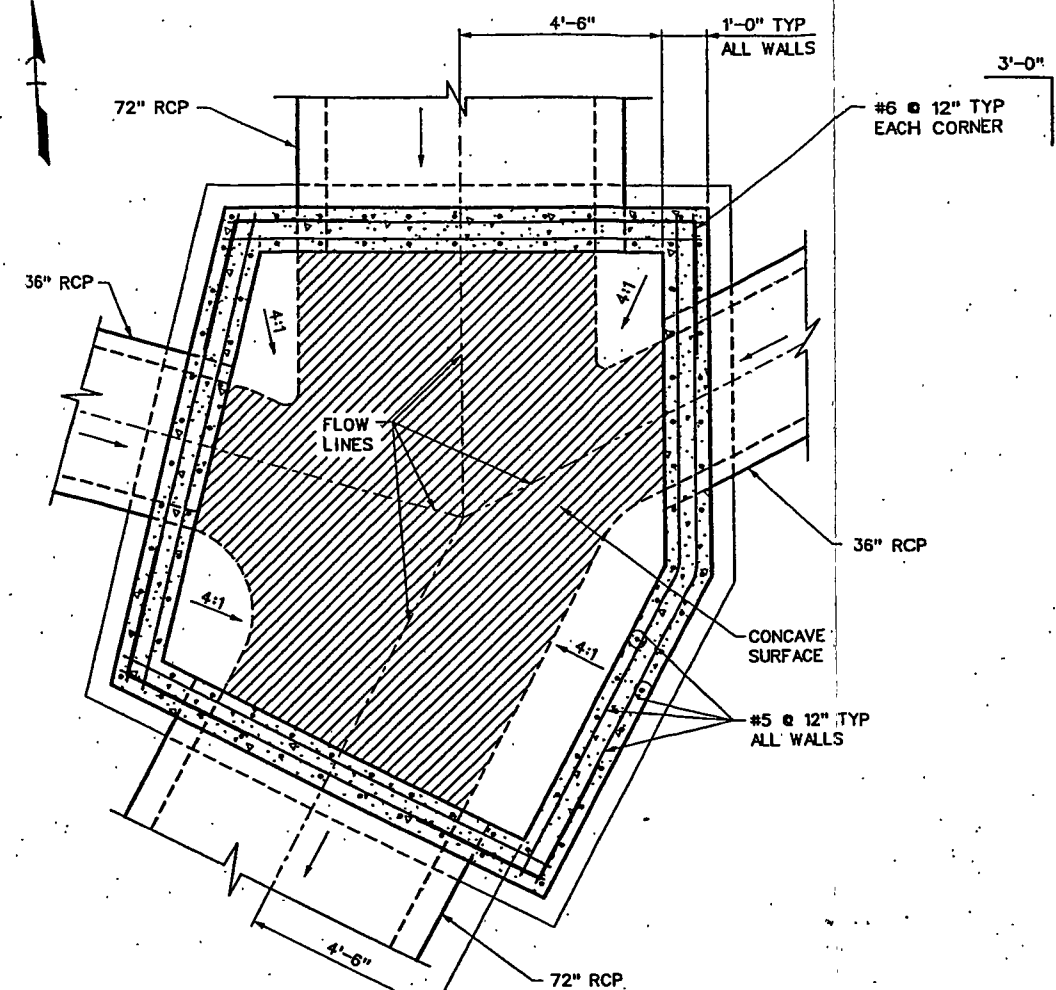
SCALE	SHEET No
HORIZ: AS SHOWN	S-13
VERT: AS SHOWN	
FIELD BOOK NONE	
	L-1646B



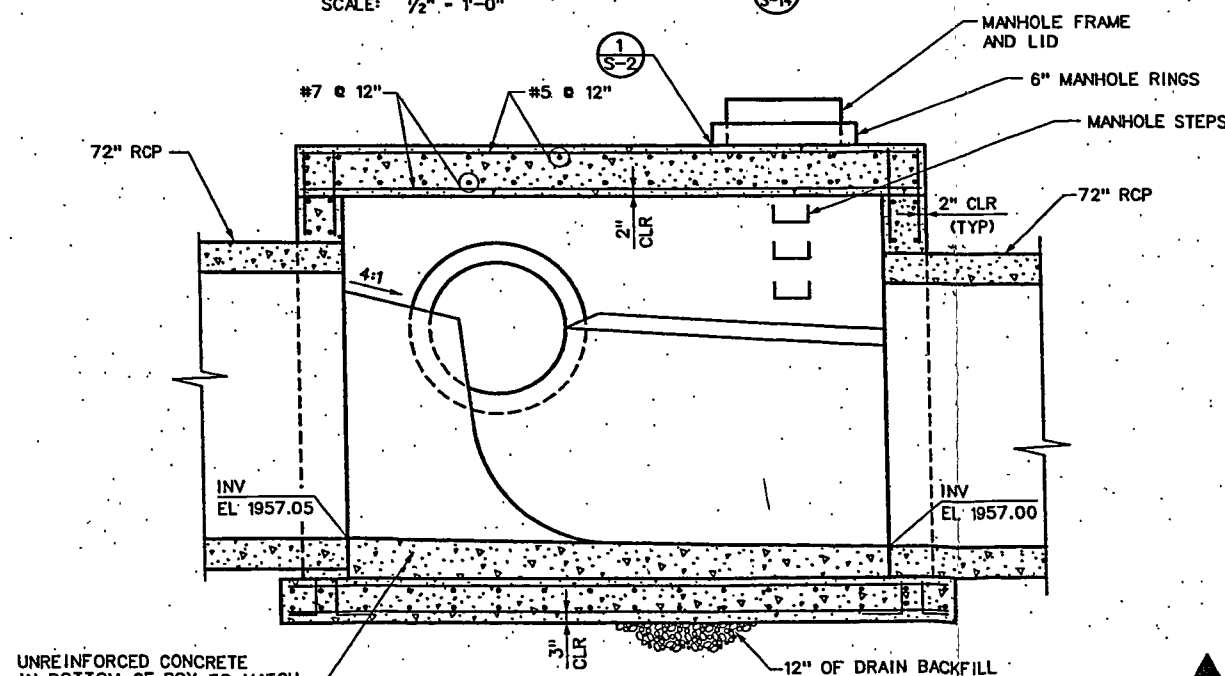
MANHOLE STRUCTURE NO. 3 PLAN
SCALE: 1/2\"/>



SECTION A-A
SCALE: 1/2\"/>



SECTION C-C
SCALE: 1/2\"/>



SECTION B-B
SCALE: 1/2\"/>

NOTE:
1 MANHOLE LIDS SHALL BE PROVIDED WITH THE LETTERING "CLARK COUNTY STORM DRAIN"

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

REV No	DATE	DESCRIPTION	APPROVED



MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010

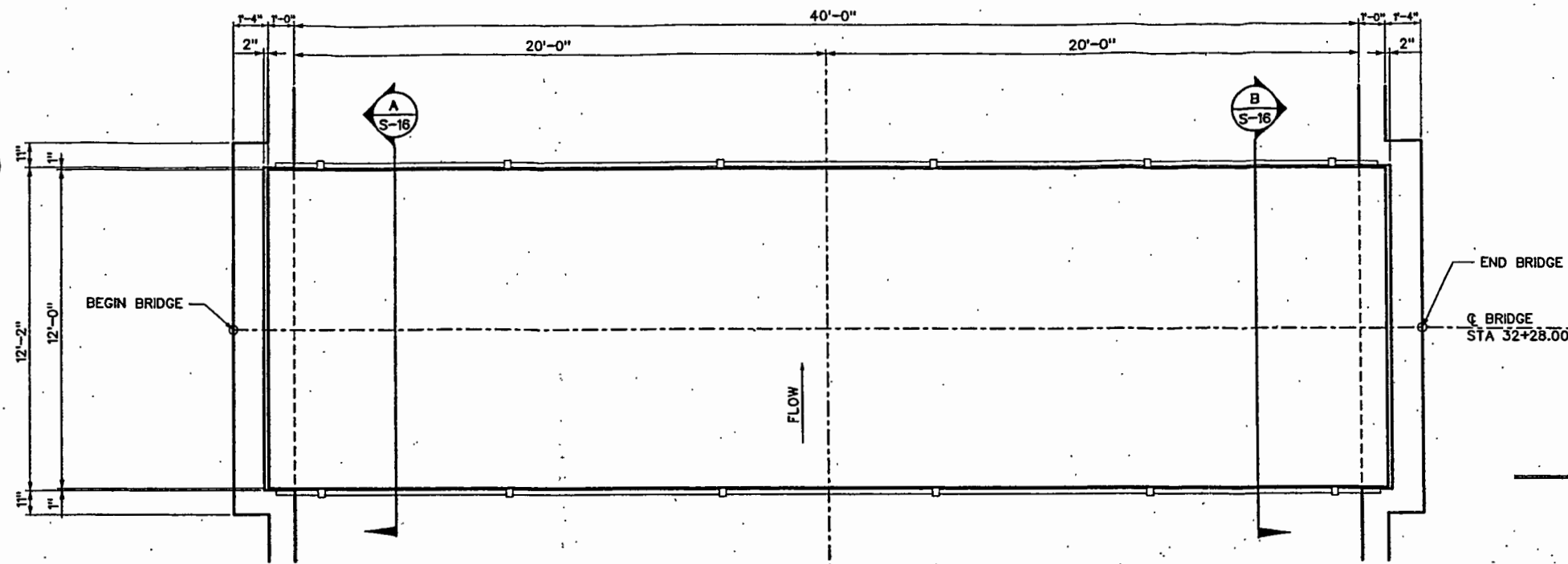


FLAMINGO WASH
MANHOLE STRUCTURE NO. 3
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

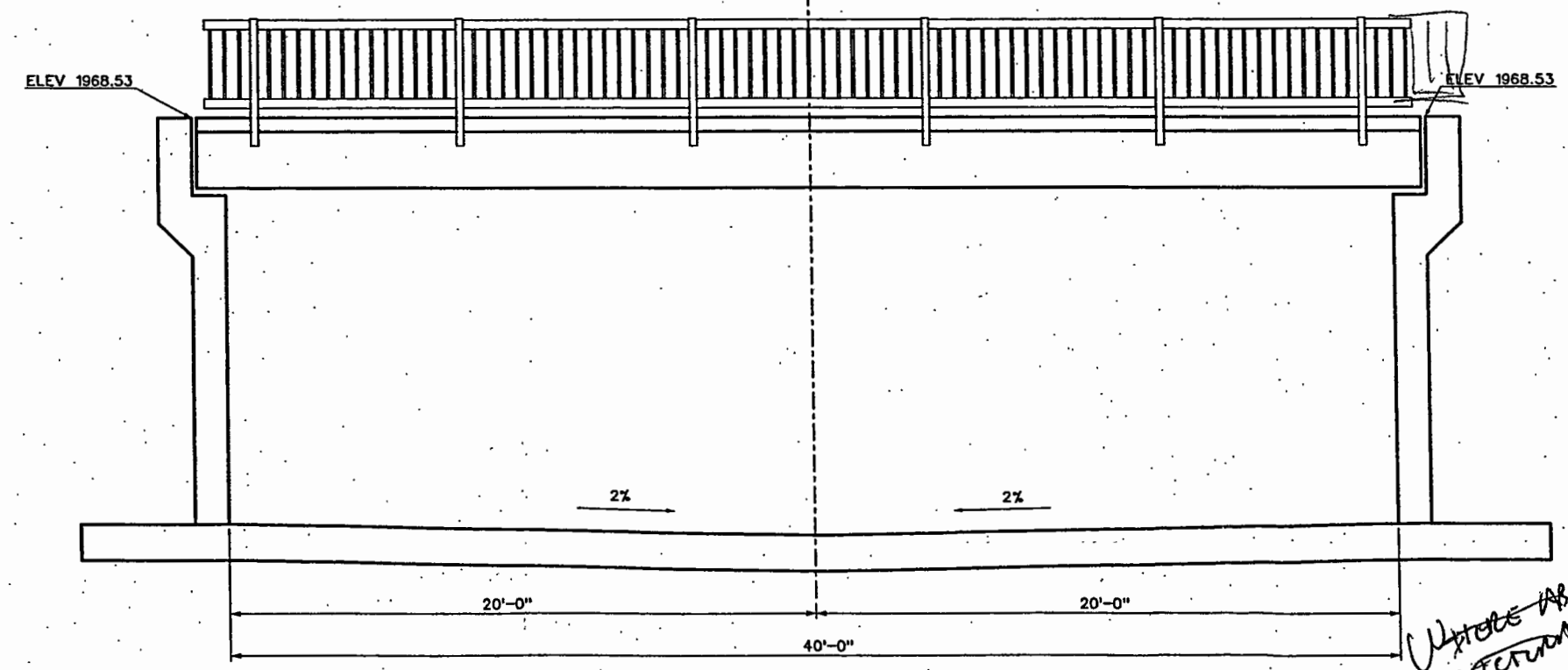
DESIGNED BY: DWS
DRAWN BY: ELY
CHECKED BY: 12/02/03
DATE:

SCALE	SHEET No
HORIZ: AS SHOWN	S-14
VERT: AS SHOWN	
FIELD BOOK NONE	
	L-1646B

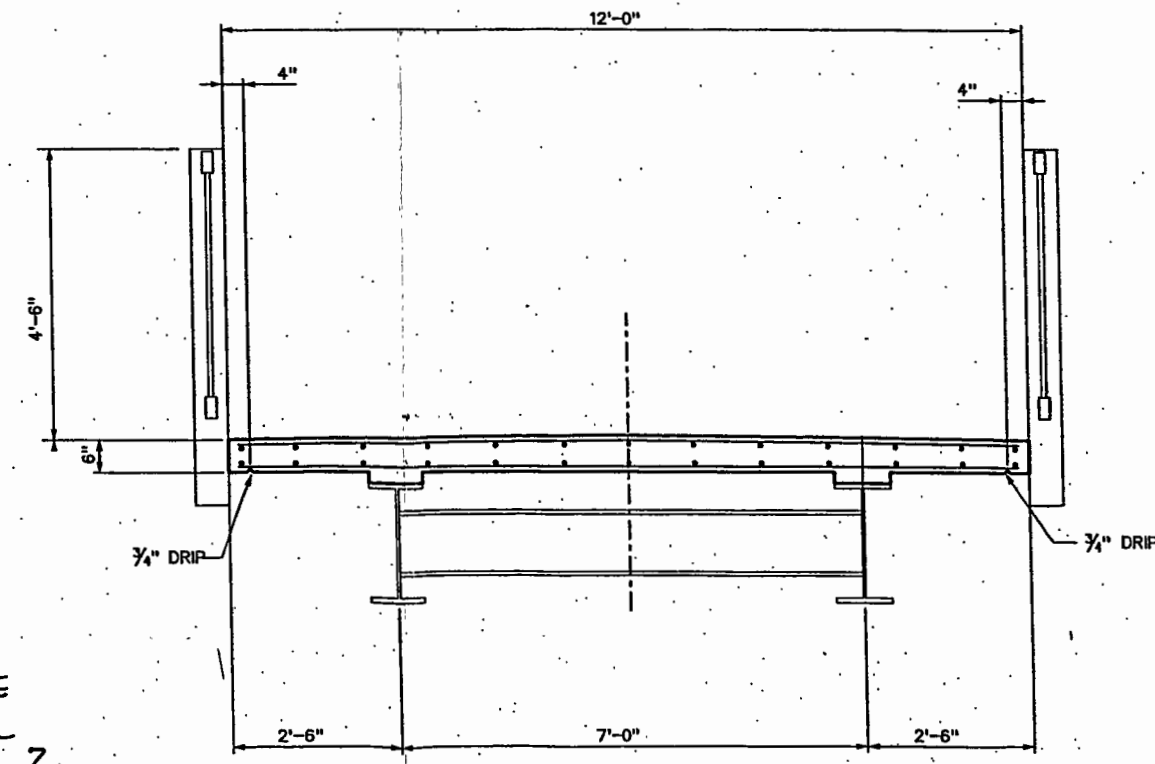


PEDESTRIAN BRIDGE 1 S-15

- NOTES:**
- THE FOLLOWING SPECIFICATIONS SHALL BE FOR A FULLY ENGINEERED CLEAR SPAN BRIDGE OF STEEL CONSTRUCTION AND SHALL BE REGARDED AS MINIMUM STANDARDS FOR DESIGN AND CONSTRUCTION. A NEWSAN BRIDGE DESIGNED, MANUFACTURED AND INSTALLED BY SKIP GIBBS COMPANY, INC., SCHOOL WAY & RAILROAD VALLEY, CA. 95470-0260, OR APPROVED EQUIVALENT SHALL BE PROVIDED.
 - DESIGN SPECIFICATIONS: AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1998", INTERIMS THROUGH 2002. AASHTO GUIDE SPECIFICATIONS FOR PEDESTRIAN BRIDGES, 1997 AND APPLICABLE INTERIMS.
 - LIVE LOAD: 85 PSF LOAD FACTOR DESIGN METHOD USED. LIVE LOAD DEFLECTION SHALL NOT EXCEED 1/1000 OF SPAN.
 - DECK CONCRETE SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. ALL REINFORCEMENT SHALL BE ASTM 615, GRADE 60.
 - ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A709 GRADE 50W.
 - RAILING HEIGHT ABOVE THE DECK SHALL BE 54 INCHES AND SHALL BE DESIGNED AS PER THE REQUIREMENTS OF AASHTO SECTION 2.7. RAILING SHALL BE SKIP GIBBS COMPANY, INC. "MADRAS TYPE" OR APPROVED EQUIVALENT.
 - GIRDER SHALL BE CAMBERED TO COMPENSATE FOR DEAD LOAD DEFLECTIONS.
 - ALL EXPOSED SURFACES OF SELF-WEATHERING STEEL SHALL BE CLEANED IN ACCORDANCE WITH STEEL STRUCTURES PAINTING COUNCIL SURFACE PREPARATION SPECIFICATIONS NO. 6. COMMERCIAL BLAST CLEANING SSPC-SP6.
 - DELIVERY OF THE BRIDGE SHALL BE MADE BY THE MANUFACTURER TO THE LOCATION OF THE BRIDGE SITE.
 - CHANNEL CONTRACTOR SHALL INSTALL THE BRIDGE SUPERSTRUCTURE AS PER MANUFACTURER'S REQUIREMENTS.
 - CONSTRUCTION OF THE CONCRETE DECK SHALL BE THE RESPONSIBILITY OF THE CHANNEL CONTRACTOR. GALVANIZED FORM DECK, SHOP ATTACHED, FOR CHANNEL CONTRACTOR'S USE IN POURING THE DECK SHALL BE THE RESPONSIBILITY OF BRIDGE MANUFACTURER.
 - THE BRIDGE MANUFACTURER SHALL BE RESPONSIBLE FOR THE DESIGN AND SUPPLYING OF ELASTOMERIC BEARING PADS. DETAILS OF BEARINGS, ANCHOR BOLTS AND EXPANSION JOINTS SHALL BE PROVIDED TO THE COUNTY PRIOR TO CONSTRUCTION OF THE ABUTMENTS FOR COORDINATION.
 - THE MANUFACTURER SHALL SUBMIT FOR THE COUNTY'S REVIEW DESIGN CALCULATIONS AND COMPLETE PLANS OF THE SUPERSTRUCTURE.
 - CALCULATIONS AND PLANS SHALL BE SIGNED AND SEALED BY AN ENGINEER LICENSED TO PRACTICE CIVIL ENGINEERING IN THE STATE OF NEVADA.



BRIDGE ELEVATION



TYPICAL SECTION

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

REV No	DATE	DESCRIPTION	APPROVED

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



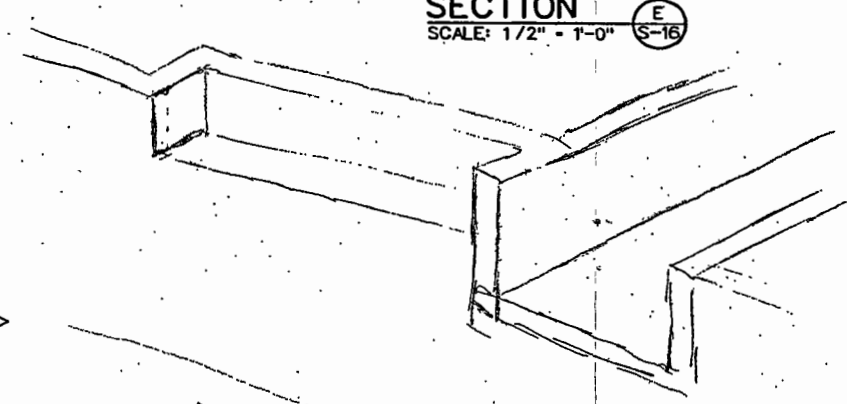
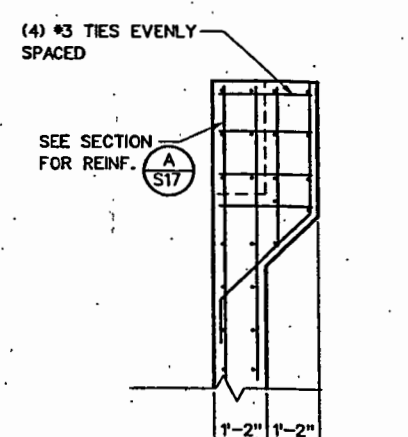
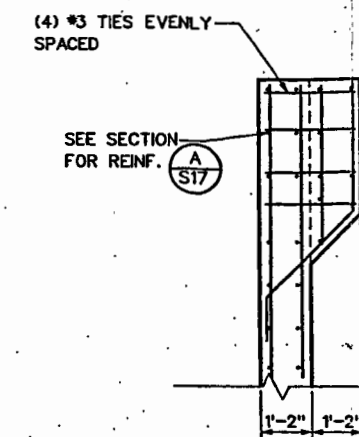
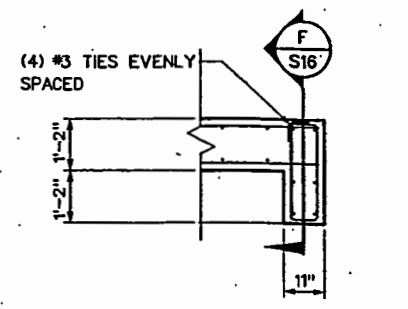
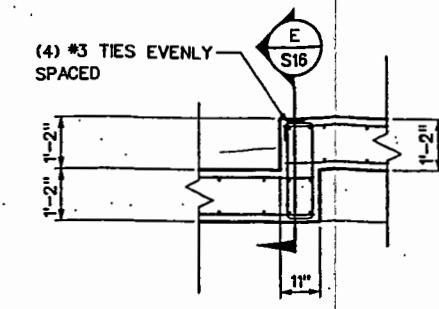
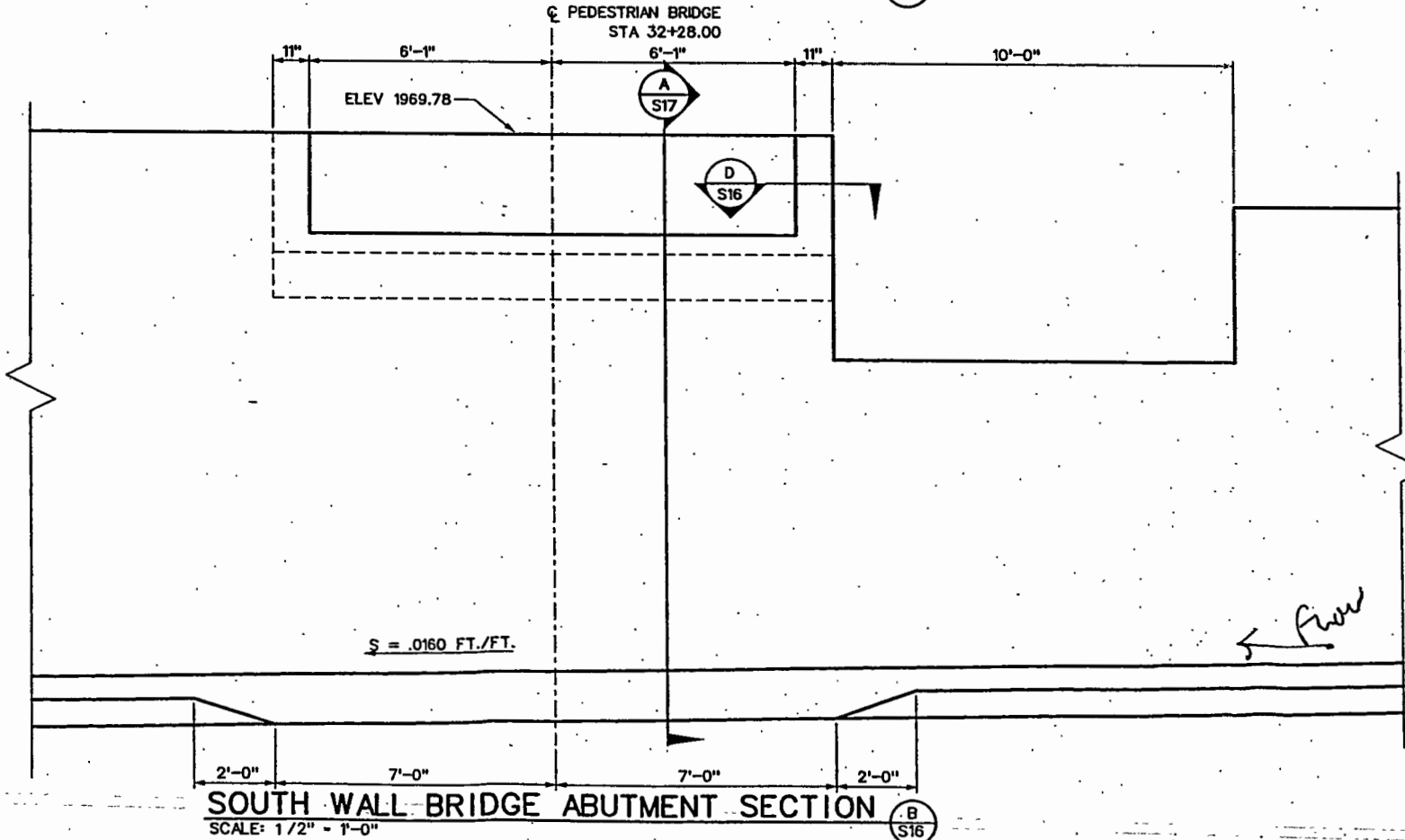
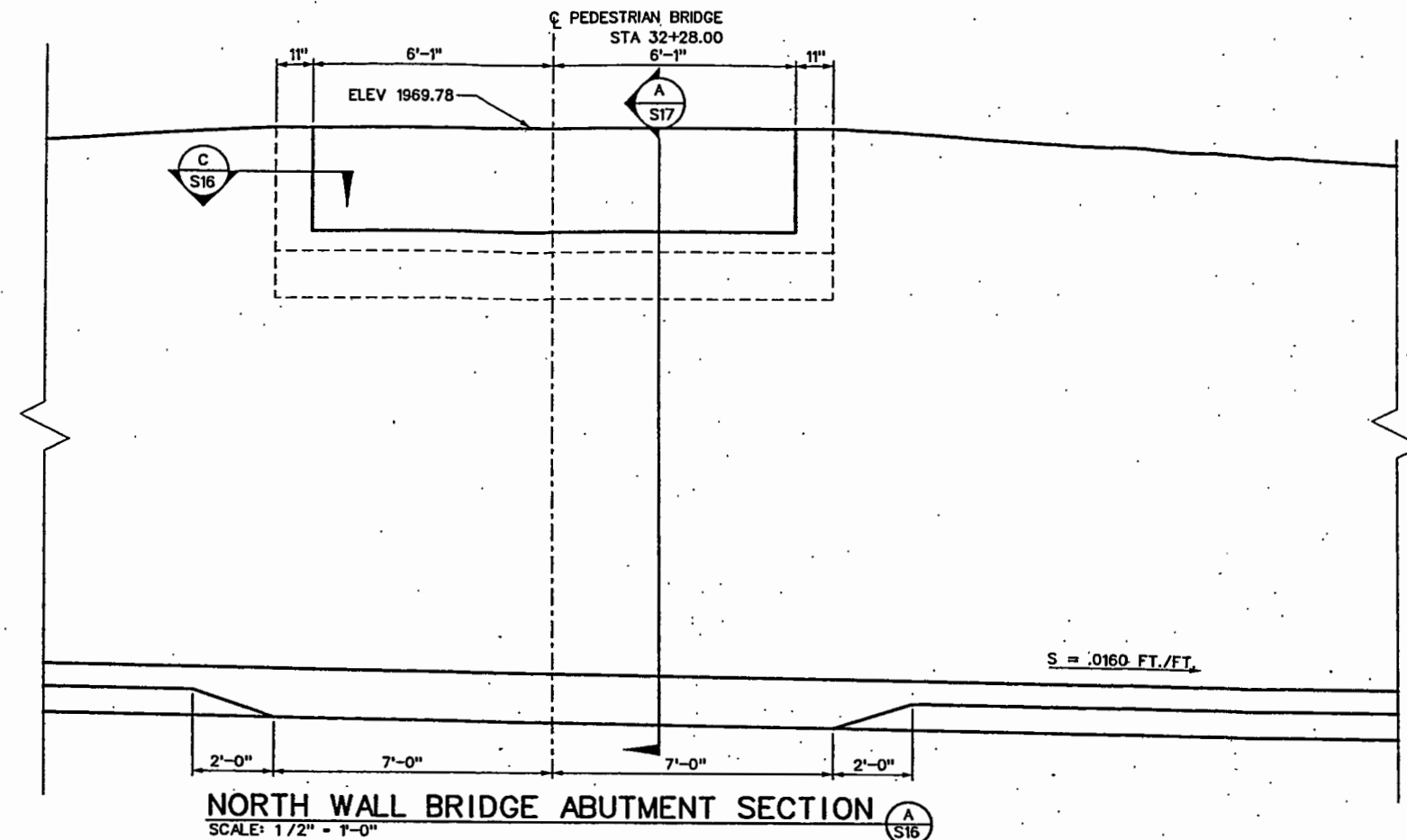
FLAMINGO WASH
PEDESTRIAN BRIDGE

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY:	DWS
DRAWN BY:	ELY
CHECKED BY:	
DATE:	12/02/03

SCALE	SHEET No
HORIZ: AS SHOWN	S-15
VERT: AS SHOWN	
FIELD BOOK NONE	



ORIENTATION

REV No	DATE	DESCRIPTION	APPROVED

MWH
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



FLAMINGO WASH
TYPICAL BRIDGE ABUTMENT SECTION
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

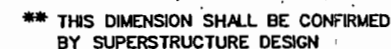
100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY:	DWS
DRAWN BY:	ELY
CHECKED BY:	
DATE:	12/02/03

SCALE	SHEET No
HORIZ: AS SHOWN	S-16
VERT: AS SHOWN	
FIELD BOOK NONE	

I-1646B

R²H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 CRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070
00019-S7.DG



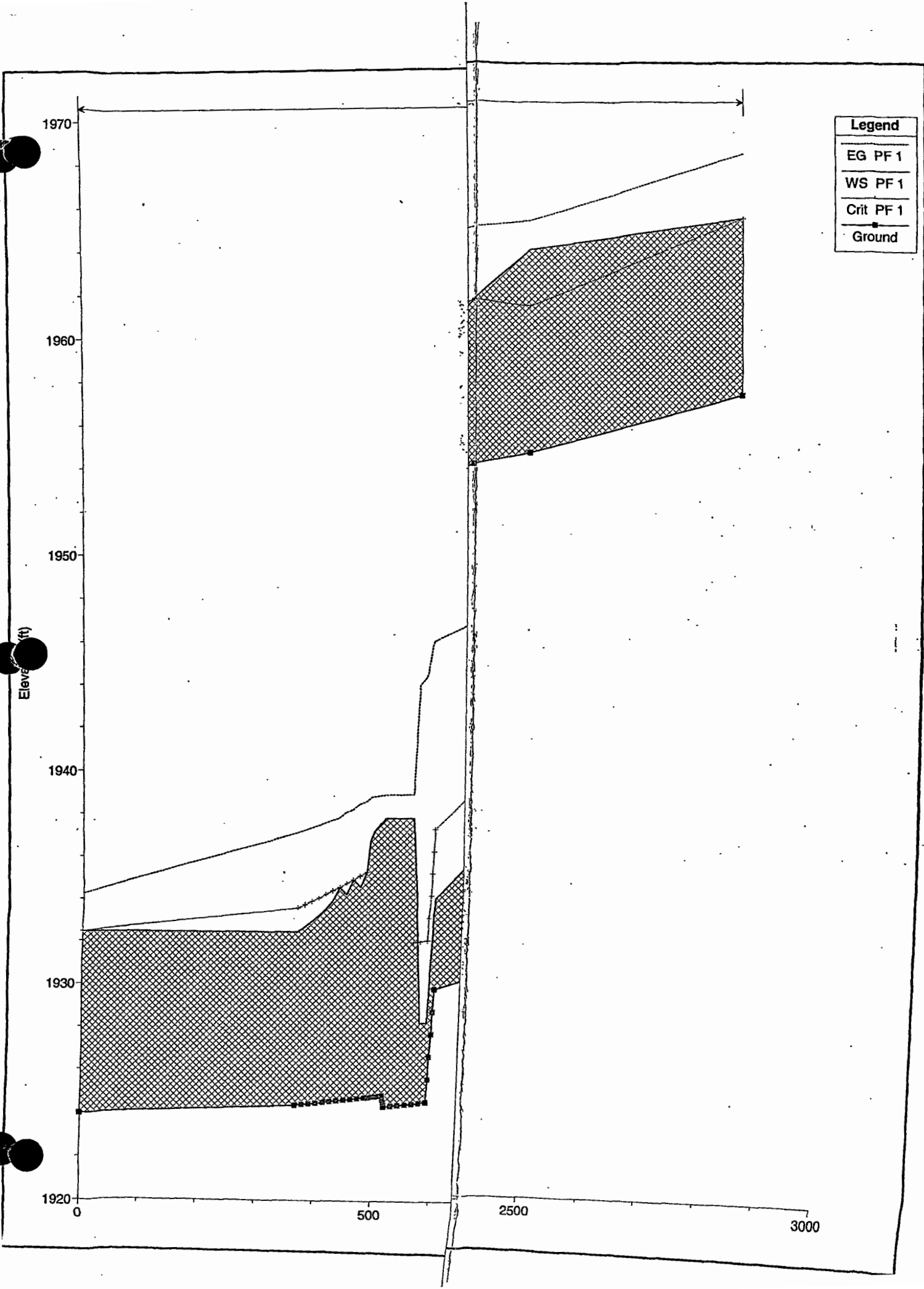


SCALE: 1/2" = 1'-0"

00019-S7.DG

100% SUBMITTAL
NOT FOR CONSTRUCTION

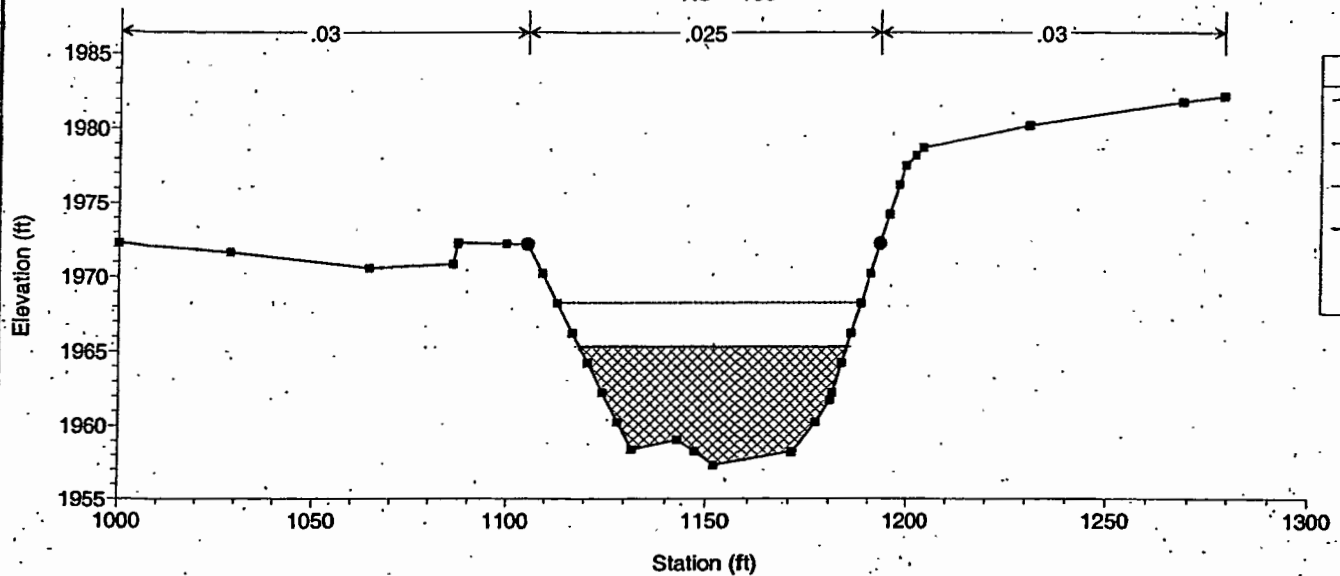
1-1645B



Legend	
EG PF 1	
WS PF 1	
Crit PF 1	
Ground	

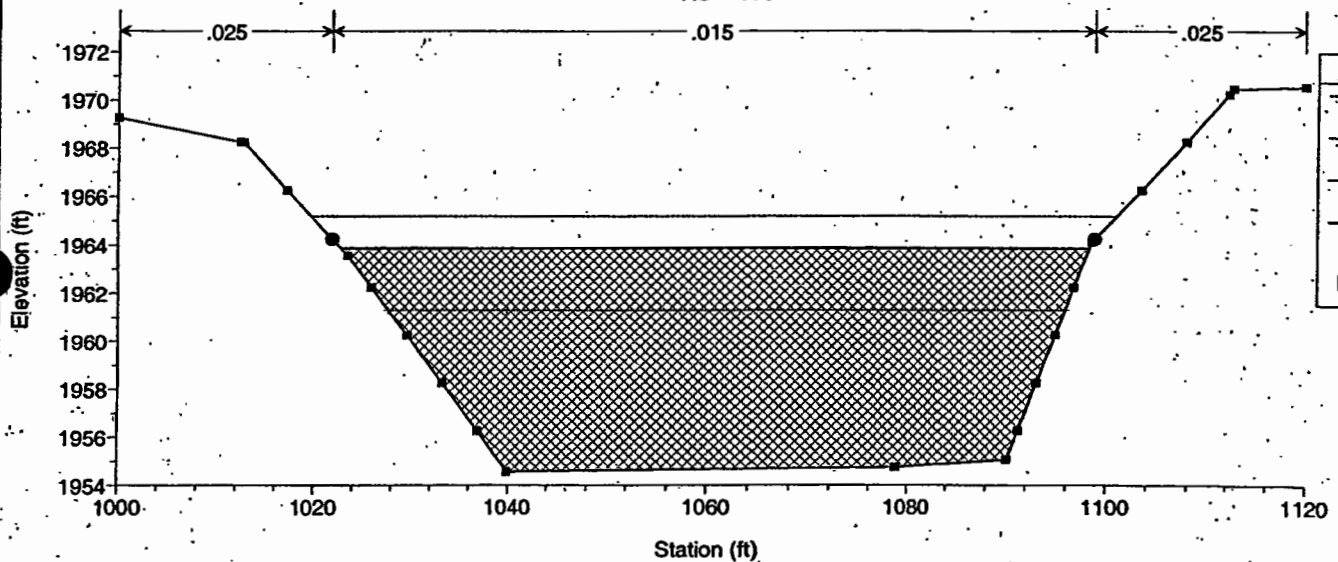
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 180



