

05-09-A170P
Formerly: 05-09-2100170P

**Request for Letter of Map Revision
C-1 Channel Phase 2
City of Henderson, NV**

Prepared for

CITY OF HENDERSON, NEVADA
240 S Water Street
Henderson, NV 89074



By

THE LOUIS BERGER GROUP, INC.
500 Amigo Court, Suite 100
Las Vegas, Nevada 89119
(702) 736-6632



July 11, 2005



NATIONAL FLOOD INSURANCE PROGRAM

FEMA NATIONAL SERVICE PROVIDER

August 11, 2005

2005 AUG 18 PM 1:50

RFCD

Mr. Roger J. Patton, P.E.
The Louis Berger Group, Inc.
500 Amigo Court, Suite 100
Las Vegas, NV 89119

IN REPLY REFER TO:
Case No.: 05-09-2100170P
Community: City of Henderson, NV
Community No.: 320005

316-AD

Dear Mr. Patton:

This responds to your request dated July 26, 2005, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	C-1 Channel Phase 2
Flooding Source:	C-1 Channel
FIRM Panel(s) Affected:	32003C2615 E

The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register*, is enclosed for your information.

If you are unable to meet the 90-day deadline for submittal of required items, and would like us to continue processing your request, you must request an extension of the deadline. This request must be submitted to us in writing and must provide (1) the reason why the data cannot be submitted within the requested timeframe, and (2) a new date for the submittal of the data. FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, the fees will be forfeited for any request for which neither the requested data nor a written extension request is received within 90 days.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

3601 Eisenhower Avenue, Alexandria, VA 22304-6425 PH:1-877-FEMA MAP FX: 703.960.9125

The Mapping on Demand Team, under contract with the Federal Emergency Management Agency, is the
National Service Provider for the National Flood Insurance Program

If you have specific questions concerning your request, please call the Revisions Coordinator for your State, Mr. Sacha Tohme, CFM, who may be reached at (703) 960-8800, ext. 3028.

Sincerely,

A handwritten signature in black ink, appearing to read 'Sheila M. Norlin', with a stylized flourish at the end.

Sheila M. Norlin, CFM
National LOMC Manager
Michael Baker Jr., Inc.

Enclosure

cc: Mr. Curt Chandler, P.E., CFM
New Development Manager
City of Henderson

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



NATIONAL FLOOD INSURANCE PROGRAM

FEMA NATIONAL SERVICE PROVIDER

Summary of Additional Data Required to Support a Letter of Map Revision (LOMR)

Case No.: 05-09-2100170P

Requester: Mr. Roger J. Patton, P.E.

Community: City of Henderson, NV

Community No.: 320005

The issues listed below must be addressed before we can continue the review of your request.

1. The submitted as-built plans entitled "Upper and Middle Reaches of the C-1 Channel – Phase 2," prepared by your firm and dated January 2003, were reduced at an unknown scale. Please provide as-built plans, certified by a registered professional engineer or land surveyor, at full accurate scale.
2. The undated submitted work map entitled "C-1 Channel Phase 2 Flood Insurance Study Work Map," prepared by your firm, was not certified by a registered professional engineer or land surveyor, as representing as-built conditions. Please provide certification, in form of a letter or stamp, that the afore-mentioned work map represents as-built conditions.



TABLE OF CONTENTS

	Page
I. Introduction.....	1
II. Hydrologic Analysis	2
III. Hydraulic Analysis.....	4
IV. Conclusions	8



APPENDICES

A. FEMA Forms

FEMA 'Overview and Concurrence Form' – MT-2 Form 1
FEMA 'Riverine Hydrology & Hydrologic Form' – MT-2 Form 2
FEMA "Riverine Structures Form" – MT-2 Form 3

B. Figures

Figure 1 – Existing FEMA Flood Zone Map
Figure 2 – Annotated FEMA Flood Zone Map

C. C-1 Channel FIS Excerpts

HECRAS Standard Table 1 Output Excerpt
Figure 7: C-1 System Flood Insurance Restudy Watershed Map
Figure 2: C-1 Channel System FIS Restudy Existing Facilities/Location Map
Effective Model Work Maps
January 16, 2004 LOMR C-1 Channel
Excerpts from Draft C-1 Channel System FIS Restudy pg 4-8

D. HEC-RAS Hydraulic Model Output

Downstream Effective Model
Upstream Effective Model
Proposed Model

E. Check-RAS Hydraulic Model Checker Output

Check-RAS Output for Structure Check
Check-RAS Output for XS Check
Check-RAS Output for NT Check

F. Work Map

G. As-Built Drawings

Upper and Middle Reaches of the C-1 Channel, Phase 2, As-built drawings

H. LOMR Data Disk

Digital Copies of the Effective FIRM Panel
FEMA Forms
Figures
HECRAS Analysis



I. INTRODUCTION

This submittal package provides hydraulic modeling in support of the request for a Letter of Map Revision (LOMR) for the channel improvements, entitled, "Upper and Middle Reaches of the C-1 Channel, Phase 2". This project is located in the City of Henderson, Nevada, and is an approximate one-mile length of concrete channel lining improvements. This LOMR extends from just downstream of Boulder Highway to the downstream end of the culvert under Vermillion Place. It ties in with Effective models on each end.

Improvements to the C-1 Channel Phase 2 were completed in 2004. The "C-1 System Flood Insurance Restudy" prepared by Carter Burgess in 2002 is the current Effective Model for the C-1 Channel watershed. The "C-1 System Flood Insurance Restudy" (referred to herein as the C-1 FIS) includes comprehensive hydrologic analysis (HEC-1) of the C-1 Channel watershed. The C-1 FIS provides the current effective hydrology for the subject project. The C-1 FIS also includes hydraulic analysis of the C-1 Channel both upstream and downstream of the subject project, however the hydraulic analysis did not include the channel reach evaluated for this LOMR. All pertinent excerpts from the C-1 FIS have been included in Appendix C of this report, and the entire C-1 FIS can be viewed by clicking on the hyperlink supplied on the data disk included in this submittal.

The C-1 Channel Phase 2 project will remove all 100-year floodplains outside of the channel between Boulder Highway and Vermillion Place. The changes will affect FIRM Panel No. 32003C2615.

The limits of this LOMR study are from approximately 450 feet downstream of the Boulder Highway culvert on the north (downstream) end of the project, to the downstream end of the Vermillion Drive culvert on the south (upstream) end of the project.

As-built plans of the C-1 Channel Phase 2 project are contained in Appendix G. At the upstream limit of this project (just downstream of Vermillion Place culvert), the C-1 Channel is trapezoidal, 5 feet deep with a 12.5-foot bottom width and 2:1 side slopes. This channel configuration continues about 3200 feet downstream, until reaching the vicinity of the railroad trestle crossing, where the channel transitions to a rectangular concrete configuration with a 30-foot wide bottom and varying depth. Continuing downstream, the channel transitions into and out of a curved culvert at Horizon Drive, concluding in a rectangular, 20-foot wide channel between Horizon Drive and Boulder Highway.

The subject reach of the C-1 Channel has a relatively steep slope and the expected 100-year peak flow rate flows in the supercritical flow regime throughout the project. The Base Flood Elevations on the work map reflect the more conservative critical water surface elevation at each cross-section. The Base Flood Elevations are below the top of the concrete channel lining throughout the extents of the proposed LOMR.



II. HYDROLOGIC ANALYSIS

The hydrologic analysis for the subject reach of the C-1 Channel is that of the Effective C-1 FIS. The C-1 FIS was referenced directly to determine the 100-year storm event flow rates for the subject Letter of Map Revision. The hydrologic analysis included the entire C-1 Channel watershed, however no hydraulic model was created for the reach of the C-1 Channel that this LOMR addresses.

The C-1 Channel Phase 2 project has been highlighted herein on a copy of Figure 7 of the C-1 FIS, which is entitled, "C-1 System Flood Insurance Restudy Watershed Map". (see Appendix C). The subject project extends from a point just downstream of concentration point CP7, downstream of the Vermillion Place culvert, northward to point CP20 at the Boulder Highway culvert. Calculated peak flow rates for the watershed are summarized on Figure 7 of the C-1 FIS.

It is important to note that in the C-1 FIS, a detailed sediment analysis of the entire watershed was completed. The final result of the sediment analysis was to increase the flow rates for all hydraulic analyses by 10 percent. Thus the flow quantities used for hydraulic analysis in the C-1 FIS are the peak flow rates given on Figure 7 times a sediment bulking factor of 1.1. The hydraulic analysis herein also implements the same peak flow rates that were generated by increasing the expected peak flow rates by a bulking factor of 1.1 in order to concur with the effective model.

The drainage area upstream of Concentration Point 7 is 11.18 square miles. Therefore, the DARF 2 column of the SDN4 model is the correct flow for this reach of the C-1 Channel. Downstream of Boulder Highway, the SDN5 storm controls.

Table 1 gives the Effective HEC1 flows for our area of interest. HEC-1 nodes are shown on the work map in Figure 7 of the FIS.



Table 1. Flows for C-1 Channel

		Bulked	
Node	Flow	10%	Comments
CP7	915	1007	Upstream of NDOT Detention Basins.
RCP7	658	726	Downstream of NDOT Detention Basins.
CP8	799	879	Downstream of Heather Drive
CP20	1178	1296	Downstream of Boulder Hwy

Once again referring to Figure 7 of the C-1 FIS, concentration point CP7 represents the peak of the hydrograph going into the upstream end of the first of two existing detention basin ponds at the US-95/College Drive interchange. Downstream of point CP7, the peak of the hydrograph is significantly decreased from 915 cfs to 660 cfs after passing through the detention ponds. Thus the final, bulked, peak flow rate for the subject channel at the upstream end of the project at Vermillion Place is 660 cfs times the bulking factor of 1.1, or 726 cfs in the 100-year storm event.

Proceeding downstream along the subject channel improvements, local inflow to the channel occurs near the Heather Drive alignment, and again about 1300 feet downstream of the Heather Drive alignment. According to the C-1 FIS hydrologic analysis, there are no other significant local inflow points to the channel until the confluence with the Boulder Highway channel at point CP20. As a result, the final, bulked, peak flow rate for the subject channel between Heather Drive and Boulder Highway is 799 cfs (point CP8) times the bulking factor of 1.1, or 879 cfs.

At point CP20, there is a confluence with the channel along Boulder Highway, which goes into a multiple-barrel culvert under the street improvements. The peak flow downstream of the confluence with the Boulder Highway channel is 1178 cfs times the bulking factor of 1.1, or 1296 cfs. It is noted that between concentration points CP8 and CP20, the watershed area increases enough that the flows given at point CP20 are generated on a separate hydrologic analysis using storm distribution number 5 (SDN5).



III. HYDRAULIC ANALYSIS

There is no Effective Model for the C-1 Channel covering the entire segment from Vermillion Place to Boulder Highway. There are four Effective models in the FIS. This LOMR will tie in with two of the models (upstream “2.2.2.1 Reach 3” and downstream “2.2.1.1 C-1 Channel, Lake Mead Dr to Boulder Hwy”).

Results of the hydraulic analysis are summarized on the HEC-RAS output, Standard Tables 1 and 2, in Appendix D of this report. A full output report from the HEC-RAS computer model has been printed and is also included in Appendix D. A digital copy of the HEC-RAS project is included on the data CD in Appendix H of this submittal Package.

It is important to note that the flows used for this Letter of Map Revision reflect the approved Effective HEC-1 analysis, however they do not match the flows in either of the two Effective HECRAS models. In the “2.2.2.1 Reach 3” model which is upstream of the Proposed model, the Effective flow corresponds to the *inflow* to the NDOT detention basin (located upstream of Vermillion Place) rather than the *outflow* as would be appropriate. The NDOT detention basins are included in the Effective HEC-1 model.

The Effective model downstream (“2.2.1.1 C-1 Channel, Lake Mead Dr to Boulder Hwy”) of this LOMR extends only about 450 feet upstream of Boulder Highway on the C-1 Channel. The flow in this segment corresponds to the algebraic difference between the flow downstream of Boulder Highway and the flow coming in from the Boulder Highway Channel. This does not match the Effective hydrologic model.

Proposed Model

The Proposed model will tie in to the downstream “2.2.1.1 C-1 Channel, Lake Mead Dr to Boulder Hwy” Effective model at cross-section 19950, approximately 450 feet downstream of Boulder Highway. The Proposed model is geometrically identical to and overlaps the Effective model by 1050 feet in order to eliminate the errant flows in this portion of the downstream Effective model.

The Proposed Model will extend to cross-section 26618.9 which is the downstream end of the Vermillion Place culvert. The Proposed model will supercede the downstream end of the “2.2.2.1 Reach 3” Effective model.

The Proposed Conditions model reflects both the physical changes under the “Upper and Middle Reaches of the C-1 Channel – Phase 2” project and the flow corrections discussed above.

The HEC-RAS model was performed in the supercritical flow regime. In accordance with FEMA regulations, critical depth is used as the Base Flood Elevation.



Table 2 compares the Proposed model results to the two Effective models on either end. The stationing for the Proposed model matches the stationing of the downstream Effective Model. The corresponding station of the C-1 Channel Phase 1 and Phase 2 projects can be obtained by subtracting 12550 feet from the HECRAS cross-section station.

At the downstream end of the Proposed model the flows and geometry are identical to the Effective model and therefore the two models tie in perfectly. At the downstream end of the Reach 3 the BFE is within 0.32 feet of the BFE at the corresponding location in the Proposed model. This of course is not a realistic comparison given the physical modifications to the channel, however ending the Proposed model at the downstream side of Vermillion Place should eliminate any discontinuity in the floodplain.



Table 2 Comparison of Effective, Corrected Effective and Proposed Base Flood Elevations for the C-1 Channel Phase II Project.