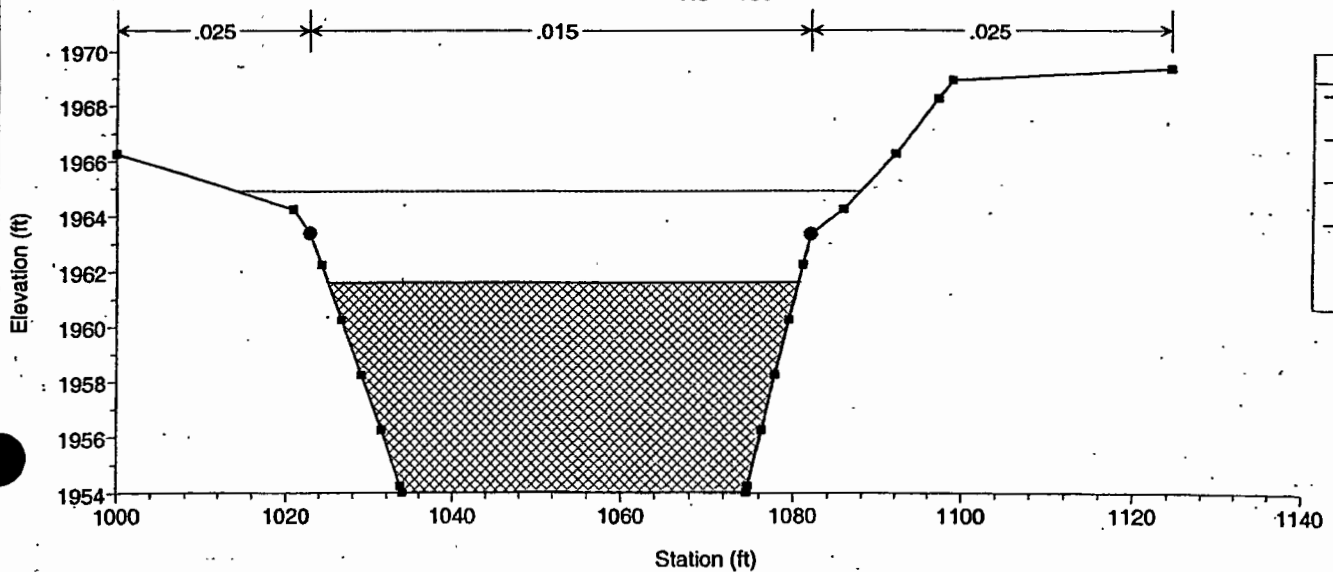
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 170



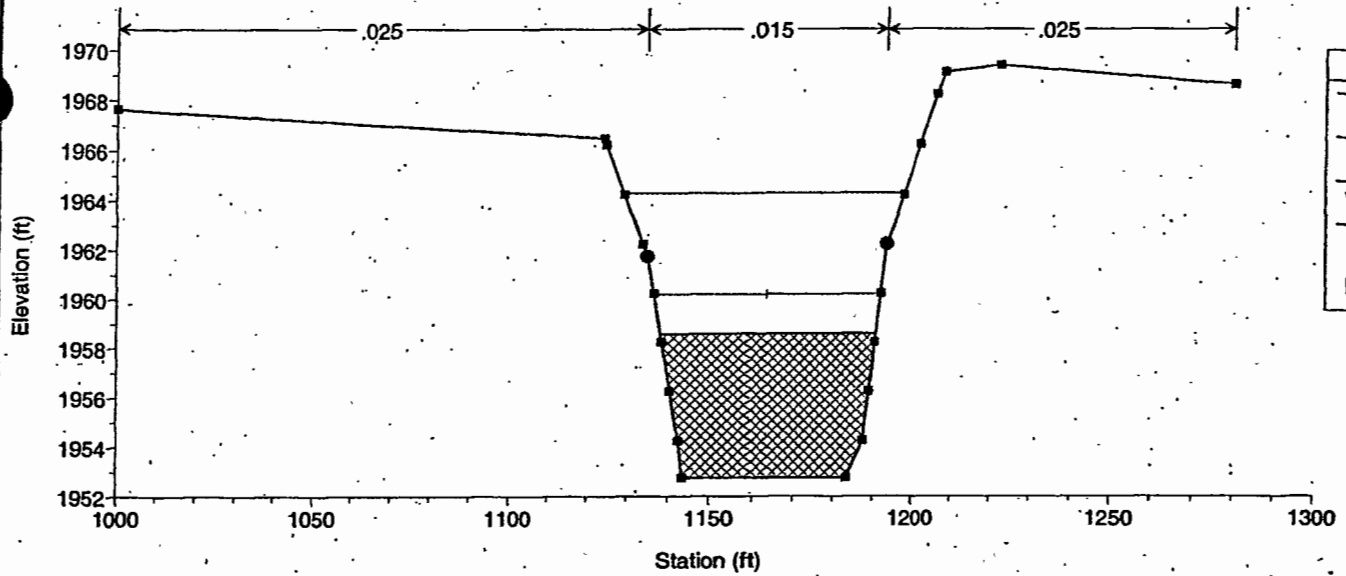
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 160



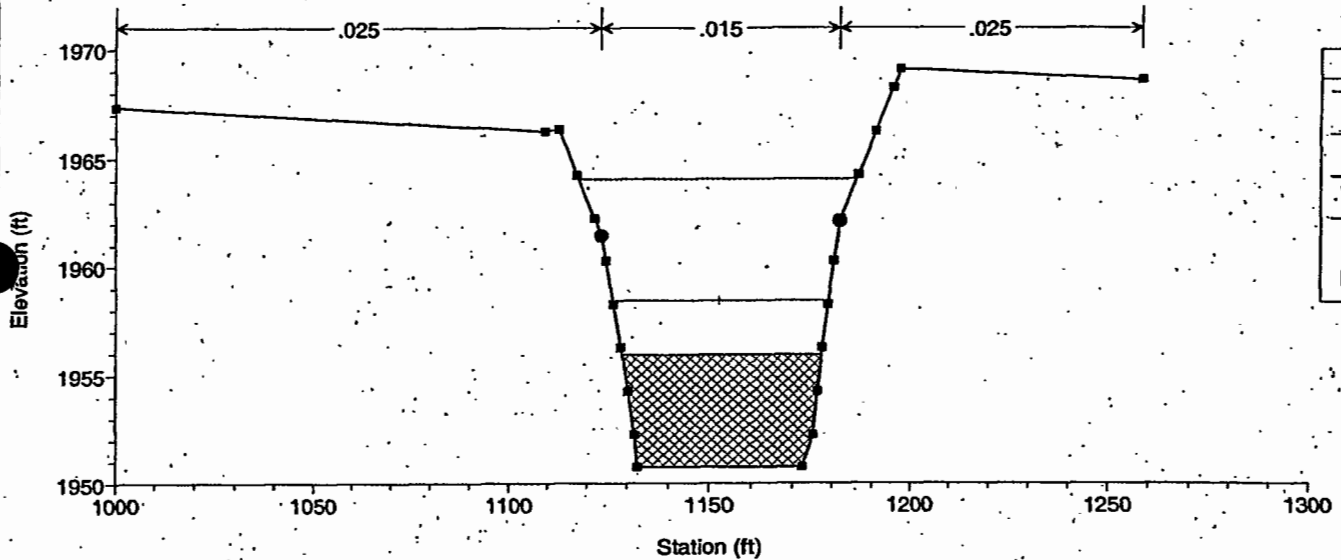
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 150



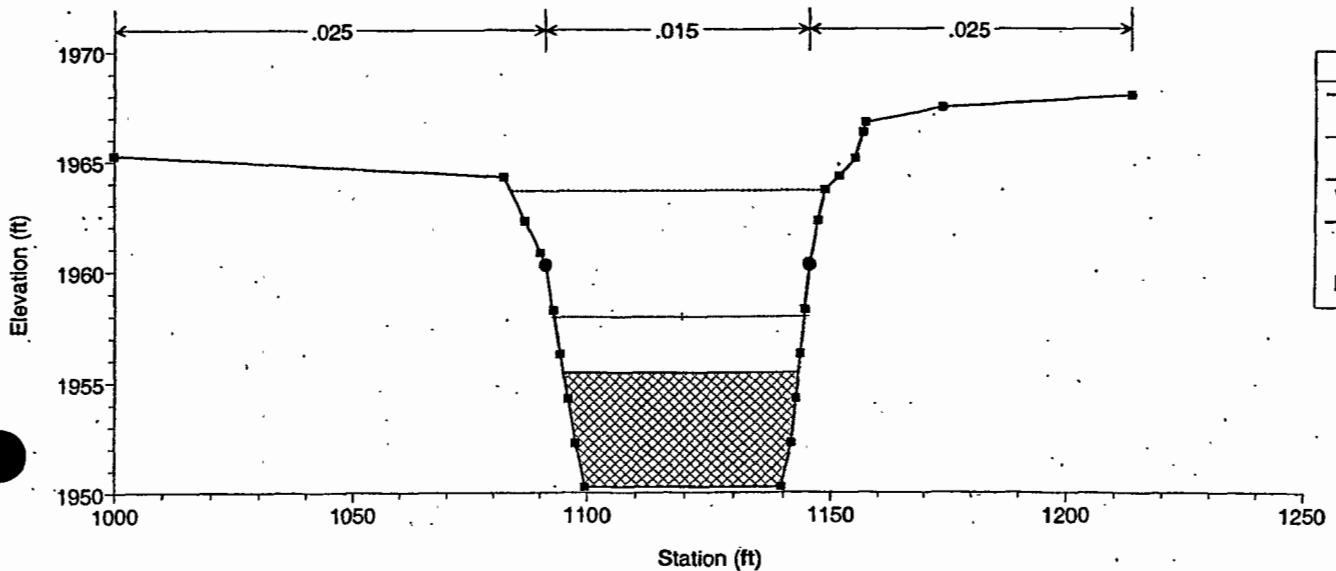
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 140



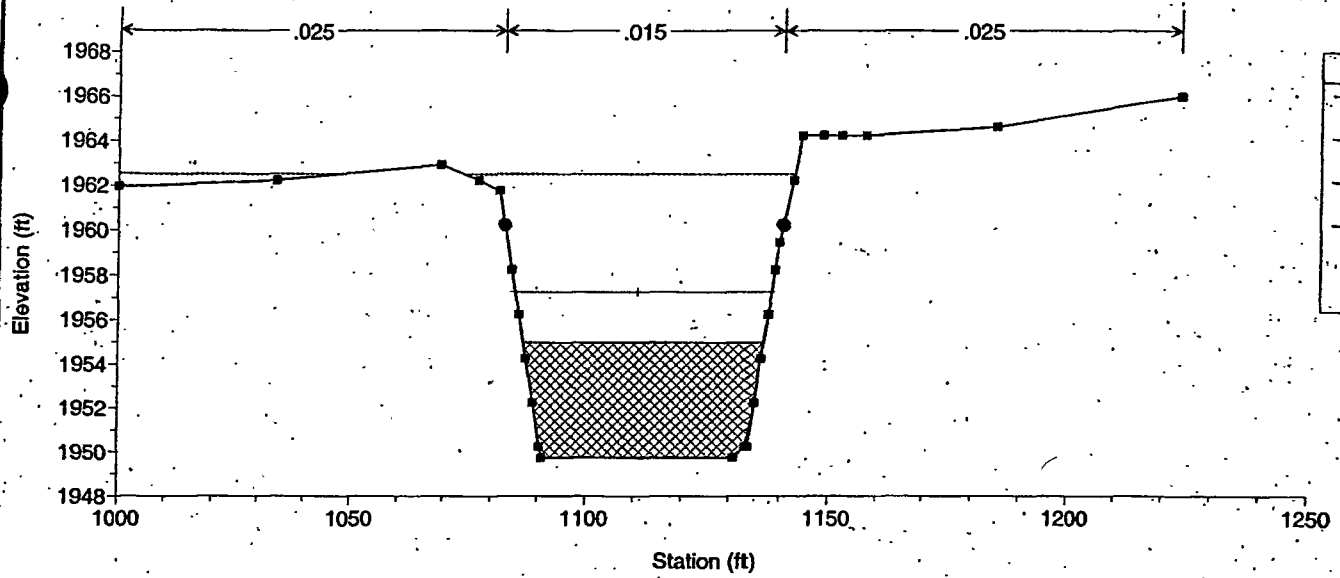
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 130



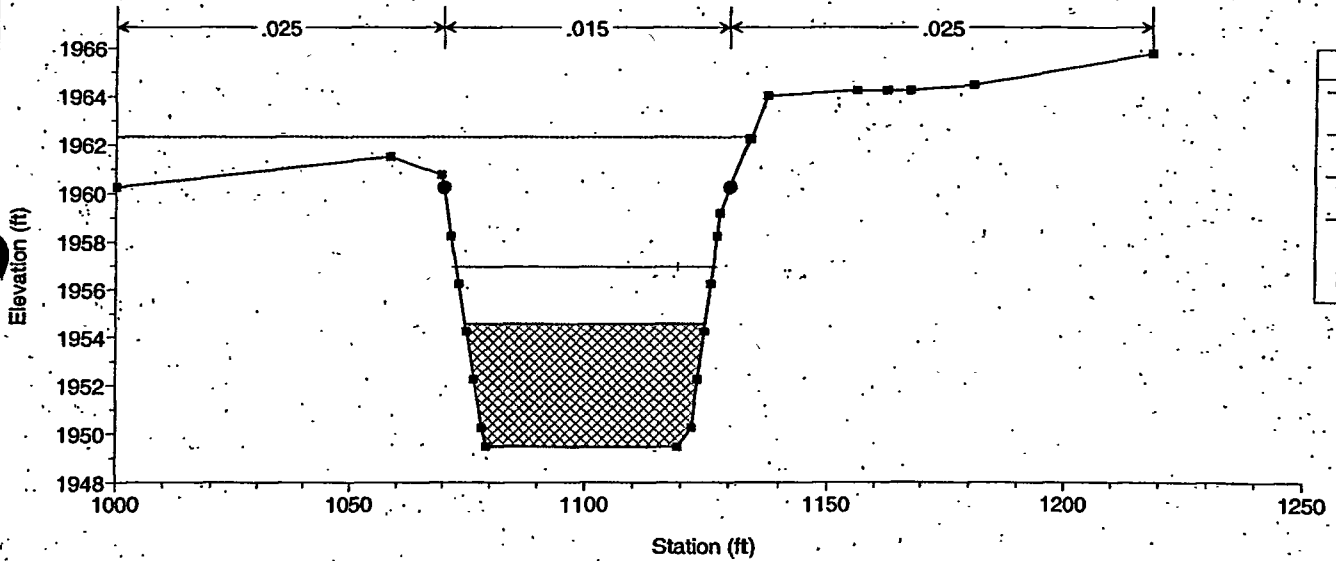
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 120



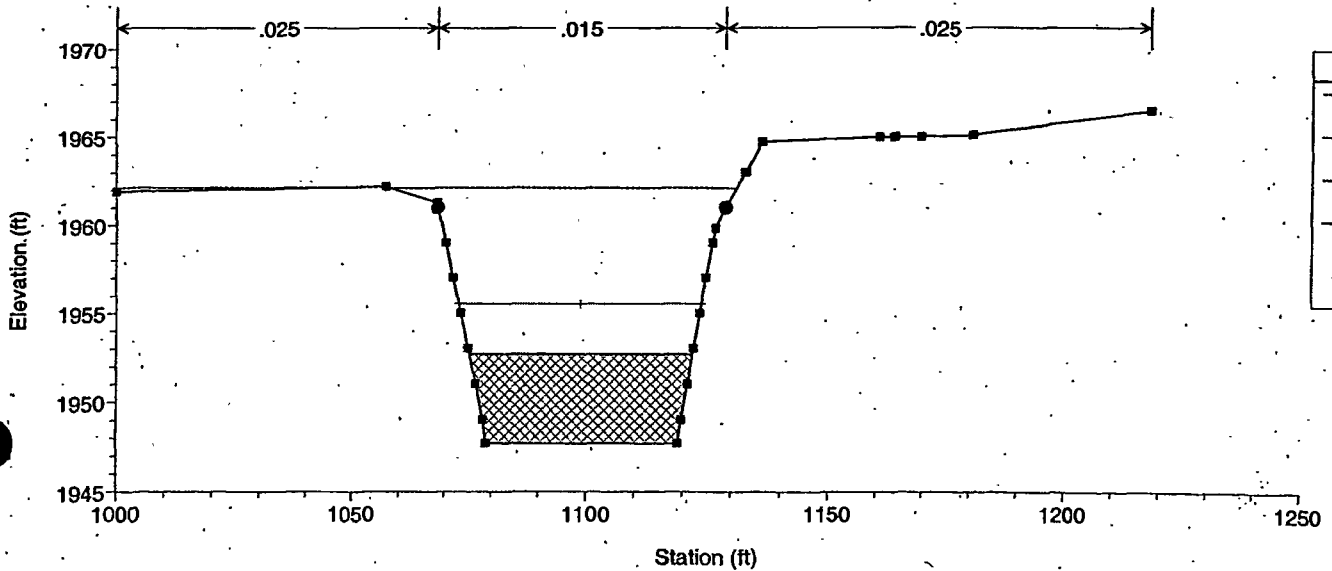
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 110



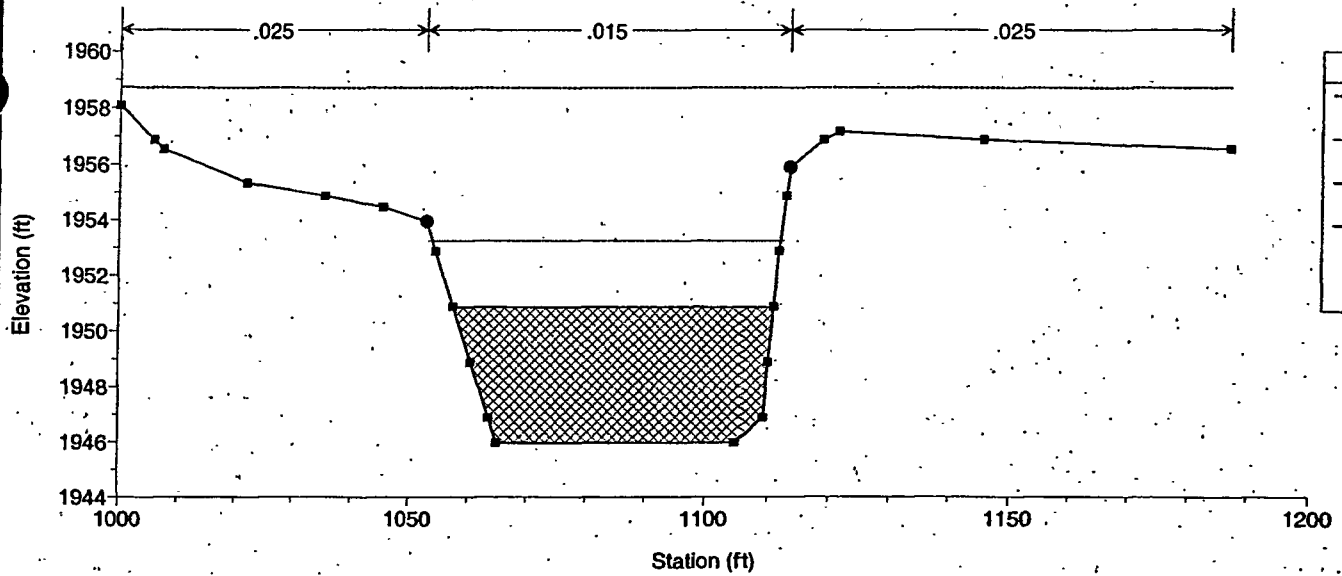
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 100



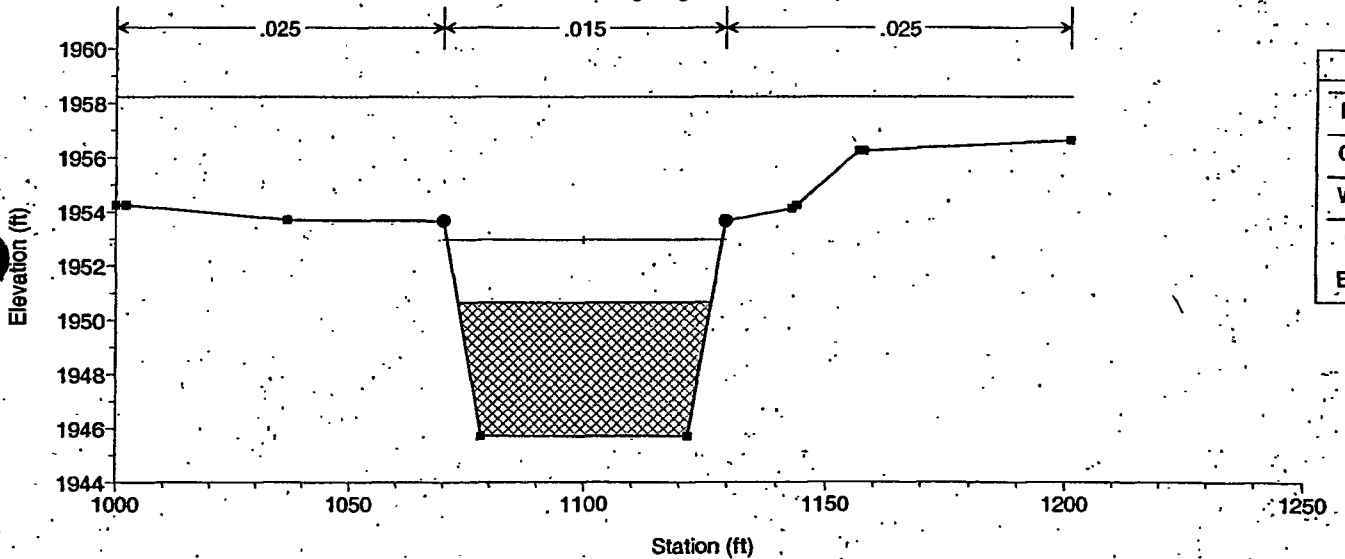
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 90



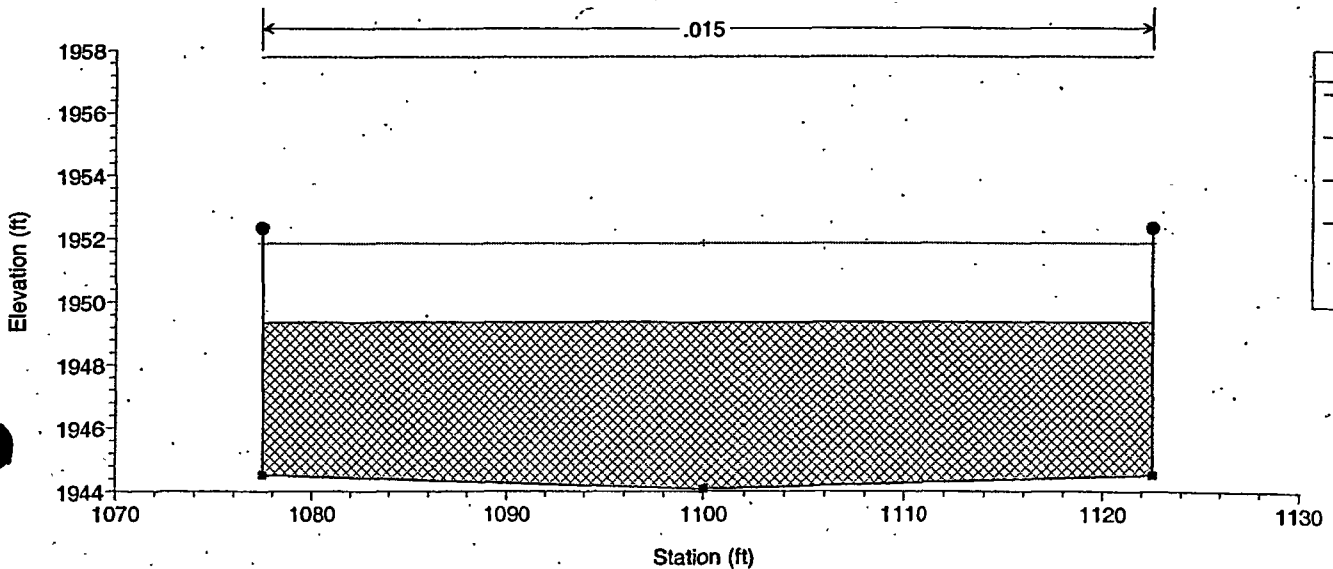
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 81 Beginning of Phase 1 Improvements



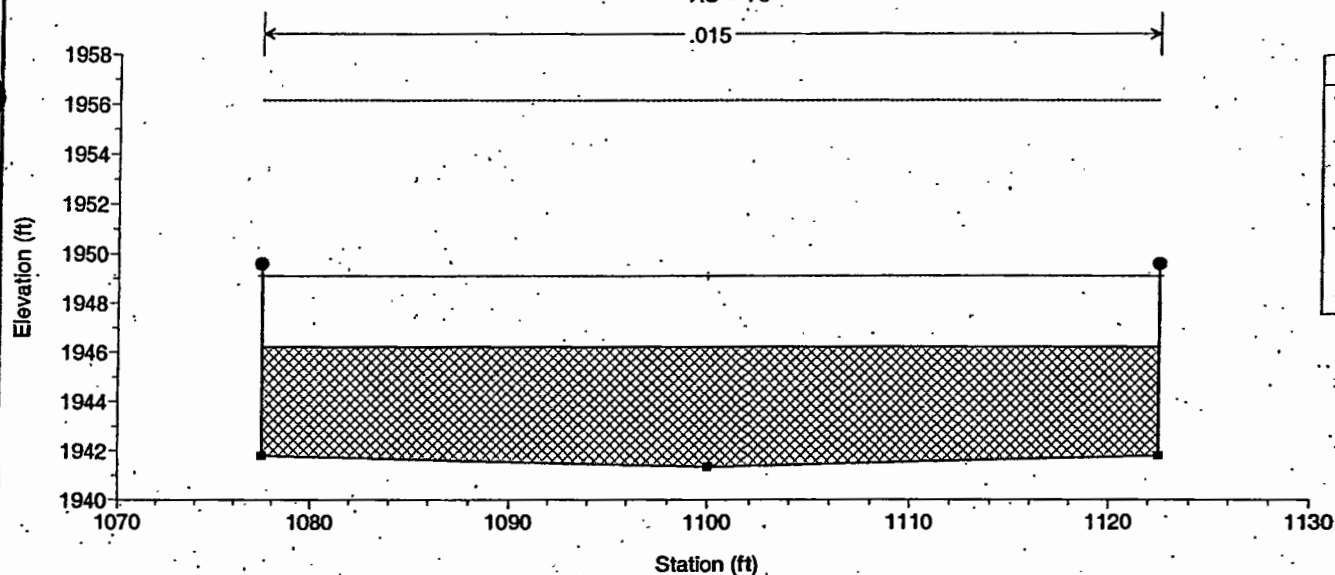
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 75



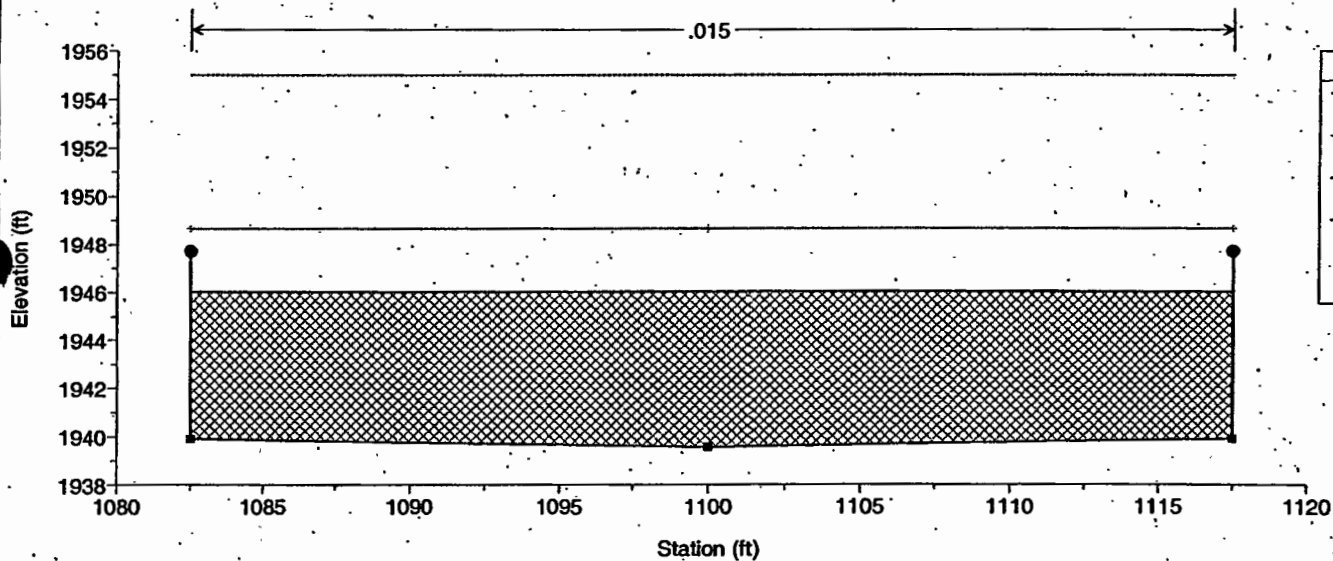
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 70



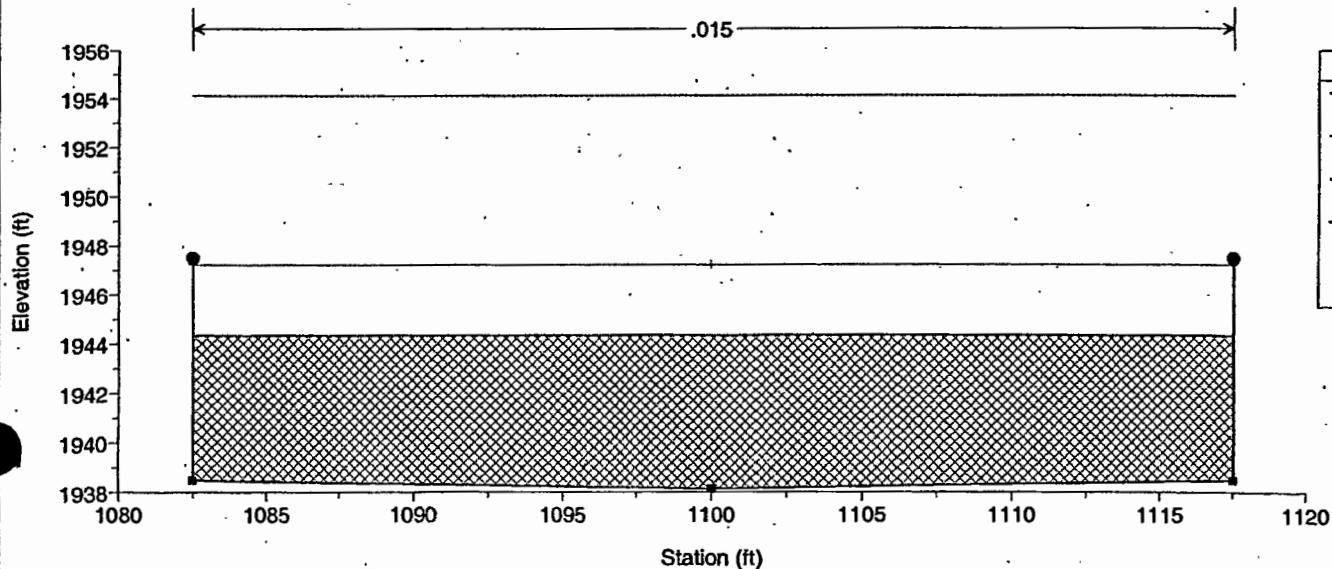
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 65



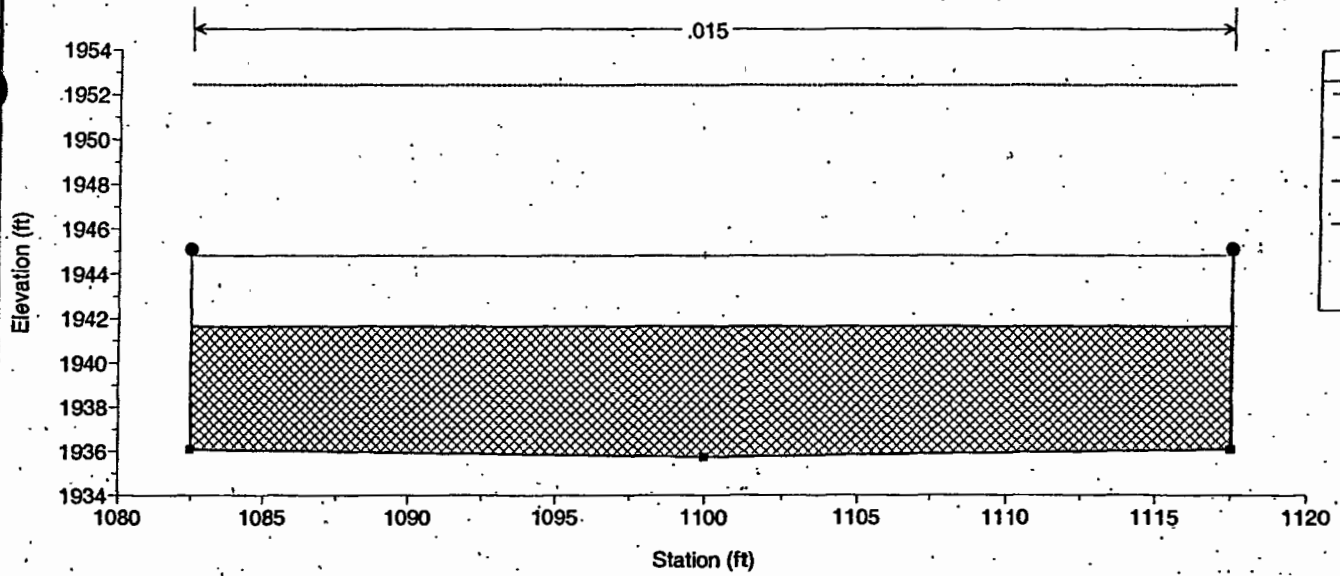
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 60



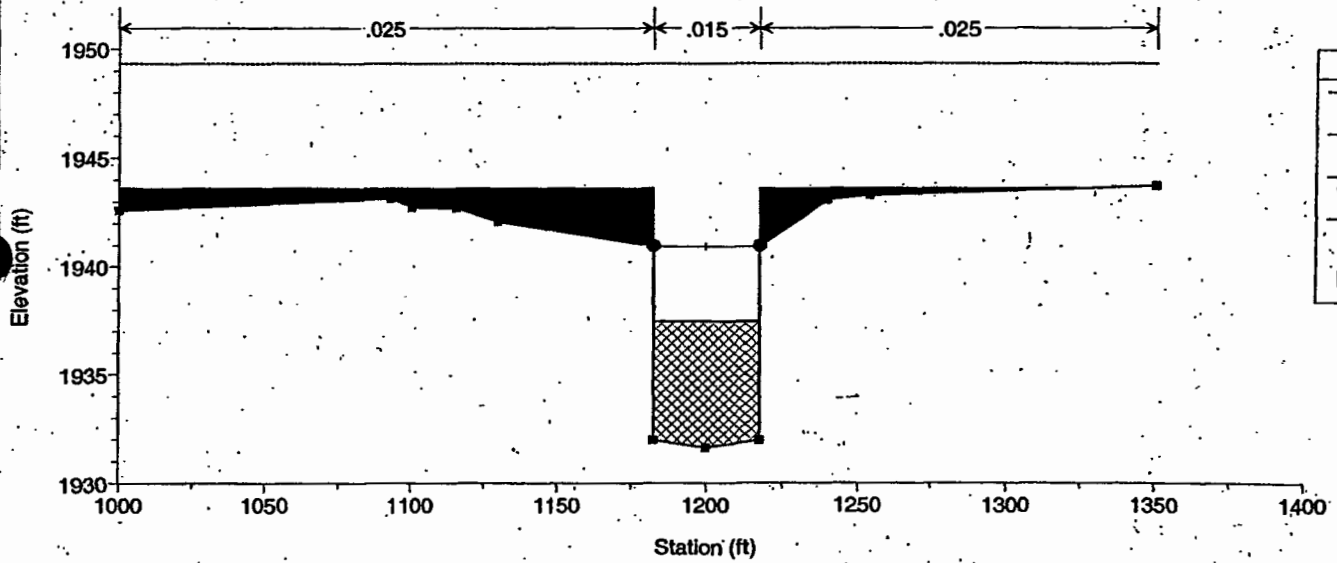
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 55



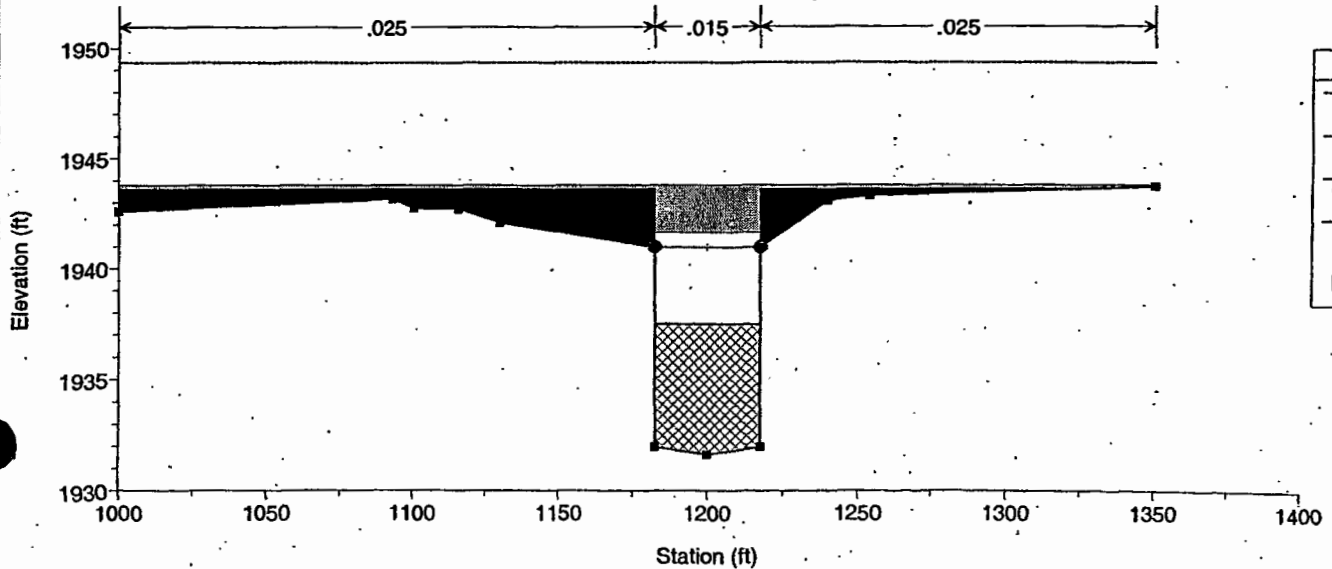
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 50



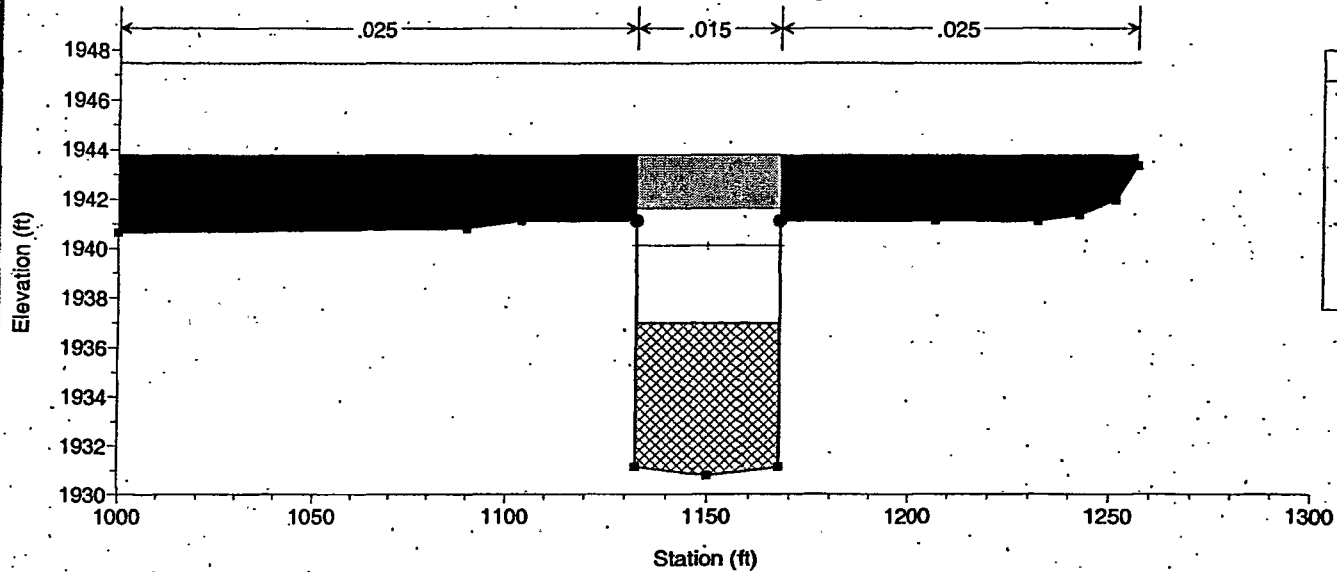
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 45 BR Bridge #1



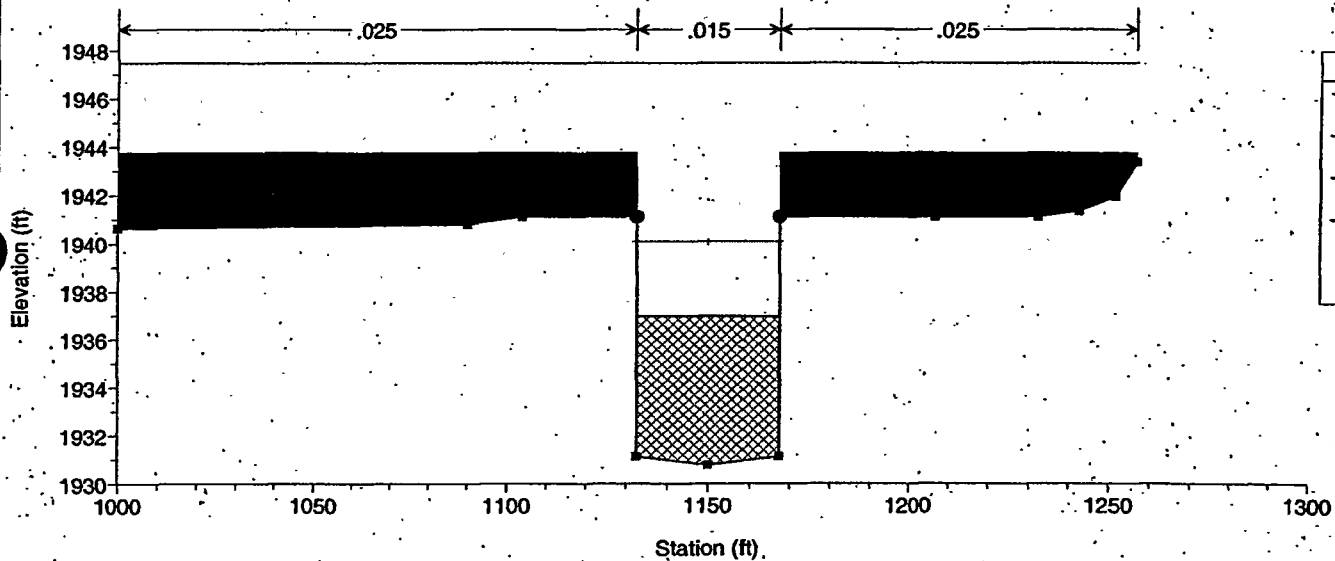
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 45 BR Bridge #1



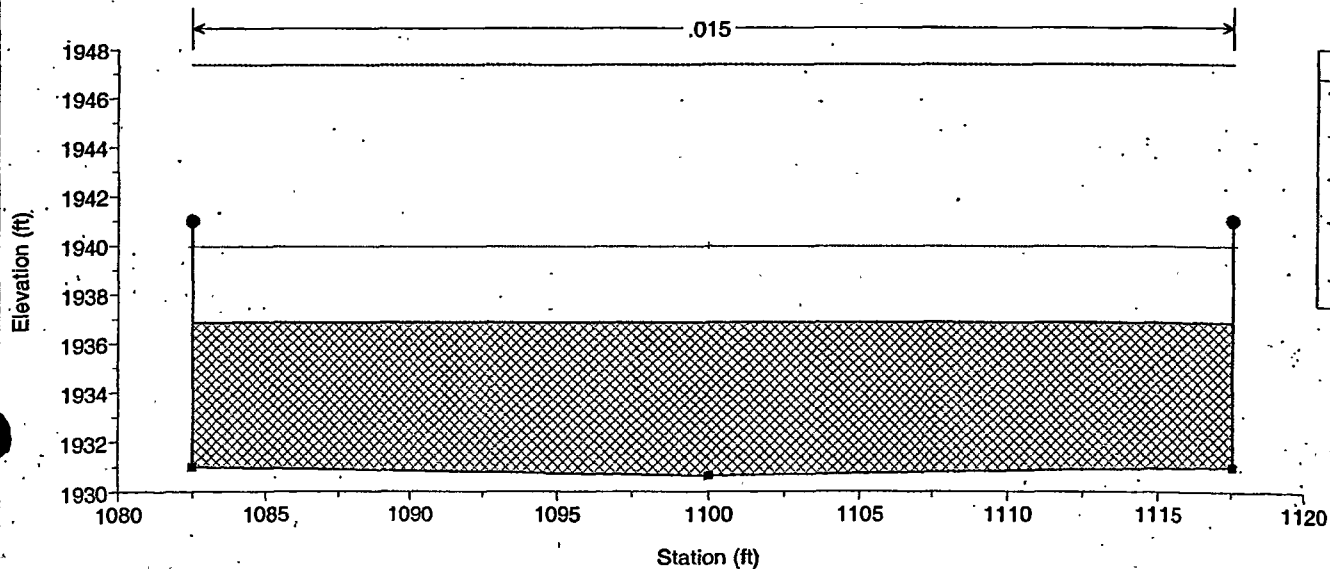
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 40

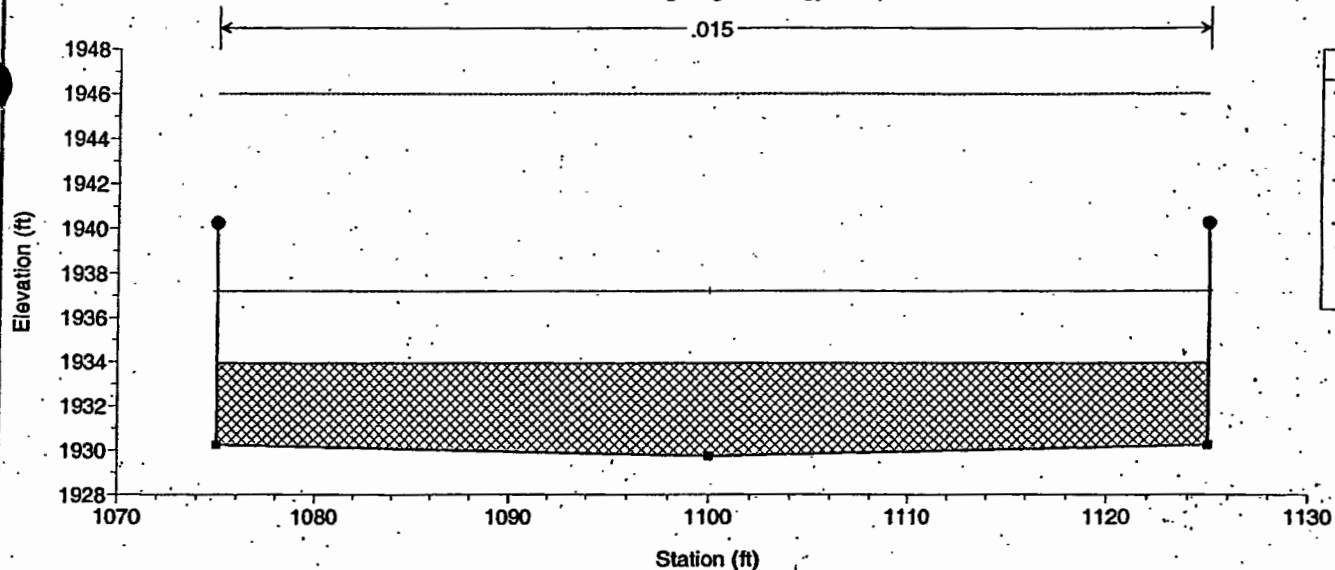


Flamingo Wash at Spencer Plan: Post Project 12/1/2003

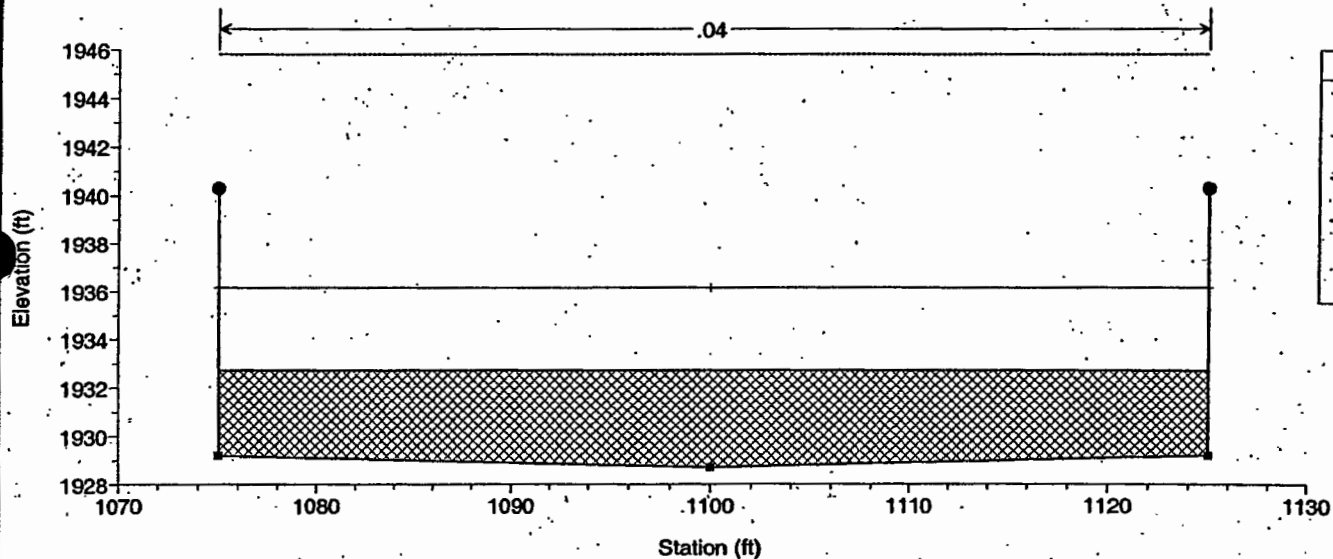
RS = 35



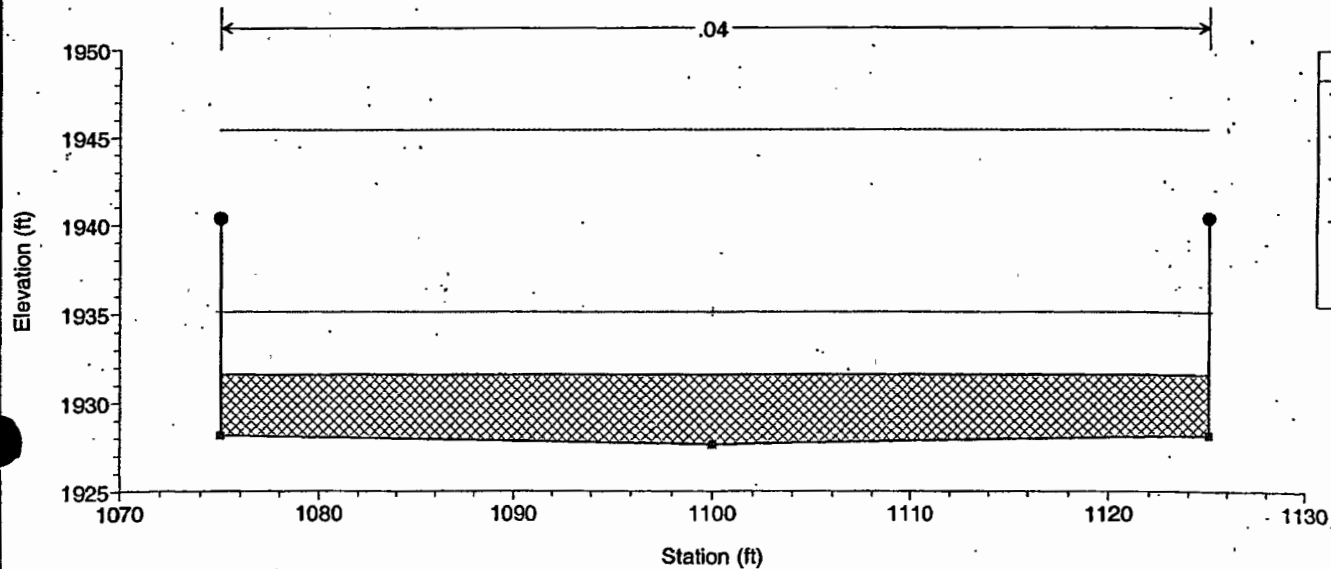
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 30 Beginning of Energy Dissipator



Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 29.6*

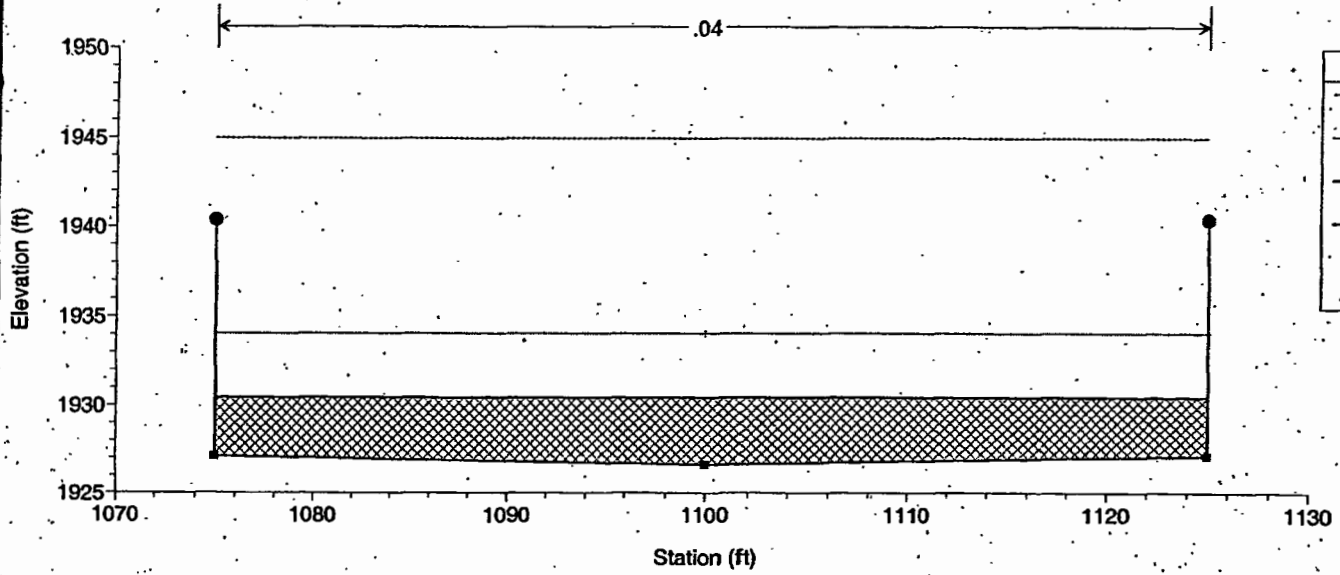


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 29.2*



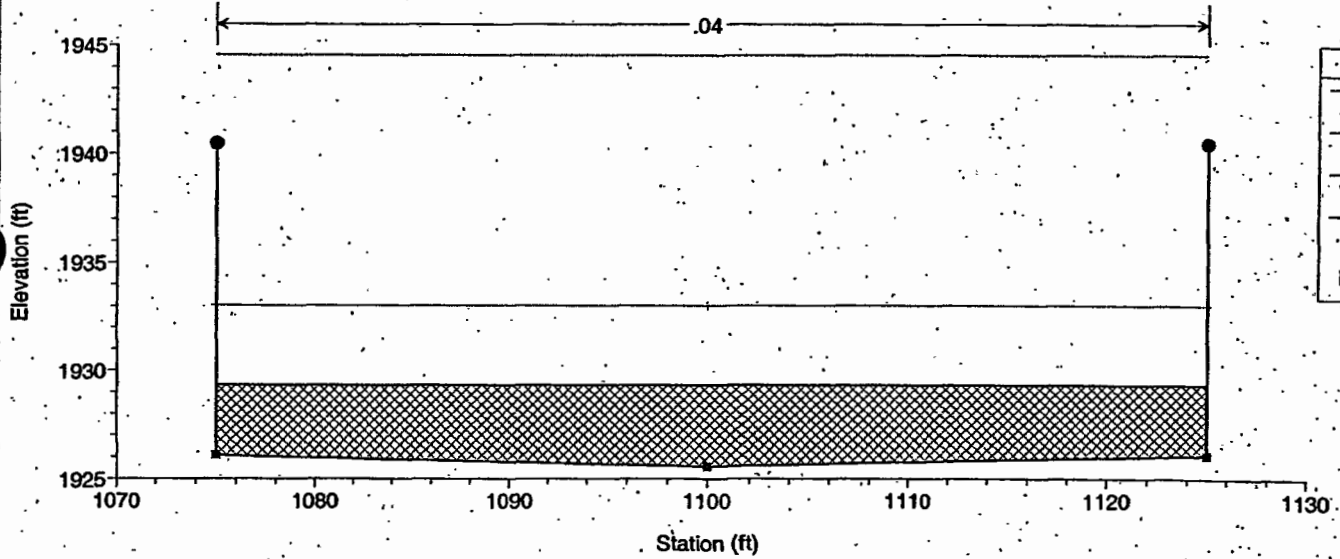
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 28.8°



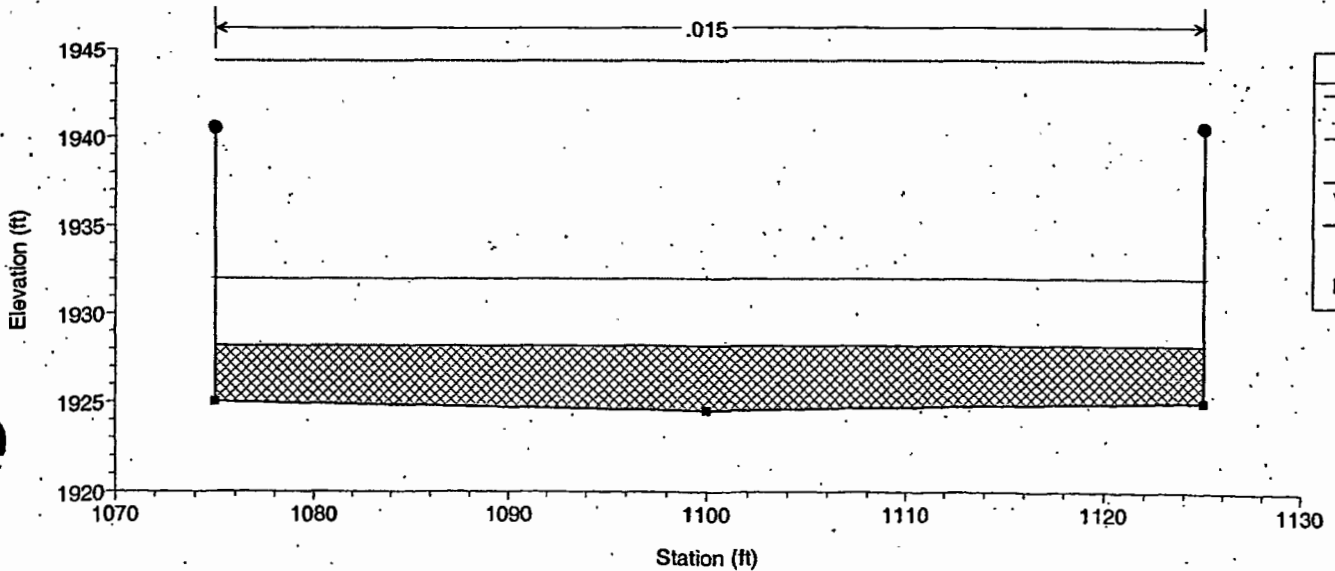
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 28.4°



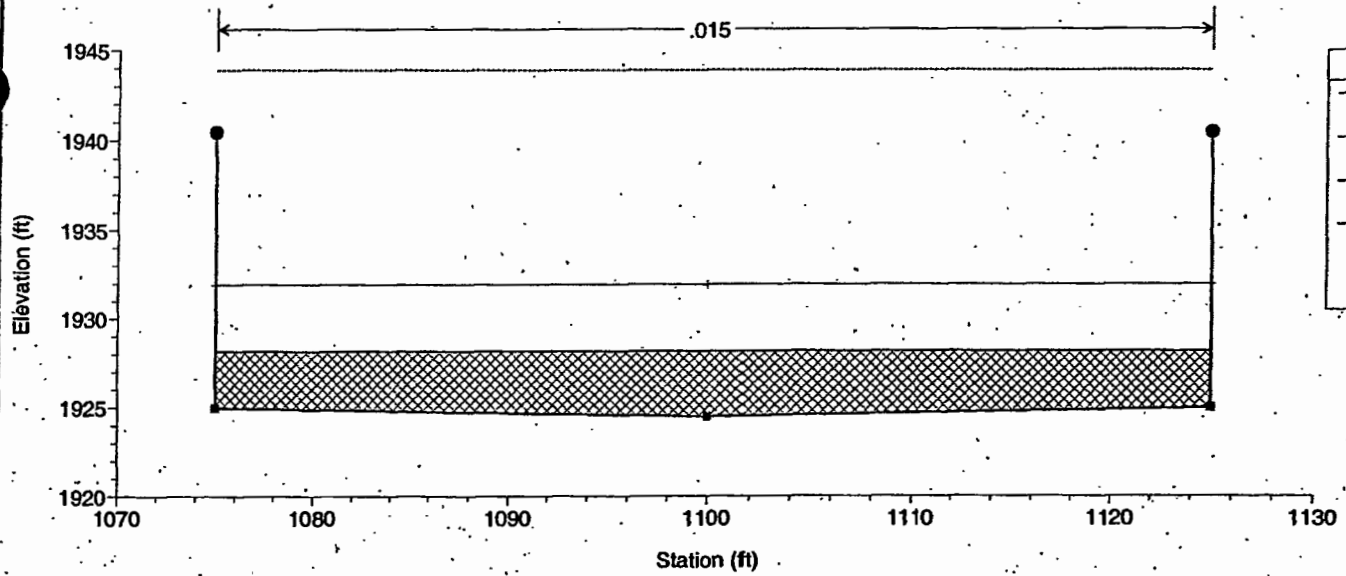
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 28



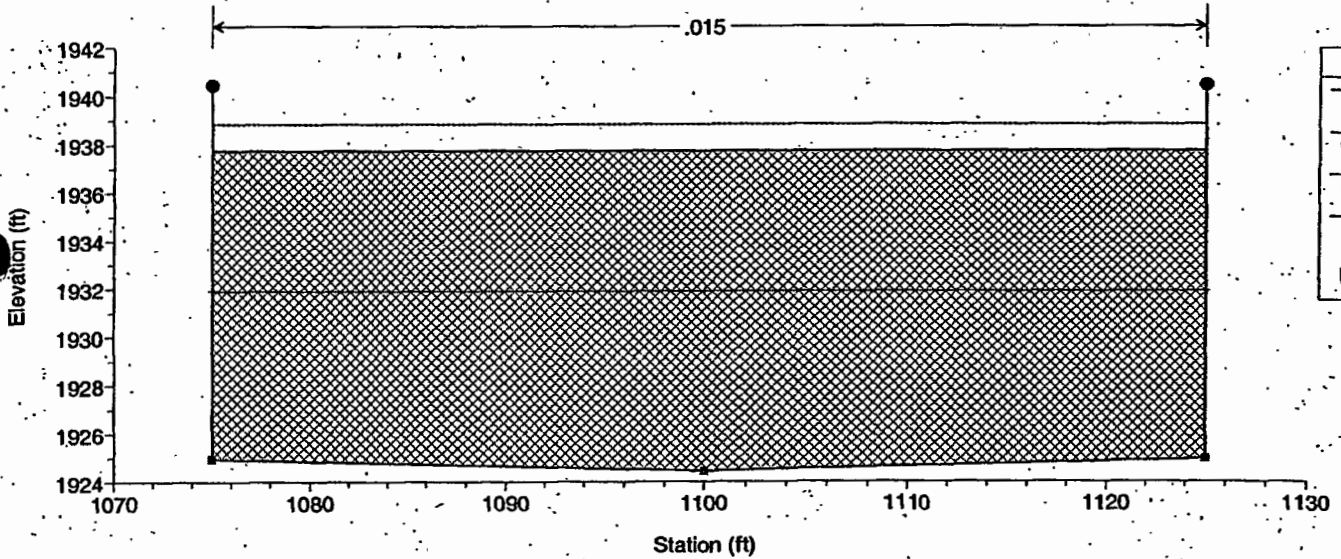
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 27.6666*



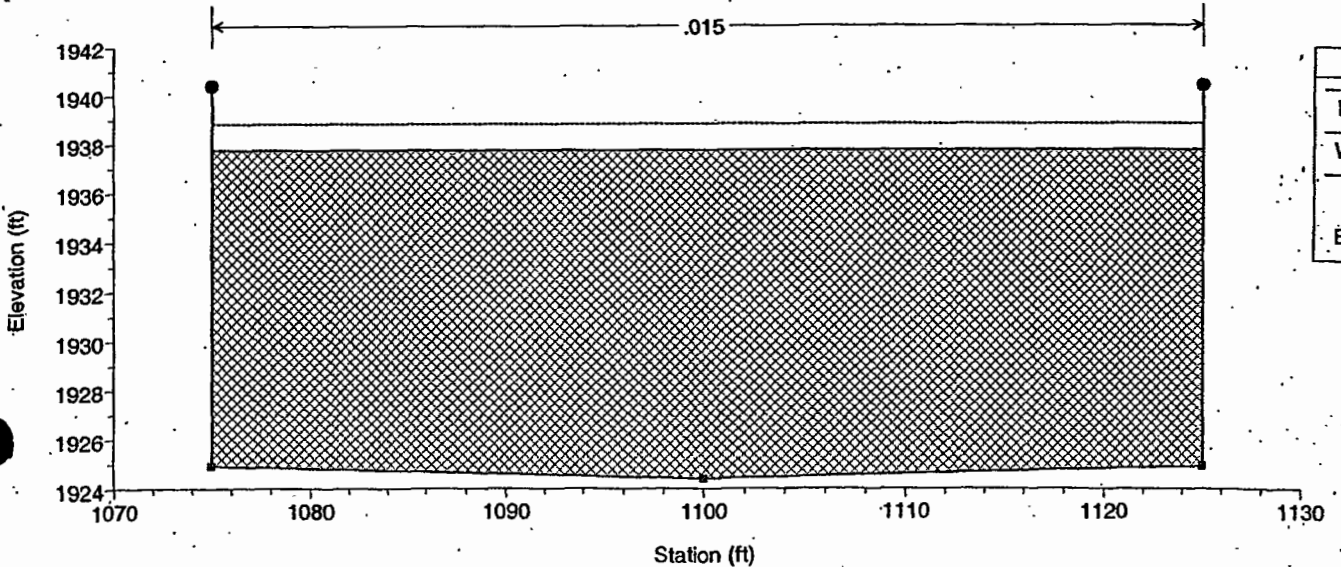
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 27.3333*



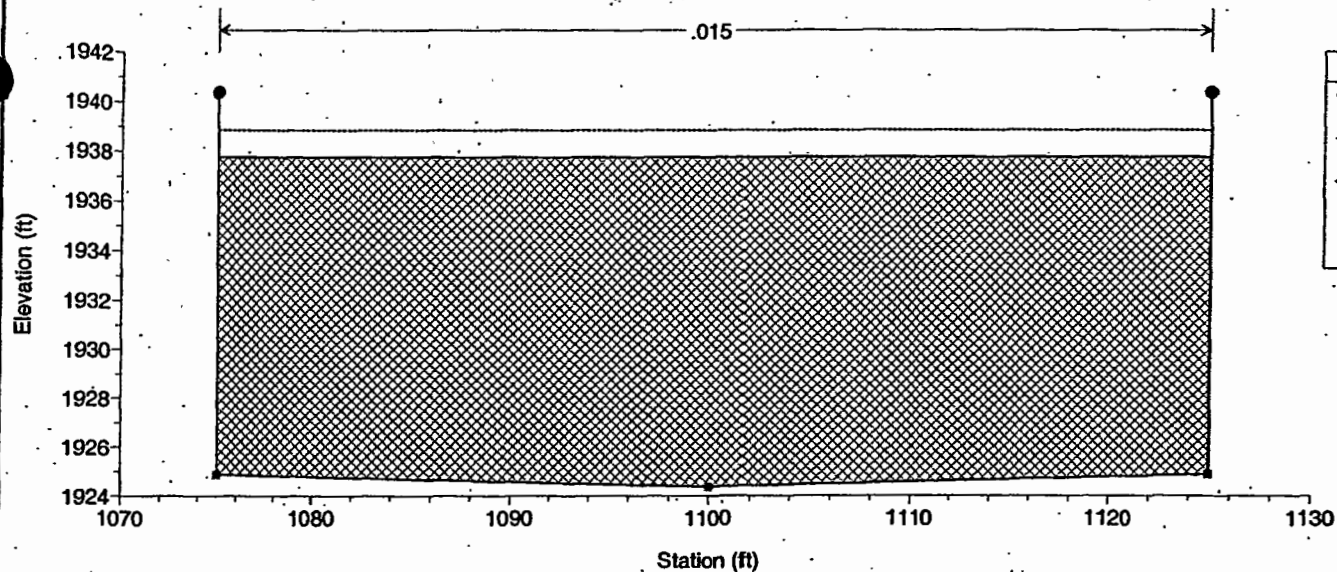
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 27.*



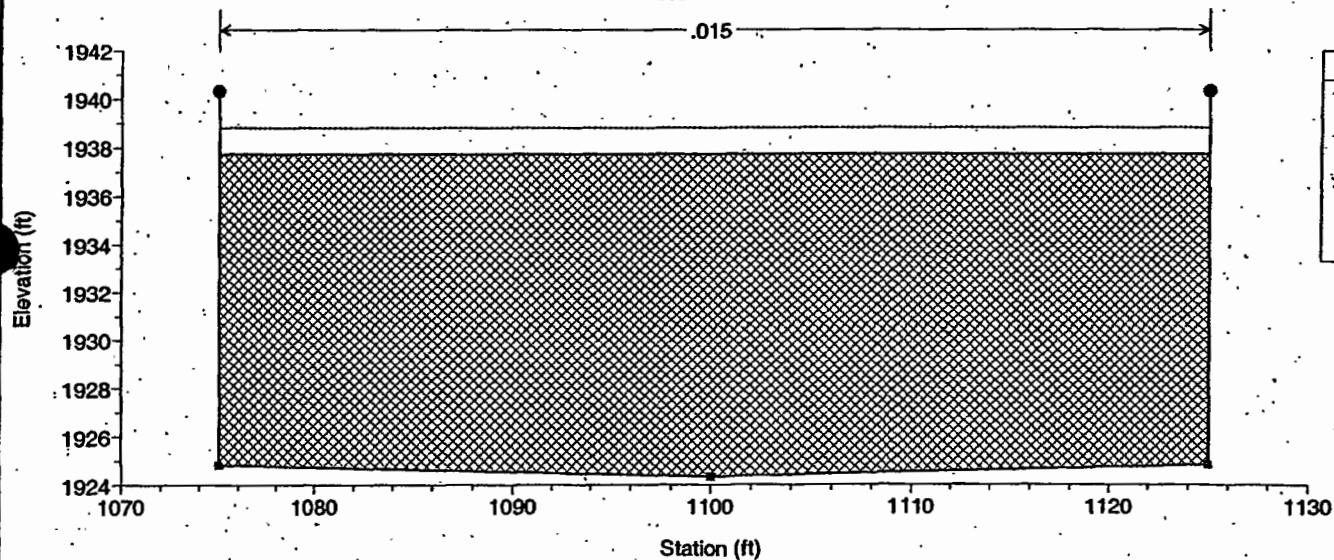
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 26.6666°