Letter of Map Revision by The Louis Berger Group, Las Vegas office 7-08-2005

Station	Effective Model		Corrected Effective Model		Proposed Condition Model		Notes
	Flow	BFE	Flow	BFE	Flow	BFE	
26618.9					726	2218.84	Downstream End of "Reach 3" Model
26504.4					726	2216.3	
26395	1006.5	2213.57	726	2212.96	726	2213.89	
26350					726	2212.88	
26198.52					726	2208.48	
26097.91					726	2205.48	
26053.68					879	2204.82	
25966.13					879	2202.6	
25865.52					879	2200.91	
25750					879	2199.06	
25660					879	2196.72	
25650					879	2196.38	
25350					879	2188.36	
25075					879	2181.00	
25050					879	2180.34	
24969.85					879	2178.19	
24940.19					879	2177.34	
24910.53					879	2175.64	
24850					879	2174.99	
24756.73					879	2172.47	
24750					879	2172.31	
24550					879	2167.59	
24350					879	2162.87	
24150					879	2157.32	
24000					879	2153.16	
23850					879	2148.75	
23700					879	2144.34	
23555					879	2142.92	
23505.48					879	2141.26	
23450					879	2140.71	
23445.5					879	2140.62	
23425.5					879	2140.48	
23418.5					879	2140.41	
23413.9					879	2140.36	
23397.1					879	2140.2	
23390					879	2140.13	
23253					879	2132.82	
23122.96					879	2125.89	
23095.66					879	2124.43	



23025					879	2120.66	
23016.33					879	2120.19	
22986.3					879	2118.18	
22550					879	2113.49	
22450					879	2112.35	
22250					879	2108.18	
22050					879	2104	
21875					879	2099.68	
21825					879	2098.44	
21550					879	2091.65	
21186					879	2082.67	
21047					879	2079.44	
21046.9					879	2079.44	
21038.45					879	2078.53	
21030					879	2078.52	
21026.87					879	2079.21	
21026.77					879	2079.17	
							Upstream End of "Lake Mead to Boulder Highway" model
21000	464.2	2076.62	879	2077.97	879	2077.97	
20855.25	464.2	2071.82	879	2072.75	879	2074.39	
20550.1	464.2	2068.05	879	2069.4	879	2068.25	
20550	464.2	2067.89	879	2067.89	879	2067.89	
20400	1295.8	2059.39	1296	2059.39	1295.8	2059.39	
20280	1295.8	2055.05	1296	2055.05	1295.8	2055.05	
20180	1295.8	2054.83	1296	2054.83	1295.8	2054.83	
20150	1295.8	2054.32	1296	2054.32	1295.8	2054.32	
19950	1295.8	2050.89	1296	2050.89	1295.8	2050.89	

The HEC-RAS analysis was checked using FEMA's Check-RAS checking program. Output of the Check-RAS analysis is included in Appendix E of this submittal. The error messages were reviewed and the model was adjusted before final Check-RAS checking. In general, the resulting error messages consist mainly of bridge structure analysis. These messages are expected since the HEC-RAS model is usually used mainly for natural channels at bridge crossings. Review of the output for the bridge structures indicates that the analysis is essentially accurate for determining critical depth at these structures.



IV. CONCLUSIONS

Hydrology for the watershed of the subject reach of the C-1 Channel was completed recently in the C-1 FIS and is widely accepted as the effective model for the area. Hydrology for the area was not revised for the purposes of this Letter of Map Revision Request.

Hydraulic analysis was prepared for the subject reach of the C-1 Channel using the HEC-RAS computer program, and checked using FEMA's Check-RAS program. It was demonstrated in the analysis that the 1% annual chance (100-year storm event) peak flow in the subject reach of the C-1 Channel is contained within the concrete lining of the channel using critical depth; the existing portions of Special Flood Hazard Zone A at the area of the improvements can now be limited to the within the channel.

THE Louis Berger Group, INC.

APPENDIX A

FEMA Forms

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
32003	Clark County, Nevada and Unincorporated Areas	NV	32003C	2615E	01/16/04

2. Flooding Source: C-1 Channel Watershed

3. Project Name/Identifier: Upper and Middle Reaches of the C-1 Channel - Phase II

4. FEMA zone designations affected: Zone 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?

☒ YesFee amount: \$4200.00☐ No, Attach ExplanationPlease see the FEMA Web site at http://www.fema.gov/fhm/fm_fees.shtm 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: Syndi J. Flippin-Dudley, Ph. D., P.E.

Company: The Louis Berger Group, Inc.

Mailing Address:
500 East Amigo Court
Suite 100
Las Vegas, NV 89119Daytime Telephone No.:
(702)-736-6632Fax No.:
(702)-736-0704

E-Mail Address: SDudley@LouisBerger.com

Signature of Requester (required):

Date:

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: Curt Chandler, P. E. Flood Control Administrator / Land Development Manager

Telephone No.:
(702)-349-5405

Community Name: City of Henderson, Nevada

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: Syndi J. Flippin-Dudley Ph D, PE

License No.: 11070

Expiration Date:
06/30/07

Company Name: The Louis Berger Group, Inc.

Telephone No.: (702)-736-6632

Fax No.:
(702)-736-0704

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 |

Seal (Optional)

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: C-1 Channel Watershed
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)
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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.shtm.

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	C-1 Channel at Boulder Highway	210.0	2076.62	2076.14
Upstream Limit	C-1 Channel near Vermillion Place	263.95	2213.57	2213.88

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [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/fhm_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:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: NA	Floodway File Name:
Revised or Post-Project Conditions Model	Natural File Name: C1lomr.prj	Floodway File Name:
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

Public reporting burden for this form is estimated to average 7 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: C-1 Channel Watershed

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
Damcomplete Section D
Levee/Floodwallcomplete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. Name of Structure: Upper and Middle Reaches of the C-1 Channel, Phase II

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

Location of Structure: Henderson, Nevada, C-1 Channel between Boulder Highway and Vermillion Place

Downstream Limit/Cross Section: C-1 Channel at Boulder Highway / Cross Section 210.0

Upstream Limit/Cross Section: C-1 Channel near Vermillion Place / Cross Section 263.95

2. Name of Structure: Existing Railroad crossing trestle at C-1 Channel

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

Location of Structure: Existing Railroad crossing trestle at C-1 Channel

Downstream Limit/Cross Section: Cross Section 233.9710

Upstream Limit/Cross Section: Cross Section 234.1390

3. Name of Structure: Horizon Drive Bridge at C-1 Channel

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

Location of Structure: Horizon Drive at C-1 Channel

Downstream Limit/Cross Section: Cross section 225.5000

Upstream Limit/Cross Section: Cross Section 229.8630

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

B. CHANNELIZATION

Flooding Source: C-1 Channel Watershed

Name of Structure: Upper and Middle Reaches of the C-1 Channel, Phase II

1. Accessory Structures

The channelization includes (check one):

- | | |
|--|---|
| ☐ Levees [Attach Section E (Levee/Floodwall)] | ☐ Drop structures |
| ☐ Superelevated sections | ☒ Transitions in cross sectional geometry |
| ☐ Debris basin/detention basin | ☐ Energy dissipator |
| ☐ Other (Describe): | |

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 1257 to 17 (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: C-1 Channel Watershed

Name of Structure: Existing Railroad Trestle and Horizon Drive bridge at the C-1 Channel

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): HEC-RAS 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) | ☒ Erosion Protection |
| ☒ Shape (culverts only) | ☒ Low Chord Elevations – Upstream and Downstream |
| ☒ Material | ☒ Top of Road Elevations – Upstream and Downstream |
| ☒ Beveling or Rounding | ☒ Structure Invert Elevations – Upstream and Downstream |
| ☒ Wing Wall Angle | ☒ Stream Invert Elevations – Upstream and Downstream |
| ☒ Skew Angle | ☒ Cross-Section Locations |
| ☒ Distances Between Cross Sections | |

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.

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: C-1 Channel Watershed

Name of Structure: Upper and Middle Reaches of the C-1 Channel, Phase II; with associated bridge crossings.

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 10% (percent concentration by volume)

Method used to estimate sediment transport: Modified Universal Soil Loss Equation used in the Effective FIS

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.

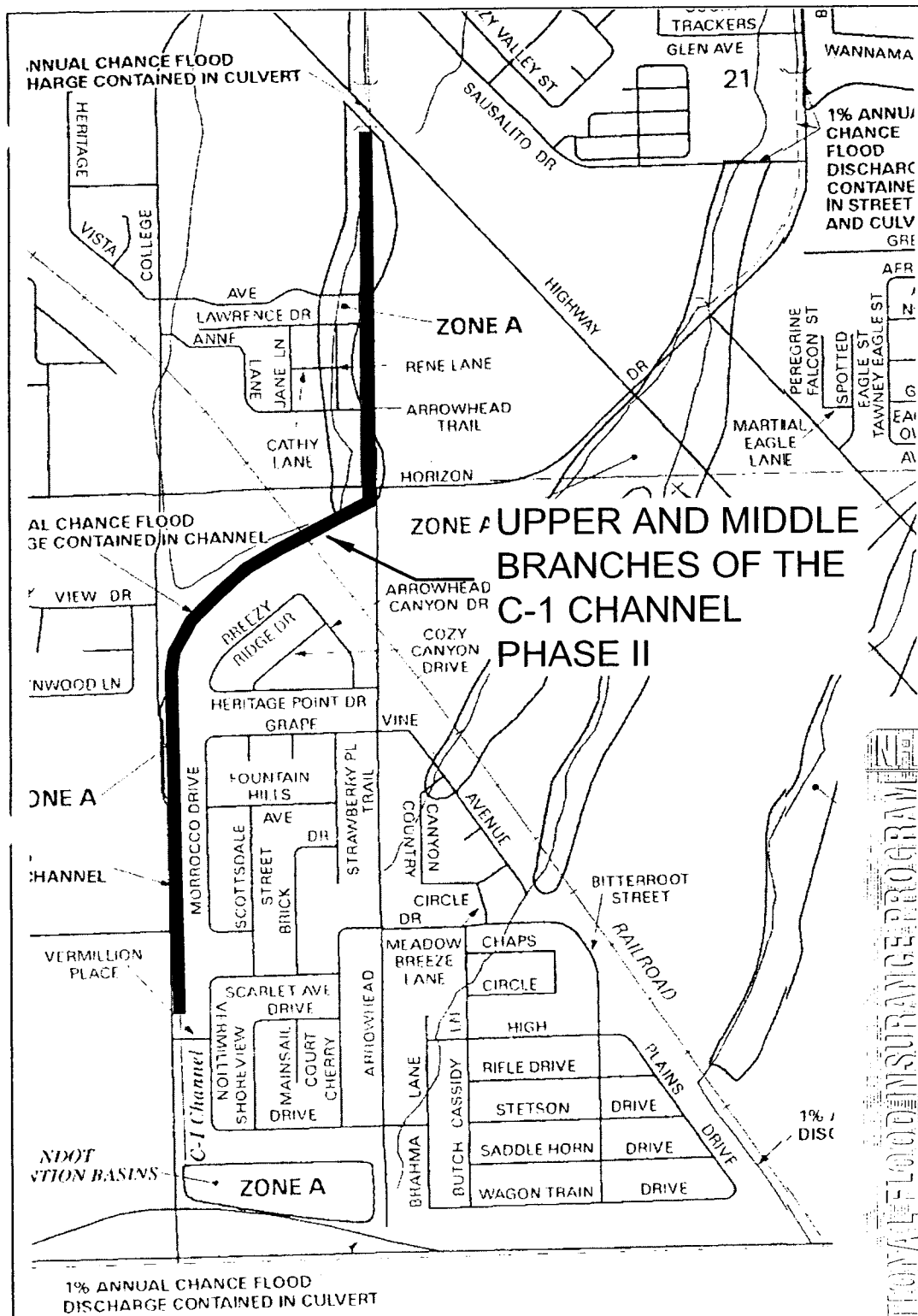
Effective FIS sediment transport data was implemented, using a 10% bulking factor.

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.

THE Louis Berger Group, INC.

APPENDIX B

Figures



PANEL 2615E

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

PANEL 2615 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COUNTY

COMMUNITY

NUMBER PANEL SUPER

HENDERSON CITY OF 020006 2615 E
CLARK COUNTY 2615 E
UNINCORPORATED

ADDED TO
LOMR
DATED JAN 16 2004

Notes 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
32003C2615E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency



MAP SCALE 1" = 1000'

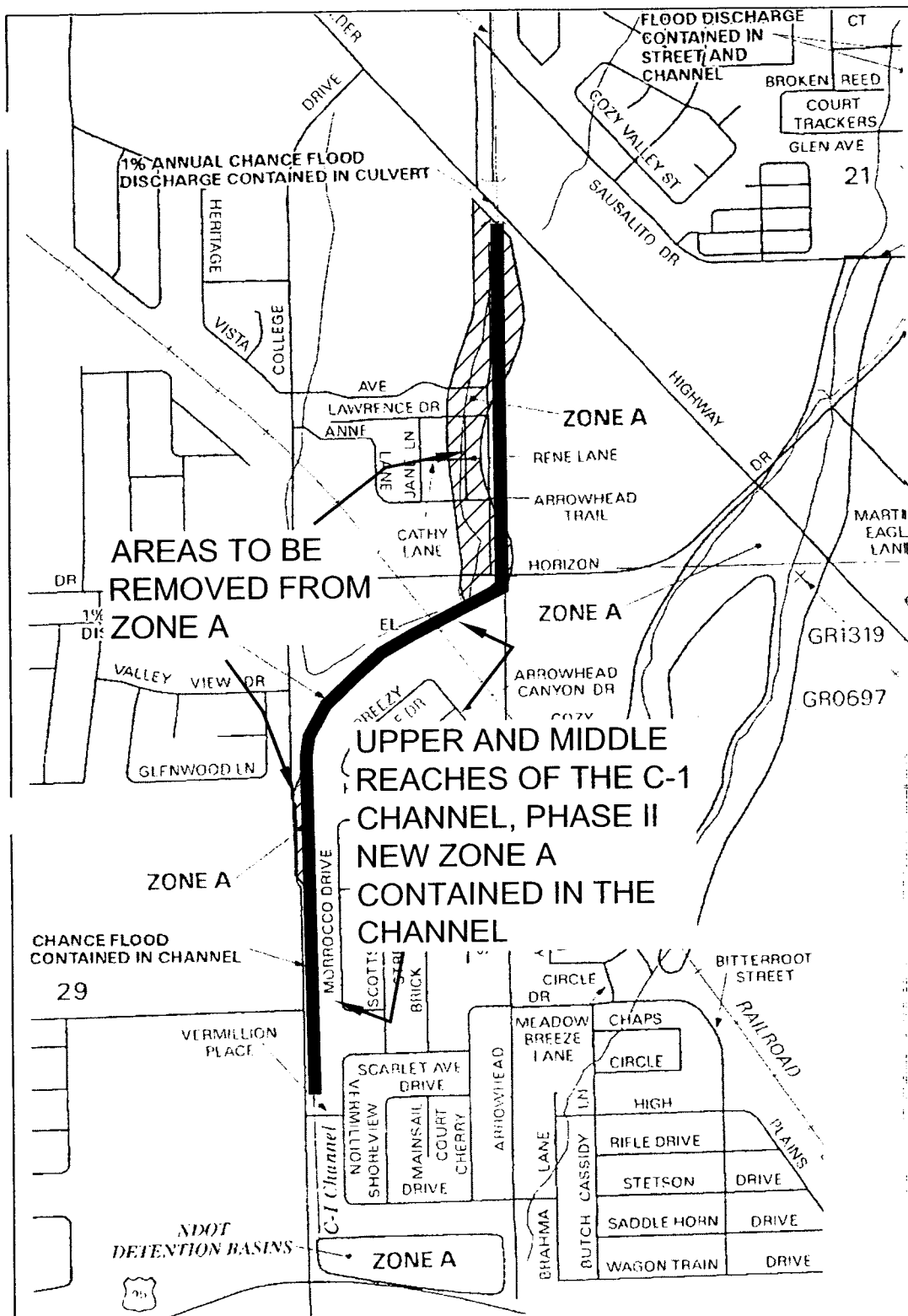
500 0 1000 2000
FEET

FEMA FLOOD ZONE MAP

FROM FIRM MAP PANEL
NO. 32003C2615E

FIGURE 1

THE LOUIS BERGER GROUP, INC.