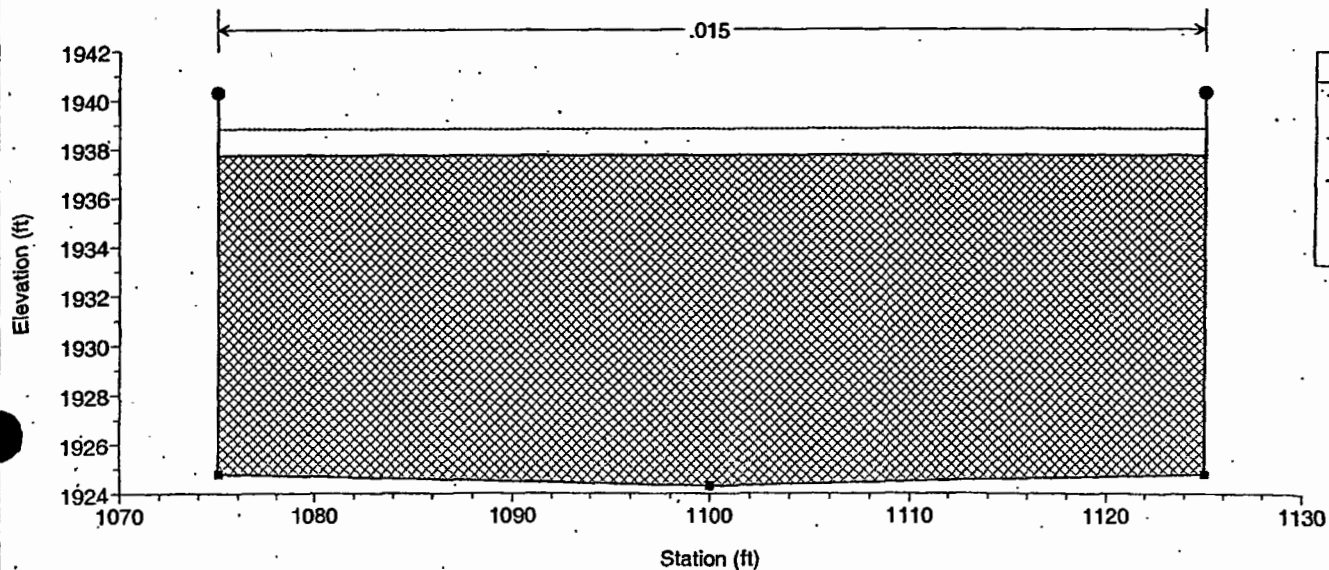
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 26.3333°



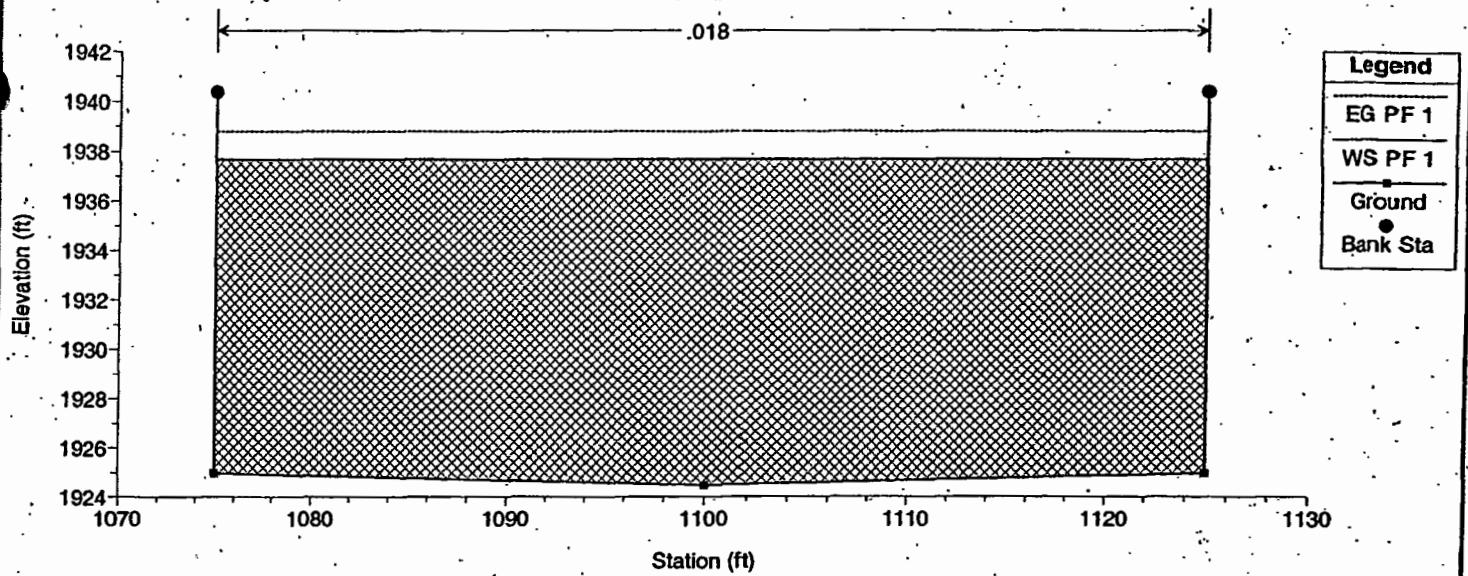
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 26



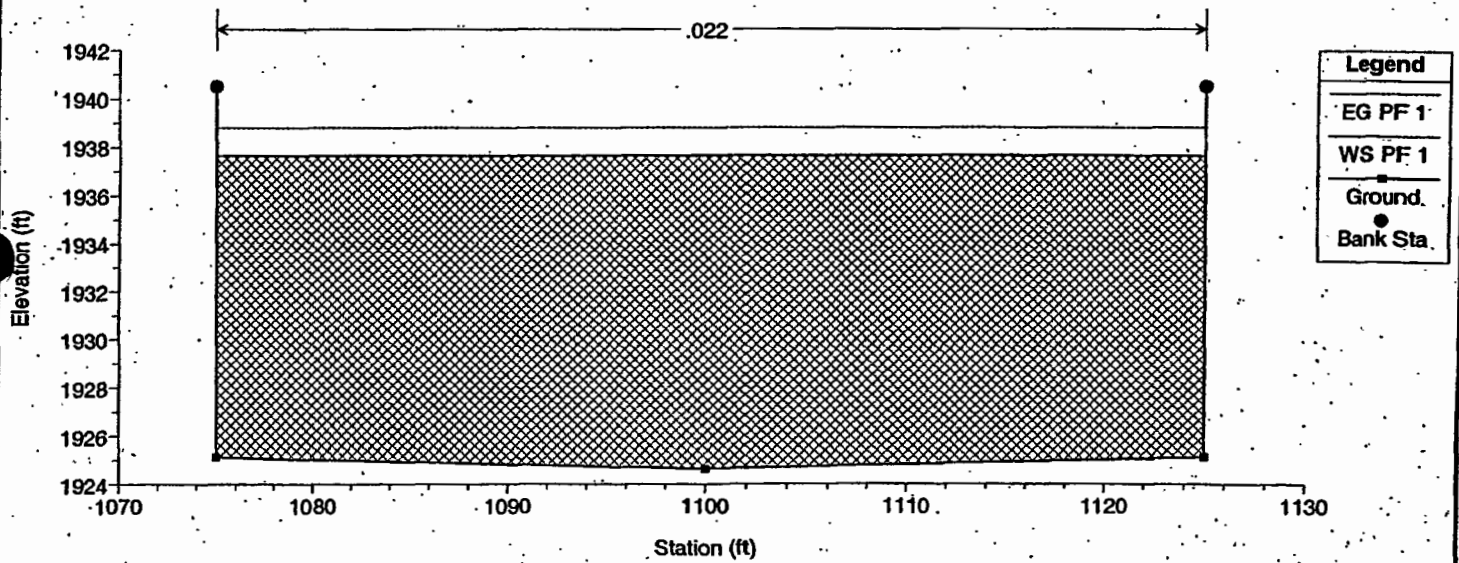
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 25.3333°



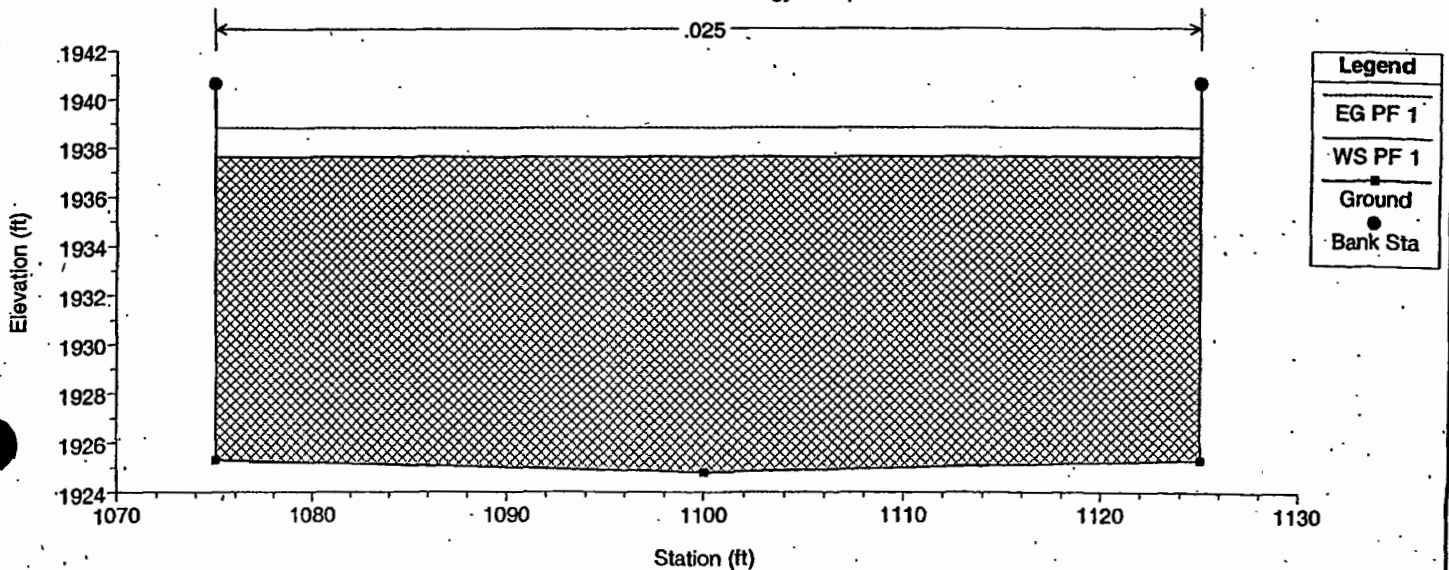
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 24.6666°



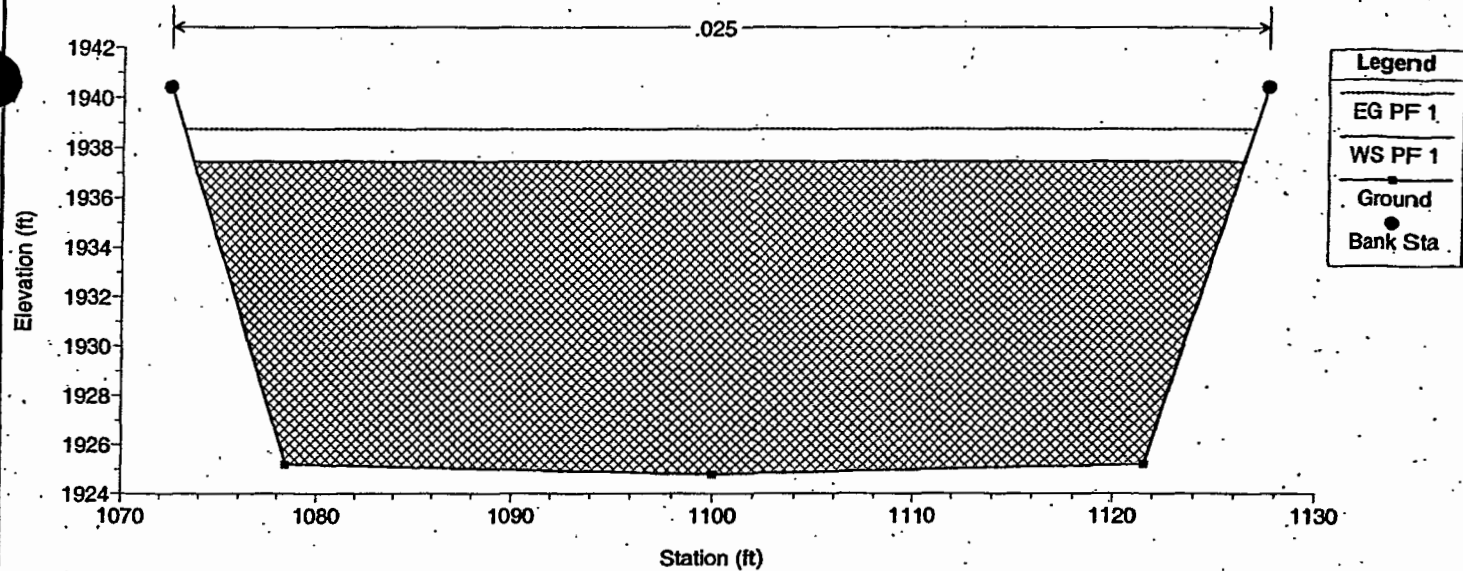
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 24 End of Energy Dissipator



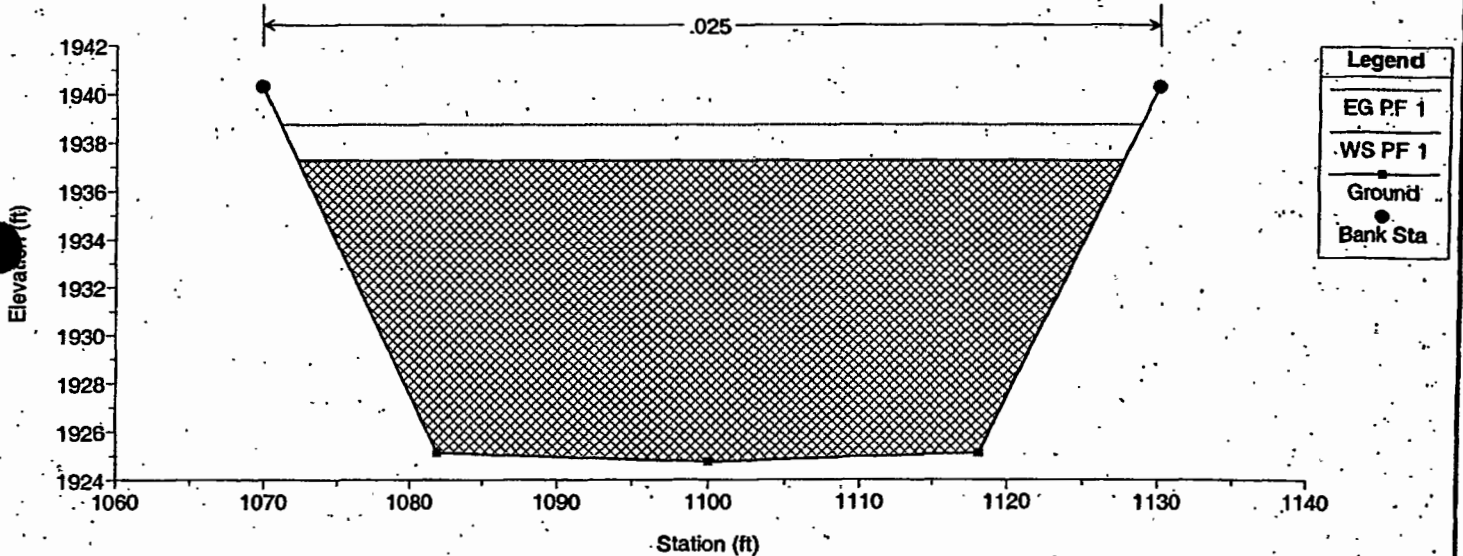
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 23.6°



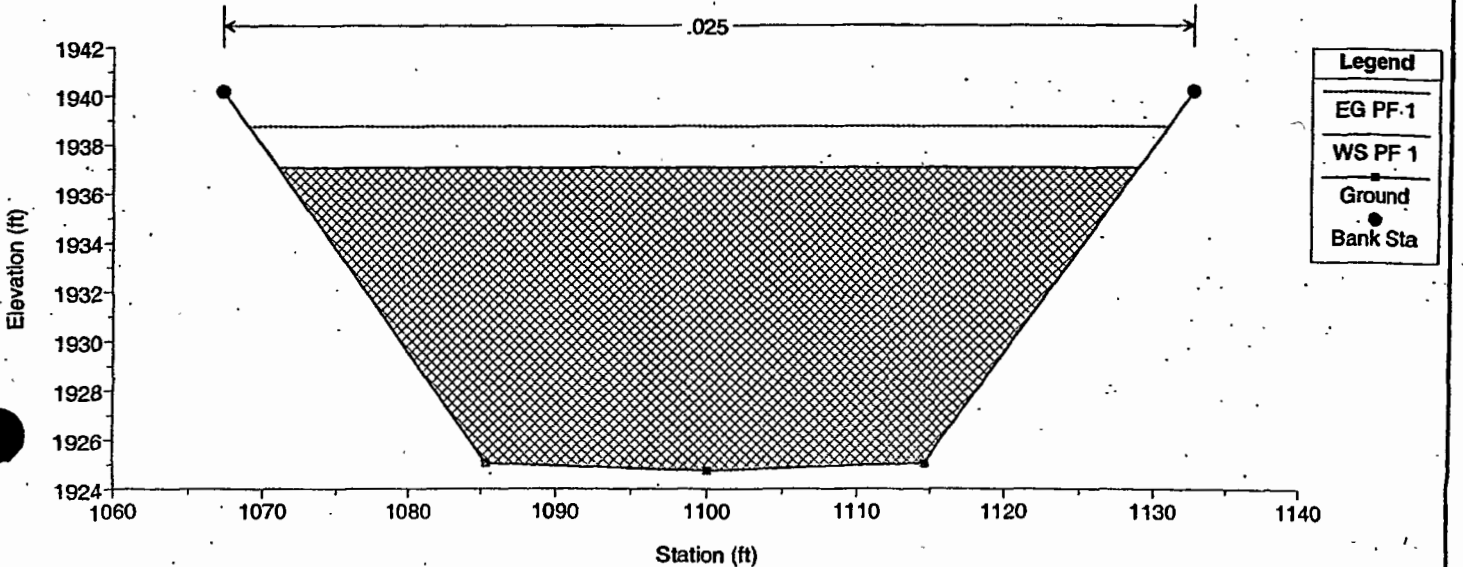
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 23.2°



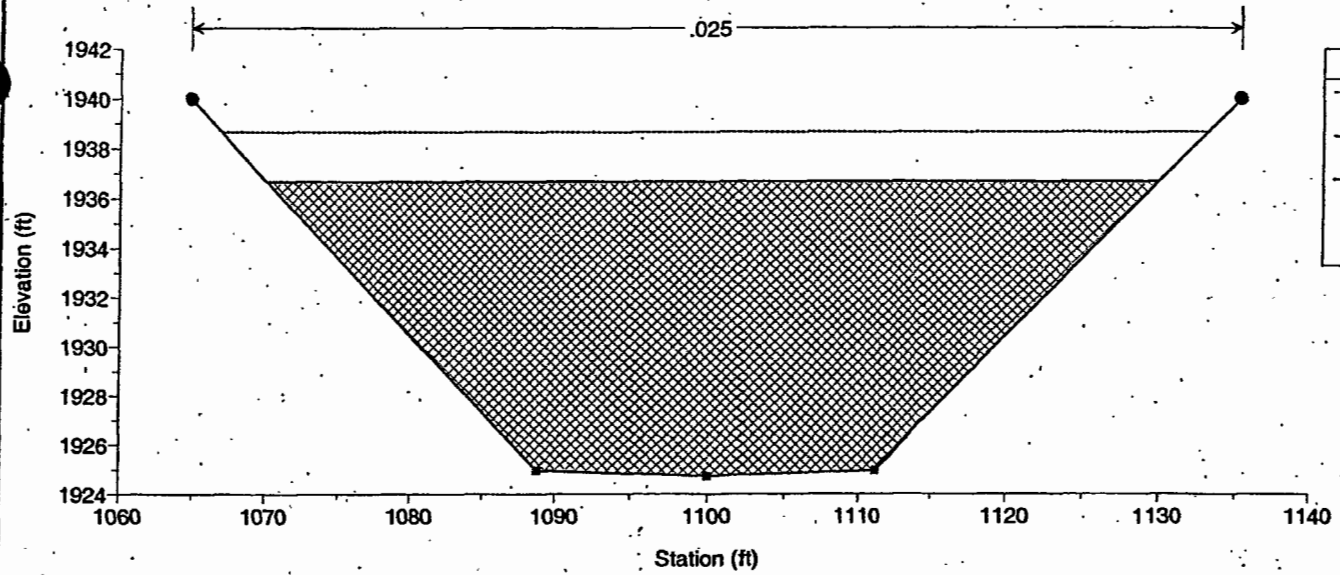
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 22.8°



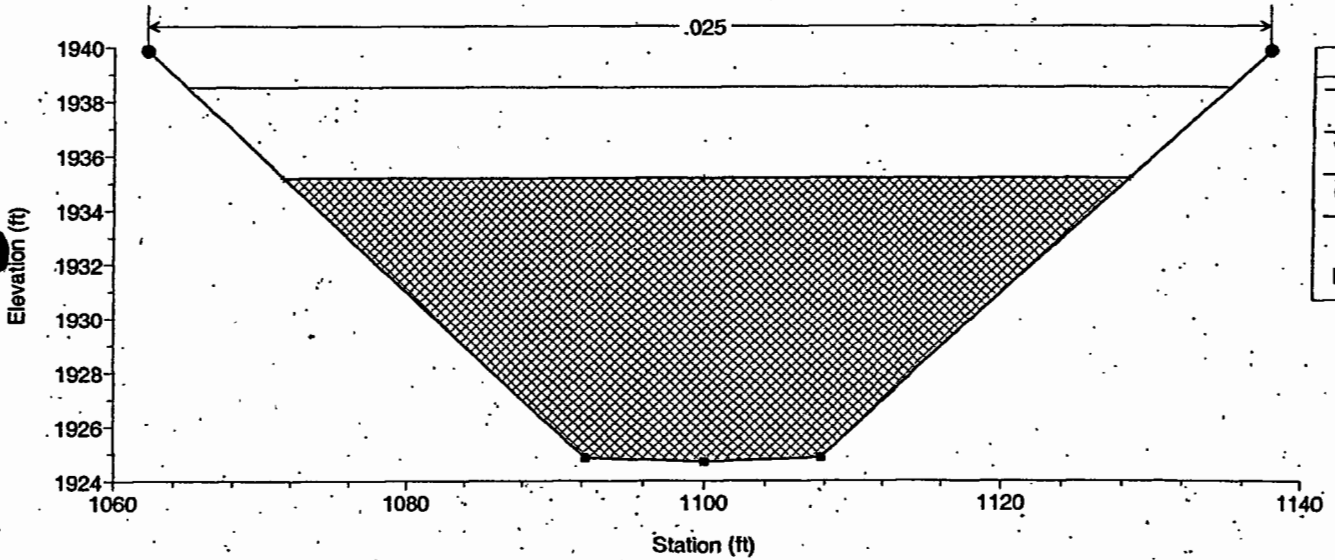
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 22.4°



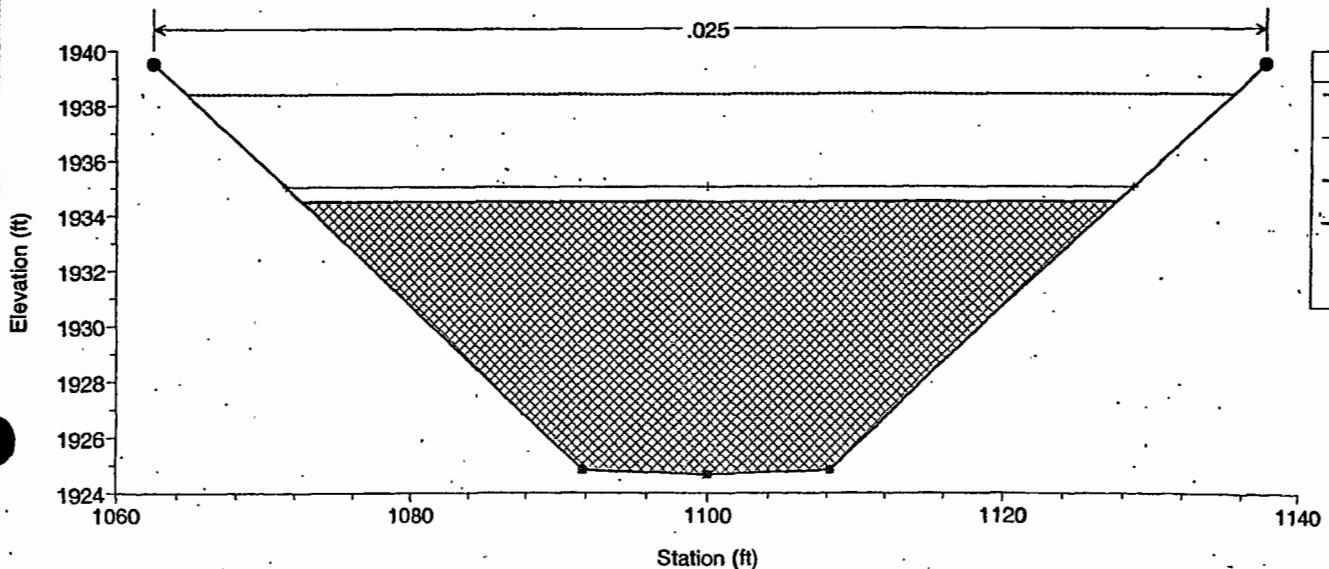
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 22°



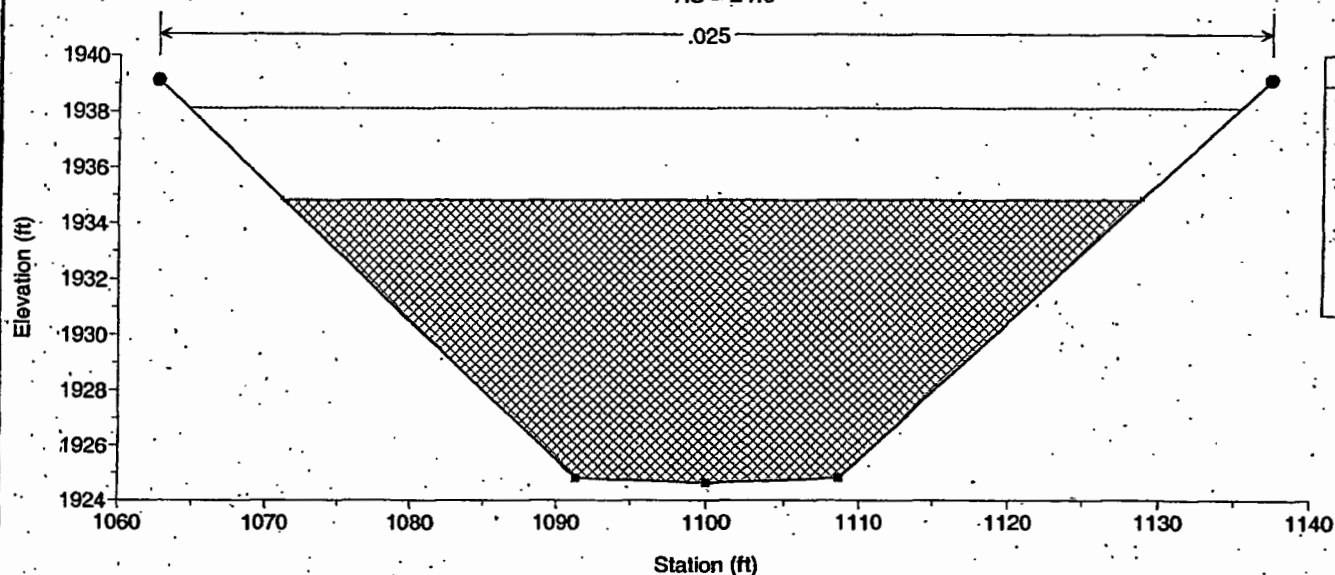
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 21.8°



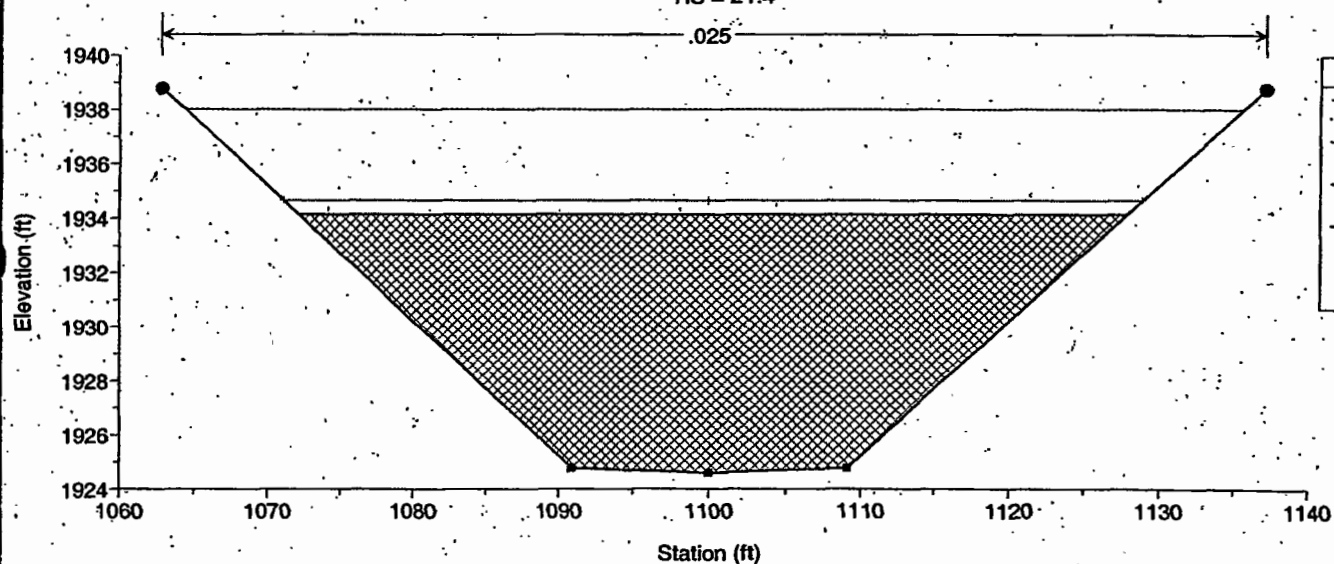
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 21.6°



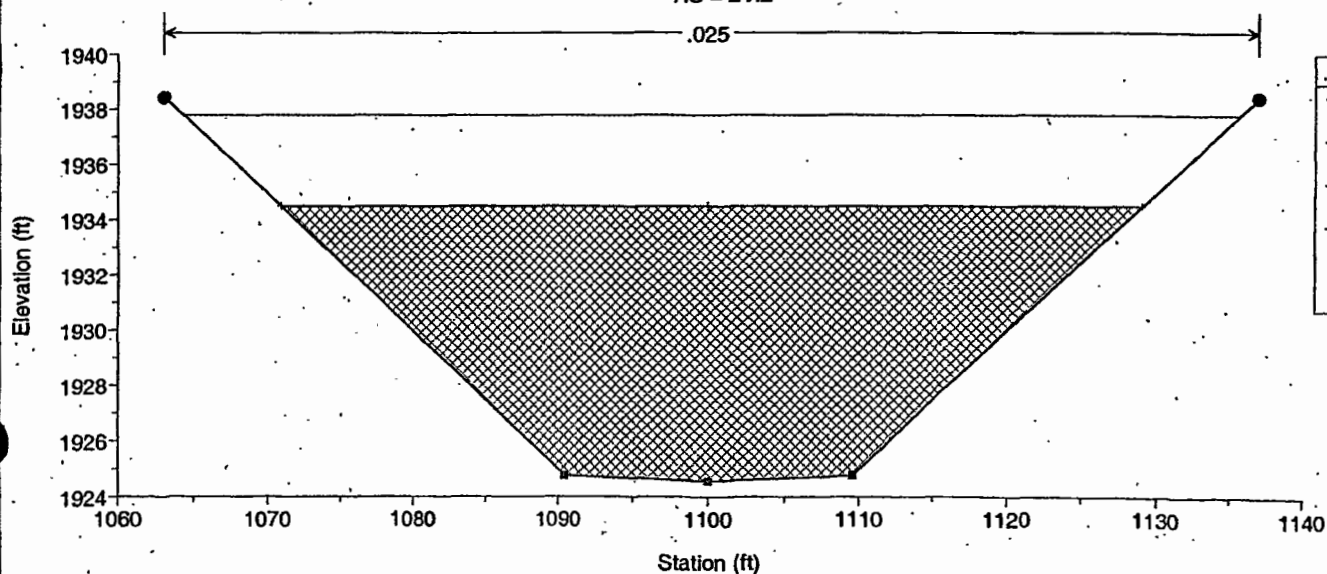
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 21.4°



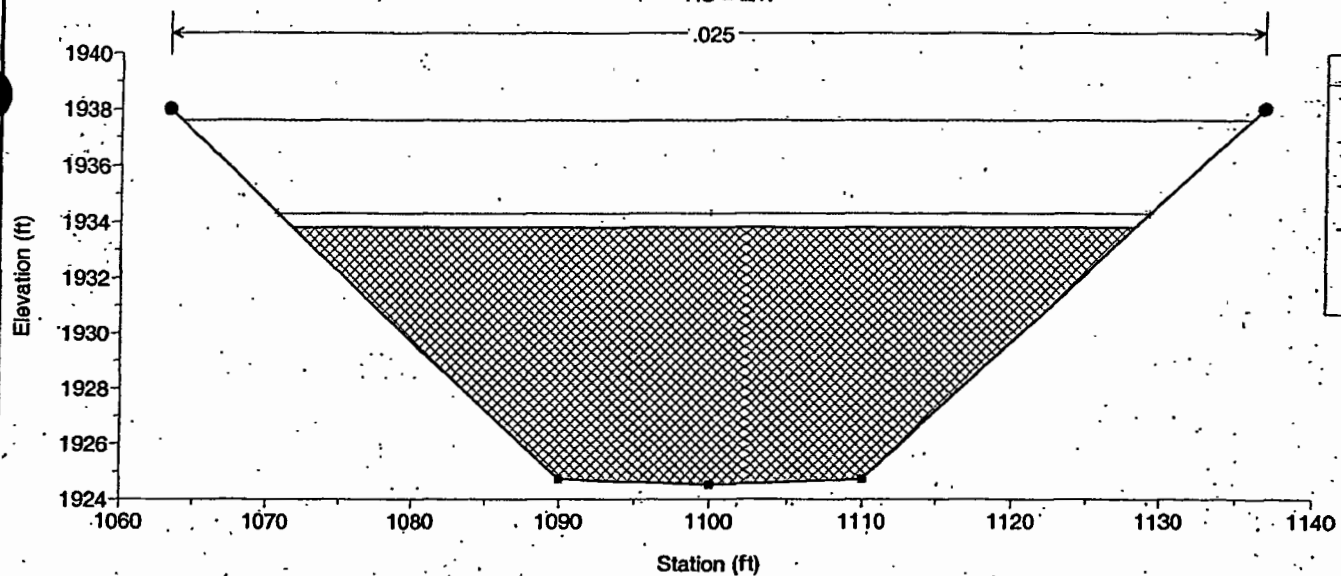
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 21.2°



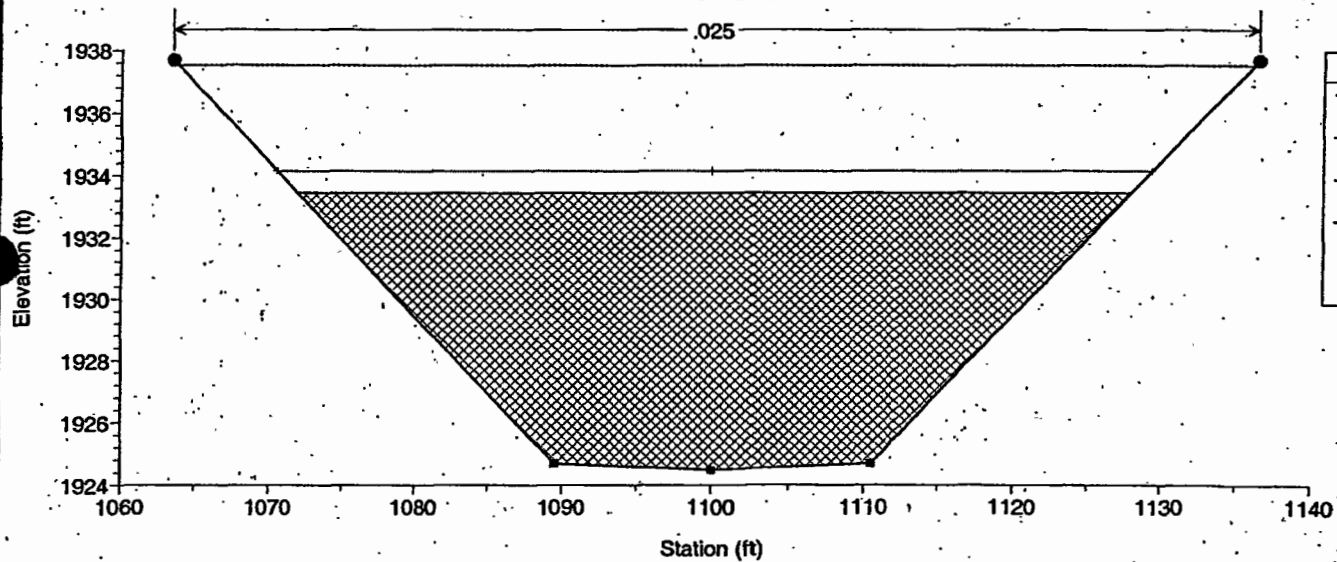
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 21.°