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2615E

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

PANEL 2615 OF 4090
SEE MAP INDEX FOR FIRM PANEL LAYOUT

CONTAINS	NUMBER	PANEL	SUFFIX
CLARK COUNTY	26001	2615	E
UNINCORPORATED AREAS	2615		E

REVISIONS TO FIRM LOMR
DATED JAN 16 2004

MAP NUMBER
32003C2615E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

ANNOTATED FLOOD ZONE MAP

PANEL NO. 32003C2615E

FIGURE 2

THE LOUIS BERGER GROUP, INC.

THE Louis Berger Group, INC.

APPENDIX C

FIS Excerpts

FIGURE 7: C-1 System Flood Insurance Restudy Watershed Map

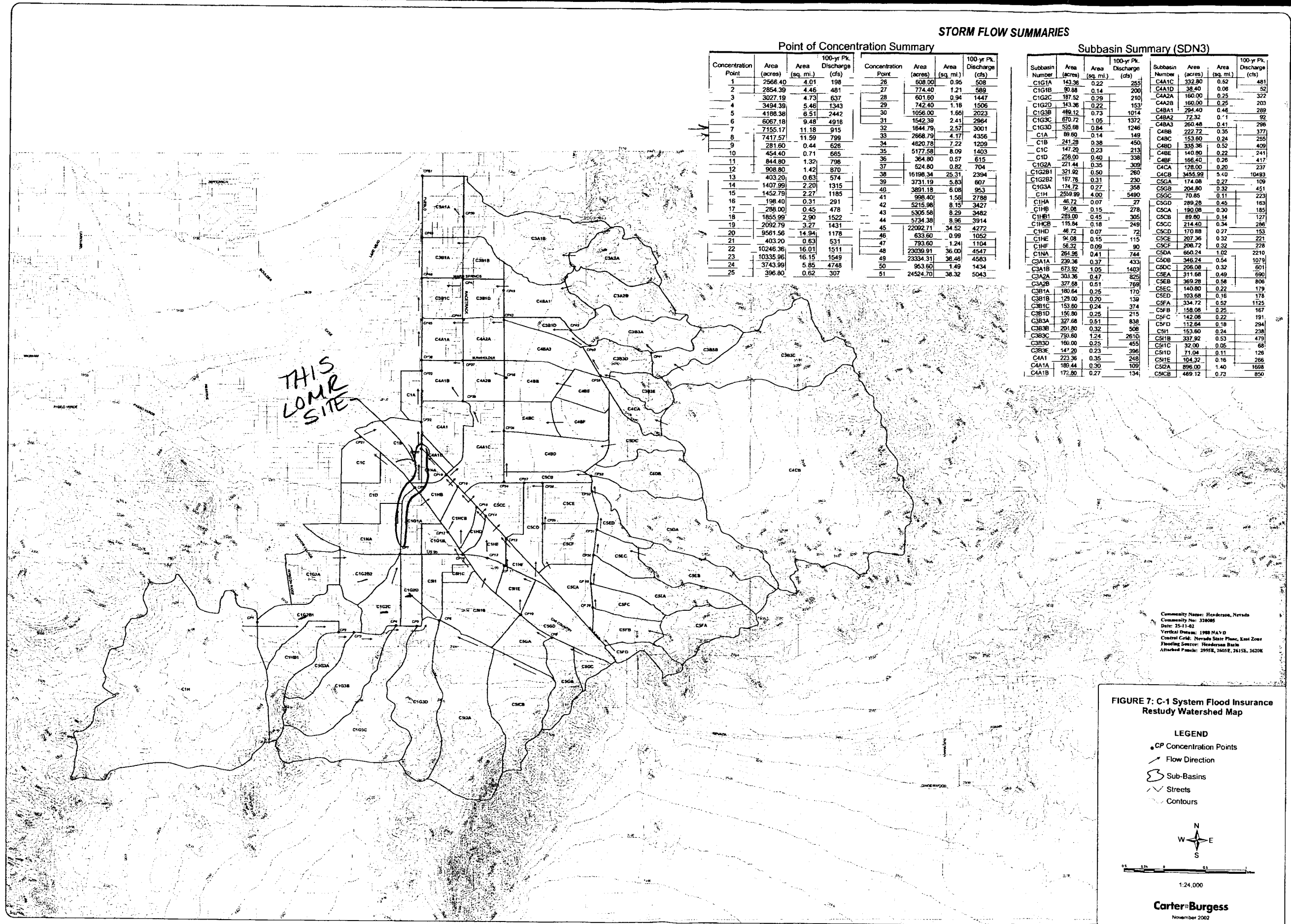
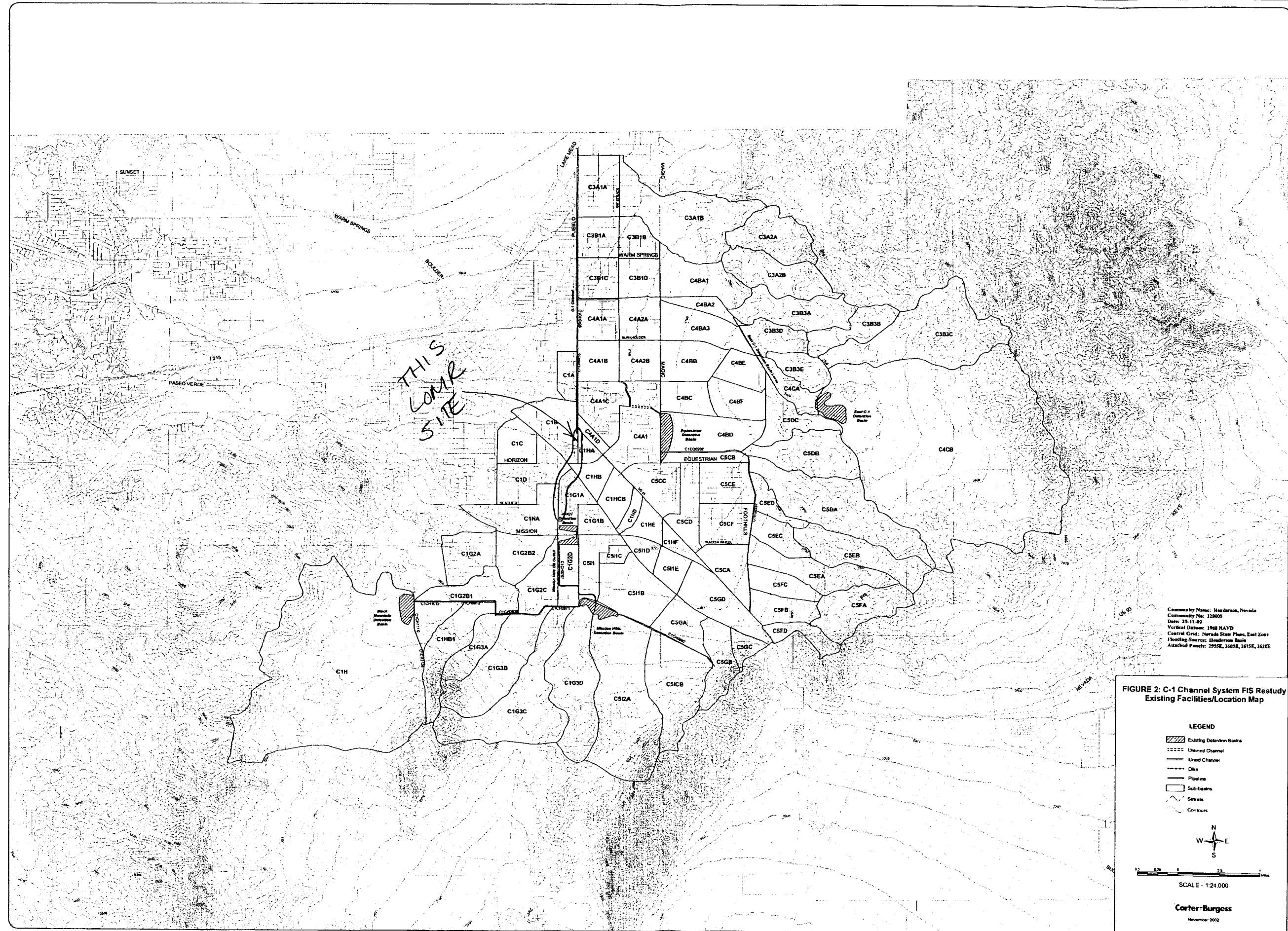
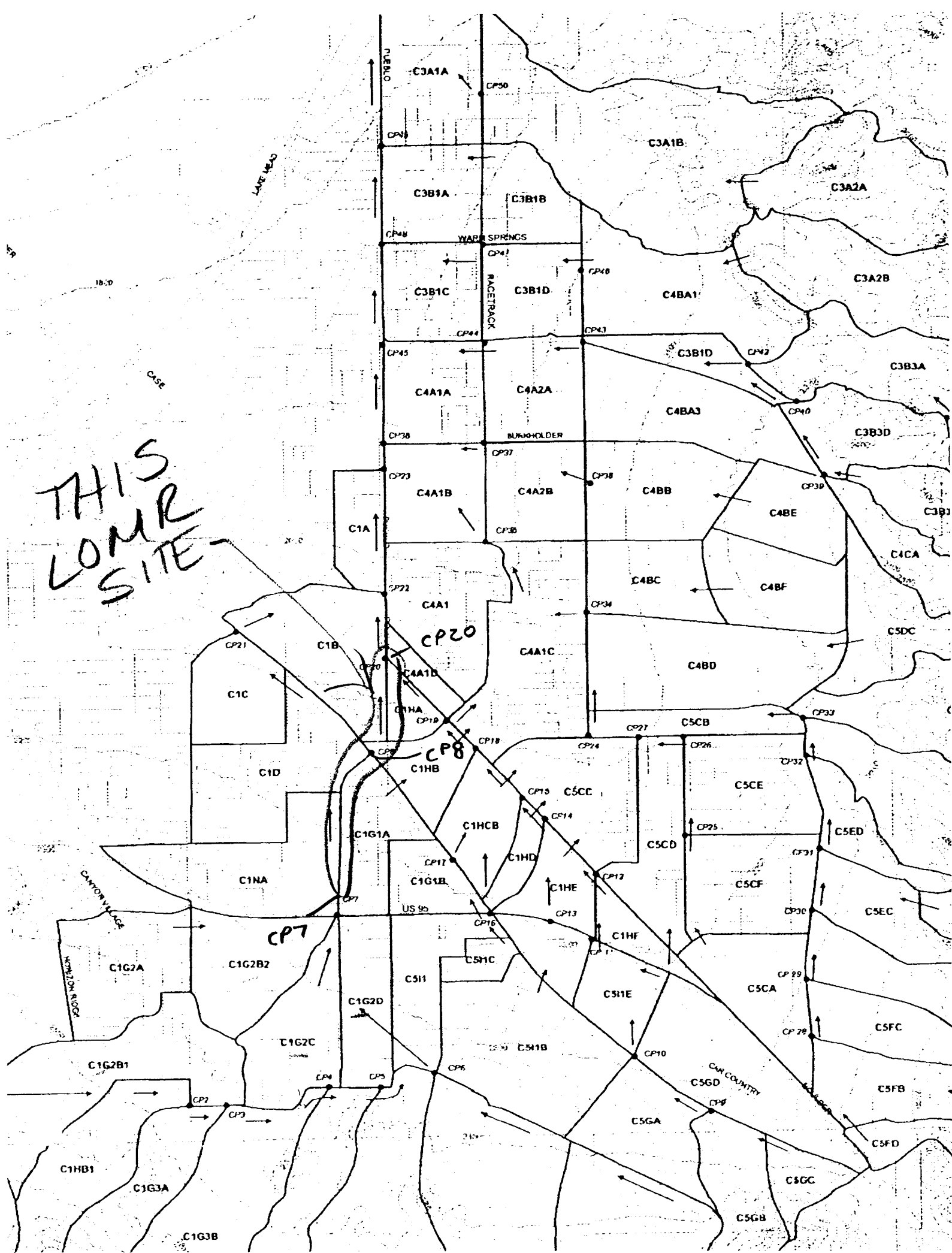


FIGURE 2: C-1 Channel System FIS Restudy Existing Facilities/Location Map



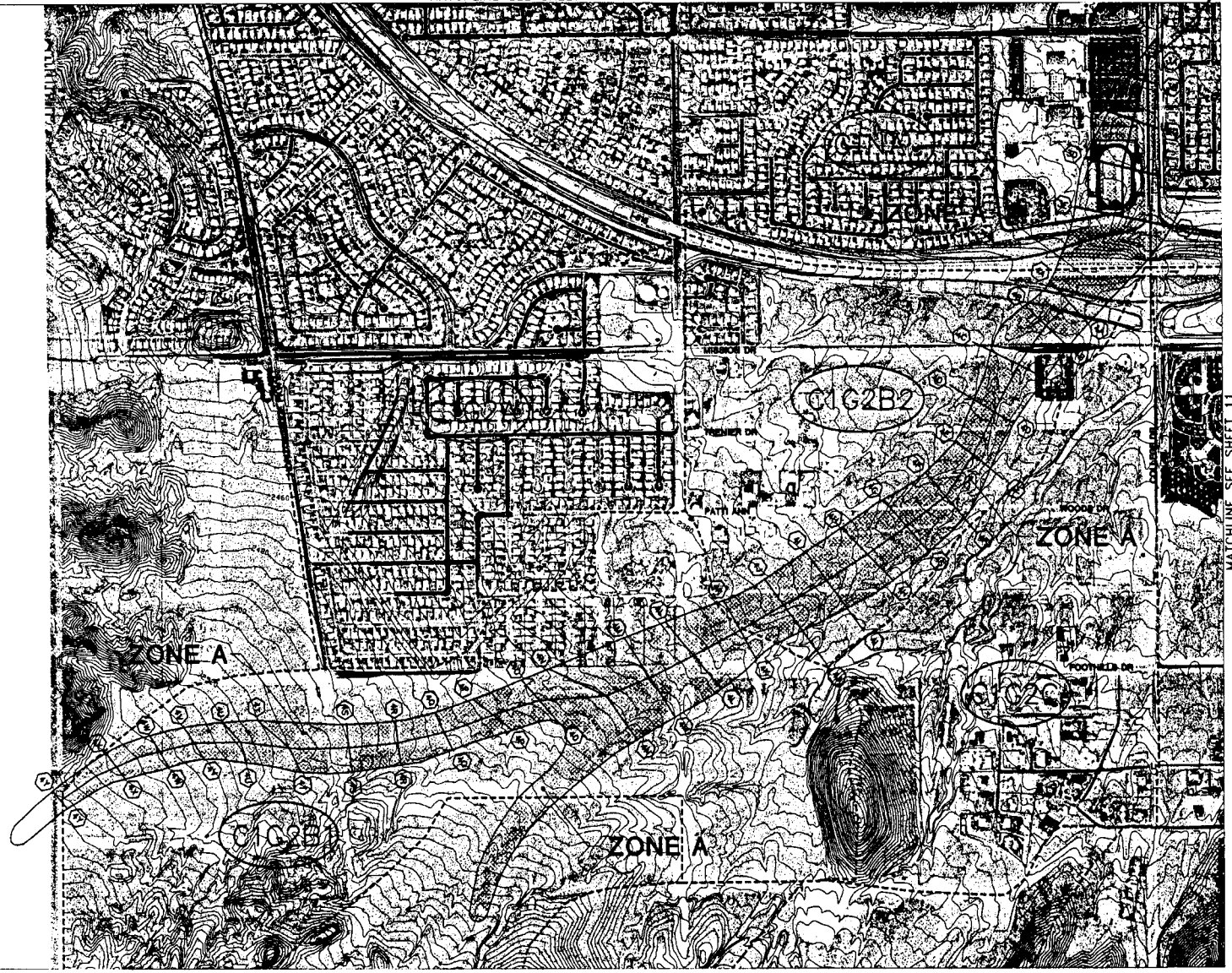
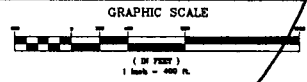
FIS
VOLUME 2
PAGE
141 OF 141
ON SCANNED
DOCUMENT,
CERFCD WEB
SITE



WORKMAP FROM UPSTREAM EFFECTIVE MODEL

P/S END
OF U/S
EFFECTIVE
MODE

MATCHLINE SEE SHEET 7



MATCHLINE SEE SHEET 11

REVISIONS	
NO.	DATE

DESIGNED BY	
CHECKED BY	
DATE	
SCALE	
DATE	

Carter Burgess
 Consultants in Planning, Engineering,
 Construction Management and Related Services
 3000 West 10th Street, Suite 200
 Fort Collins, CO 80521
 (970) 225-1200 Fax (970) 225-5464

PROJECT: C-1 CHANNEL SYSTEM FIS RESTUDY
 DRAWING: APPROXIMATE METHODS HYDRAULICS
 EFFECTIVE WORK MAP

SHEET	10
OF	12

10

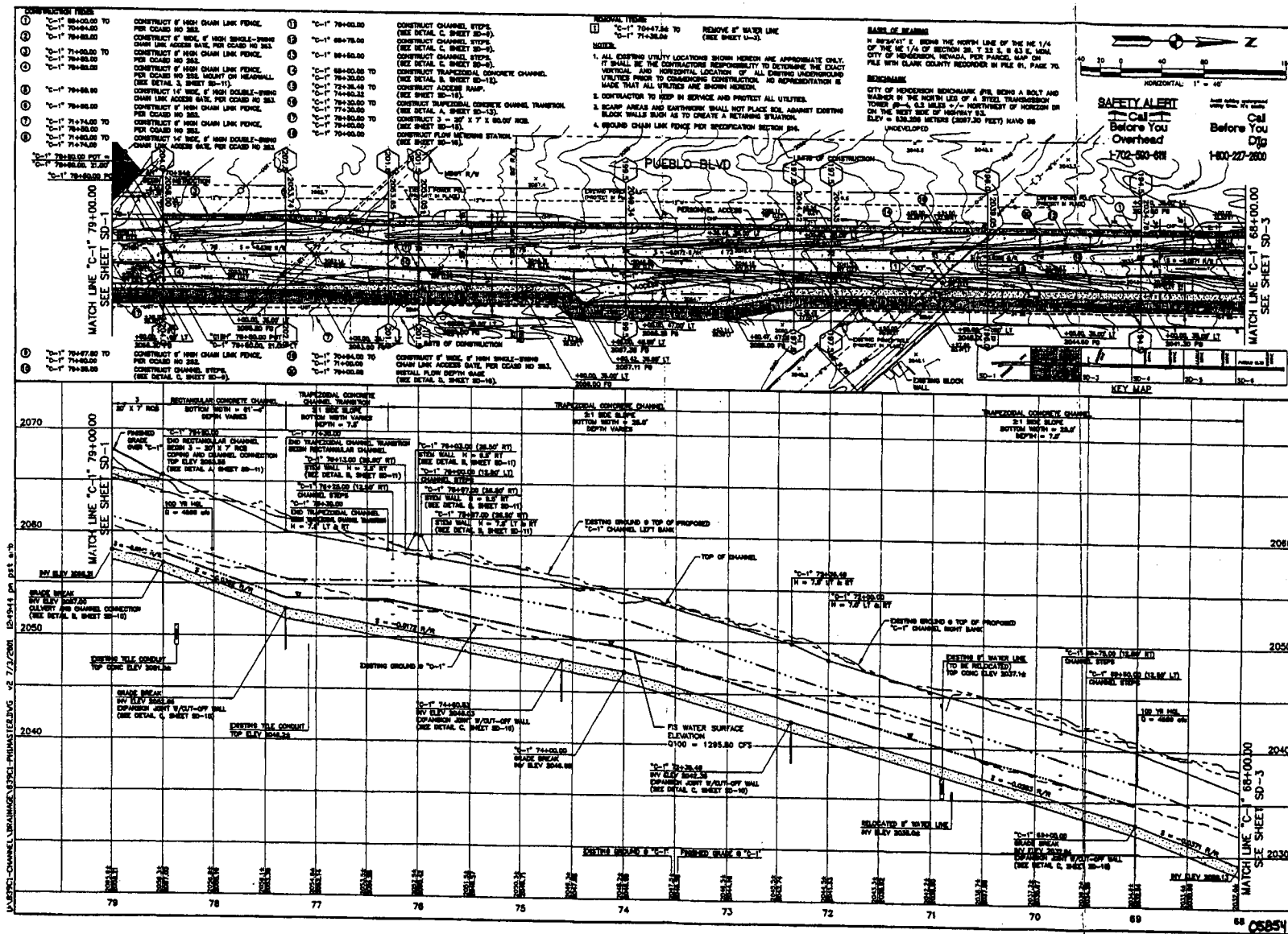
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WORK MAP FROM D/S EFFECTIVE MODEL



THE LOUIS BERGER GROUP, INC.

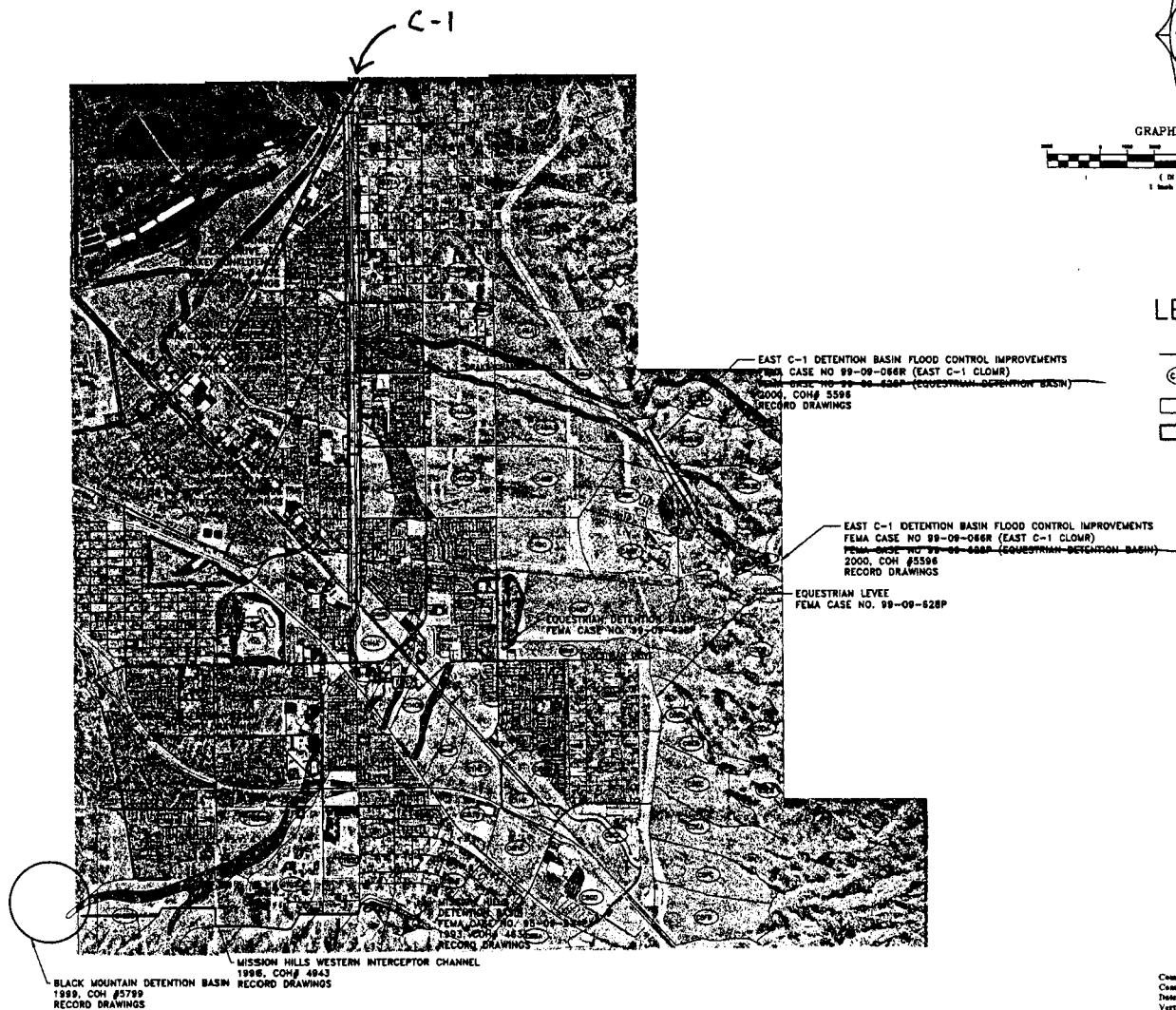
UPPER AND MIDDLE REACHES OF THE C-1 CHANNEL - PHASE 1
GRADING & DRAINAGE PLAN & PROFILE
"C-1" 68+00.00 TO "C-1" 79+00.00
HENDERSON NEVADA, DEPARTMENT OF PUBLIC WORKS



PROJECT NO:	538
DRAWN BY:	AM
DESIGNED BY:	HW
CHECKED BY:	S.D.
APPROVED BY:	TL
SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
DRAWING NO	
SD-2	
SHEET 8 OF 34	

SD-2
PAGE 2 OF 34

WORKMAP FROM EFFECTIVE FIS



Community Name: Henderson, Nevada
Community No: 320005
Date: 15-11-01
Vertical Datum: 1988 NAVD
Control Grid: Nevada State Plane, East Zone
Flooded Source: Henderson Basin
Attached Panels: 2955E, 2645E, 2615E, 2610E

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Carter Burgess
Consultants in Planning, Engineering,
Construction Management, and Related Services
4000 Bermuda Road
Henderson, Nevada 89011
(702) 896-4400 Fax (702) 896-2444

C-1 CHANNEL SYSTEM FIS RESTUDY
FIGURE 3
DETAILED METHOD ANALYSIS

PROJECT:
REVISIONS:

SHEET
1
1 OF 1

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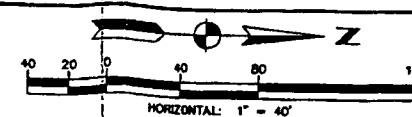
REMOVAL ITEMS			
1	"C-1" 81+41.83	REMOVE GUARDRAIL.	
2	"C-1" 78+18.3±	REMOVE GUARDRAIL.	4
3	"C-1" 82+21.4± TO "C-1" 78+00.0±	REMOVE ARCH CULVERT.	"C-1" 78+30.0± TO "C-1" 81+98.0± "C-1" 80+85.0±

REMOVE 12" WATER LINE.
(SEE SHEET U-2).

REMOVE 12" WATER LINE AND AIR RELEASE VALVE.
(SEE SHEET U-1).

REMOVE 12" WATER LINE.
(SEE SHEET U-2).

REMOVE 12" WATER LINE AND AIR RELEASE VALVE.
(SEE SHEET U-1).