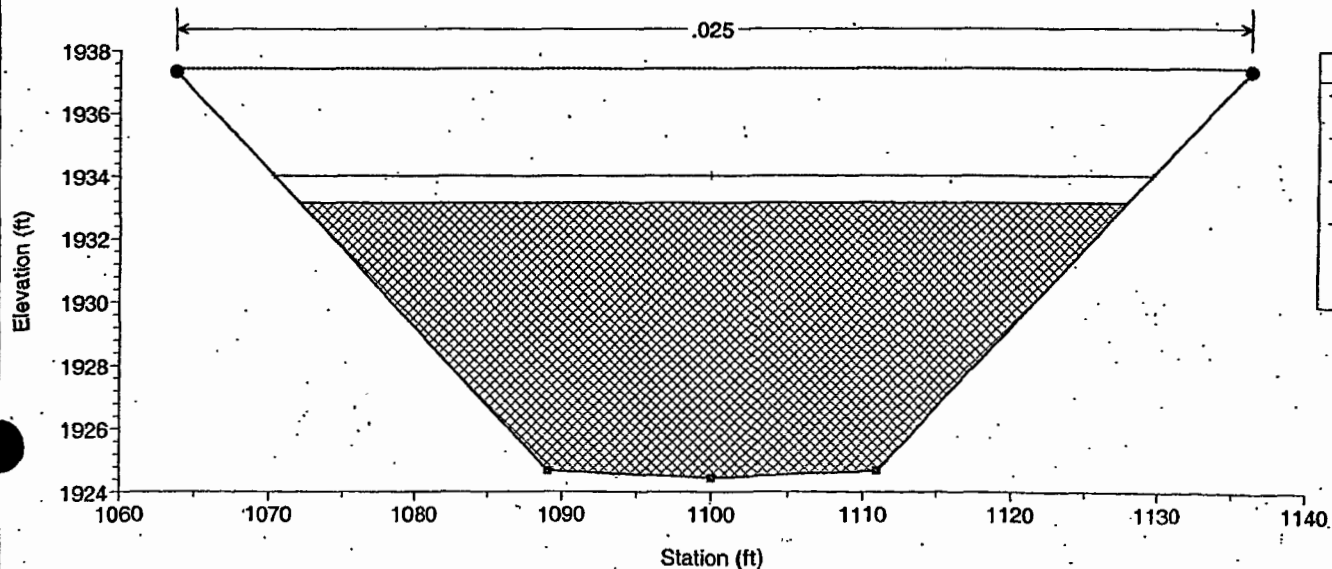
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 20.8°



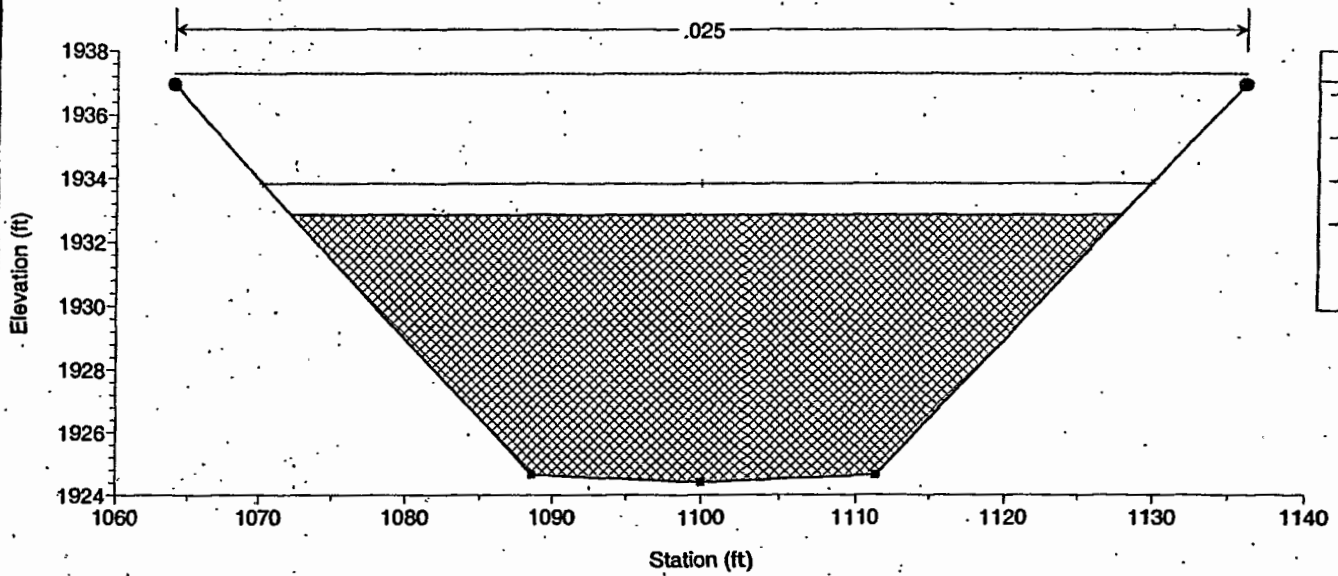
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 20.6°



Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 20.4°

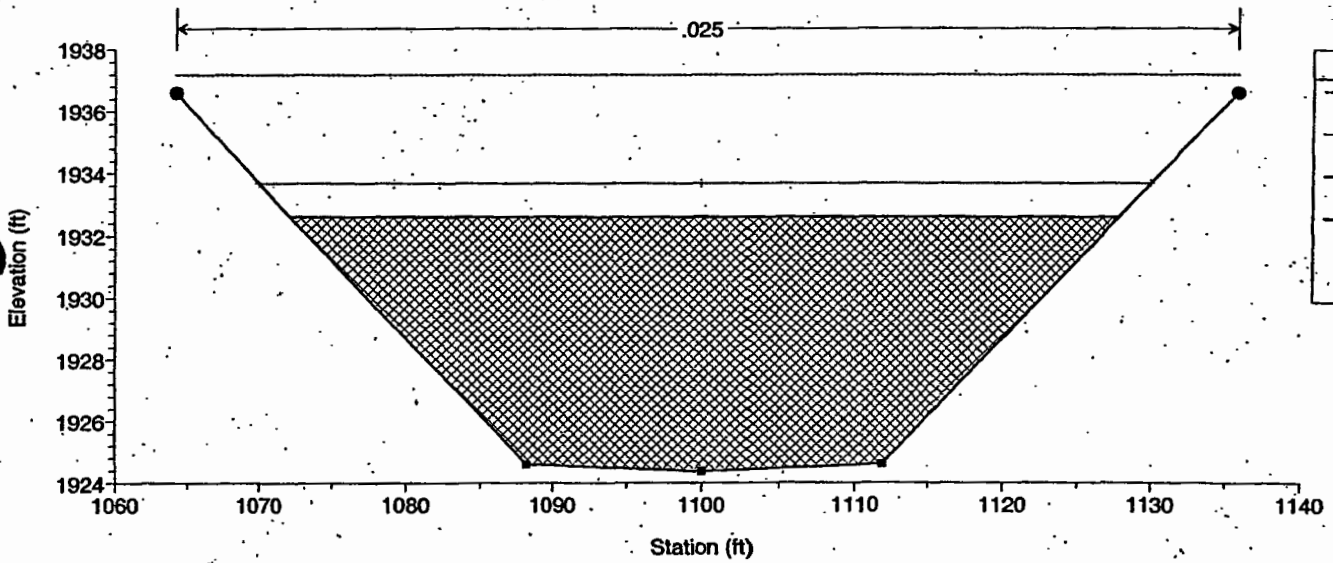


Legend

- EG PF 1
- Crit PF 1
- WS PF 1
- Ground
- Bank Sta

Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 20.2°

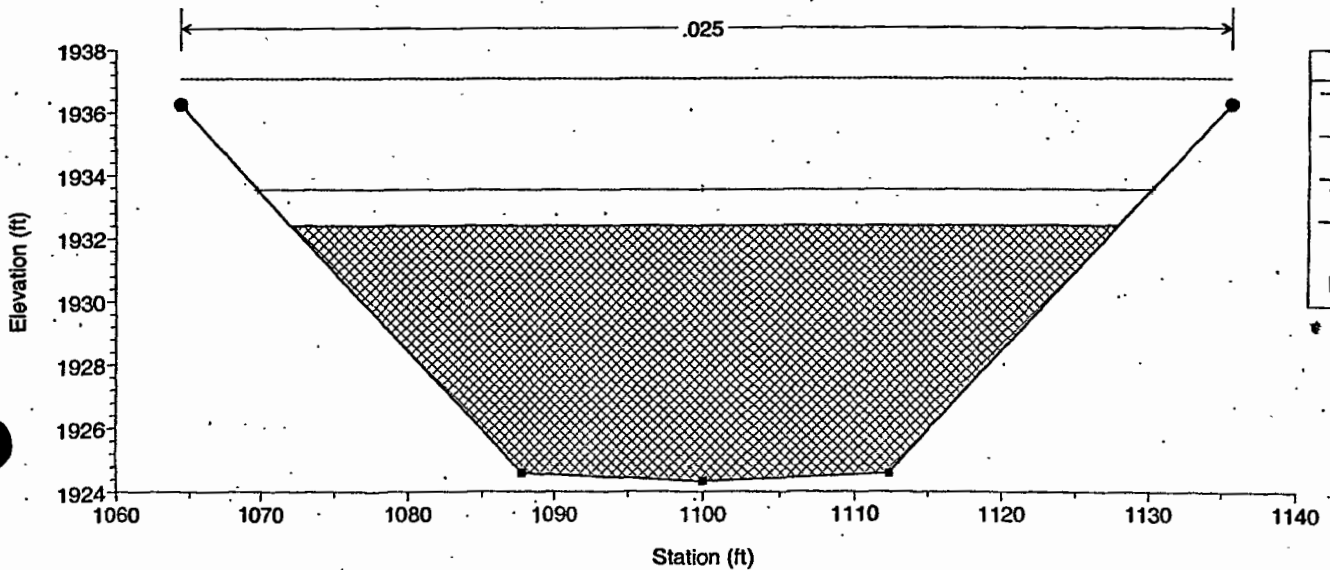


Legend

- EG PF 1
- Crit PF 1
- WS PF 1
- Ground
- Bank Sta

Flamingo Wash at Spencer Plan: Post Project 12/1/2003

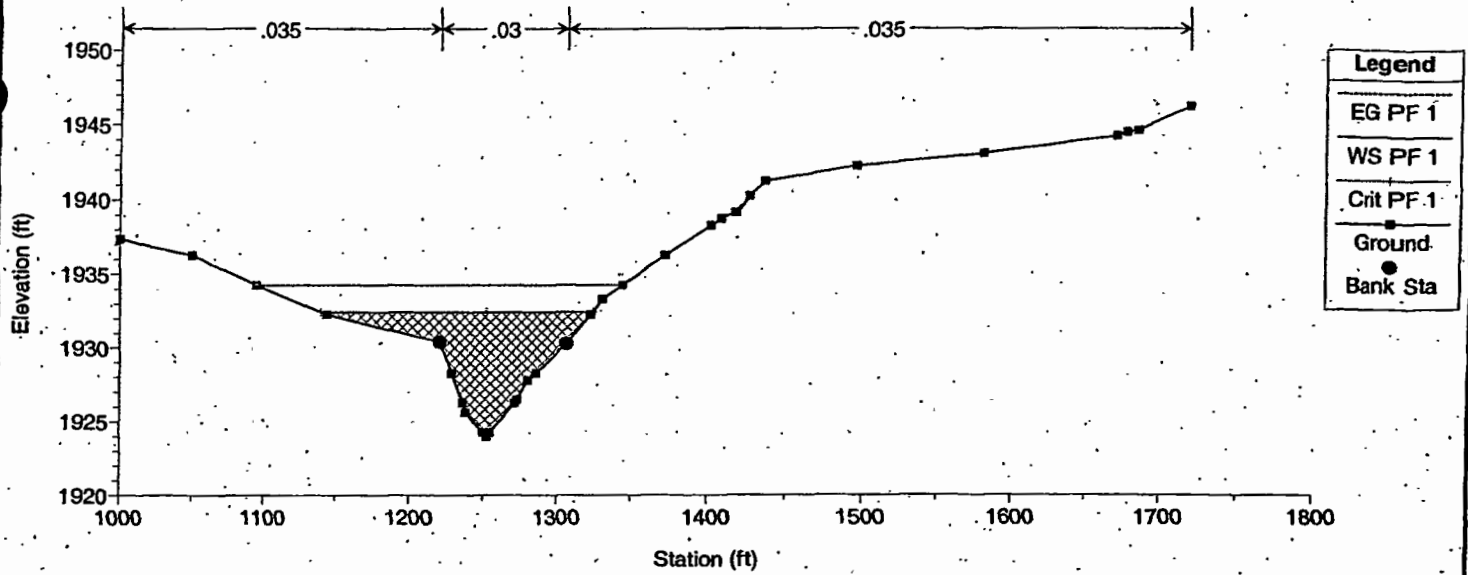
RS = 20 End of Phase 1 Improvements



Legend

- EG PF 1
- Crit PF 1
- WS PF 1
- Ground
- Bank Sta

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 10

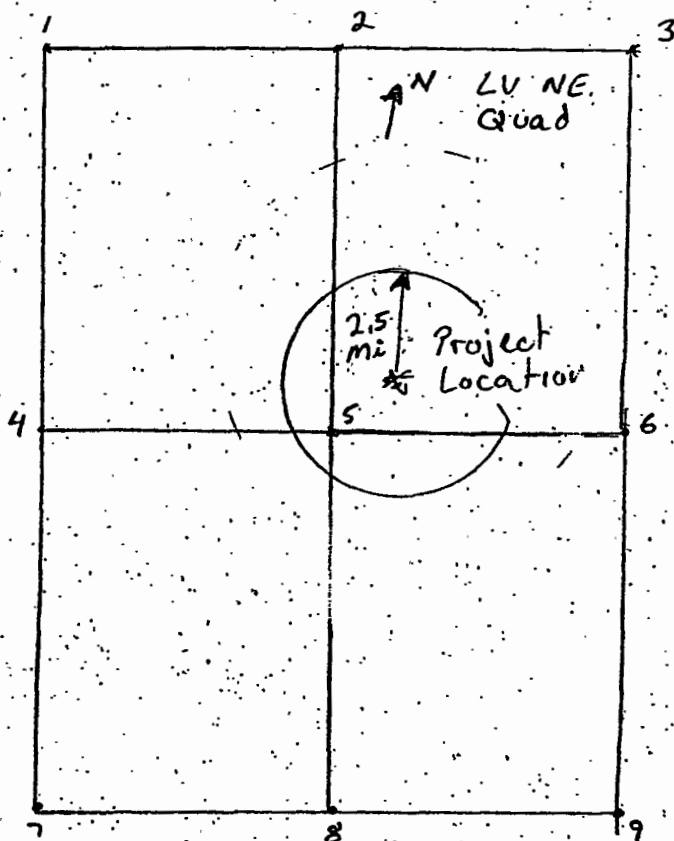


**THE LOUIS BERGER GROUP INC. DATUM CONVERSION
(NGVD 29 TO NAVD 88)**

BY 99D DATE 7-1-03

CHKD. BY DATE

SUBJECT

Flamingo Wash Datum ConversionSHEET NO. 1 OF 1PROJECT 879

Quad Name	Corner (#)	Latitude	Longitude	ALGUD → NAVD Conversion
Las Vegas NE	SW (5)	36° 07' 30"	115° 07' 30"	+ 2.14 feet
	NW (2)	36° 15' 00"	115° 07' 30"	+ 2.23 feet
	NE (3)	36° 15' 00"	115° 00' 00"	+ 2.36 feet
	SE (6)	36° 07' 30"	115° 00' 00"	+ 2.30 feet

$$\text{Average Conversion Factor} = (2.14 + 2.23 + 2.36 + 2.30) / 4 = +2.26$$

$$\text{Maximum Offset} = 2.26 - 2.14 = 0.12 \text{ feet}$$

$0.12 < 0.25 \therefore$ Multiple Conversion is NOT Required

**MONTGOMERY WATSON HARZA FLAMINGO WASH
IMPROVEMENT PLANS PHASE I**

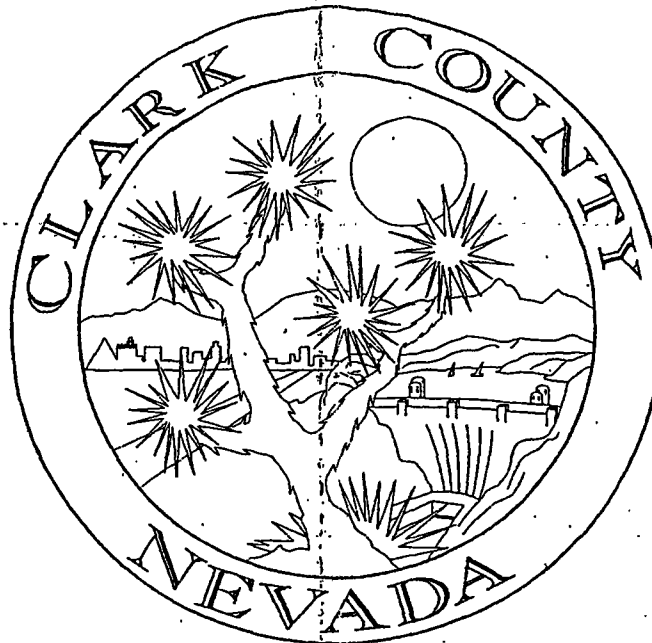
DEPARTMENT OF PUBLIC WORKS

INDEX OF SHEETS

- C-1 COVER SHEET
- C-2 BENCHMARK, GENERAL & CONSTRUCTION NOTES, BASIS OF BEARING, LEGEND & ABBREVIATIONS
- C-3 HORIZONTAL & VERTICAL CONTROL PLAN
- C-4 CHANNEL PLAN & PROFILE, STA 24+15.42 TO STA 17+00.00
- C-5 CHANNEL PLAN & PROFILE, STA 17+00.00 TO STA 11+12.59
- C-6 CHANNEL SECTIONS & DETAILS
- C-7 CHANNEL SECTIONS & DETAILS
- C-8 CHANNEL CROSS SECTIONS, STA 10+03.00 TO STA 21+00.00
- C-9 CHANNEL CROSS SECTIONS, STA 22+00.00 TO STA 24+16.00
- C-10 SPENCER STREET PLAN & PROFILE
- C-11 STORM DRAIN PLAN & PROFILE, STA 10+00.00 TO STA 13+13.23
- C-12 STORM DRAIN CONNECTIONS, PLAN & PROFILE & DETAILS
- C-13 MAINTENANCE ROAD PLAN & PROFILE, STA 5+00.00 TO STA 8+02.00
- C-14 ACCESS RAMPS PLAN & PROFILE
- C-15 FENCING AND STREET LIGHTING PLANS
- C-16 WATER LINE RELOCATION
- C-17 CIVIL DETAILS 1
- C-18 CIVIL DETAILS 2
- C-19 CIVIL DETAILS 3
- C-20 CIVIL DETAILS 4
- S-1 GENERAL STRUCTURAL NOTES AND DETAILS
- S-2 BRIDGE PLAN
- S-3 BRIDGE SLAB REINFORCEMENT PLAN
- S-4 SECTIONS, DETAILS & GENERAL STRUCTURAL NOTES
- S-5 SECTIONS & DETAILS
- S-6 STRUCTURAL PLAN & SECTIONS
- S-7 GENERAL STRUCTURAL CHANNEL PLAN, PROFILE & DETAIL
- S-8 CHANNEL SECTIONS
- S-9 CHANNEL SECTIONS
- S-10 CHANNEL & RAMP SECTIONS
- S-11 CHANNEL SECTIONS
- S-12 SECTIONS & DETAILS MANHOLE NO. 1
- S-13 SECTIONS & DETAILS MANHOLE NO. 2
- S-14 SECTIONS, DETAILS & GENERAL STRUCTURAL NOTES
- S-15 CHANNEL SECTIONS & DETAILS

County Commissioners

Darlo Herrera, Chairman
Myrna Williams, Vice Chair
Yvonne Atkinson Gates
Erin Kenny
Mary J. Kincaid-Chauncey
Chip Maxfield
Bruce L. Woodbury



"Progress as Promised"

AUGUST 2001 IMPROVEMENT PLANS FOR FLAMINGO WASH MARYLAND PARKWAY TO SPENCER STREET PHASE I CLARK COUNTY, NEVADA FUNDED BY CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

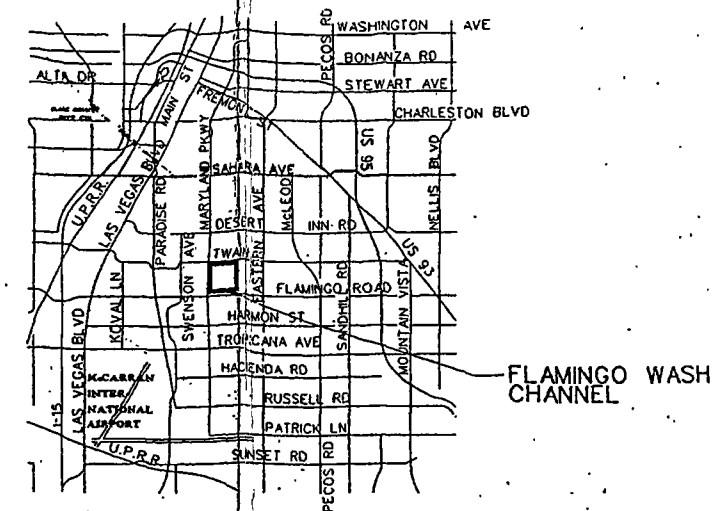
DESIGNED BY:



MONTGOMERY WATSON HARZA

Las Vegas, Nevada

MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



Vicinity Map

NOT TO SCALE

County Manager

Thomas F. Reilly

Director of Public Works

Approved:

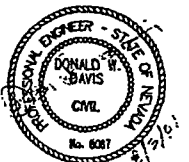
M.J. Manning
M.J. Manning, R.P.E.

Clark County Regional Flood Control District

General Manager / Chief Engineer

Approved:

Gale Wm. Fraser
Gale Wm. Fraser, II, P.E.



AGENCY	PLANS REVIEWED BY	DATE	DEPARTMENT OF PUBLIC WORKS	BY	DATE	NUMBER	REVISIONS DESCRIPTION	DATE	
SPRINT			DEPUTY DIRECTOR		11-30-01				
LAS VEGAS VALLEY WATER DISTRICT		8-06-01	COMMUNITY DEVELOPMENT DIVISION		8-7-01				
SOUTHWEST GAS COMPANY		8-3-01	CONSTRUCTION MANAGEMENT DIVISION		8-7-01				
NEVADA POWER COMPANY, DISTRIBUTION		8-3-01	DESIGN ENGINEERING DIVISION		8-7-01				
NEVADA POWER COMPANY, TRANSMISSION		11-16-01	MAINTENANCE MANAGEMENT DIVISION		8-7-01				
CLARK COUNTY SANITATION DISTRICT		8/3/01	TRAFFIC MANAGEMENT DIVISION		8/7/01				
COX COMMUNICATIONS LAS VEGAS, INC		8/6/01	COUNTY SURVEYOR'S OFFICE		8-07-2001				

C-1

L-1646

WITH UPDATED MYLAR'S CONFORMED

1-10-03

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
05.01	Quality Control	1	LS
07.01	Traffic Control	1	LS
08.01	Video Taping	1	LS
09.01	Construction Conflicts & Additional Work	1	LS
09.02	Historical Owner Caused Delay Allowance	5	DAYS
09.03	Historical Owner Caused Delay Allowance Additional Amount over \$500.00/Day	5	DAYS
10.01	Mobilization	1	LS
102.01	Demolition and Removal of Spencer Street Bridge	1	LS
102.02	Remove Concrete Curb and Gutter	177	LF
102.03	Remove Concrete Sidewalk	708	SF
102.04	Debris Removal/Clearing and Grubbing	1	LS
103.01	Channel Excavation	16,660	CY
103.02	Compacted Backfill	13,880	CY
109.01	Drain Backfill	1,713	CY
17.01	Dewatering	1	LS
20.01	Type II Aggregate Base	520	CY
20.01	Plantmix Bituminous Surface	385	TON
20.01	Concrete Channel Transition Station 23+65.42 to Station 24+15.42	50	LF
20.02	45" Wide Rectangular Concrete Channel Station 22+13.66 to Station 23+65.42	152	LF
20.03	Rectangular Concrete Transition Station 21+13.66 to Station 22+13.66	100	LF
20.04	35" Wide Rectangular Concrete Channel Station 15+61.05 to Station 21+13.66	553	LF
20.05	Channel Access Ramp 1	1	LS
20.06	Channel Access Ramp 2	1	LS
20.07	Energy Dissipation Structure and Transition Station 12+62.42 to Station 14+46.92	1	LS
20.08	Spencer Street Bridge Station 14+46.92 to Station 15+61.05	1	LS
20.09	Stilling Well	1	LS
23.01	Class III 12" Storm Drain Pipe	132	LF
23.02	Class III 18" Storm Drain Pipe	30	LF
23.03	Class III 24" Storm Drain Pipe	67	LF
23.04	Class III 36" Reinforced Concrete Pipe	74	LF
23.05	Class III 48" Reinforced Concrete Pipe	244	LF
19.01	32" Type "DM" Drop Inlet	1	EA
19.02	52" Type "DM" Drop Inlet	1	EA
19.03	4" Type "A" Drop Inlet	1	EA
19.04	Manhole Structure No. 1	1	EA
19.05	Manhole Structure No. 2	1	EA
19.06	Reconstruct NDOT Type 4 Manhole	1	EA
0.01	Grouted Heavy Riprap Channel Lining	1,400	CY
0.02	Light Riprap	653	CY
1.01	Concrete Slope Paving	4,275	SF
3.01	7" Type Curb & Gutter	219	LF
3.02	Concrete Sidewalk	1,093	SF
3.03	Concrete Driveway	500	SF
3.04	Cross Gutter	823	SF
6.01	Post and Cable Railing	2,500	LF
6.02	6" Tubular Steel Fence	320	LF
6.03	14" Tubular Steel Double Swing Gate	2	EA
6.04	5" Tubular Steel Single Swing Gate	1	EA
6.05	24" Tubular Steel Double Swing Gate	1	EA
6.06	CMU/Tubular Steel Fencing	35	LF
3.01	Install Street Light Pole and Luminaire	2	EA
3.02	Remove and Replace Streetlight Pole and Luminaire	1	EA
9.01	8" Water Line Relocation at Spencer Street	1	LS
3.01	Non-Reflective Pavement Markers	144	EA
3.02	Reflective Pavement Markers	48	EA
7.01	Dust Control	1	LS
7.02	Dust Control Palliative	1	LS

GENERAL NOTES

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE UNIFORM STANDARD DRAWINGS AND "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" CLARK COUNTY AREA, NEVADA LATEST EDITION AND DEPARTMENT OF PUBLIC WORKS CLARK COUNTY, NEVADA, "IMPROVEMENT STANDARDS 1983, REVISED MAY 1990," UNLESS OTHERWISE SPECIFIED BY NOTE ON THE PLANS AND/OR SPECIAL PROVISIONS. THE IMPROVEMENT STANDARDS WILL HEREINAFTER BE REFERRED TO AS "CLARK COUNTY STANDARD DRAWINGS".
- TRAFFIC SIGNAL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA VOLUME II" LATEST EDITION.
- WHENEVER ANY ITEM OF WORK IS SPECIFIED FOR CONSTRUCTION IN ACCORDANCE WITH "UNIFORM STANDARD DRAWINGS" IT WILL BE A REFERENCE TO THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA 1988".
- ALL UTILITIES SHOWN ARE BELIEVED TO BE ACCURATELY LOCATED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL UTILITIES LIKELY TO BE AFFECTED. THE CONTRACTOR SHALL DETERMINE THE LOCATION AND DEPTH OF SUSPECTED UTILITY INTERFERENCES, AND SHALL FURNISH INFORMATION ON THE SAME TO THE ENGINEER, NOT LESS THAN TEN (10) DAYS PRIOR TO THE ANTICIPATED IMPACT OF THESE SUSPECTED INTERFERENCES ON HIS WORK. IF CONFLICTS EXIST, THE CONTRACTOR WILL IMMEDIATELY CONTACT THE ENGINEER AND PROVIDE THE ENGINEER WITH ALL THE NECESSARY DATA SUCH AS ELEVATIONS, HORIZONTAL LOCATIONS, ETC., AND PROVIDE THE ENGINEER WITH SKETCHES INDICATING THE PROPOSED IMPROVEMENT AND THE UTILITY CONFLICT. THE ENGINEER WILL EXAMINE AND REVIEW ALL THE DATA AND SKETCHES PROVIDED, AND WILL PROVIDE THE CONTRACTOR WITH AN ALTERNATIVE DESIGN WITHIN FIVE (5) DAYS AFTER RECEIPT OF DATA AND SKETCHES.
- CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO BEGINNING CONSTRUCTION.
- THE SOUTHWEST GAS COMPANY SHALL BE RESPONSIBLE FOR THE REMOVAL, RELOCATION OR ADJUSTMENT OF ALL GAS LINES AND APPURTENANCES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL COORDINATE WITH THE SOUTHWEST GAS COMPANY CONTRACTOR WHEN GAS LINE RELOCATIONS ARE PERFORMED IN CONCURRENCE WITH CONSTRUCTION OF THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.

THE SPRINT CENTRAL TELEPHONE COMPANY SHALL BE RESPONSIBLE FOR THE ADJUSTMENT OF TELEPHONE MANHOLES AND RELOCATIONS OF TELEPHONE POLES AND UNDERGROUND TELEPHONE LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.

THE NEVADA POWER COMPANY SHALL BE RESPONSIBLE FOR THE RELOCATION OF UNDERGROUND OR OVERHEAD POWER LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL LAS VEGAS VALLEY WATER DISTRICT FACILITIES AND CLARK COUNTY SANITATION DISTRICT MANHOLES AS INDICATED ON THE PLANS OR IN THE SPECIAL PROVISIONS UNLESS OTHERWISE INDICATED.

THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALL, FENCES, SIGNS, STRUCTURES, LIGHTS OR ANY OTHER IMPROVEMENTS OUTSIDE THE RIGHT-OF-WAY EXCEPT WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OR AS DIRECTED BY THE ENGINEER.

EXACT LOCATIONS OF ALL SAWCUT LINES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER. THOSE SAWCUTS THAT ARE LONGITUDINAL TO THE ROADWAY MAY BE WHEEL CUT WITH EQUIPMENT AS APPROVED BY THE ENGINEER. ALL OTHER SAWCUTS SHALL BE MADE BY A ROTARY SAW.

IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING REQUIRED TO REMAIN, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.

CONTRACTOR MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION OPERATIONS UNIT AT (702) 455-7511 FOR LOCATIONS OF STREET LIGHTING, TRAFFIC SIGNALS, LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM (LVACTS) INTERCONNECT CABLE AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG (UNDERGROUND SERVICE ALERT) AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE THE CONTRACTOR OF LIABILITY FOR CLARK COUNTY FACILITIES.

BASIS OF BEARING

NORTH 02°51'17" EAST BEING THE WEST LINE OF THE SOUTHWEST 1/4 OF SECTION 14, TOWNSHIP 21 SOUTH, RANGE 61 EAST, M.D.M., AS SHOWN PER MARYLAND PLAZA RECORDED IN BOOK 68 PAGE 75 OF PLATS.

BENCHMARKS

CLARK COUNTY BENCHMARK NO. 6C1114SWW6 DESCRIBED AS: RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, EAST SIDE OF MARYLAND PKWY. AT THE NORTH SIDE OF THE FLAMINGO WASH.

EL 1988.79 (NAVD-88)
EL 606.183 (METERS)

CLARK COUNTY FIRE DEPARTMENT

DATE

Call before you Overhead

1-702-993-6111

Call before you Dig

1-800-271-2888

LVVWD STANDARD NOTES

LVVWD PROJECT # 23969

- NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
- ALL WORK SHALL CONFORM TO LVVWD'S STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
- ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2, SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
- A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
- ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
- ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
- ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
- THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATER LINE AND SANITARY OR STORM SEWER LINE CROSS:
 - A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS:
 - POTABLE WATER SUPPLY QUALITY MATERIAL.
 - ENCASEMENT, WITH FOUR (4) INCH CONCRETE (MINIMUM).
 - SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE.

EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10 FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
- WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
- ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
- THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
- CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.
- ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

ABBREVIATIONS

ABC	AGGREGATE BASE COURSE	MN	MINIMUM
AC	ACRE	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
ACP	ASBESTOS CEMENT PIPE	NTS	NOT TO SCALE
AGG	AGGREGATE	OC	ON CENTER
APPROX	APPROXIMATELY	OD	OUTSIDE DIAMETER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	OF	OUTER FACE
AWWA	AMERICAN WATER WORKS ASSOCIATION	OHP	OVERHEAD POWERLINE
BC	BACK OF CURB	PBS	PLANTMIX BITUMINOUS SURFACE
BOT	BOTTOM	PC	POINT OF CURVATURE
BSW	BACK OF SIDEWALK	PI	POINT OF INTERSECTION
C	CONDUIT	PL	PROPERTY LINE
CC	CLARK COUNTY	POB	POINT OF BEGINNING
CCRFCO	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT	POE	POINT OF ENDING
C&G	CURB AND GUTTER	PT	POINT OF TANGENCY
CLR	CLEARANCE	PVC	POLY VINYL CHLORIDE
CMP	CORRUGATED METAL PIPE	PVMT	PAVEMENT
COMM DWY	COMMERCIAL DRIVEWAY	R	RADIUS
CONC	CONCRETE	RCB	REINFORCED CONCRETE BOX
CONST	CONSTRUCTION OR CONSTRUCT	RCP	REINFORCED CONCRETE PIPE
CONT	CONTINUOUS	REINF	REINFORCED
CY	CUBIC YARD	ROFC	RATE OF FLOW CONTROL
DI	DROP INLET	RP	RADIUS POINT
DIA	DIAMETER	RT	RIGHT
DIAG	DIAGONAL	R/W	RIGHT-OF-WAY
DWG	DRAWING	S	SLOPE
DWY	DRIVEWAY	SC	SCALE
EA	EACH	SD	STORM DRAIN
EF	EACH FACE	SF	SQUARE FEET
ELEV	ELEVATION	SM	SIMILAR
EOP	END OF PROJECT	SPA	SPACED
EP	EDGE OF PAVEMENT	SPEC'S	PROJECT SPECIFICATIONS
EW	EACH WAY	SSMH	SANITARY SEWER MANHOLE
EXIST	EXISTING	STA	STATION
FG	FINISHED GRADE	STD	STANDARD
FL	FLOW LINE	STL	STEEL
FM	FOUND	SW	SIDEWALK
FW	FLAMINGO WASH	TBSW	TOP BACK OF SIDEWALK
G	NATURAL GAS	TC	TOP OF CURB
GB	GRADE BREAK	T.C.E.	TEMPORARY CONSTRUCTION EASEMENT
H	WALL HEIGHT	TH	TEST HOLE
HDPE	HIGH DENSITY POLY ETHYLENE	TOS	TOE OF SLOPE
HPS	HIGH PRESSURE SODIUM	T.O.W.	TOP OF WALL
I	INSIDE DIAMETER	TP	TOP OF PIPE
IF	INNER FACE	TRANS	TRANSITION
INV	INVERT	TRAP	TRAPEZOIDAL
LF	LINEAR FEET	(TYP)	TYPICAL
LVVWD	LAS VEGAS VALLEY WATER DISTRICT	USD	UNIFORM STANDARD DRAWING
MATL	MATERIAL	VC	VERTICAL CURVE
MAX	MAXIMUM	VCP	VITRIFIED CLAY PIPE
MH	MANHOLE	VG	VALLEY GUTTER
		VPC	VERTICAL POINT OF CURVE
		VPI	VERTICAL POINT OF INTERSECTION
		VPT	VERTICAL POINT OF TANGENCY
		WS	WATER SURFACE

LEGEND

	REMOVAL ITEM, CONSTRUCTION ITEM, TRAFFIC ITEM
	CENTERLINE W/STATION
	RIGHT-OF-WAY LINE
	PROPERTY LINE
	TEMPORARY CONSTRUCTION EASEMENT
	PROPOSED RIGHT-OF-WAY LINE
	PROPOSED 250 W HPS STREETLIGHT
	PROPOSED 400 W HPS STREETLIGHT
	EXISTING/PROPOSED/FUTURE DROP INLET
	EXISTING/PROPOSED CURB & GUTTER
	EXISTING/PROPOSED UNDERGROUND UTILITY
	EXISTING/PROPOSED/ADJUST MANHOLE
	EXISTING/PROPOSED/ADJUST PULLBOX
	EXISTING/PROPOSED/ADJUST WATER OR GAS VALVE
	EXISTING/PROPOSED EDGE OF PAVEMENT
	EXISTING/PROPOSED DRIVEWAY
	EXISTING BLOCKWALL/FENCE
	EXISTING/PROPOSED ELEVATION
	CURVE DATA NOTATION
	EXISTING TELEPHONE AND/OR POWER POLE
	EXISTING/PROPOSED FIRE HYDRANT
	EXISTING/PROPOSED SERVICE PEDESTAL
	PAVEMENT TRANSITION
	EXISTING MANBOX
	BENCHMARK
	POT HOLE NUMBER
	EXISTING/ADJUST WATER METER
	SAWCUT LINE
	EXISTING/PROPOSED CONTROLLER CABINET
	EXISTING/PROPOSED SIDEWALK RAMP
	TOP OF SLOPE
	FALL SLOPE
	CUT SLOPE
	DAYLIGHT LINE
	TUBULAR STEEL FENCE
	SECTION DETAIL
	POST & CABLE RAILING

9/24/01

ADDED CMU/TUBULAR STEEL FENCING (ADD.#3)

9/24/01

REVISED QUANTITY PER ADDENDUM #3

DATE	DESCRIPTION	APPROVED

MONTGOMERY WATSON HARZA

Las Vegas, Nevada

MONTGOMERY WATSON HARZA

3014 WEST CHARLESTON BLVD

LAS VEGAS, NV 89102

(702) 878-8010

CLARK COUNTY

FLAMINGO WASH

BENCHMARK, GENERAL & CONSTRUCTION NOTES,

BASIS OF BEARING, LEGEND & ABBREVIATIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER

DONALD W. DAVIS

CIVIL

No. 6067

8/31/01

DESIGNED BY: KJS

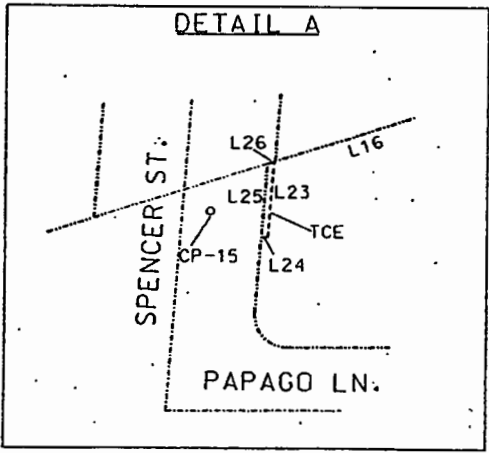
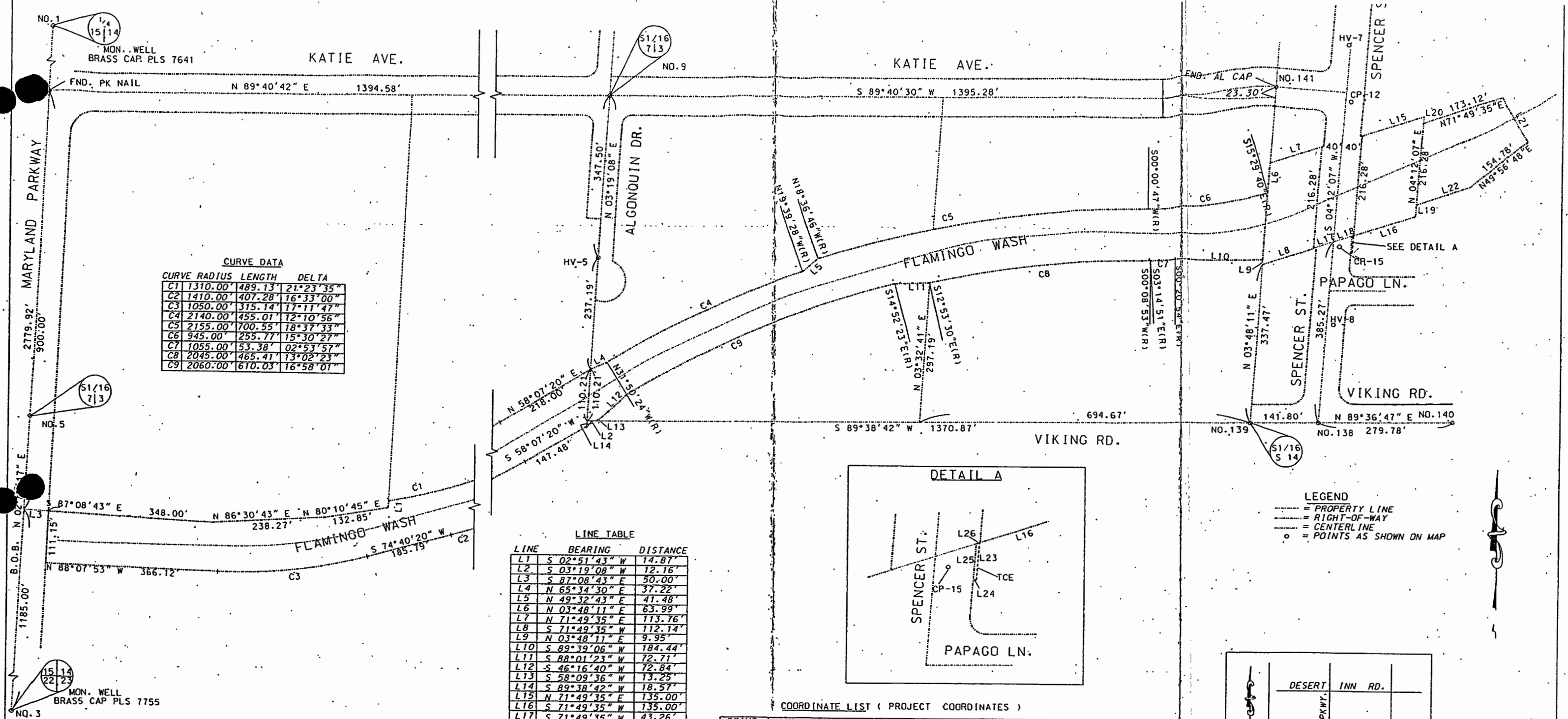
DRAWN BY: FAO

CHECKED BY: DWD

DATE: 7/30/2001

SCALE	SHEET No
HORIZ: NONE	C-2
VERT: NONE	
FIELD BOOK: NONE	

L-1646



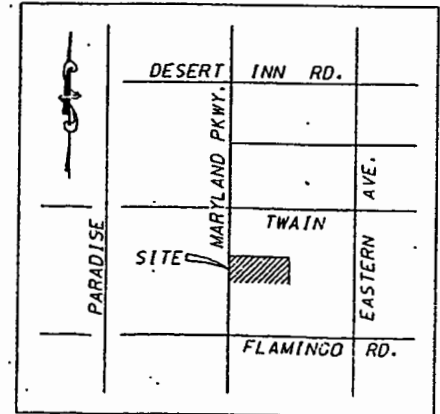
LEGEND
 --- = PROPERTY LINE
 --- = RIGHT-OF-WAY
 --- = CENTERLINE
 o = POINTS AS SHOWN ON MAP

BASIS OF BEARINGS
 NORTH 02°51'17" EAST BEING THE WEST LINE OF THE SOUTHWEST QUARTER OF SECTION 14, TOWNSHIP 21 SOUTH, RANGE 61 EAST, M.D.M., AS SHOWN PER MARYLAND PLAZA RECORDED IN BOOK 68 PAGE 75 OF PLATS.