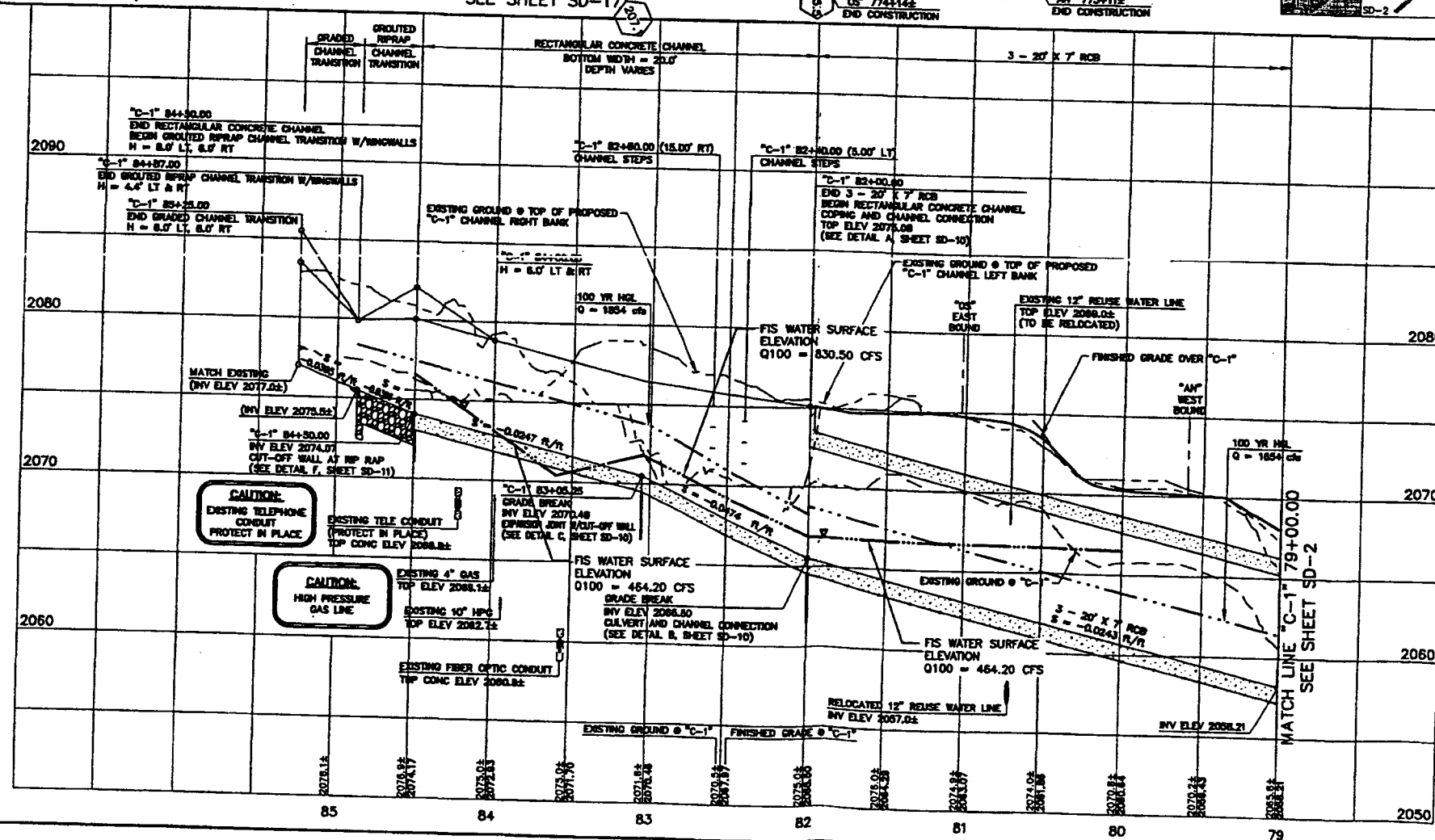
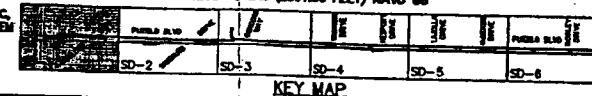
**Call
Before You
Overhead**
1-702-593-6111

**Call
Before You
Dig
1-800-227-2600**

1. ALL EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL UTILITIES ARE SHOWN HEREON.
2. CONTRACTOR TO KEEP IN SERVICE AND PROTECT ALL UTILITIES.
3. SCARP AREAS AND EARTHWORK SHALL NOT PLACE SOIL AGAINST EXISTING BLOCK WALLS SUCH AS TO CREATE A RETAINING SITUATION.
4. FOR ADDITIONAL GRADING NOT SHOWN, SEE SHEET 80-17.
5. GROUND CHAIN LINK FENCE PER SPECIFICATION SECTION 618.

N 89°24'41" E BEING THE NORTH LINE OF THE NE 1/4
OF THE NE 1/4 OF SECTION 28, T 22 S, R 83 E, MOM.
CITY OF HENDERSON, NEVADA, PER PARCEL MAP ON
FILE WITH CLARK COUNTY RECORDER IN FILE 61, PAGE 70.

CITY OF HENDERSON BENCHMARK #18, BEING A BOLT AND WASHER IN THE NORTH LEG OF A STEEL TRANSMISSION TOWER #8-4, 0.2 MILES +/- NORTHWEST OF HORIZON DR ON THE WEST SIDE OF HIGHWAY 93.
ELEV = 630.256 METERS (2067.30 FEET) NAD 83



UPPER AND MIDDLE REACHES OF THE C-1 CHANNEL - PHASE 1
GRADING & DRAINAGE PLAN & PROFILE
;"C-1" 85+25.00 TO "C-1" 79+00.00
HENDERSON NEVADA, DEPARTMENT OF PUBLIC WORKS



SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'

DRAWING NO

SD-1

05854



DRAFT C-1 Channel System FIS Restudy

the south and east. The Black Mountain (Southwest C-1) Detention Basin—Mission Hills Western Interceptor—Mission Hills Detention Basin and Levee intercept storm flows from the south, whereas the Equestrian Detention Basin and Levee, and the East C-1 Detention Basin and Levee intercept storm flows from the east (Figure 2). These facilities provide adequate protection from potential flood hazards. It is important to note that the C-1 watershed no longer functions as an alluvial system because of the construction of flood control facilities.

2.3.1 Drake Channel

was completed of the Drake Channel's
A preliminary analysis of its ability to meet FEMA standards and reduce flood hazard areas. The Drake Channel east of Race Track Road exists as an earthen trapezoidal channel with a series of 18 gabion drop structures. The Drake Channel is expected to accept a good portion of the 100-year flow from its tributary watersheds. However, although the completion of the East C-1 Detention Basin and Levee have significantly reduced the 100-year flow rate to the Drake Channel, until future planned flood control facilities are completed some flow can be expected to continue north past the channel.

The following issues concern the Drake Channel east of Rack Track Road:

- As-built and geotechnical information could not be located;
- The southern bank shows signs of rill and gully erosion. Much of this erosion appears to have occurred before the construction of the East C-1 Detention Basin and Levee and is no longer an issue. However, storm flows draining west and north of the East C-1 Levee still drain over the south bank at some locations, which may cause future rill and gully erosion.
- The Drake Channel does not meet minimum hydraulic standards. Velocities exceed 5 fps without riprap armoring, and minimum freeboard requirements for subcritical flow are exceeded. In some locations the 100-year water surface elevation is slightly higher than the channel left and right overbanks.

in the hydrologic modeling
Because of the above issues with the Drake Channel, the CCRFCD has decided not to certify the channel until the East C-1 Levee is extended north to further cut-off and significantly reduce storm flows from reaching the Drake. For this report, an assumption was made that the 100-year peak discharge flows west in the Drake to the C-1 Channel. No attempt is made to remove existing SFHAs north of Drake Channel at this time.

Section 2.4 Flood Protection Measures

The City of Henderson is a rapidly developing community, and has adopted strict local development regulations in order to mitigate storm-related losses. In addition, the CCRFCD has developed specific criteria for floodplain development in their Hydrologic Criteria and Drainage Design Manual, dated December 1991, and revised August 1999. The CCRFCD has constructed numerous major flood control facilities to protect the City of Henderson from flood related damages. New facilities are planned for construction in

*DRAFT C-1 Channel System FIS Restudy*

the City of Henderson as part of the Clark County Regional Flood Control District's Flood Control Master Plan, however, this study is based on existing facilities as of January 2002 (Figure 2). Photographs of flood control facilities in the study area are located in the field review, located in Section 5.1, Volume IV.

Because existing LOMR's have been filed for the Equestrian Detention Basin and Levee, and the Mission Hills Detention Basin and Levee, record drawings and supporting information will not be submitted as part of this study. However, record information and supporting documentation will be submitted for all facilities not approved by FEMA at this time.

The following flood control facilities are included in the study area:

Upper C-1 Basin:

- Black Mountain (Southwest C-1) Detention Basin (CCRFCD Facility No. C1CH 0167)
 - 247 acre-feet of storage
 - Inflow of 2261 cfs
 - Outflow of 184 cfs
 - Record Drawings
 - Construction Complete
- Mission Hills Western Interceptor (CCRFCD Facility No. C1CH 0871 to 1012).
 - Record drawings
 - Construction complete
- Mission Hills Detention Basin (CCRFCD Facility No. C1CH 0737)
 - FEMA Case No. 95-09-934P
 - 403 acre-feet of storage
 - Inflow of 3923 cfs
 - Outflow of 323 cfs
 - Record Drawings
 - Construction complete
- Mission Hills Levee (CCRFCD Facility No. C1CH 0737).
 - FEMA Case No. 95-09-934P
 - Record Drawings
 - Construction complete
- NDOT Detention Ponds (CCRFCD Facility No. C1CH 0658)
 - 188 of storage (Pond A, 94 acre-feet; Pond B, 94 acre-feet) of storage
 - ○ Inflow of 915 cfs
 - ○ Outflow of 658 cfs
 - ○ Record Drawings (personal communication, NDOT)
 - ○ Construction complete



DRAFT C-1 Channel System FIS Restudy

Central C-1 Basin:

- Equestrian Levee (CCRFGD Facility No. C1EQ 0301 to 0349)
 - FEMA Case No. 99-09-628P
 - Record Drawings
 - Construction complete
- Equestrian Detention Basin (CCRFGD Facility No. C1EQ 0246)
 - FEMA Case No. 99-09-628P
 - 389 acre-feet of storage
 - Inflow of 4219 cfs
 - Outflow of 223 cfs
 - Record drawings
 - Construction complete
- C-1 Channel, Middle Reach (CCRFGD Facility No. C1CH 0412 to 0520)
 - Drawings dated 6/26/01
 - Construction complete May, 2002.
 - As-built survey yet to be completed by Contractor
 - Record Drawings



Lower C-1 Basin:

- East C-1 Detention Basin (CCRFGD Facility No. C1IT 0492)
 - FEMA Case No. 99-09-628P
 - 271 acre-feet of storage *066*
 - Inflow of 2391 cfs
 - Outflow of 408 cfs
 - Record Drawings
 - Construction complete
- East C-1 Levee (CCRFGD Facility No. C1IT 0246)
 - FEMA Case No. 99-09-066R
 - Record drawings
 - Construction complete
- C-1 Channel (CCRFGD Facility No. C1CH 0174 to C1CH 0365)
 - Record drawings
 - Construction complete

Are not these the same?

SECTION 3.0

ENGINEERING METHODS

Section 3.1

Hydrologic Analysis

Hydrologic modeling was conducted pursuant to the criteria outlined in the CCRFCD's Hydrologic Criteria and Drainage Design Manual, and the U.S. Army Corps of Engineer's HEC-1 Flood Hydrograph Package Users Manual (HEC, 1990) for the Natural Resource Conservation Service (NRCS) Unit Hydrograph Option. The hydrologic models performed for this FIS restudy can be found in Section 2.1, Volumes 1 and 2, "Hydrologic Analysis."

3.1.1 Methodology

Input parameters for the HEC-1 models utilized basin area, soils classification, land use, run-off curve numbers, basin topography, point precipitation, rainfall duration and distribution, time of concentration, and hydrograph lag times. Subbasin delineations were based on the 2001 CCRFCD Master Plan Update to the greatest extent possible. However, substantial changes were made to reflect existing conditions, Clark County 5-foot contour data, and field reconnaissance. These changes were centered upstream of the Drake Channel in the River Mountains, and upstream of the Equestrian Detention Basin. Subbasin delineations used in the Equestrian Detention Basin LOMR (Case No. 99-09-628P) were used as much as practical, however, these also were modified to reflect existing conditions. Infiltration and storage characteristics of the subbasins were simulated in the model using runoff curve numbers. Composite curve numbers were developed for each subbasin based upon land use, soil type, vegetation type, and antecedent moisture content (AMC) Type II. Point rainfall depths used in the CCRFCD's 1996 Master Plan Update were applied to the subbasins and adjusted according to local depth-area reduction factors (DARFs) for storms of 6-hour duration. Recurrence intervals of 2, 10, 25, 50 and 100-year events were simulated over the entire study area using three separate storm distribution patterns. The SDN3, SDN4, and SDN5 storm distributions were modeled, and results are tabulated in Section 2.1.4 "Overall Storm HEC-1 Model," Volume II. Time of concentration (t_c) calculations for each subbasin were developed using the criteria outlined in the CCRFCD's Hydrologic Criteria and Drainage Design Manual. The lag times for subbasins were based on the following equation: $TLAG = 0.6t_c$. Time of concentration calculations used for model input are presented in Section 2.3.3 and 2.3.4 "Curve Number Calculations," and "Time of Concentration Calculations," Volume II. Figure 5 illustrates existing soil conditions. Figure 6 illustrates existing land use; Figure 7 illustrates an overall watershed map.

3.1.2 Regional Analysis

Figure 7 illustrates the C-1 watershed subbasin layout and routing of storm flows. Refer to this figure and Figure 2 during the following discussion.

The hydrologic analysis begins in the **Upper C-1 Basin**, and quantifies flow from subbasins contributing to CCRFCD facilities in that region. Runoff from subbasin C1H begins at the top of the McCullough Range and is intercepted by the Black Mountain (Southwest C-1) Detention Basin. The outfall structure from this detention basin drains

*DRAFT C-1 Channel System FIS Restudy*

east through the Mission Hills Western Interceptor, which picks up runoff from subbasins C1HB1, C1G3A, C1G3B, C1G3C, and C1G3D. This facility directs flow to the Mission Hills Detention Basin, which also intercepts flow from subbasins C5ICB and C5I2A. Quantified outflow from the Mission Hills Detention Basin is then routed via an 84-inch pipe to the NDOT Detention Basin at I-515 and College Drive, and is routed to the upper C-1 Channel. Subbasins contributing flow in this area include C1G2B1, C1G2A, C1G2B, C1G2C, C1G2D, C5I1 and C5I1C. Subbasins in the Mission Hills Range include C5GB and C5GC, which are routed to subbasin C5GA. Runoff from these basins is routed south along Boulder Highway, where a future facility will convey stormwater to the C-1 Channel. A series of five small culverts under the Boulder Highway divert flow from subbasins C5I1B, C5GD, C5I1E, C5I1D, C1HF, C1HE, C1HD, C1HCB, and C1HB into the Central C-1 Basin, which were described in detail in a previous LOMR for the Equestrian Detention Basin, Case No. 95-09-934P. At least three other culverts cross Boulder Highway in the vicinity of the Race Track Road intersection, however, these were not included as part of this study (Figure 3). Land use in this drainage area is primarily residential, which is bisected by the existing railroad, I-515, and the Boulder Highway. Pertinent concentration points have been identified, and flows at these locations are tabulated on Figure 7. Please refer to the HEC-1 schematic and Figure 7 for model details on hydrograph routing parameters.

In the **Central C-1 Basin**, stormwater runoff from the southeastern portion of the region begins in the River Mountains in subbasins C5FA, C5FD, C5FB, C5FC, C5EA, C5EB, C5EC, C5ED, and C5DA. Flows quantified in these areas are routed along the Equestrian Levee to the Equestrian Detention Basin. Flows crossing through culverts under the Boulder Highway (Upper C-1 Basin), are routed through basins C5CA, C5CD, C5CC, C5CF, and C5CE to the Equestrian Detention Basin. Flow from basin C5DC, and C4BD are also directed to the Equestrian Detention Basin. The Southern Nevada Water Authority constructed a water treatment facility to treat raw water from Lake Mead before distribution to the Las Vegas Valley. Associated with this treatment facility is an onsite detention basin with a 48-inch pipeline outfall. This outfall drains subbasin C4BF to the Equestrian Detention Basin through subbasin C4BD. Flows discharging from the Equestrian Detention Basin are routed to the future Burkholder Channel. This outfall--the Equestrian Detention Basin Outfall-- intercepts flow from subbasins C4A1C and C4A1B and directs these flows to the C-1 Channel. The C-1 Channel intercepts all flow from the Upper and Central C-1 basins at Burkholder Road. Pertinent concentration points have been identified and flows at these locations are tabulated on Figure 7. Refer to the HEC-1 schematic and Figure 7 for details on hydrograph routing parameters.

The **Lower C-1 Basin** includes hydrologic subbasins which begin in the River Mountains. Storm water runoff from subbasin C4CB is intercepted by the East C-1 Detention Basin. Outflow from this detention basin, as well as flow from subbasins C4CA, C3B3E and C3B3D are routed along the East C-1 Levee to the Drake Channel. The Drake Channel also intercepts flow from subbasin C4BA2, C3B3C, C3B3B, and C3B3A. Storm water runoff from subbasins C4BA3, C4A2A and C4A1A is then routed to the C-1 Channel. Below the Drake Channel, flow from subbasins C3A2B, C3A2A, C4BA1, C3B1D, C3B1C, C3B1B, C3B1A, C3A1B, and C3A1A are also routed to the C-1 Channel. Pertinent concentration points have been identified, and flows at these

*DRAFT C-1 Channel System FIS Restudy*

locations are tabulated in Tables 1 & 2, and on Figure 7. Please refer to the HEC-1 schematic and Figure 7 for details on hydrograph routing parameters.

3.1.3 Local Analysis

Detailed, local hydrologic analysis was necessary to quantify storm flows in subbasin C4A1. A SFHA Zone A adjacent to Newport Townhomes was removed by Approximate Methods Hydraulics. The hydrologic analysis, and associated exhibits, are located in Section 2.1.5. "Local Hydrology"—Volume II.

3.1.4 Study Assumptions and Modifications made to the existing Flood Insurance Study

Several assumptions have been made in development of this hydrology. For one, the study assumes that alluvial processes no longer apply to the C-1 system. This assumption is reasonable given the extensive construction of structural controls. The East C-1 Levee and East C-1 Detention Basin truncate the apex of an alluvial fan spreading west from the River Mountains. The Equestrian and Mission Hills flood control facilities further cutoff storm runoff and direct storm flows into detention basins with controlled outflow. Given this level of construction, Section "G" of the latest regulations for study contractors, titled "Flood Insurance Study Guidelines and Specifications for Study Contractors" does not apply. A newly created SFHA draining northwest from the East C-1 Levee is therefore categorized as a Zone A.

Another assumption has been made about the Drake Channel. Although the Drake Channel does not meet CCRFCD hydraulic criteria, it is assumed that the Drake Channel intercepts the 100-year peak discharge and conveys the flow to the C-1 Channel.

3.1.5 Results

Results from the hydrologic model were used to establish existing stormwater flows throughout the study area, and specific points of concentration were identified for input to the hydraulic model of the C-1 Channel in specific reaches. Table 1 is a storm flow summary for each subbasin based on an SDN3 storm distribution for the 1 percent chance storm event. Table 2 is a storm flow summary for each point of concentration based on SDN3, SDN4, and SDN5 for 1 percent chance storm event. SDN3 controls where the watershed is less than 8 square miles, whereas, SDN4 and SDN5 control where the watershed is between 8 and 12 square miles, and greater than 12 square miles, respectively.

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APPENDIX D

HEC-RAS Hydraulic Model Output

Downstream Effective Model
2.2.1.1 C-1 Channel,
Lake Mead to Boulder Hwy

FROM C-1 CHANNEL FIS
VOL. II PG 7 OF 144
OF SCANNED DOCUMENT

HEC-RAS Plan: X-Section

Reach	River Sta	Q Total (cfs)	Min Ch 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
MAIN1	21000	464.20	2074.07	2076.62	2076.62	2077.91	0.003285	9.11	50.98	20.00	1.01
MAIN1	20855.25	464.20	2070.49	2071.82	2073.04	2076.54	0.024963	17.43	26.63	20.00	2.66
HDWORKS	20740.1	830.50	2068.00	2070.37	2070.37	2071.56	0.003301	8.77	94.67	40.00	1.00
HDWORKS	20530.1	830.50	2065.50	2066.90	2067.87	2070.31	0.017018	14.82	56.03	40.00	2.21
DRAKE	18	3227.40	1886.08	1897.95	1897.96	1902.24	0.003081	16.63	194.12	22.72	1.00
DRAKE	17	3227.40	1885.04	1891.73	1894.71	1901.45	0.009669	25.02	129.01	21.08	1.78
DRAKE	16	3227.40	1884.00	1888.65	1892.02	1900.62	0.015424	27.76	116.26	25.00	2.27
DRAKE	15	3227.40	1882.96	1887.56	1890.98	1899.80	0.015961	28.08	114.93	25.00	2.31
DRAKE	14	3227.40	1878.91	1882.99	1886.93	1898.53	0.022784	31.63	102.03	25.00	2.76
DRAKE	13	3227.40	1874.86	1878.62	1882.88	1896.96	0.029269	34.37	93.90	25.00	3.13
DRAKE	12	3227.40	1871.59	1875.18	1879.61	1895.23	0.033473	35.93	89.83	25.00	3.34
DRAKE	11	3227.40	1866.76	1870.12	1874.78	1893.08	0.041174	38.46	83.92	25.00	3.70
DRAKE	10	3227.40	1862.48	1865.71	1870.51	1890.58	0.046514	40.02	80.64	25.00	3.93
DRAKE	9	3227.40	1862.43	1865.88	1870.46	1887.68	0.038050	37.47	86.12	25.00	3.56
DRAKE	8	3227.40	1862.38	1866.06	1870.41	1885.16	0.031108	35.07	92.03	25.00	3.22
DRAKE	7	3227.40	1862.33	1866.25	1870.35	1883.06	0.025654	32.90	98.09	25.00	2.93
DRAKE	6	3227.40	1862.29	1866.41	1870.31	1881.67	0.022181	31.35	102.95	25.00	2.72
DRAKE	5	3227.40	1862.28	1866.42	1870.31	1881.59	0.021971	31.25	103.27	25.00	2.71
DRAKE	4	3227.40	1862.23	1866.68	1870.25	1879.77	0.017631	29.04	111.15	25.00	2.43
DRAKE	3	3227.40	1862.18	1866.90	1870.20	1878.53	0.014783	27.37	117.94	25.00	2.22
DRAKE	2	3227.40	1862.13	1867.14	1870.15	1877.46	0.012393	25.78	125.17	25.00	2.03
DRAKE	1	3227.40	1862.10	1867.26	1870.12	1876.97	0.011313	25.00	129.10	25.00	1.94
MAIN2	20550.1	464.20	2065.50	2066.57		2073.92	0.050674	21.78	21.33	20.00	3.71
MAIN2	20550.1	1295.80	2065.50	2066.47	2067.89	2073.90	0.053326	21.89	59.20	61.33	3.93
MAIN2	20475	Culvert									
MAIN2	20400	1295.80	2057.00	2058.00	2059.39	2064.98	0.048055	21.21	61.11	61.33	3.93
MAIN2	20200	1295.80	2052.66	2053.74	2055.05	2059.65	0.036496	19.50	66.44	61.33	3.30
MAIN2	20100	1295.80	2050.93	2053.65	2054.83	2057.46	0.008619	15.68	82.86	35.87	1.82
MAIN2	20100	1295.80	2050.42	2053.05	2054.32	2057.16	0.009617	16.27	79.67	35.53	1.91
MAIN2	19950	1295.80	2046.99	2049.34	2050.89	2054.71	0.014342	18.60	69.67	34.39	2.30
MAIN2	19700	1295.80	2042.36	2044.42	2046.26	2051.63	0.022310	21.54	60.15	33.26	2.82
MAIN2	19700	1295.80	2041.33	2043.35	2045.20	2050.77	0.023691	21.85	59.30	33.66	2.90
MAIN2	19500	1295.80	2037.09	2039.05	2040.96	2046.98	0.026208	22.60	57.34	33.41	3.04
MAIN2	19300	1295.80	2032.84	2034.78	2036.71	2042.94	0.027377	22.93	56.52	33.31	3.10
MAIN2	19200	1295.80	2025.00	2026.82	2028.87	2036.30	0.034357	24.71	52.44	32.78	3.44
MAIN2	19137.00	1295.80	2021.23	2022.56	2024.47	2032.26	0.047505	24.99	51.86	38.99	3.82