BENCH MARK
 CLARK CO. NO. 6C11-14SW6
 RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, EAST SIDE OF MARYLAND PKWY. AT NORTH SIDE OF FLAMINGO WASH.
 ELEVATION: 606.183 (M) 1988.785 (F)

COORDINATE LIST (PROJECT COORDINATES)

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
NO.1	10000.000	10000.000		WELL/B CAP PLS 7641
NO.3	7223.529	9861.545		WELL/B CAP PLS 7755
NO.5	8611.891	9930.779		BRASS CAP PLS 7004
NO.8	9305.948	9965.390		PK NAIL
NO.9	9313.777	11359.949		ALUM. CAP PLS 7704
HV-5	8966.865	11339.831	1967.95	ALUM. CAP PLS 3161
HV-7	9433.812	12906.635	1943.93	PK NAIL
HV-8	8838.029	12879.973	1947.19	PK NAIL
CP-12	9314.5673	12912.094		PK NAIL
CP-15	9003.703	12891.140		PK NAIL
NO.138	8629.617	12850.935		ALUM. CAP PLS 7004
NO.139	8628.659	12709.137		ALUM. CAP
NO.140	8631.506	13130.707		ALUM. CAP PLS 4046
NO.141	9344.964	12756.306		ALUM. CAP



REV No	DATE	DESCRIPTION	APPROVED

MWH
MONTGOMERY WATSON HARZA

Las Vegas, Nevada

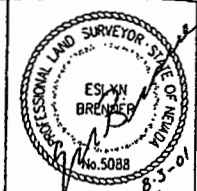
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD.
LAS VEGAS, NV 89102
(702) 878-8010



FLAMINGO WASH

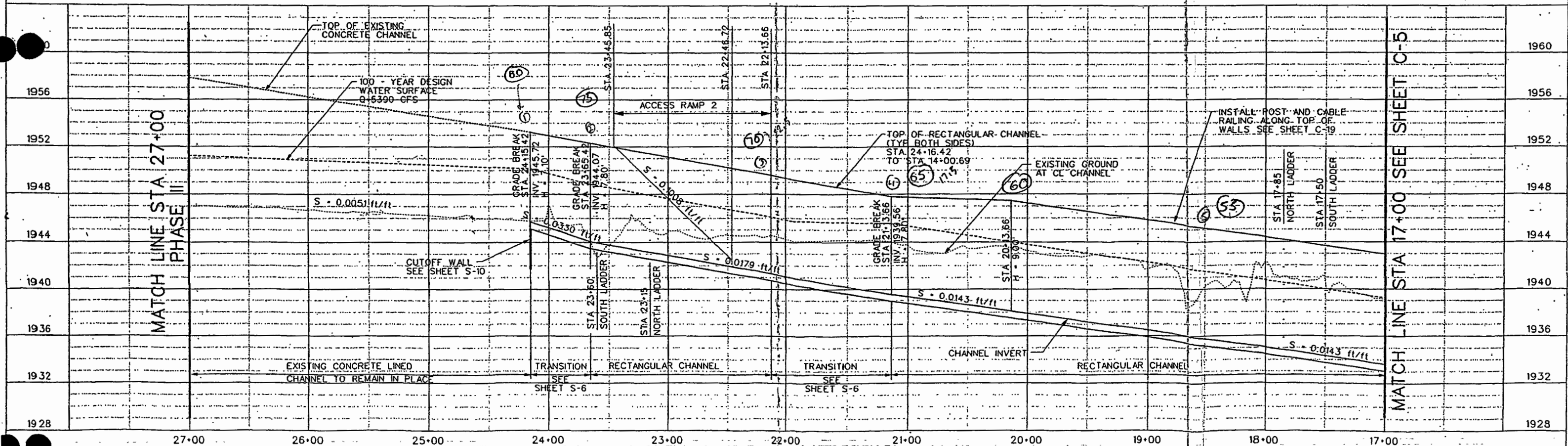
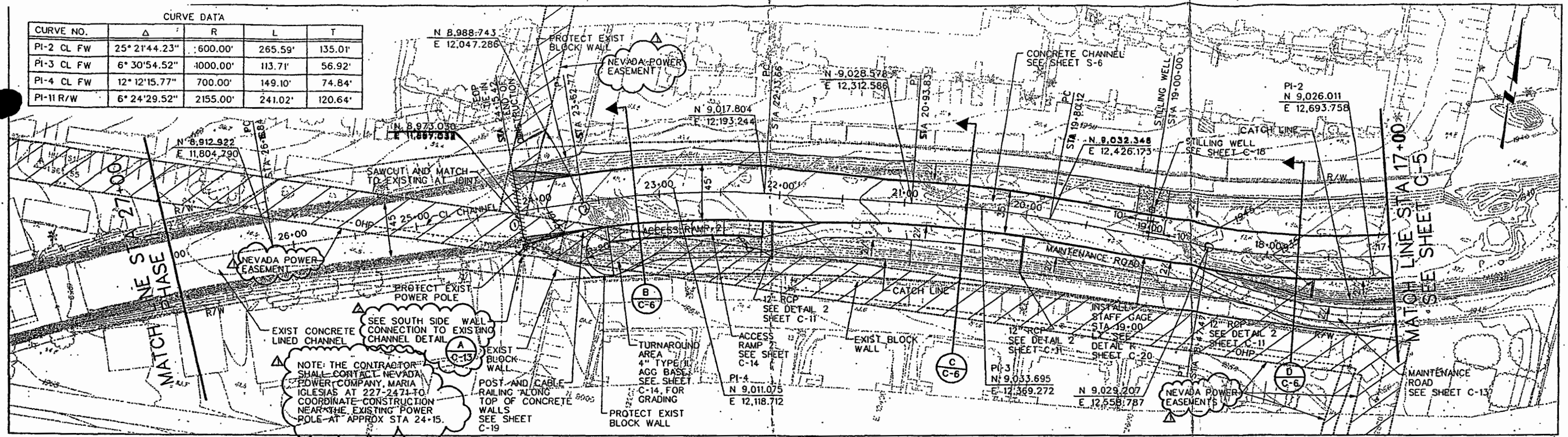
HORIZONTAL & VERTICAL CONTROL PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



DESIGNED BY: EB	SCALE: HORIZ: 1" = 100'	C-3
DRAWN BY: SB	VERT: FIELD BOOK BA-90	
CHECKED BY: EB	DATE: 7/30/2001	
SHEET No: L-1646		

CURVE DATA				
CURVE NO.	Δ	R	L	T
PI-2 CL FW	25° 21' 44.23"	600.00'	265.59'	135.01'
PI-3 CL FW	6° 30' 54.52"	1000.00'	113.71'	56.92'
PI-4 CL FW	12° 12' 15.77"	700.00'	149.10'	74.84'
PI-11 R/W	6° 24' 29.52"	2155.00'	241.02'	120.64'



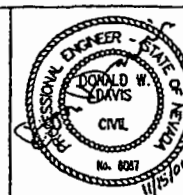
REV No	DATE	DESCRIPTION	APPROVED
9/24/01		ADDED DETAIL CALLOUT PER ADDENDUM #3	
9/24/01		ADDED NEVADA POWER NOTES & EASEMENTS	

MWH
MONTGOMERY WATSON HARZA

Las Vegas, Nevada

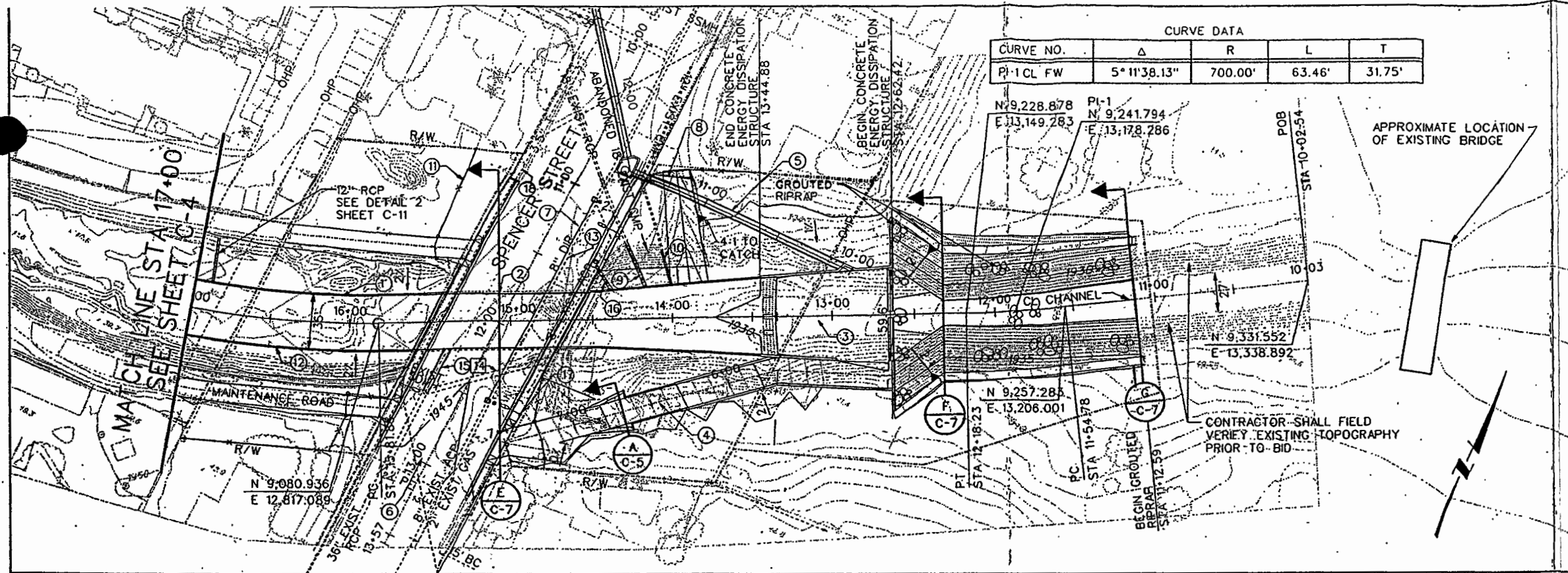
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010

FLAMINGO WASH CHANNEL PLAN & PROFILE, STA 24+15.42 TO STA 17+00.00 CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



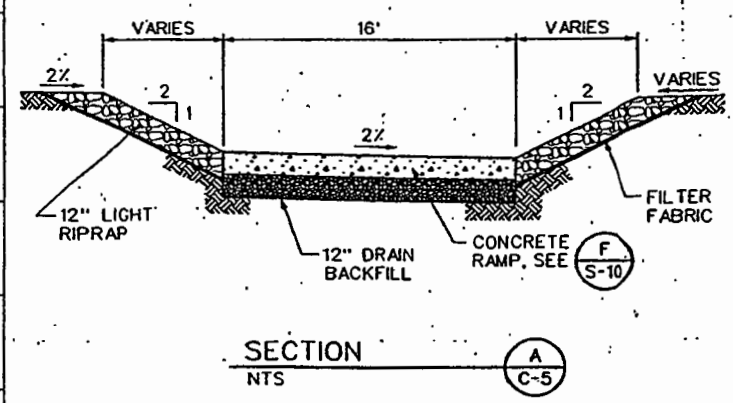
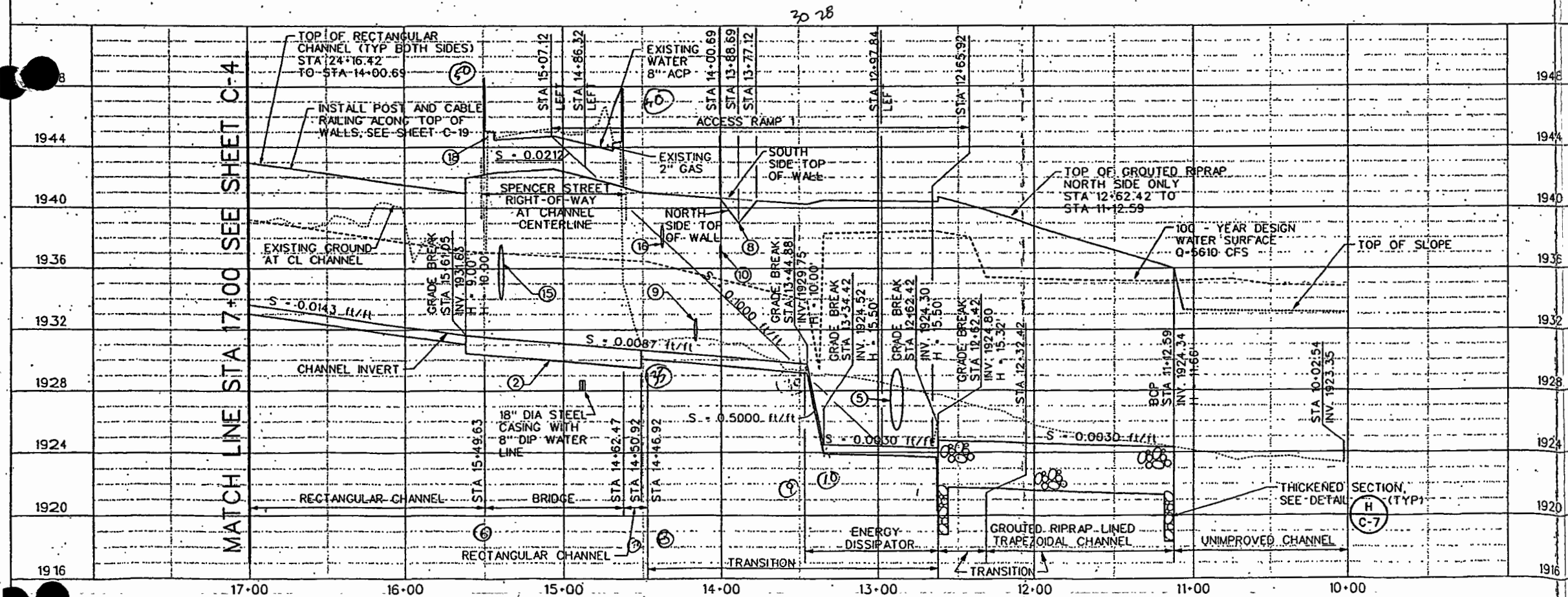
DESIGNED BY: KJS
 DRAWN BY: KJS
 CHECKED BY: DWD
 DATE: 7/30/2001

SCALE		SHEET No C-4
HORIZ:	1" = 40'	
VERT:	1" = 4'	
FIELD BOOK NONE		
		1-1646



- KEY NOTES**
- ① CONCRETE CHANNEL, SEE SHEET S-7
 - ② CONCRETE BRIDGE, SEE SHEET S-2 & S-3
 - ③ CONCRETE ENERGY DISSIPATION STRUCTURE, SEE SHEET S-7
 - ④ CONCRETE RAMP, SEE SHEETS C-14 & S-7
 - ⑤ STORM DRAIN, SEE SHEET C-11
 - ⑥ SPENCER STREET ROADWAY IMPROVEMENTS, SEE SHEET C-10
 - ⑦ RELOCATE 8" WATER LINE, SEE SHEETS C-10 & C-18
 - ⑧ RECONSTRUCT CONCRETE APRON, SEE SHEET C-17
 - ⑨ EXTEND EXISTING 18" SD, SEE SHEET C-12
 - ⑩ 12" SD, CONNECT TO EXISTING 12" CMP, SEE SHEET C-12
 - ⑪ FENCING PLAN, SEE SHEET C-15
 - ⑫ POST AND CABLE RAILING, SEE SHEET C-19
 - ⑬ RELOCATE GAS LINE BY SOUTHWEST GAS
 - ⑭ REMOVE EXIST 36" RCP
 - ⑮ RECONSTRUCT MANHOLE AND EXTEND 36" RCP, SEE SHEET C-12
 - ⑯ 18" SD, SEE SHEET C-12
 - ⑰ STREET LIGHTING PLAN, SEE SHEET C-15
 - ⑱ RELOCATE 3.5" T BY SPRINT

LVVWD *[Signature]* 8/03/01
DATE

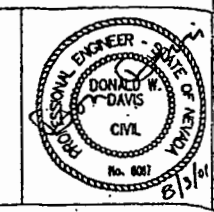


REV	NO	DATE	DESCRIPTION	APPROVED

MWH
 MONTGOMERY WATSON HARZA
 Las Vegas, Nevada
 3014 WEST CHARLESTON BLVD
 LAS VEGAS, NV 89102
 (702) 878-8010

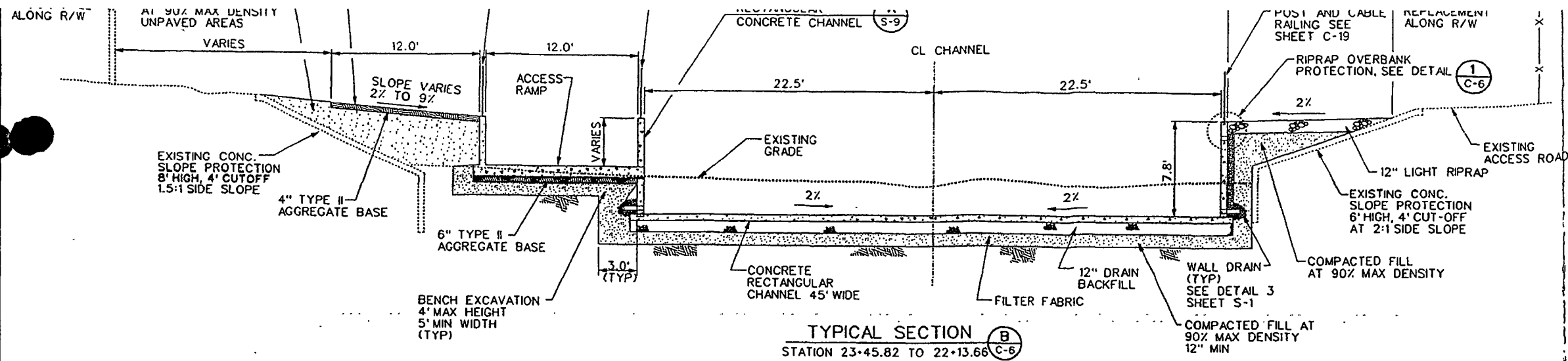


FLAMINGO WASH CHANNEL PLAN & PROFILE, STA 17+00.00 TO STA 11+12.59 CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

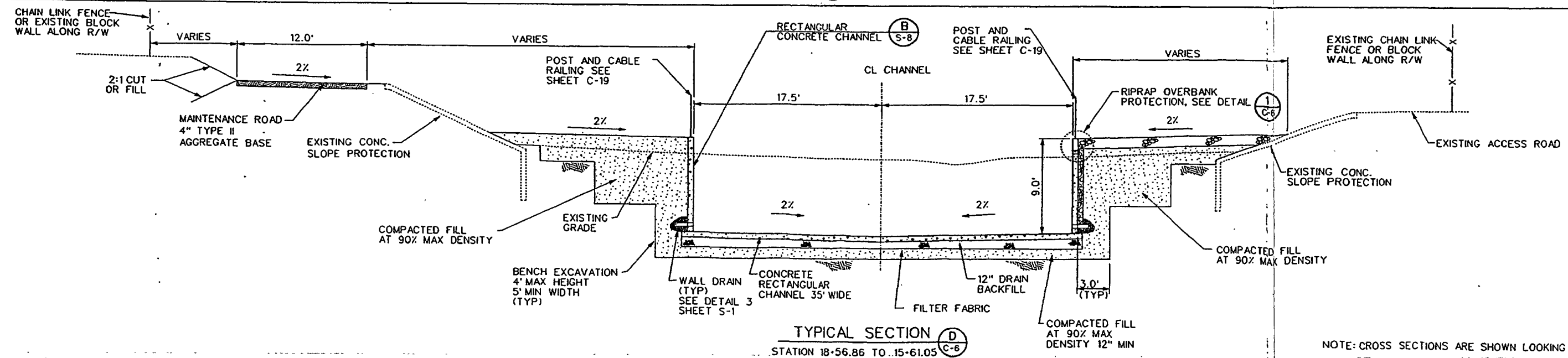
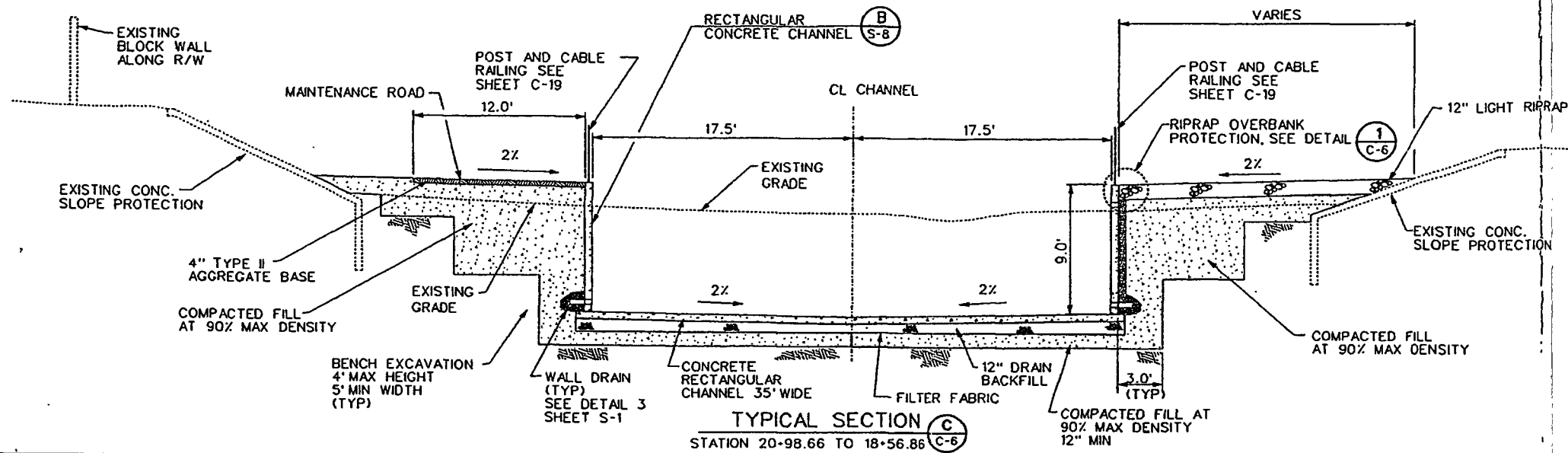


DESIGNED BY:	KJS	SCALE	HORIZ: 1" = 40'	SHEET No C-5
DRAWN BY:	KJS	VERT: 1" = 4'		
CHECKED BY:	DWD	FIELD BOOK	NONE	
DATE:	7/30/2001			

L-1646



RIPRAP OVERBANK PROTECTION DETAIL 1
NTS



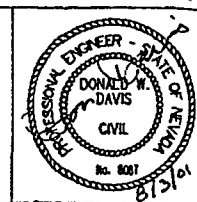
NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

REV	DATE	DESCRIPTION	APPROVED

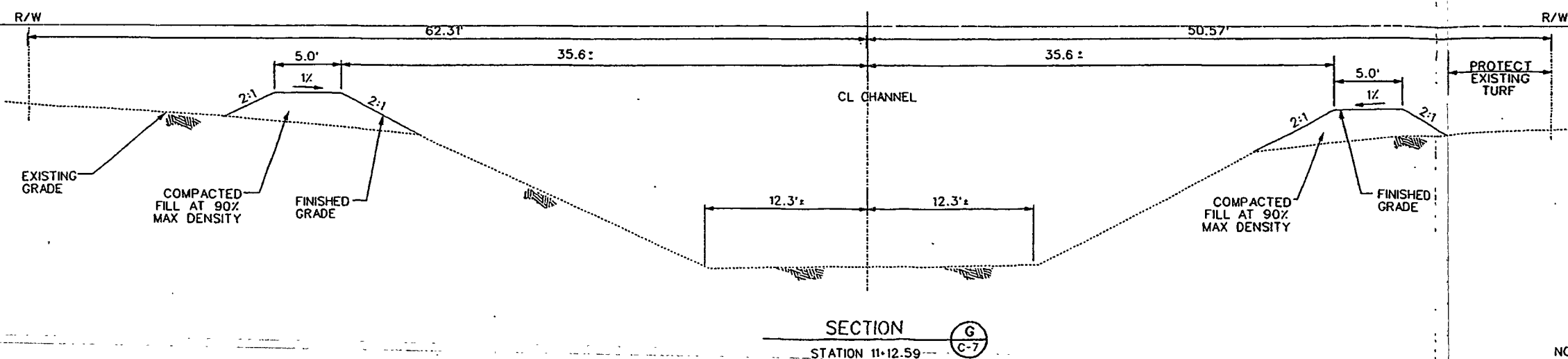
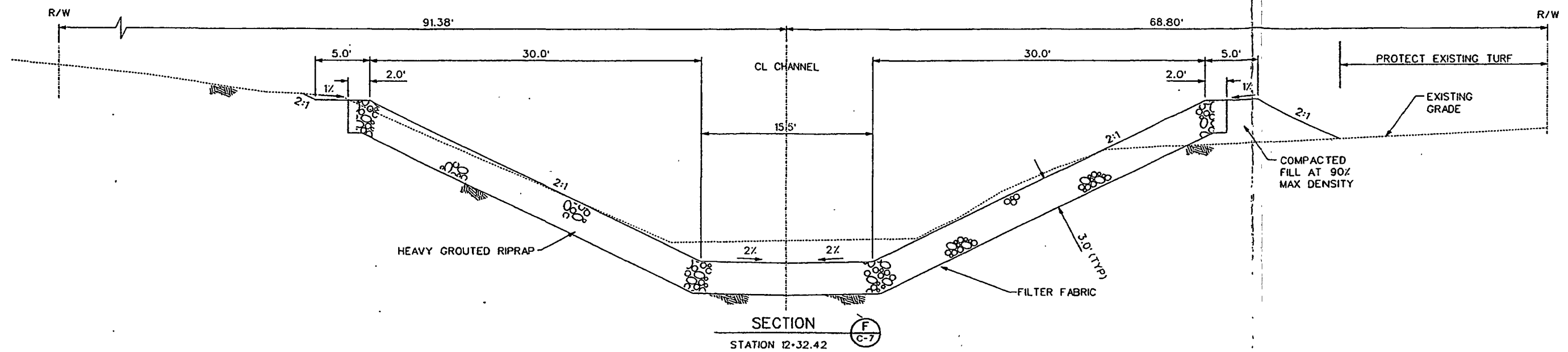
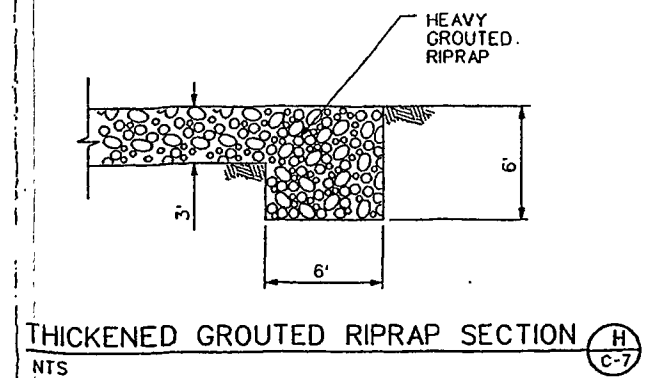
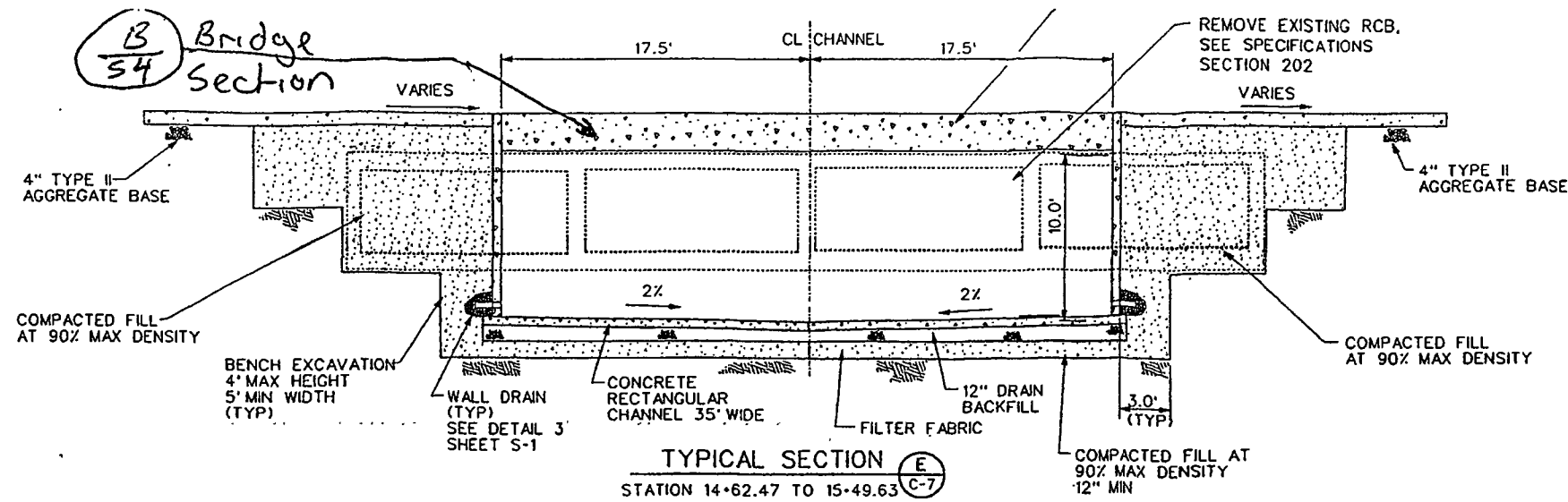
MONTGOMERY WATSON HARZA
 Las Vegas, Nevada
 3014 WEST CHARLESTON BLVD
 LAS VEGAS, NV 89102
 (702) 878-8010



FLAMINGO WASH CHANNEL SECTIONS & DETAILS CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



DESIGNED BY:	DWD	SCALE HORIZ: 1" = 5' VERT: 1" = 5' FIELD BOOK NONE	SHEET No C-6 L-1646
DRAWN BY:	JRE		
CHECKED BY:	DWD		
DATE:	7/30/2001		



NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

REV	No	DATE	DESCRIPTION	APPROVED

Los Vegas, Nevada

MWH
MONTGOMERY WATSON HARZA

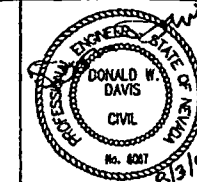
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010



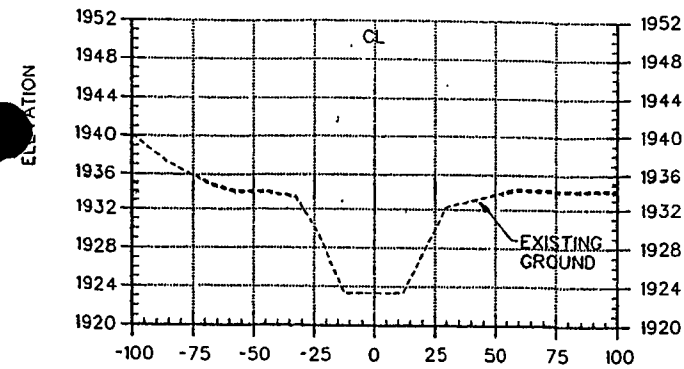
FLAMINGO WASH

CHANNEL SECTIONS & DETAILS

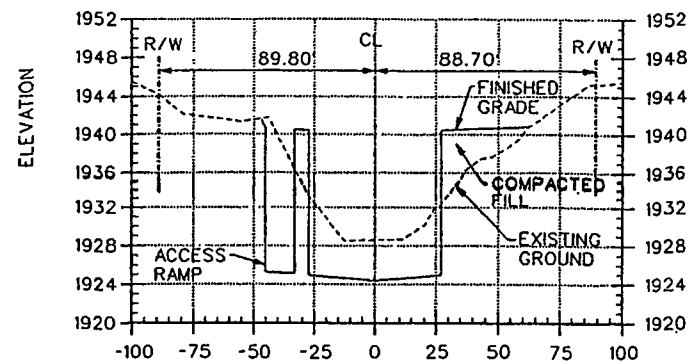
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



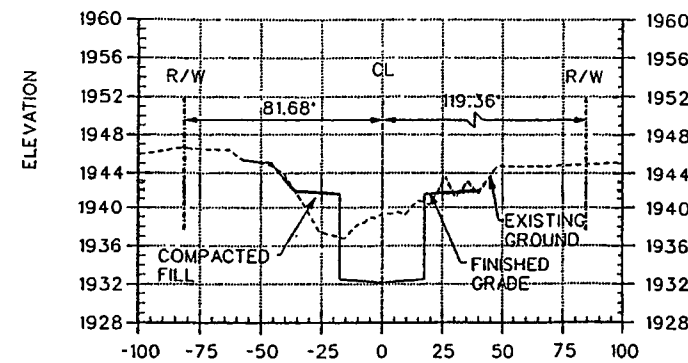
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DRAWN BY:	JRE	HORIZ: 1" = 5'	C-7
CHECKED BY:	DWD	VERT: 1" = 5'	
DATE:	7/30/2001	FIELD BOOK: NONE	
			L-1646