Tie-in Point

DUPLICATE
D/S EFFECTIVE 7/07/05

HEC-RAS Plan: X-Section

Reach	River Sta	Profile	Q Total (cfs)	Min Ch 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 # Ch
MAIN3	21000	Effective	464.20	2074.07	2076.62	2076.62	2077.91	0.003279	9.10	51.01	20.00	1.00
MAIN3	21000	Corr Effective	879.50	2074.07	2077.97	2077.98	2079.94	0.003269	11.27	78.04	20.01	1.01
MAIN3	20655.25	Effective	464.20	2070.49	2071.82	2073.04	2076.55	0.025036	17.45	26.61	20.00	2.67
MAIN3	20655.25	Corr Effective	879.50	2070.49	2072.75	2074.40	2078.64	0.017114	19.47	45.16	20.01	2.28
HDWORKS	20710.41	Effective	830.50	2068.00	2070.37	2070.37	2071.56	0.003302	8.77	94.66	40.00	1.01
HDWORKS	20710.41	Corr Effective	416.90	2068.00	2069.50	2069.50	2070.25	0.003481	6.97	59.84	40.00	1.00
HDWORKS	20550.1	Effective	830.50	2065.50	2066.90	2067.87	2070.32	0.017084	14.84	55.96	40.00	2.21
HDWORKS	20550.1	Corr Effective	416.90	2065.50	2066.31	2067.00	2068.89	0.024906	12.89	32.35	40.00	2.52
DRAKE	18	Effective	3227.40	1886.08	1897.95	1897.96	1902.24	0.003081	16.63	194.12	22.72	1.00
DRAKE	18	Corr Effective	3227.40	1886.08	1897.95	1897.96	1902.24	0.003081	16.63	194.12	22.72	1.00
DRAKE	17	Effective	3227.40	1885.04	1891.73	1894.71	1901.45	0.009668	25.02	129.02	21.08	1.78
DRAKE	17	Corr Effective	3227.40	1885.04	1891.73	1894.71	1901.45	0.009668	25.02	129.02	21.08	1.78
DRAKE	16	Effective	3227.40	1884.00	1888.65	1892.02	1900.61	0.015409	27.75	116.30	25.00	2.27
DRAKE	16	Corr Effective	3227.40	1884.00	1888.65	1892.02	1900.61	0.015409	27.75	116.30	25.00	2.27
DRAKE	15	Effective	3227.40	1882.96	1887.56	1890.98	1899.79	0.015935	28.07	114.99	25.00	2.31
DRAKE	15	Corr Effective	3227.40	1882.96	1887.56	1890.98	1899.79	0.015935	28.07	114.99	25.00	2.31
DRAKE	14	Effective	3227.40	1878.91	1882.99	1886.93	1898.52	0.022762	31.62	102.07	25.00	2.76
DRAKE	14	Corr Effective	3227.40	1878.91	1882.99	1886.93	1898.52	0.022762	31.62	102.07	25.00	2.76
DRAKE	13	Effective	3227.40	1874.86	1878.62	1882.88	1896.95	0.029246	34.36	93.92	25.00	3.12
DRAKE	13	Corr Effective	3227.40	1874.86	1878.62	1882.88	1896.95	0.029246	34.36	93.92	25.00	3.12
DRAKE	12	Effective	3227.40	1871.59	1875.18	1879.61	1895.22	0.033456	35.92	89.85	25.00	3.34
DRAKE	12	Corr Effective	3227.40	1871.59	1875.18	1879.61	1895.22	0.033456	35.92	89.85	25.00	3.34
DRAKE	11	Effective	3227.40	1866.76	1870.12	1874.78	1893.08	0.041165	38.45	83.93	25.00	3.70
DRAKE	11	Corr Effective	3227.40	1866.76	1870.12	1874.78	1893.08	0.041165	38.45	83.93	25.00	3.70
DRAKE	10	Effective	3227.40	1862.48	1865.71	1870.51	1890.58	0.046509	40.02	80.64	25.00	3.93
DRAKE	10	Corr Effective	3227.40	1862.48	1865.71	1870.51	1890.58	0.046509	40.02	80.64	25.00	3.93
DRAKE	9	Effective	3227.40	1862.43	1865.88	1870.46	1887.68	0.038042	37.47	86.13	25.00	3.56
DRAKE	9	Corr Effective	3227.40	1862.43	1865.88	1870.46	1887.68	0.038042	37.47	86.13	25.00	3.56
DRAKE	8	Effective	3227.40	1862.38	1866.06	1870.41	1885.15	0.031080	35.06	92.06	25.00	3.22
DRAKE	8	Corr Effective	3227.40	1862.38	1866.06	1870.41	1885.15	0.031080	35.06	92.06	25.00	3.22
DRAKE	7	Effective	3227.40	1862.33	1866.26	1870.36	1883.05	0.025618	32.89	98.14	25.00	2.93
DRAKE	7	Corr Effective	3227.40	1862.33	1866.26	1870.36	1883.05	0.025618	32.89	98.14	25.00	2.93
DRAKE	6	Effective	3227.40	1862.29	1866.41	1870.32	1881.66	0.022165	31.34	102.97	25.00	2.72
DRAKE	6	Corr Effective	3227.40	1862.29	1866.41	1870.32	1881.66	0.022165	31.34	102.97	25.00	2.72
DRAKE	5	Effective	3227.40	1862.29	1866.41	1870.31	1881.66	0.022165	31.34	102.97	25.00	2.72
DRAKE	5	Corr Effective	3227.40	1862.29	1866.41	1870.31	1881.66	0.022165	31.34	102.97	25.00	2.72
DRAKE	4	Effective	3227.40	1862.23	1866.66	1870.25	1879.83	0.017778	29.12	110.85	25.00	2.44
DRAKE	4	Corr Effective	3227.40	1862.23	1866.66	1870.25	1879.83	0.017778	29.12	110.85	25.00	2.44
DRAKE	3	Effective	3227.40	1862.18	1866.89	1870.20	1878.56	0.014861	27.41	117.72	25.00	2.23
DRAKE	3	Corr Effective	3227.40	1862.18	1866.89	1870.20	1878.56	0.014861	27.41	117.72	25.00	2.23
DRAKE	2	Effective	3227.40	1862.13	1867.13	1870.15	1877.48	0.012444	25.82	125.00	25.00	2.03
DRAKE	2	Corr Effective	3227.40	1862.13	1867.13	1870.15	1877.48	0.012444	25.82	125.00	25.00	2.03
DRAKE	1	Effective	3227.40	1862.10	1867.25	1870.12	1877.00	0.011379	25.05	128.85	25.00	1.94
DRAKE	1	Corr Effective	3227.40	1862.10	1867.25	1870.12	1877.00	0.011379	25.05	128.85	25.00	1.94
MAIN2	20550.1	Effective	464.20	2065.50	2067.15	2068.05	2070.21	0.012584	14.03	33.08	20.00	1.92
MAIN2	20550.1	Corr Effective	878.90	2065.50	2067.80	2069.40	2073.49	0.016255	19.15	45.90	20.00	2.23
MAIN2	20550	Effective	1295.80	2065.50	2066.96	2067.89	2070.20	0.013598	14.44	89.77	61.33	2.10
MAIN2	20550	Corr Effective	1295.80	2065.50	2066.51	2067.89	2073.37	0.046686	21.02	61.64	61.33	3.69
MAIN2	20475	Culvert										
MAIN2	20400	Effective	1295.80	2057.00	2058.04	2059.39	2064.40	0.041181	20.23	64.04	61.33	2.10
MAIN2	20400	Corr Effective	1295.80	2057.00	2057.99	2059.39	2065.07	0.049196	21.36	60.67	61.33	3.69
MAIN2	20280	Effective	1295.80	2052.66	2053.75	2055.05	2059.62	0.036173	19.45	66.62	61.33	3.29
MAIN2	20280	Corr Effective	1295.80	2052.66	2053.74	2055.05	2059.66	0.036604	19.52	66.38	61.33	3.31
MAIN2	20180	Effective	1295.80	2050.93	2053.65	2054.83	2057.45	0.008554	15.64	82.87	35.89	1.81

HEC-RAS Plan: X-Section (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/l)	Vel Cntl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ctl
MAIN2	20180	Corr Effective	1295.80	2050.93	2053.65	2054.83	2057.47	0.008635	15.69	82.61	35.86	1.82
MAIN2	20150	Effective	1295.80	2050.42	2053.06	2054.32	2057.15	0.009555	16.23	79.84	35.55	1.91
MAIN2	20150	Corr Effective	1295.80	2050.42	2053.05	2054.32	2057.17	0.009658	16.29	79.55	35.52	1.92
MAIN2	19950	Effective	1295.80	2046.99	2049.34	2050.89	2054.70	0.014321	18.59	69.71	34.39	2.30
MAIN2	19950	Corr Effective	1295.80	2046.99	2049.34	2050.89	2054.71	0.014357	18.61	69.65	34.38	2.30
MAIN2	19786.49	Effective	1295.80	2042.36	2044.43	2046.26	2051.63	0.022305	21.54	60.15	33.26	2.82
MAIN2	19786.49	Corr Effective	1295.80	2042.36	2044.42	2046.26	2051.64	0.022323	21.55	60.14	33.26	2.82
MAIN2	19750	Effective	1295.80	2041.33	2043.35	2045.20	2050.77	0.023716	21.86	59.28	33.66	2.90
MAIN2	19750	Corr Effective	1295.80	2041.33	2043.35	2045.20	2050.77	0.023731	21.86	59.26	33.66	2.90
MAIN2	19600	Effective	1295.80	2037.09	2039.05	2040.96	2046.99	0.026236	22.60	57.32	33.41	3.04
MAIN2	19600	Corr Effective	1295.80	2037.09	2039.05	2040.96	2046.99	0.026248	22.61	57.32	33.41	3.04
MAIN2	19450	Effective	1295.80	2032.84	2034.78	2036.71	2042.94	0.027394	22.93	56.51	33.31	3.10
MAIN2	19450	Corr Effective	1295.80	2032.84	2034.78	2036.71	2042.94	0.027400	22.93	56.51	33.31	3.10
MAIN2	19237	Effective	1295.80	2025.00	2026.82	2028.87	2036.30	0.034357	24.71	52.44	32.78	3.44
MAIN2	19237	Corr Effective	1295.80	2025.00	2026.82	2028.87	2036.30	0.034357	24.71	52.44	32.78	3.44
MAIN2	19137.00	Effective	1295.80	2021.23	2022.56	2024.47	2032.25	0.047490	24.99	51.86	38.99	3.82
MAIN2	19137.00	Corr Effective	1295.80	2021.23	2022.56	2024.47	2032.26	0.047548	24.99	51.84	38.99	3.82
MAIN2	19059.85	Effective	1295.80	2018.37	2019.76	2021.61	2028.60	0.040908	23.86	54.31	39.00	3.56
MAIN2	19059.85	Corr Effective	1295.80	2018.37	2019.76	2021.61	2028.61	0.040931	23.87	54.30	39.00	3.56
MAIN2	19020.51	Effective	1295.80	2017.64	2019.13	2020.90	2026.82	0.032590	22.25	58.24	38.99	3.21
MAIN2	19020.51	Corr Effective	1295.80	2017.64	2019.13	2020.90	2026.82	0.032598	22.25	58.24	38.99	3.21
MAIN2	18858.93	Effective	1662.10	2014.56	2016.71	2018.40	2022.83	0.016691	19.86	83.67	38.99	2.39
MAIN2	18858.93	Corr Effective	1662.10	2014.56	2016.71	2018.40	2022.83	0.016694	19.87	83.67	38.99	2.39
MAIN2	18850	Effective	1662.10	2014.42	2016.57	2018.24	2022.69	0.016679	19.86	83.71	39.00	2.39
MAIN2	18850	Corr Effective	1662.10	2014.42	2016.57	2018.24	2022.69	0.016682	19.86	83.70	39.00	2.39
MAIN2	18750	Effective	1662.10	2012.72	2014.86	2016.54	2021.01	0.016801	19.90	83.52	39.00	2.40
MAIN2	18750	Corr Effective	1662.10	2012.72	2014.86	2016.54	2021.01	0.016804	19.90	83.51	39.00	2.40
MAIN2	18650	Effective	1662.10	2011.03	2013.46	2015.16	2019.36	0.014778	19.50	85.22	40.25	2.36
MAIN2	18650	Corr Effective	1662.10	2011.03	2013.46	2015.16	2019.36	0.014781	19.51	85.21	40.25	2.36
MAIN2	18550	Effective	1662.10	2009.33	2011.72	2013.45	2017.83	0.015529	19.83	83.83	40.10	2.42
MAIN2	18550	Corr Effective	1662.10	2009.33	2011.72	2013.45	2017.83	0.015531	19.83	83.82	40.10	2.42
MAIN2	18400	Effective	1662.10	2005.59	2008.14	2010.08	2015.26	0.017440	21.42	77.61	35.92	2.57
MAIN2	18400	Corr Effective	1662.10	2005.59	2008.14	2010.08	2015.26	0.017440	21.42	77.61	35.92	2.57
MAIN2	18200	Effective	1662.10	2000.59	2002.98	2005.08	2011.26	0.021803	23.09	71.99	35.24	2.85
MAIN2	18200	Corr Effective	1662.10	2000.59	2002.98	2005.08	2011.26	0.021803	23.09	71.99	35.24	2.85
MAIN2	18050	Effective	1662.10	1996.85	1999.20	2001.34	2007.84	0.023271	23.60	70.43	35.05	2.93
MAIN2	18050	Corr Effective	1662.10	1996.85	1999.20	2001.34	2007.84	0.023271	23.60	70.43	35.05	2.93
MAIN2	18000	Effective	1662.10	1995.56	1997.89	2000.05	2006.66	0.023737	23.76	69.97	35.00	2.96
MAIN2	18000	Corr Effective	1662.10	1995.56	1997.89	2000.05	2006.66	0.023737	23.76	69.97	35.00	2.96
MAIN2	17800	Effective	1662.10	1990.42	1992.72	1994.91	2001.77	0.024882	24.13	68.87	34.86	3.03
MAIN2	17800	Corr Effective	1662.10	1990.42	1992.72	1994.91	2001.77	0.024882	24.13	68.87	34.86	3.03
MAIN2	17675	Effective	1662.10	1987.20	1989.49	1991.69	1998.62	0.025229	24.25	68.55	34.82	3.05
MAIN2	17675	Corr Effective	1662.10	1987.20	1989.49	1991.69	1998.62	0.025229	24.25	68.55	34.82	3.05
MAIN2	17650	Effective	1662.10	1986.56	1988.88	1991.09	1997.98	0.024682	24.22	68.63	34.26	3.02
MAIN2	17650	Corr Effective	1662.10	1986.56	1988.88	1991.09	1997.98	0.024682	24.22	68.63	34.26	3.02
MAIN2	17600	Effective	1662.10	1985.27	1987.58	1989.79	1996.74	0.024904	24.29	68.43	34.24	3.03
MAIN2	17600	Corr Effective	1662.10	1985.27	1987.58	1989.79	1996.74	0.024904	24.29	68.43	34.24	3.03
MAIN2	17400	Effective	1662.10	1980.12	1982.42	1984.65	1991.70	0.025379	24.44	68.00	34.19	3.05
MAIN2	17400	Corr Effective	1662.10	1980.12	1982.42	1984.65	1991.70	0.025379	24.44	68.00	34.19	3.05
MAIN2	17200	Effective	1662.10	1974.98	1977.27	1979.50	1986.60	0.025567	24.50	67.83	34.17	3.06
MAIN2	17200	Corr Effective	1662.10	1974.98	1977.27	1979.50	1986.60	0.025567	24.50	67.83	34.17	3.06
MAIN2	17000	Effective	1662.10	1969.83	1972.12	1974.36	1981.47	0.025675	24.54	67.74	34.16	3.07
MAIN2	17000	Corr Effective	1662.10	1969.83	1972.12	1974.36	1981.47	0.025675	24.54	67.74	34.16	3.07
MAIN2	16800	Effective	1662.10	1964.68	1966.97	1969.20	1976.33	0.025728	24.55	67.69	34.15	3.07