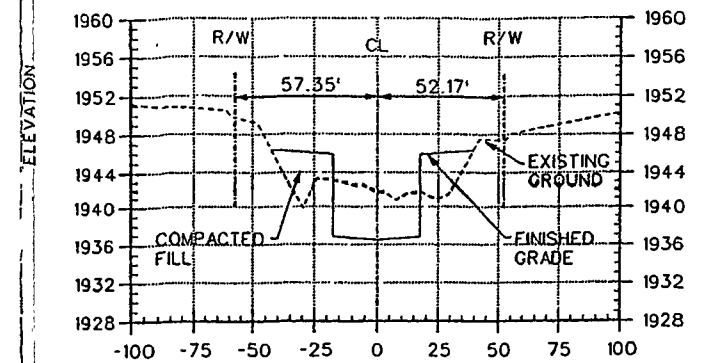
10+03



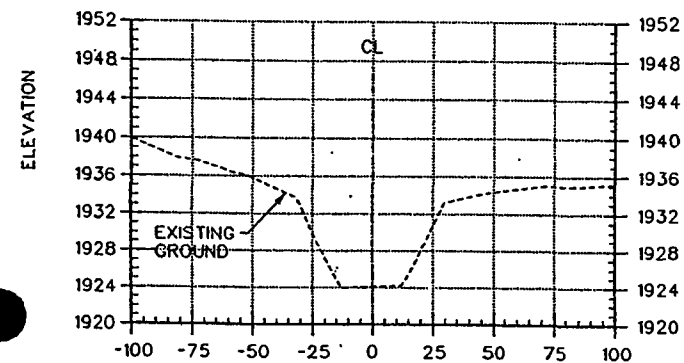
13+00



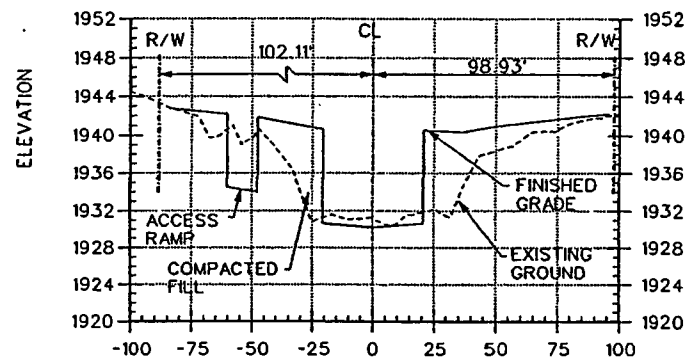
16+00



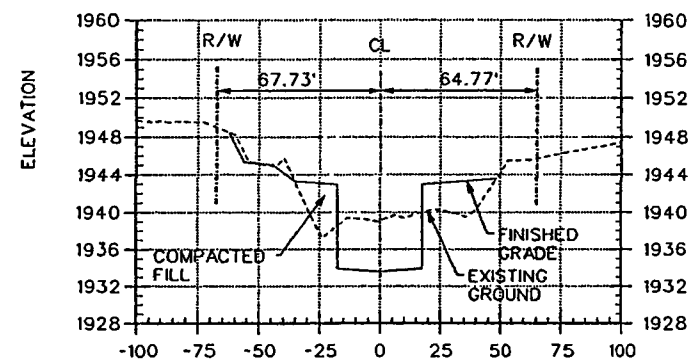
19+00



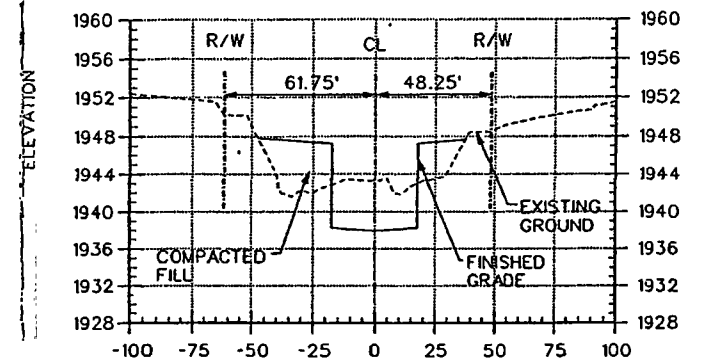
11+00



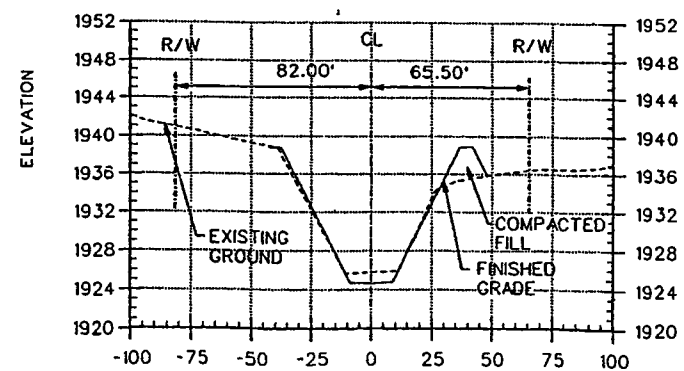
14+00



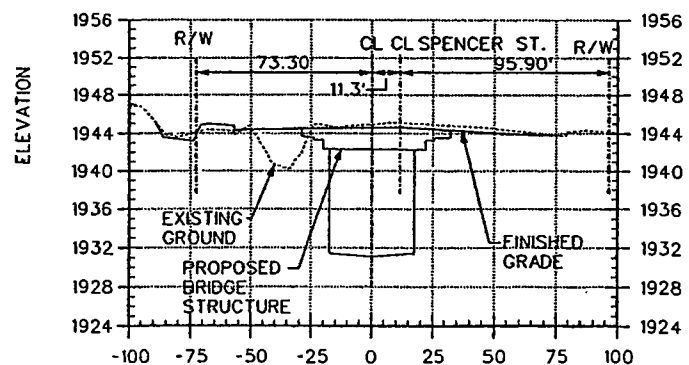
17+00



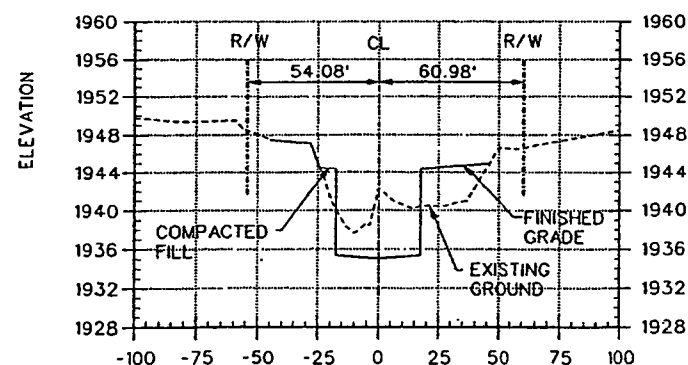
20+00



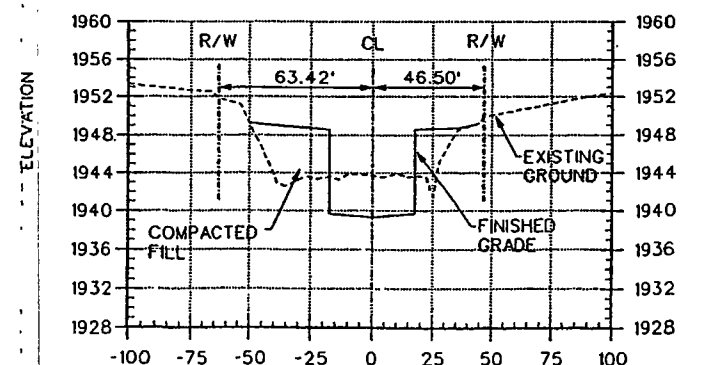
12+00



15+00



18+00



21+00

NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

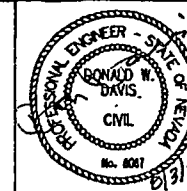
REV No	DATE	DESCRIPTION	APPROVED
1			
2			
3			

Las Vegas, Nevada

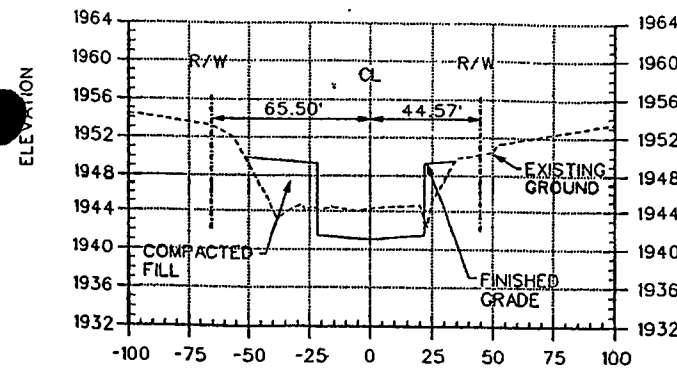
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010



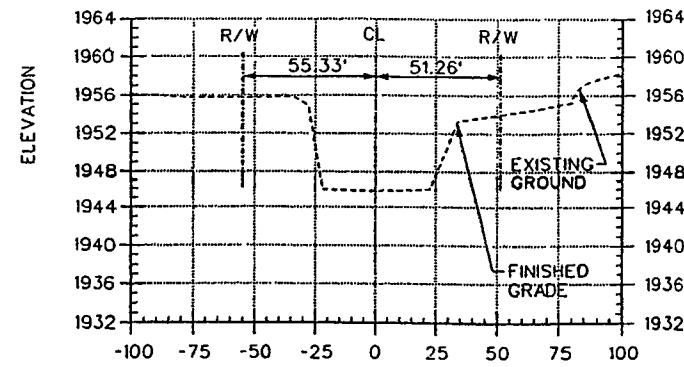
FLAMINGO WASH CHANNEL CROSS SECTIONS, STA 10+03.00 TO STA 21+00.00 CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



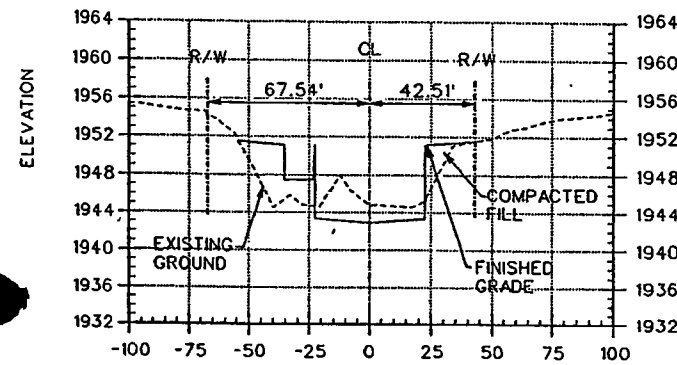
DESIGNED BY: KJS	SCALE: HORIZ: 1" = 40'	SHEET No: C-8
DRAWN BY: FAO	VERT: 1" = 10'	
CHECKED BY: DWD	FIELD BOOK: NONE	
DATE: 7/30/2001		L-1646



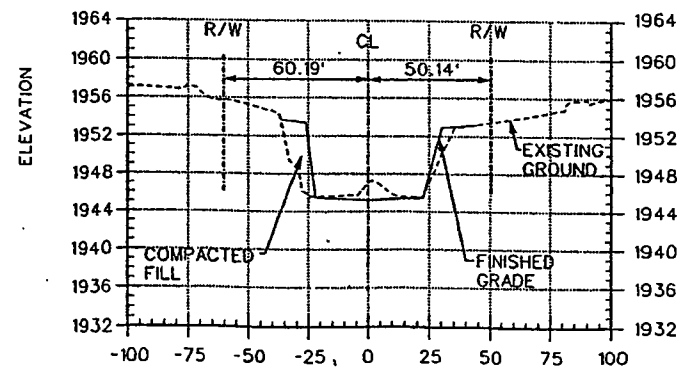
22+00



24+16



23+00



24+00

NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

REV	No	DATE	DESCRIPTION	APPROVED

MWH
MONTGOMERY WATSON HARZA

Las Vegas,
Nevada

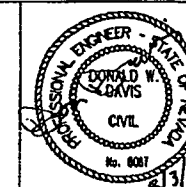
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010



FLAMINGO WASH

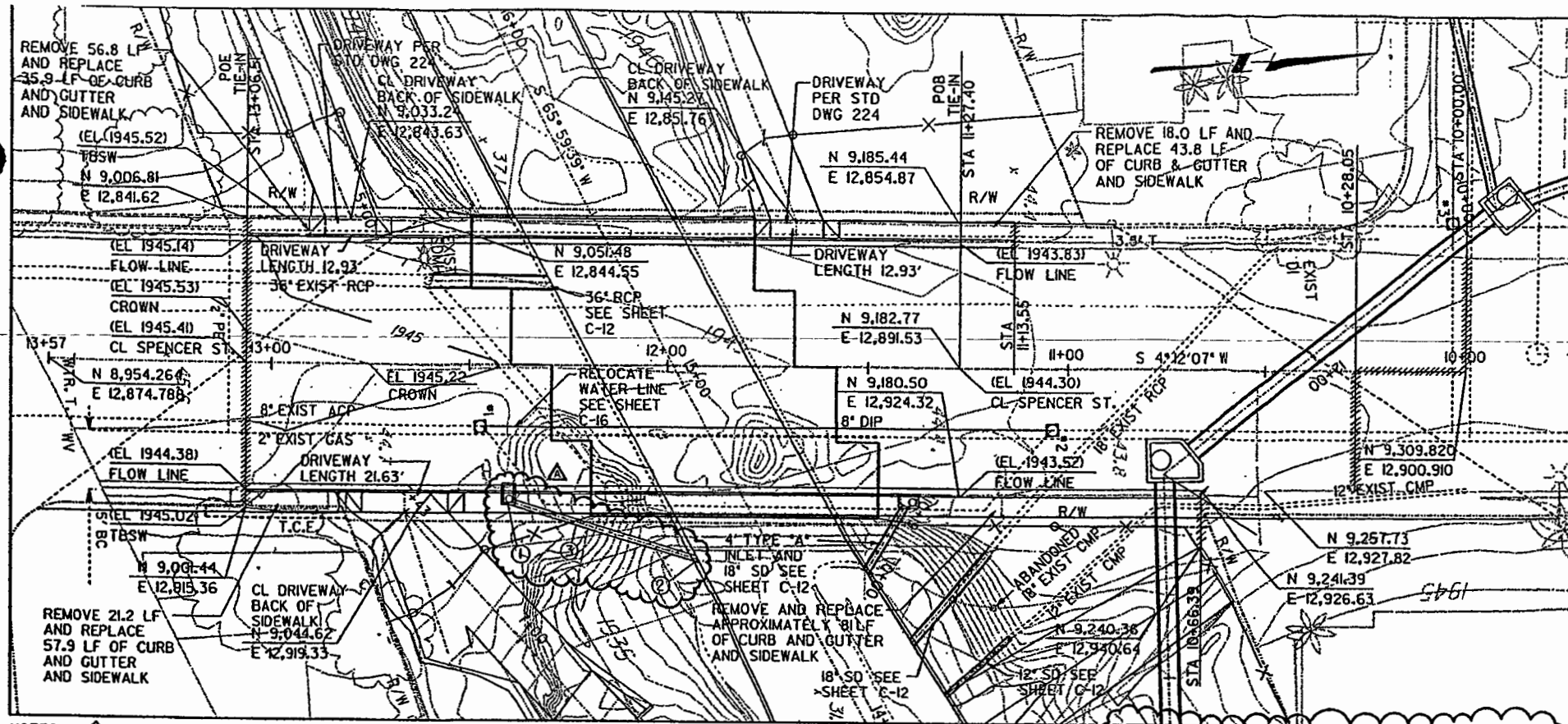
CHANNEL CROSS SECTIONS, STA 22+00.00 TO STA 24+16.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

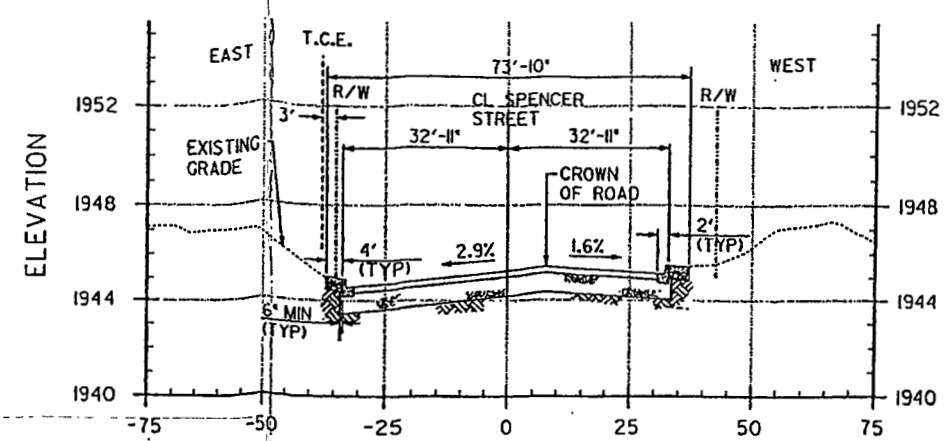
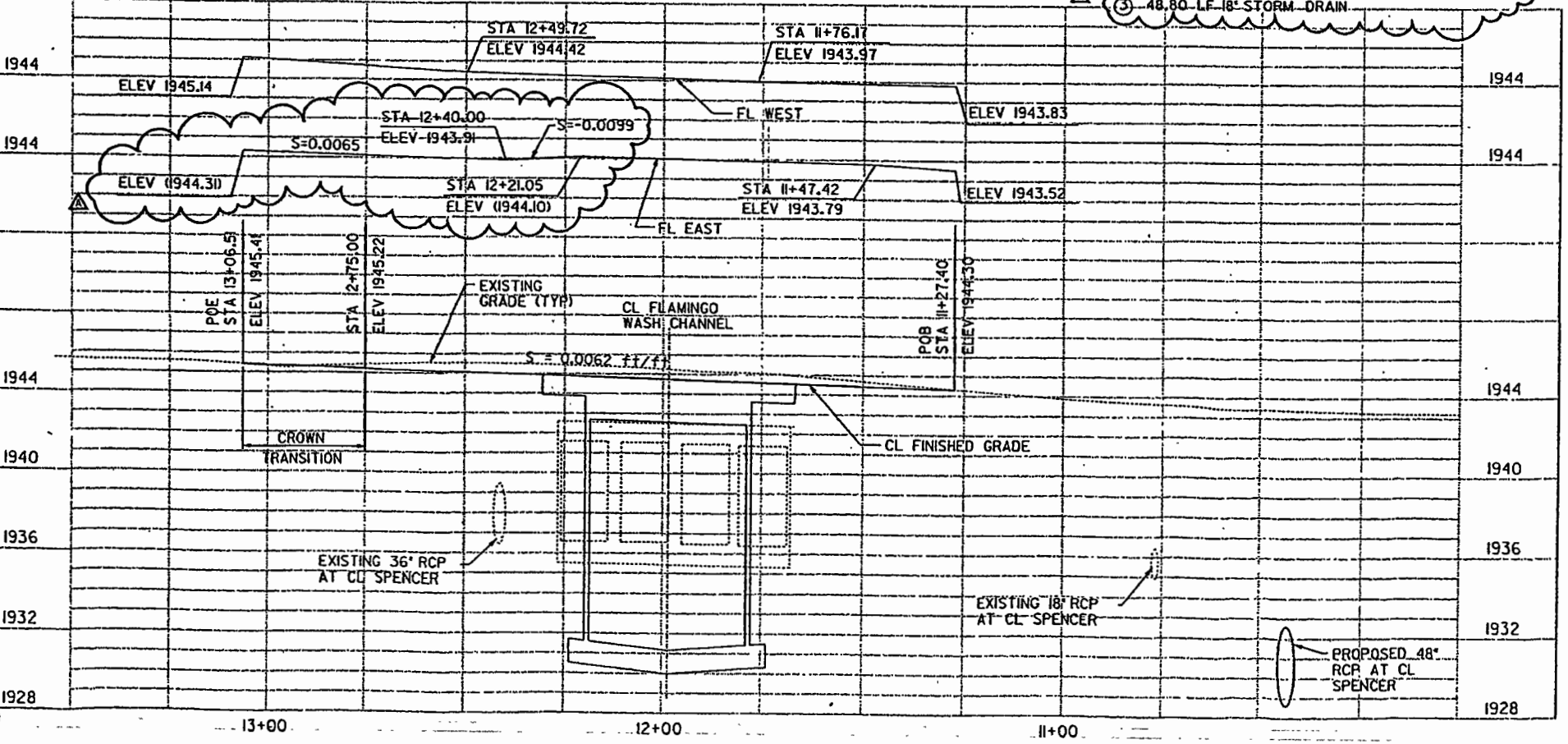


DESIGNED BY:	KJS
DRAWN BY:	FAO
CHECKED BY:	DWD
DATE:	7/30/2001

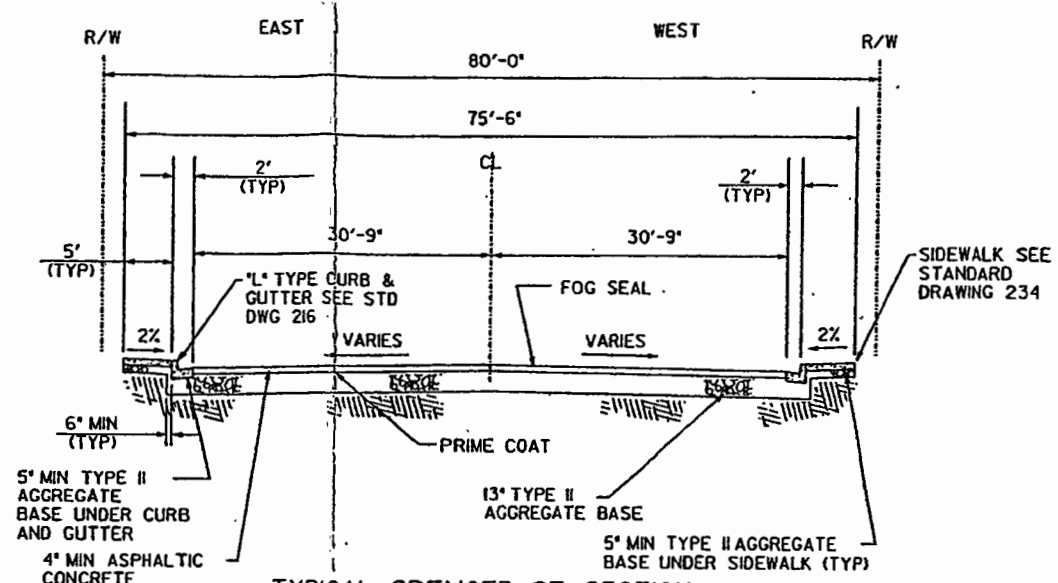
SCALE	SHEET No
HORIZ: 1" = 40'	C-9
VERT: 1" = 10'	
FIELD BOOK NONE	
	L-1646



NOTES: 1. PAVEMENT MARKINGS FOR SPENCER STREET SHALL BE TYPE I CENTERLINE DELINEATION PER STD DWG NO. 244. TYPE 4 LANE DELINEATION PER STD DWG NO. 244A (12 FEET EACH SIDE OF CENTERLINE) FROM STA 10+34.09 TO STA 13+52.87.
2. STREET LIGHTING PLAN, SEE SHEET C-15

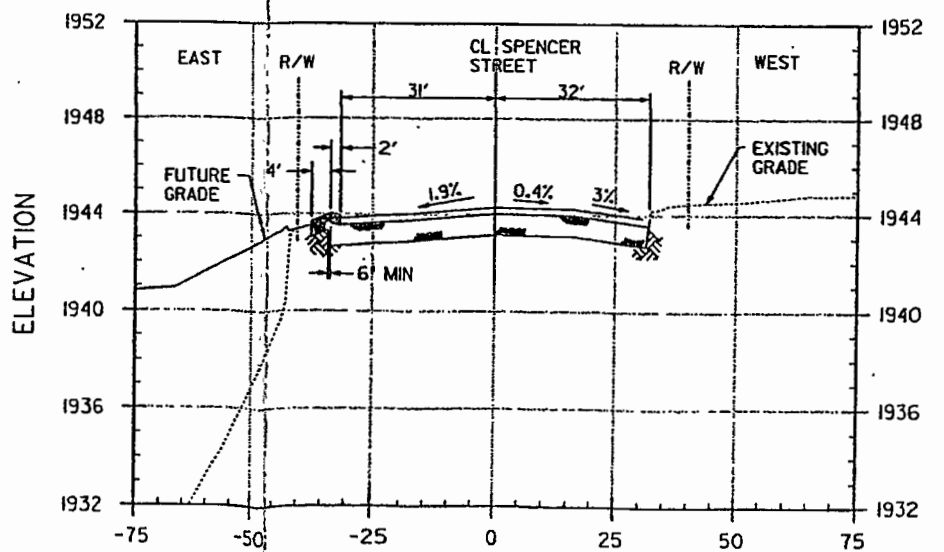


EXISTING AT STA 13+06.51



TYPICAL SPENCER ST. SECTION

STATIONS 11+27.40 TO BRIDGE SLAB & BRIDGE SLAB TO 12+75.00

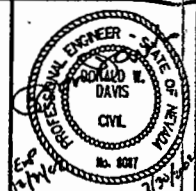


EXISTING AT STA 11+27.40

FLAMINGO WASH SPENCER STREET PLAN & PROFILE CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



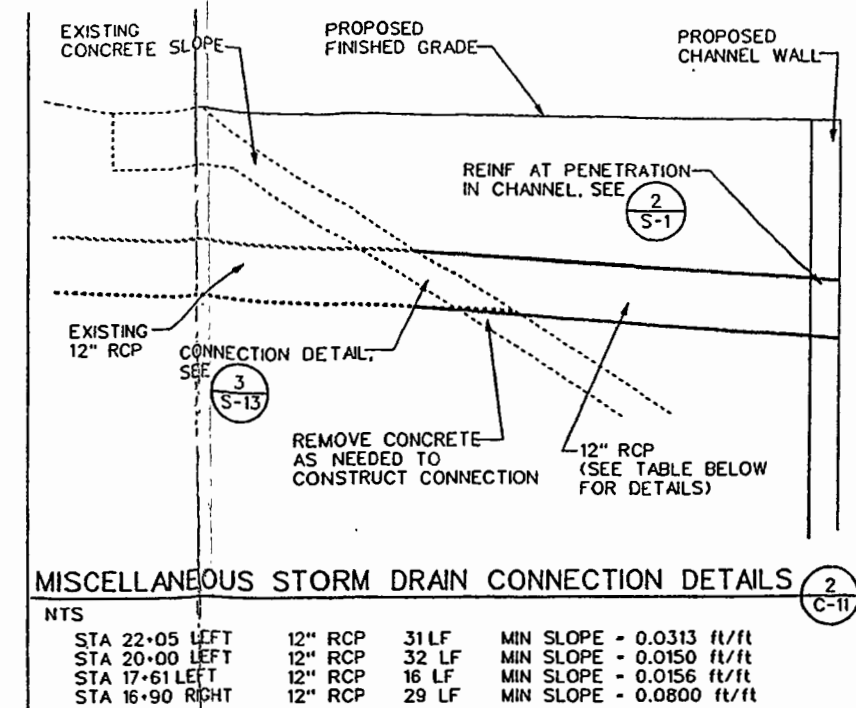
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



DESIGNED BY: KJS
DRAWN BY: FAO
CHECKED BY: DWD
DATE: 7/30/2001

SCALE
HORIZ: 1" = 20'
VERT: 1" = 4'
FIELD BOOK NONE

SHEET No
C-10
L-1646



Hold overhead power
the contact

Call
before you
Overhead
1-782-593-6111

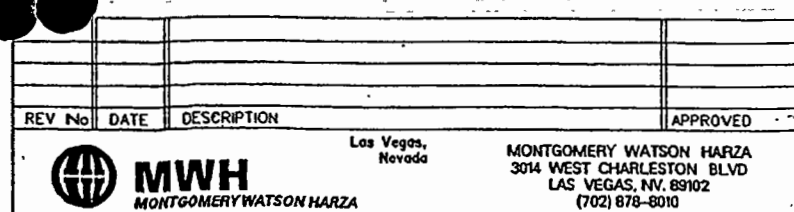
Avoid calling underground
utility lines. It's costly.

Call
before you
Dig.

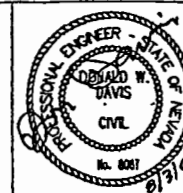
1-800-227-2600

PROTECT WATERLINES IN PLACE. WHEREVER A WATERLINE IS WITHIN 18" ABOVE A STORM DRAIN LINE, OR WHERE COMPACTION UNDER A WATERLINE CAN NOT BE MET, BACKFILL TRENCH WITH CEMENT SLURRY OR FLOWABLE FILL TO THE SPRINGLINE OF THE WATERLINE. THIS REQUIREMENT IS FOR STRUCTURAL SUPPORT ONLY. ADDITIONAL HEALTH REGULATIONS MAY APPLY PER UDACS 2.19

LVVWD 8/03/01
DATE



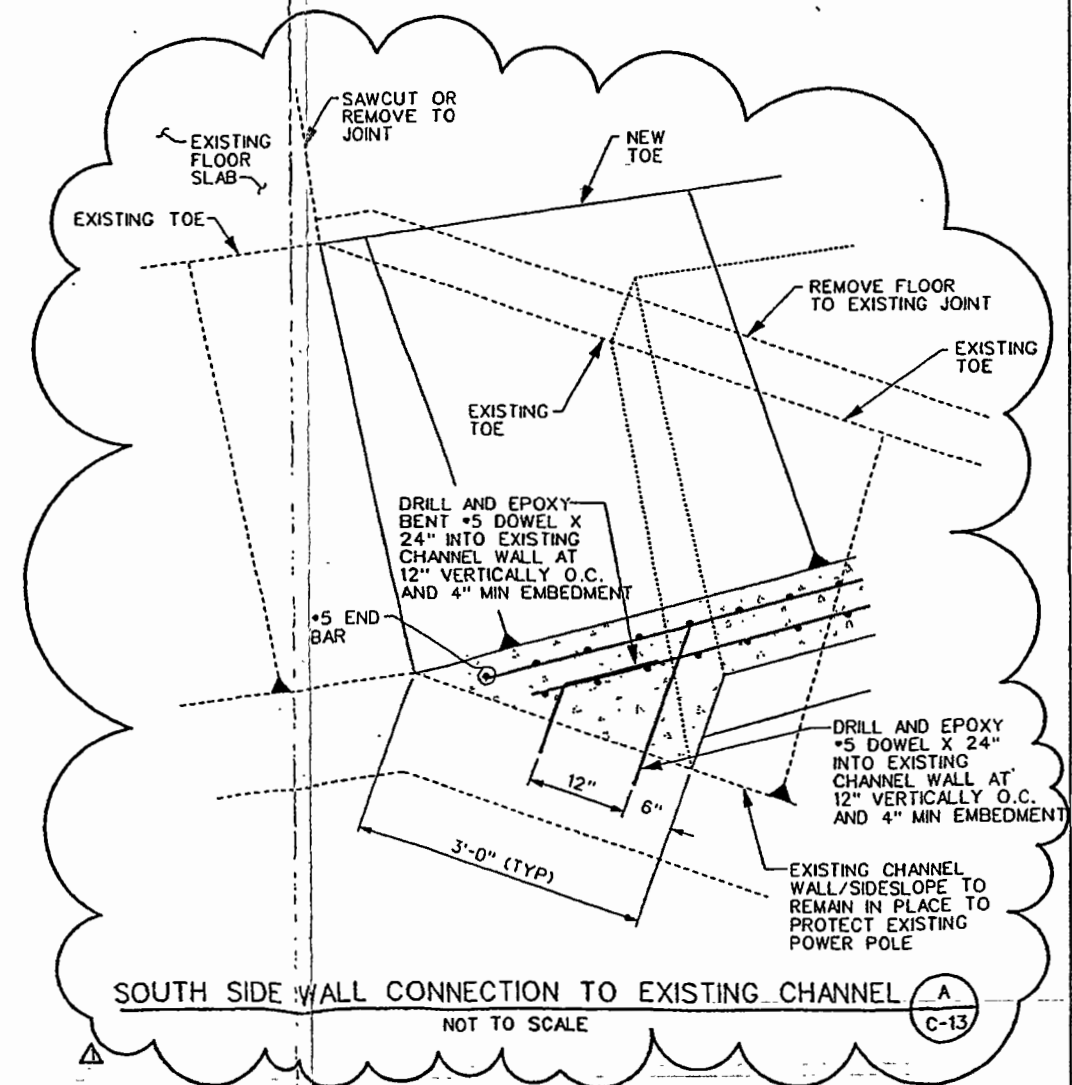
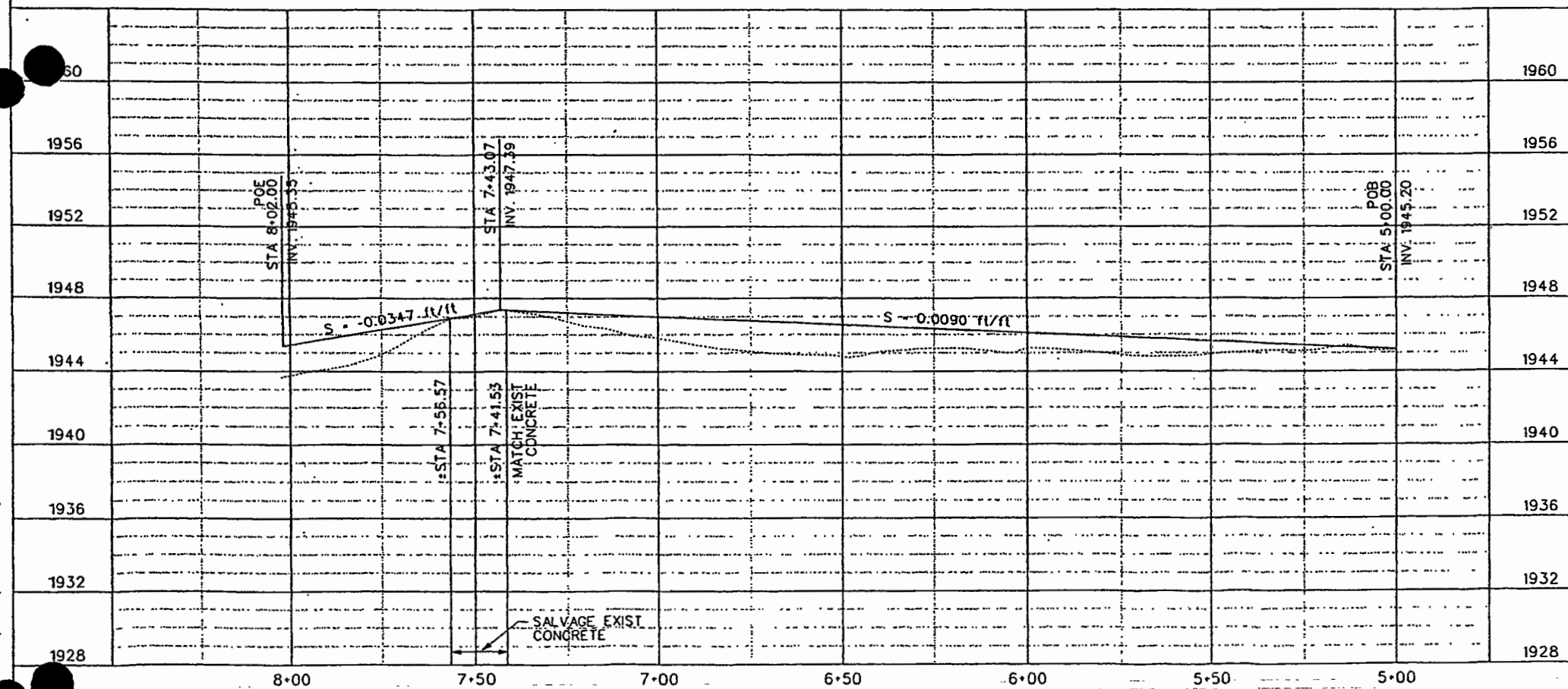
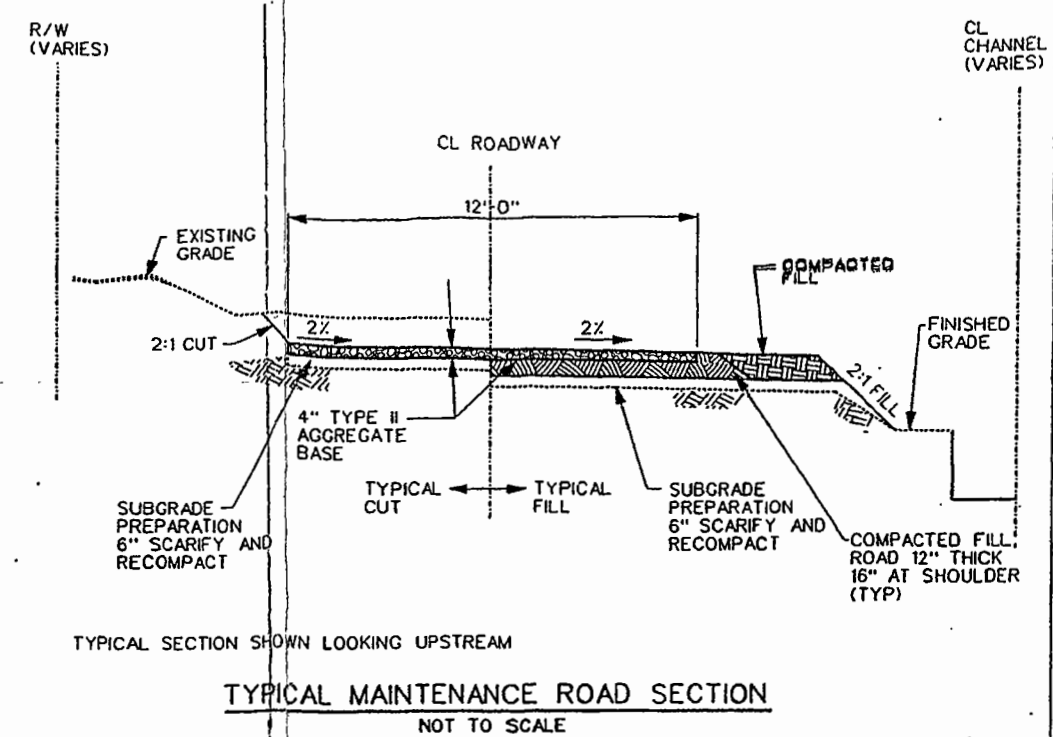
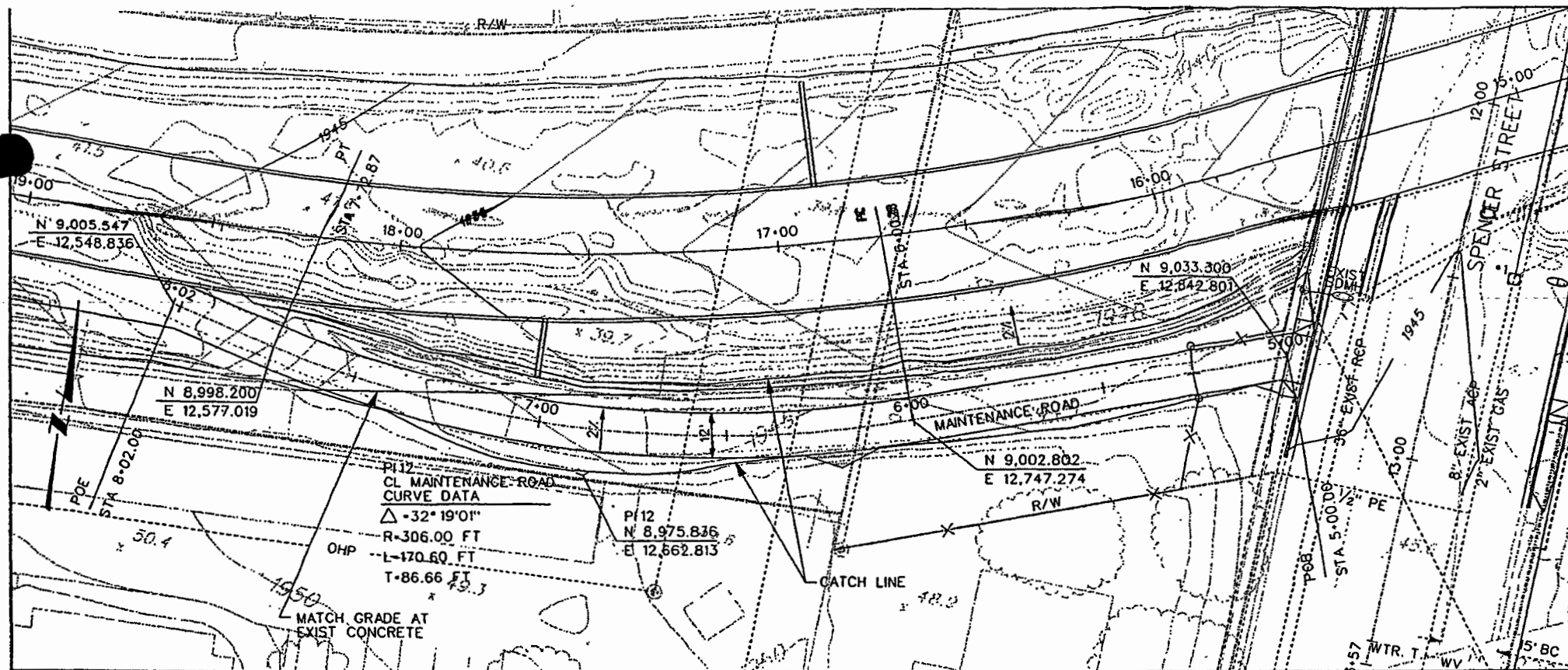
FLAMINGO WASH
STORM DRAIN PLAN & PROFILE,
STA 10+00.00 TO STA 13+13.23
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



DESIGNED BY: MKW
DRAWN BY: MKW
CHECKED BY: DWD
DATE: 7/30/2001

SCALE
HORIZ: 1" = 20'
VERT: 1" = 4'
FIELD BOOK NONE

SHEET No
C-11
1-1646

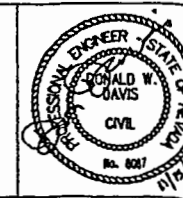


REV No	DATE	DESCRIPTION	APPROVED
1	9/24/01	ADDED WALL CONNECTION DETAIL PER ADDENDUM #3	

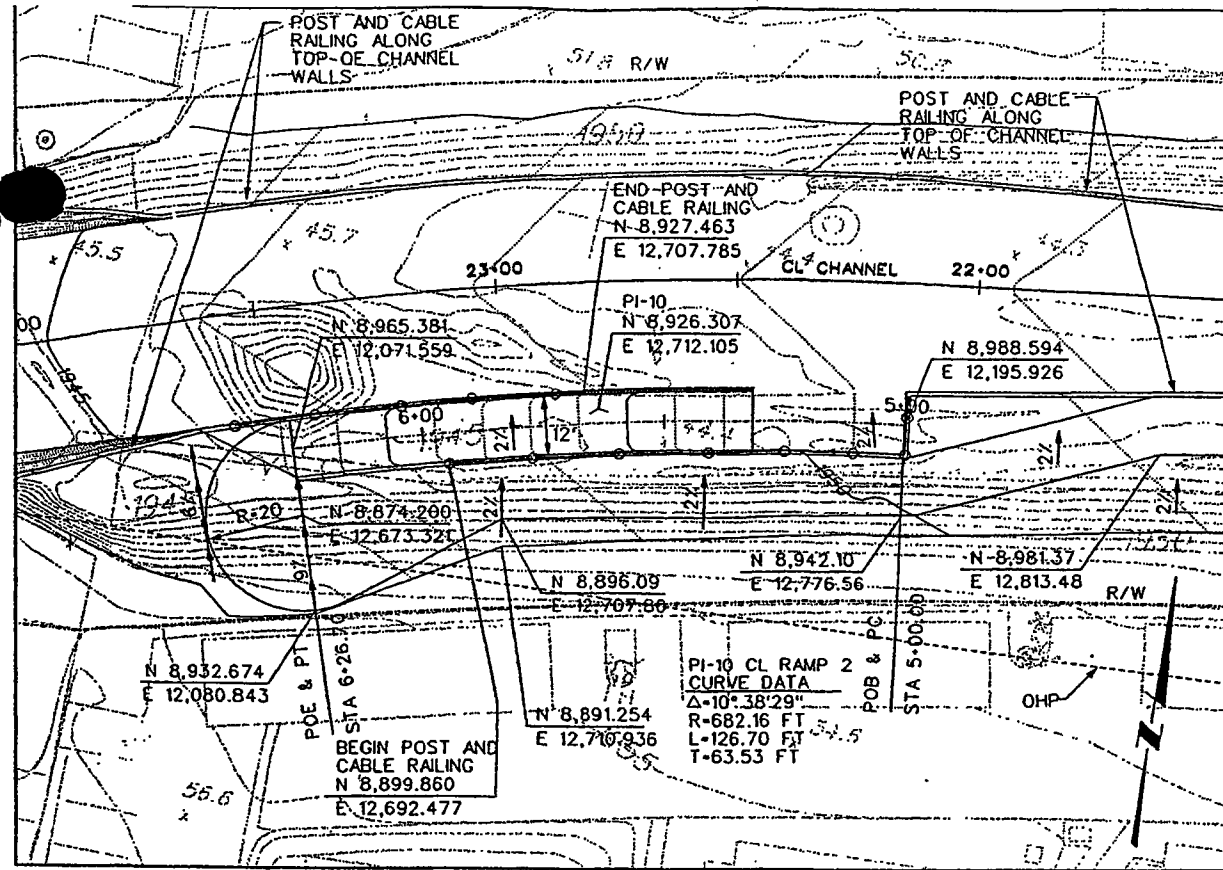
MONTGOMERY WATSON HARZA
 3014 WEST CHARLESTON BLVD
 LAS VEGAS, NV 89102
 (702) 878-8010



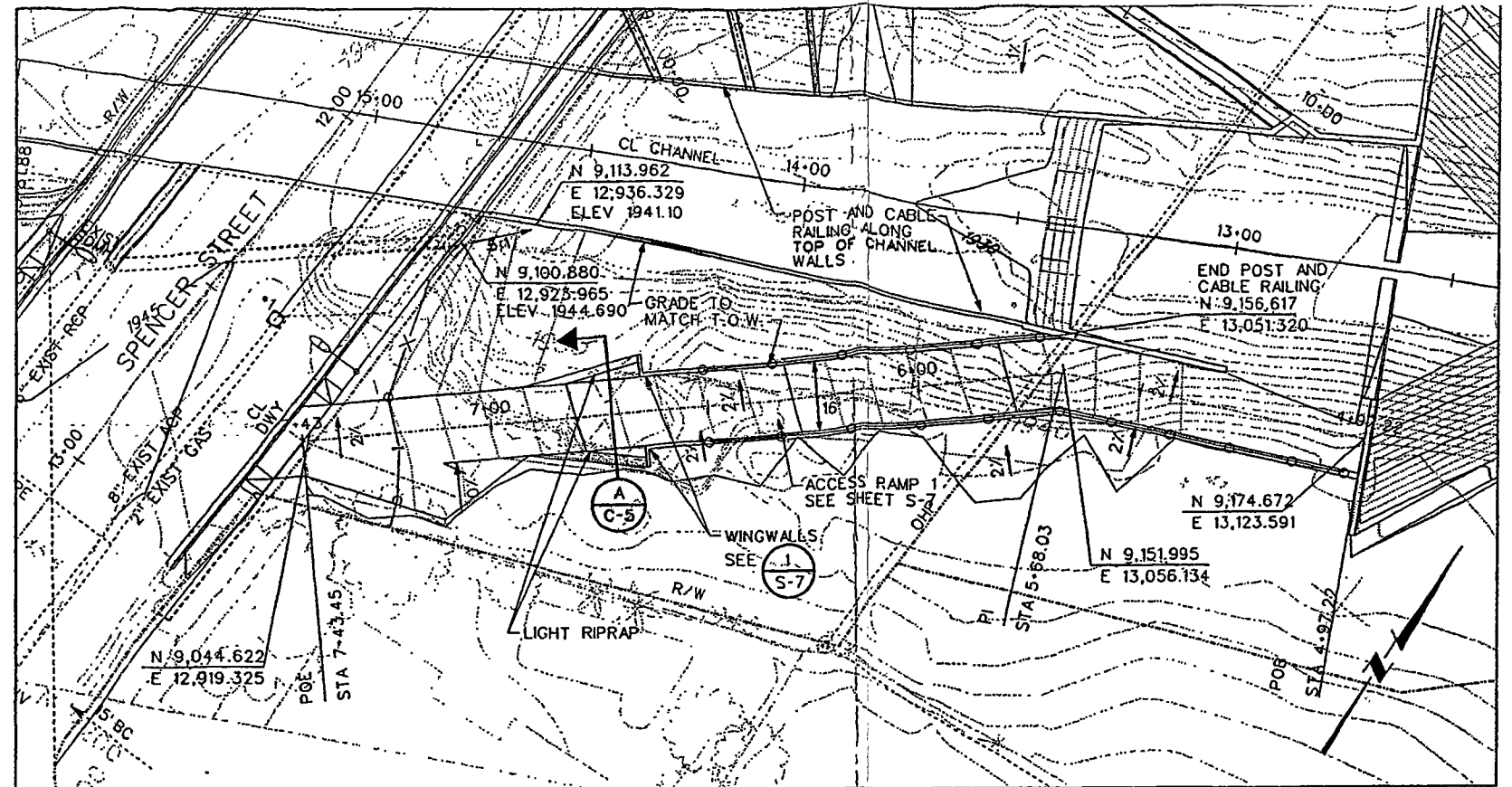
FLAMINGO WASH
 MAINTENANCE ROAD PLAN & PROFILE,
 STA 5+00.00 TO STA 8+02.00
 CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



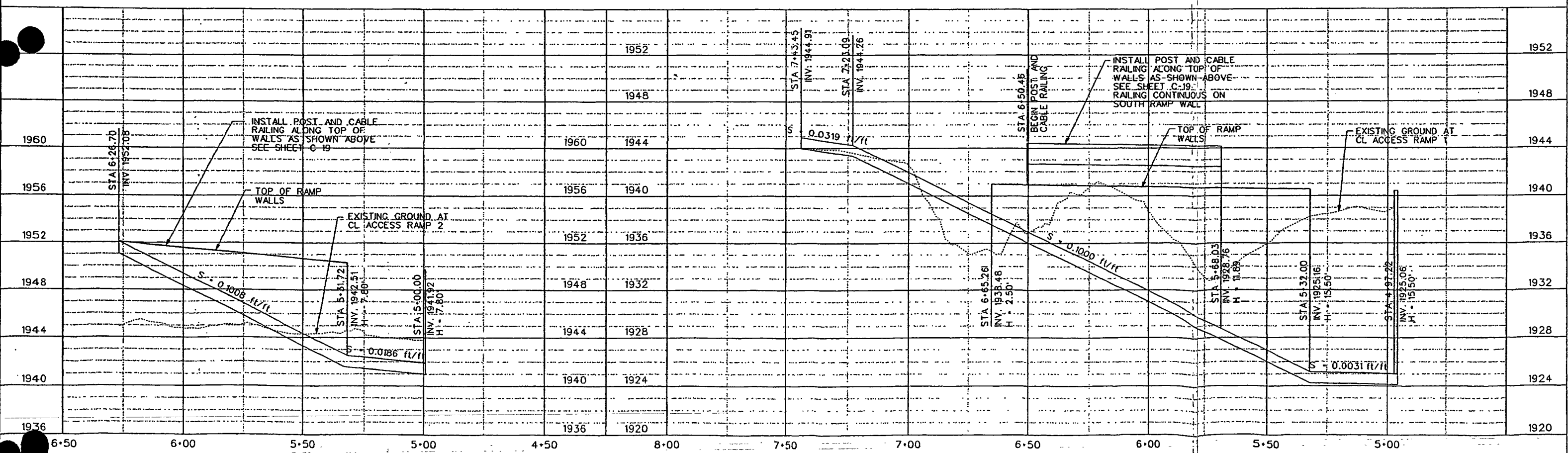
DESIGNED BY:	KJS	SCALE	HORIZ: 1" = 20'	SHEET No
DRAWN BY:	MKW	VERT: 1" = 4'		C-13
CHECKED BY:	DWD	FIELD BOOK	NONE	
DATE:	7/30/2001			L-1646



ACCESS RAMP 2



ACCESS RAMP 1



REV No	DATE	DESCRIPTION	APPROVED

Las Vegas, Nevada

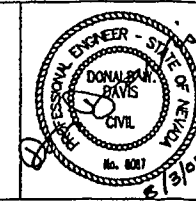
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV 89102
(702) 878-8010



FLAMINGO WASH

ACCESS RAMPS PLAN & PROFILE

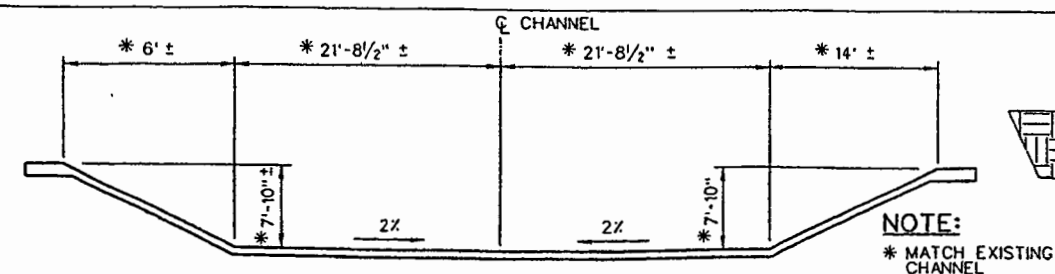
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



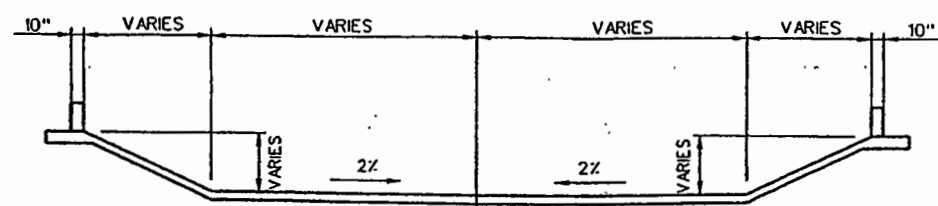
DESIGNED BY: KJS
 DRAWN BY: MKW
 CHECKED BY: DWD
 DATE: 7/30/2001

SCALE
 HORIZ: 1" = 20'
 VERT: 1" = 4'
 FIELD BOOK NONE

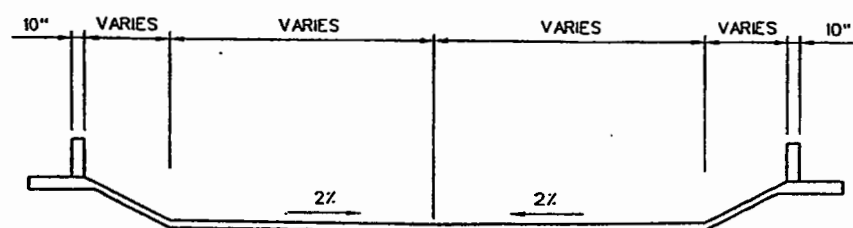
SHEET No
C-14
 L-1646



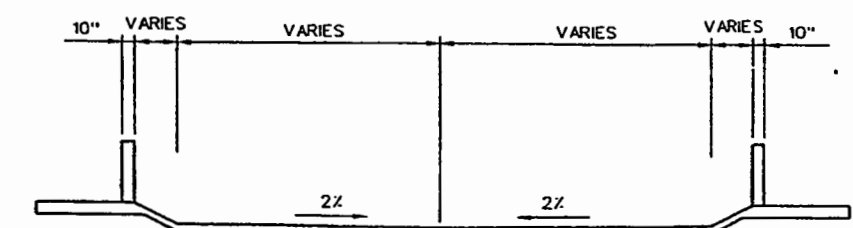
AT BEGINNING OF TRANSITION CHANNEL STA. 24+15.42



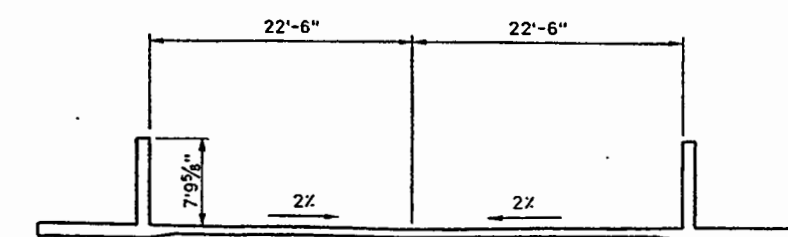
AT 3/4 POINT



AT 1/2 POINT



AT 1/4 POINT



AT END OF TRANSITION STA. 23+65.42

WALL SECTIONS AT TRANSITION CHANNEL
STA. 23+65.42 TO STA. 24+15.42

SCALE: N.T.S.

NOTE:
* MATCH EXISTING CHANNEL

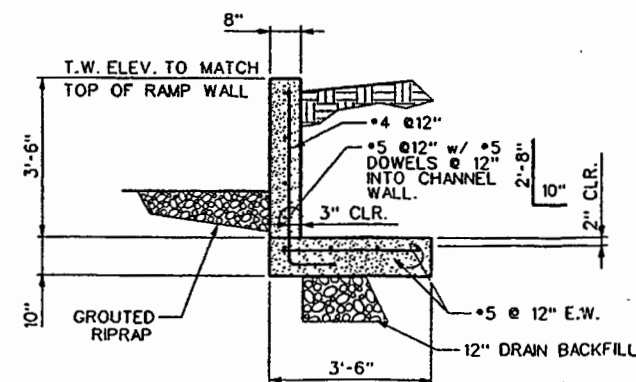
WALL DRAIN CAST IN WALL
2" WEEP HOLES EVENLY
SPACED FOR SOUTH WING
WALL 3" WEEP HOLES EVENLY
SPACED FOR NORTH WALL.

TOP OF FOOTING TO
MATCH TOP OF CHANNEL
SLAB.

12" DRAIN BACKFILL

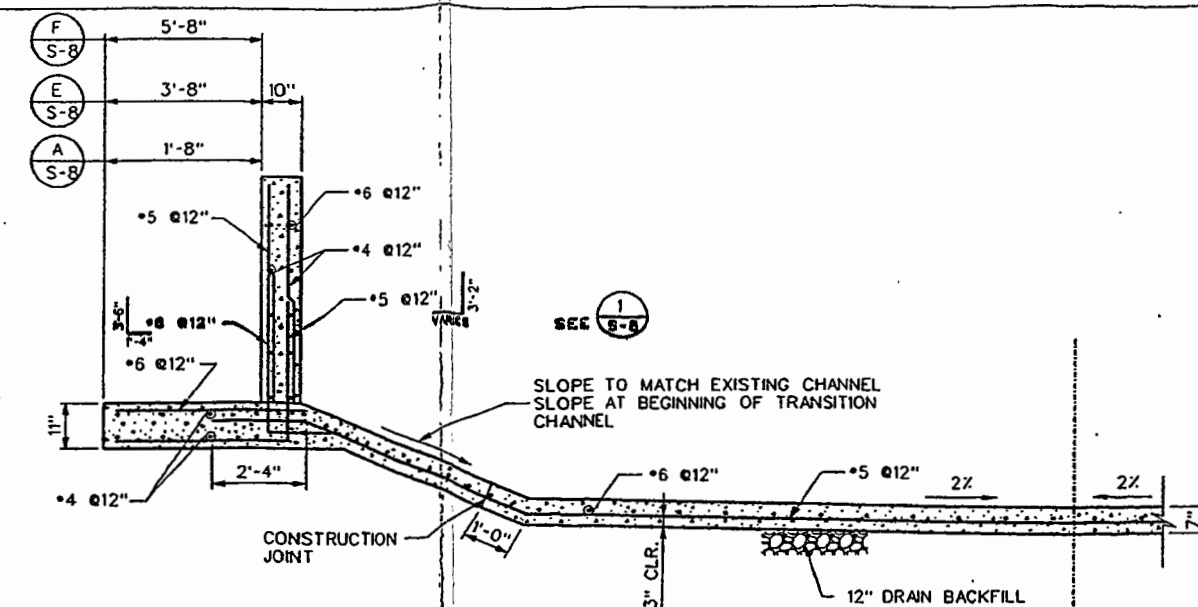
WINGWALL SECTION

SCALE: 1/2" = 1'-0"



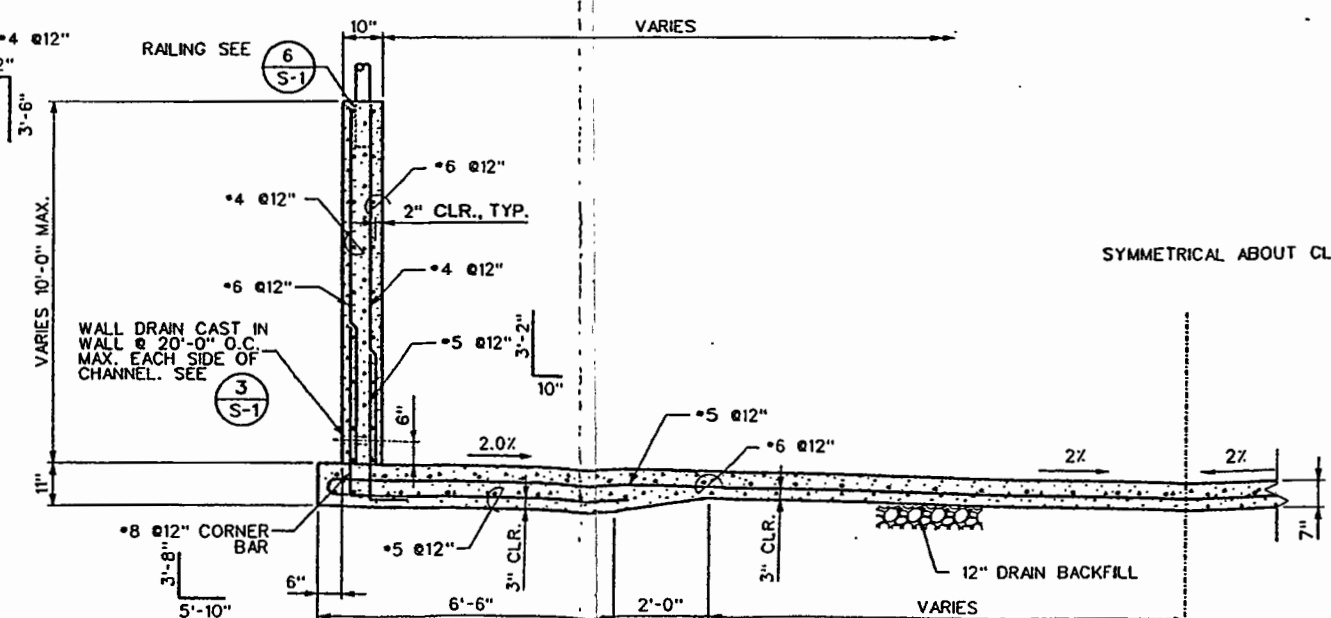
WINGWALL SECTION

SCALE: 1/2" = 1'-0"



TRANSITION CHANNEL SECTION

SCALE: N.T.S.



CHANNEL SECTION

SCALE: 1/2" = 1'-0"

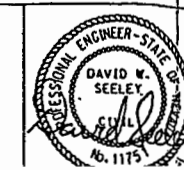
REV	NO	DATE	DESCRIPTION	APPROVED
1	1	7/30/2001	DESIGNED BY: DWS	
2	2	7/30/2001	DRAWN BY: ALA	
3	3	7/30/2001	CHECKED BY: DWS	
4	4	7/30/2001	DATE: 7/30/2001	



FLAMINGO WASH

CHANNEL SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

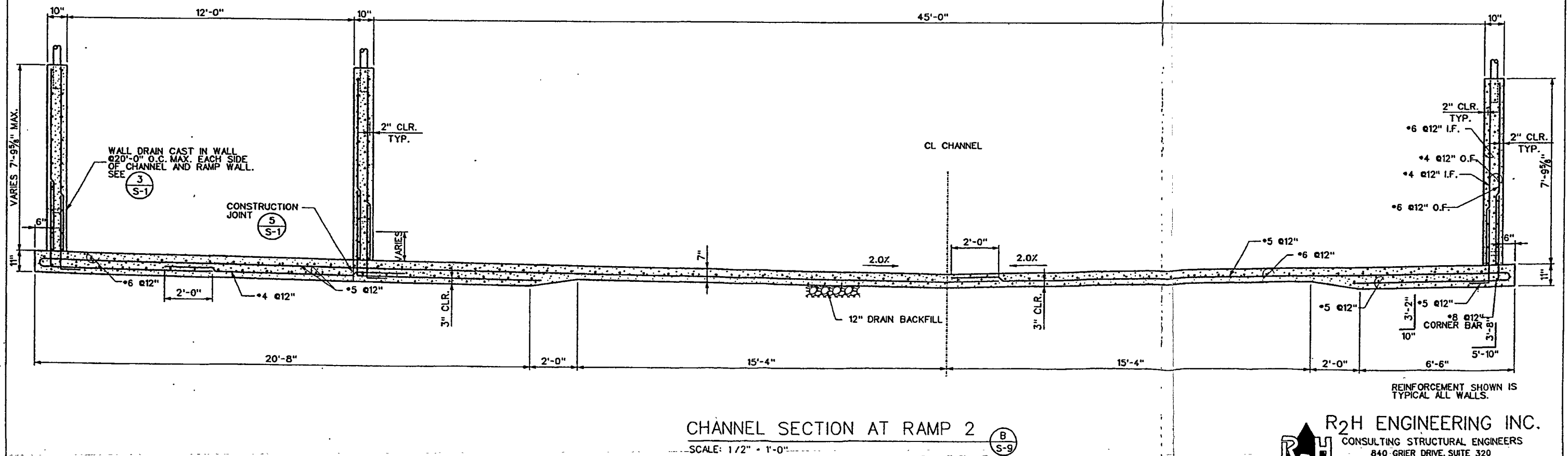
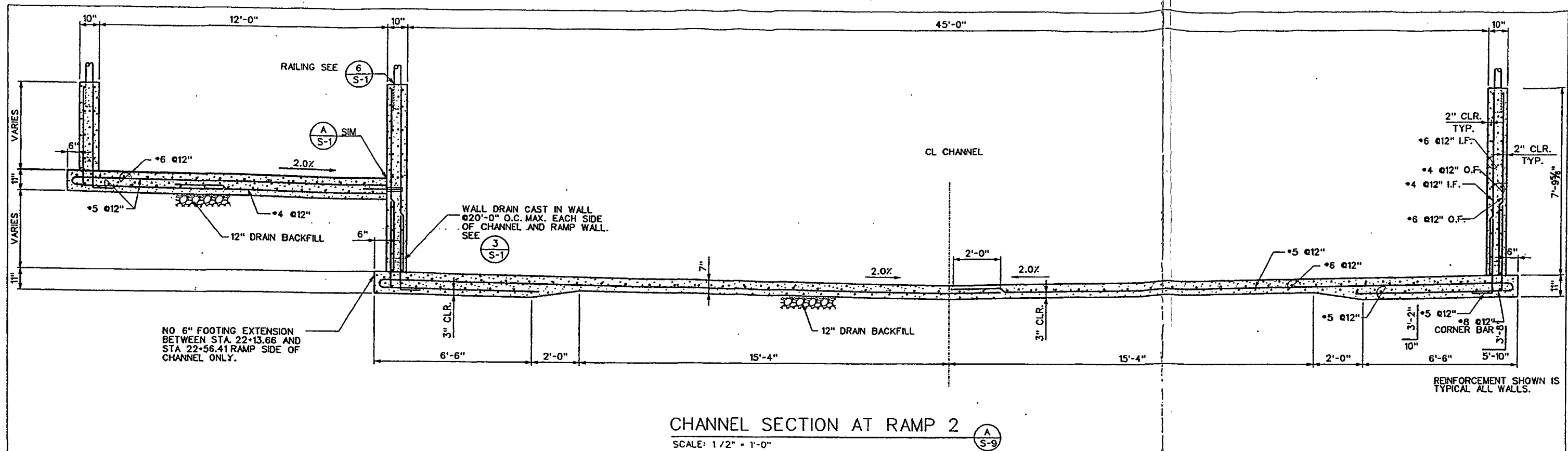


DESIGNED BY: DWS
DRAWN BY: ALA
CHECKED BY: DWS
DATE: 7/30/2001



R²H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070 00019-S08.DGN

SCALE	SHEET No
HORIZ: AS SHOWN	S-8
VERT: AS SHOWN	
FIELD BOOK NONE	

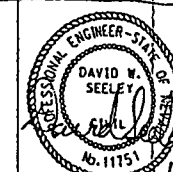


REV. NO.	DATE	DESCRIPTION	APPROVED

MWH
 MONTGOMERY WATSON HARZA
 Las Vegas, Nevada
 3014 WEST CHARLESTON BLVD
 LAS VEGAS, NV. 89102
 (702) 878-8010

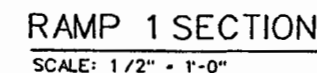
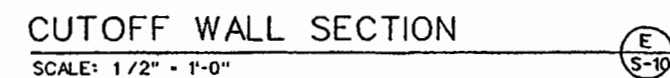
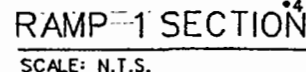
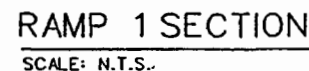
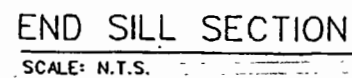
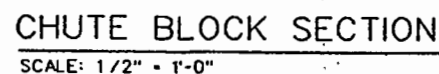
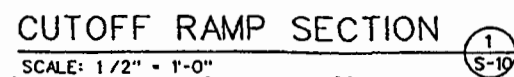


FLAMINGO WASH CHANNEL SECTIONS CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



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 CONSULTING STRUCTURAL ENGINEERS
 840 GRIER DRIVE SUITE 320
 LAS VEGAS, NEVADA 89119
 PHONE (702) 260-7000
 FAX (702) 260-7070
 00019-S09.DGN

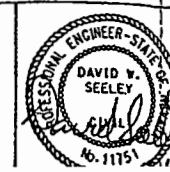
DESIGNED BY: DWS	SCALE	SHEET No
DRAWN BY: ALA	HORIZ: AS SHOWN	S-9
CHECKED BY: DWS	VERT: AS SHOWN	
DATE: 7/30/2001	FIELD BOOK NONE	



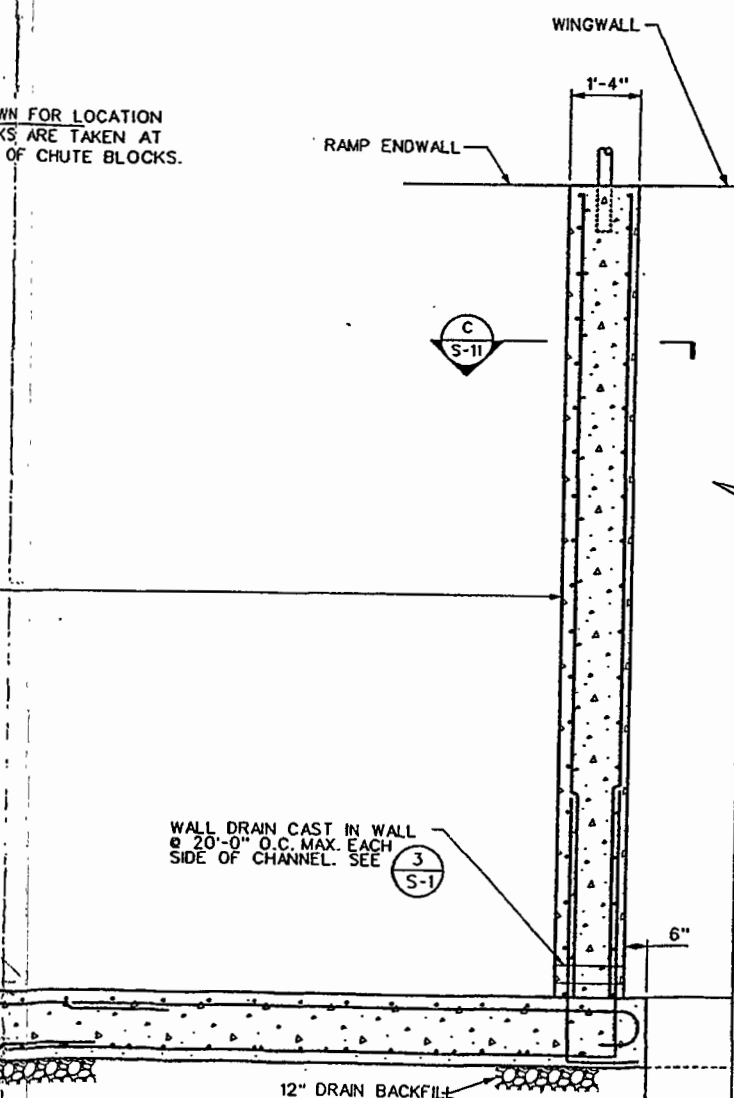
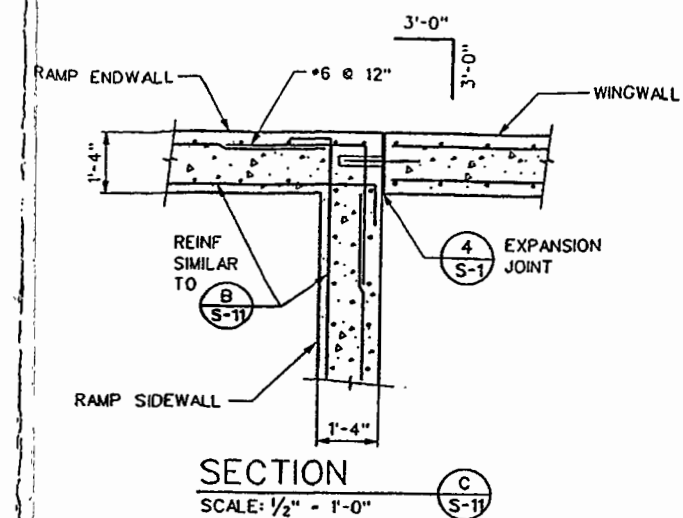
SCALE	SHEET No
HORIZ: AS SHOWN	S-10
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FIELD BOOK NONE	


MWH
MONTGOMERY WATSON HARZA

FLAMINGO WASH
CHANNEL & RAMP SECTIONS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS



DESIGNED BY: DWS
DRAWN BY: ALA
CHECKED BY: DWS
DATE: 7/30/2001



WALL DRAIN CAST IN WALL
@ 20'-0" O.C. MAX. EACH
SIDE OF CHANNEL. SEE 3

REINFORCEMENT SHOWN TYPICAL IN ALL WALLS.

B
S-11

SCALE: N.T.S.

CHANNEL SECTIONS

CLARK COUNTY NEVADA DEPARTMENT OF PUBLIC WORKS

R₂H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 CRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

00019-S11.DGN

SHEET No

DESIGNED BY: DWS
DRAWN BY: ALA
CHECKED BY: DWS
DATE: 7/30/2001

SCALE
HORIZ: AS SHOWN
VERT: AS SHOWN
FIELD BOOK NONE

S-11

REV No.
DATE
DESCRIPTION
APPROVED

MWH
 Las Vegas,
Nevada

MONTGOMERY WATSON HARZA
 3014 WEST CHARLESTON BLVD
 LAS VEGAS, NV 89107