HEC-RAS Plan: X-Section (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
MAIN2	16800	Corr Effective	1662.10	1964.68	1966.97	1969.20	1976.33	0.025728	24.55	67.89	34.15	3.07
MAIN2	16600	Effective	1662.10	1959.53	1961.82	1964.06	1971.19	0.025751	24.56	67.67	34.15	3.08
MAIN2	16600	Corr Effective	1662.10	1959.53	1961.82	1964.06	1971.19	0.025751	24.56	67.67	34.15	3.08
MAIN2	16400	Effective	1662.10	1954.39	1956.68	1958.91	1966.04	0.025713	24.55	67.70	34.16	3.07
MAIN2	16400	Corr Effective	1662.10	1954.39	1956.68	1958.91	1966.04	0.025713	24.55	67.70	34.16	3.07
MAIN2	16200	Effective	1662.10	1949.24	1951.53	1953.77	1960.90	0.025761	24.57	67.66	34.15	3.08
MAIN2	16200	Corr Effective	1662.10	1949.24	1951.53	1953.77	1960.90	0.025761	24.57	67.66	34.15	3.08
MAIN2	16000	Effective	1662.10	1944.09	1946.38	1948.62	1955.75	0.025756	24.56	67.66	34.15	3.08
MAIN2	16000	Corr Effective	1662.10	1944.09	1946.38	1948.62	1955.75	0.025756	24.56	67.66	34.15	3.08
MAIN2	15800	Effective	1662.10	1938.95	1941.24	1943.48	1950.60	0.025713	24.55	67.70	34.16	3.07
MAIN2	15800	Corr Effective	1662.10	1938.95	1941.24	1943.48	1950.60	0.025713	24.55	67.70	34.16	3.07
MAIN2	15700	Effective	1703.90	1936.37	1938.71	1940.97	1948.06	0.025063	24.54	69.42	34.36	3.04
MAIN2	15700	Corr Effective	1703.90	1936.37	1938.71	1940.97	1948.06	0.025063	24.54	69.42	34.36	3.04
MAIN2	15500	Effective	1703.90	1931.76	1934.15	1936.35	1943.09	0.023426	24.00	71.01	34.54	2.95
MAIN2	15500	Corr Effective	1703.90	1931.76	1934.15	1936.35	1943.09	0.023426	24.00	71.01	34.54	2.95
MAIN2	15300	Effective	1703.90	1927.68	1930.14	1932.27	1938.46	0.021037	23.15	73.61	34.84	2.81
MAIN2	15300	Corr Effective	1703.90	1927.68	1930.14	1932.27	1938.46	0.021037	23.15	73.61	34.84	2.81
MAIN2	15260.78	Effective	1703.90	1926.76	1929.14	1931.25	1937.59	0.022695	23.33	73.04	36.42	2.90
MAIN2	15260.78	Corr Effective	1703.90	1926.76	1929.14	1931.25	1937.59	0.022695	23.33	73.04	36.42	2.90
MAIN2	15200	Effective	1703.90	1925.38	1927.83	1929.97	1936.23	0.021325	23.26	73.26	34.78	2.82
MAIN2	15200	Corr Effective	1703.90	1925.38	1927.83	1929.97	1936.23	0.021325	23.26	73.26	34.78	2.82
MAIN2	15199.9	Effective	1703.90	1925.38	1927.83	1929.97	1936.22	0.058813	23.25	73.29	34.80	2.82
MAIN2	15199.9	Corr Effective	1703.90	1925.38	1927.83	1929.97	1936.22	0.058813	23.25	73.29	34.80	2.82
MAIN2	15100	Effective	2800.60	1921.88	1925.98	1928.01	1932.57	0.022911	20.61	135.90	41.38	2.00
MAIN2	15100	Corr Effective	2800.60	1921.88	1925.98	1928.01	1932.57	0.022911	20.61	135.90	41.38	2.00
MAIN2	15000	Effective	2800.60	1918.38	1922.23	1924.53	1929.90	0.028924	22.21	126.07	40.42	2.22
MAIN2	15000	Corr Effective	2800.60	1918.38	1922.23	1924.53	1929.90	0.028924	22.21	126.07	40.42	2.22
MAIN2	14900	Effective	2800.60	1914.88	1918.63	1921.04	1926.81	0.031993	22.95	122.05	40.02	2.32
MAIN2	14900	Corr Effective	2800.60	1914.88	1918.63	1921.04	1926.81	0.031993	22.95	122.05	40.02	2.32
MAIN2	14890	Effective	2800.60	1914.75	1918.54	1920.91	1926.58	0.012496	22.76	123.07	39.97	2.29
MAIN2	14890	Corr Effective	2800.60	1914.75	1918.54	1920.91	1926.58	0.012496	22.76	123.07	39.97	2.29
MAIN2	14800	Effective	2800.60	1913.63	1917.42	1919.79	1925.46	0.012491	22.75	123.11	39.99	2.28
MAIN2	14800	Corr Effective	2800.60	1913.63	1917.42	1919.79	1925.46	0.012491	22.75	123.11	39.99	2.28
MAIN2	14600	Effective	2800.60	1911.13	1914.92	1917.28	1922.95	0.012475	22.74	123.16	39.99	2.28
MAIN2	14600	Corr Effective	2800.60	1911.13	1914.92	1917.28	1922.95	0.012475	22.74	123.16	39.99	2.28
MAIN2	14550	Effective	2800.60	1910.45	1914.22	1916.58	1922.31	0.012652	22.82	122.72	40.08	2.30
MAIN2	14550	Corr Effective	2800.60	1910.45	1914.22	1916.58	1922.31	0.012652	22.82	122.72	40.08	2.30
MAIN2	14500	Bridge										
MAIN2	14450	Effective	2800.60	1909.23	1913.01	1915.38	1921.04	0.012508	22.73	123.20	40.13	2.29
MAIN2	14450	Corr Effective	2800.60	1909.23	1913.01	1915.38	1921.04	0.012508	22.73	123.20	40.13	2.29
MAIN2	14360	Effective	2800.60	1908.10	1911.88	1914.23	1919.91	0.012524	22.74	123.15	40.13	2.29
MAIN2	14360	Corr Effective	2800.60	1908.10	1911.88	1914.23	1919.91	0.012524	22.74	123.15	40.13	2.29
MAIN2	14350	Effective	2800.60	1908.00	1911.82	1914.13	1919.68	0.030100	22.50	124.47	40.26	2.26
MAIN2	14350	Corr Effective	2800.60	1908.00	1911.82	1914.13	1919.68	0.030100	22.50	124.47	40.26	2.26
MAIN2	14300	Effective	2800.60	1906.25	1910.02	1912.38	1918.11	0.031492	22.83	122.67	40.08	2.30
MAIN2	14300	Corr Effective	2800.60	1906.25	1910.02	1912.38	1918.11	0.031492	22.83	122.67	40.08	2.30
MAIN2	14200	Effective	2800.60	1902.75	1906.47	1908.88	1914.85	0.033242	23.23	120.56	39.87	2.35
MAIN2	14200	Corr Effective	2800.60	1902.75	1906.47	1908.88	1914.85	0.033242	23.23	120.56	39.87	2.35
MAIN2	14100	Effective	2800.60	1899.25	1902.94	1905.38	1911.46	0.034131	23.43	119.54	39.77	2.38
MAIN2	14100	Corr Effective	2800.60	1899.25	1902.94	1905.38	1911.46	0.034131	23.43	119.54	39.77	2.38
MAIN2	14090	Effective	2800.60	1898.99	1902.58	1905.02	1911.24	0.014528	23.62	118.55	41.07	2.45
MAIN2	14090	Corr Effective	2800.60	1898.99	1902.58	1905.02	1911.24	0.014528	23.62	118.55	41.07	2.45
MAIN2	14000	Effective	2800.60	1897.87	1901.62	1904.03	1909.88	0.012989	23.07	121.41	39.78	2.33
MAIN2	14000	Corr Effective	2800.60	1897.87	1901.62	1904.03	1909.88	0.012989	23.07	121.41	39.78	2.33

HEC-RAS Plan: X-Section (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch 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
MAIN2	13800	Effective	2800.60	1895.50	1899.21	1901.53	1907.21	0.012943	22.70	123.37	41.57	2.32
MAIN2	13800	Corr Effective	2800.60	1895.50	1899.21	1901.53	1907.21	0.012943	22.70	123.37	41.57	2.32
MAIN2	13664.86	Effective	2800.60	1893.81	1897.63	1899.96	1905.47	0.012060	22.46	124.68	40.21	2.25
MAIN2	13664.86	Corr Effective	2800.60	1893.81	1897.63	1899.96	1905.47	0.012060	22.46	124.68	40.21	2.25
MAIN2	13601	Effective	2800.60	1893.01	1896.82	1899.16	1904.69	0.012159	22.51	124.41	40.25	2.26
MAIN2	13601	Corr Effective	2800.60	1893.01	1896.82	1899.16	1904.69	0.012159	22.51	124.41	40.25	2.26
MAIN2	13600	Effective	2800.60	1893.00	1896.81	1899.15	1904.68	0.030141	22.51	124.41	40.25	2.26
MAIN2	13600	Corr Effective	2800.60	1893.00	1896.81	1899.15	1904.68	0.030141	22.51	124.41	40.25	2.26
MAIN2	13500	Effective	2800.60	1889.50	1893.24	1895.65	1901.51	0.032578	23.08	121.34	39.95	2.33
MAIN2	13500	Corr Effective	2800.60	1889.50	1893.24	1895.65	1901.51	0.032578	23.08	121.34	39.95	2.33
MAIN2	13400	Effective	2800.60	1886.00	1889.70	1892.15	1898.17	0.033796	23.35	119.92	39.80	2.37
MAIN2	13400	Corr Effective	2800.60	1886.00	1889.70	1892.15	1898.17	0.033796	23.35	119.92	39.80	2.37
MAIN2	13300	Effective	2800.60	1882.50	1886.18	1888.65	1894.75	0.034391	23.48	119.25	39.74	2.39
MAIN2	13300	Corr Effective	2800.60	1882.50	1886.18	1888.65	1894.75	0.034391	23.48	119.25	39.74	2.39
MAIN2	13200	Effective	2800.60	1881.25	1885.16	1887.39	1892.60	0.011162	21.89	127.97	40.45	2.17
MAIN2	13200	Corr Effective	2800.60	1881.25	1885.16	1887.39	1892.60	0.011162	21.89	127.97	40.45	2.17
MAIN2	13000	Effective	2800.60	1878.75	1882.61	1884.90	1890.29	0.011687	22.24	125.95	40.25	2.22
MAIN2	13000	Corr Effective	2800.60	1878.75	1882.61	1884.90	1890.29	0.011687	22.24	125.95	40.25	2.22
MAIN2	12800	Effective	2800.60	1876.25	1880.08	1882.40	1887.90	0.011997	22.44	124.82	40.14	2.24
MAIN2	12800	Corr Effective	2800.60	1876.25	1880.08	1882.40	1887.90	0.011997	22.44	124.82	40.14	2.24
MAIN2	12691	Effective	2800.60	1874.89	1878.70	1881.02	1886.58	0.012196	22.53	124.33	40.29	2.26
MAIN2	12691	Corr Effective	2800.60	1874.89	1878.70	1881.02	1886.58	0.012196	22.53	124.33	40.29	2.26
MAIN2	12591	Effective	2800.60	1873.64	1876.72	1879.05	1885.17	0.015045	23.32	120.09	39.00	2.34
MAIN2	12591	Corr Effective	2800.60	1873.64	1876.72	1879.05	1885.17	0.015045	23.32	120.09	39.00	2.34
MAIN2	12512.76	Effective	2800.60	1867.34	1869.80	1872.75	1883.06	0.030731	29.22	95.85	39.00	3.28
MAIN2	12512.76	Corr Effective	2800.60	1867.34	1869.80	1872.75	1883.06	0.030731	29.22	95.85	39.00	3.28
MAIN2	12450	Effective	2800.60	1862.28	1874.83	1867.69	1875.34	0.000222	5.72	489.52	39.00	0.28
MAIN2	12450	Corr Effective	2800.60	1862.28	1874.83	1867.69	1875.34	0.000222	5.72	489.52	39.00	0.28
MAIN2	12400	Effective	2800.60	1862.24	1874.82		1875.33	0.000220	5.71	490.69	39.00	0.28
MAIN2	12400	Corr Effective	2800.60	1862.24	1874.82		1875.33	0.000220	5.71	490.70	39.00	0.28
MAIN2	12344.58	Effective	2800.60	1862.19	1874.81		1875.31	0.000217	5.68	493.47	39.18	0.28
MAIN2	12344.58	Corr Effective	2800.60	1862.19	1874.81		1875.31	0.000217	5.68	493.47	39.18	0.28
MAIN2	12300	Effective	2800.60	1862.15	1874.80		1875.30	0.000217	5.67	493.51	39.00	0.28
MAIN2	12300	Corr Effective	2800.60	1862.15	1874.80		1875.30	0.000217	5.67	493.51	39.00	0.28
MAIN2	12234.51	Effective	2800.60	1862.09	1874.81	1867.41	1875.28	0.000200	5.50	508.85	40.00	0.41
MAIN2	12234.51	Corr Effective	2800.60	1862.09	1874.81	1867.42	1875.28	0.000200	5.50	508.85	40.00	0.41
MAIN1	12060.97	Effective	4818.00	1861.93	1874.35		1875.28	0.000365	7.76	620.90	50.00	0.39
MAIN1	12060.97	Corr Effective	4818.00	1861.93	1874.35		1875.28	0.000365	7.76	620.90	50.00	0.39
MAIN1	11950	Effective	4818.00	1861.83	1874.32		1875.24	0.000360	7.72	624.25	50.00	0.38
MAIN1	11950	Corr Effective	4818.00	1861.83	1874.32		1875.24	0.000360	7.72	624.25	50.00	0.38
MAIN1	11850	Effective	4818.00	1860.76	1873.75		1875.15	0.000591	9.49	507.75	54.17	0.55
MAIN1	11850	Corr Effective	4818.00	1860.76	1873.75		1875.15	0.000591	9.49	507.75	54.17	0.55
MAIN1	11800	Effective	4818.00	1860.22	1870.99	1870.99	1874.85	0.002177	15.76	305.68	40.00	1.00
MAIN1	11800	Corr Effective	4818.00	1860.22	1870.99	1870.99	1874.85	0.002177	15.76	305.68	40.00	1.00
MAIN1	11750	Effective	4818.00	1859.69	1867.36	1869.61	1874.37	0.005787	21.25	226.75	44.10	1.65
MAIN1	11750	Corr Effective	4818.00	1859.69	1867.36	1869.61	1874.37	0.005787	21.25	226.75	44.10	1.65
MAIN1	11550	Effective	4818.00	1857.54	1864.67	1867.32	1872.95	0.007414	23.08	208.75	43.53	1.86
MAIN1	11550	Corr Effective	4818.00	1857.54	1864.67	1867.32	1872.95	0.007414	23.08	208.75	43.53	1.86
MAIN1	11300	Effective	4818.00	1854.87	1861.55	1864.37	1870.81	0.008976	24.42	197.31	44.10	2.03
MAIN1	11300	Corr Effective	4818.00	1854.87	1861.55	1864.37	1870.81	0.008976	24.42	197.31	44.10	2.03
MAIN1	11022.25	Effective	4818.00	1851.89	1859.18	1861.99	1868.44	0.008032	24.43	197.24	39.13	1.92
MAIN1	11022.25	Corr Effective	4818.00	1851.89	1859.18	1861.99	1868.44	0.008032	24.43	197.24	39.13	1.92
MAIN1	10843	Effective	4818.00	1850.77	1857.93	1860.61	1866.92	0.007970	24.06	200.22	40.92	1.92
MAIN1	10843	Corr Effective	4818.00	1850.77	1857.93	1860.61	1866.92	0.007970	24.06	200.22	40.92	1.92

HEC-RAS Plan: X-Section (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch 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 # Ch
MAIN1	10700	Effective	4818.00	1849.53	1856.99	1859.67	1865.76	0.007423	23.77	202.68	39.38	1.85
MAIN1	10700	Corr Effective	4818.00	1849.53	1856.99	1859.67	1865.76	0.007423	23.77	202.68	39.38	1.85
MAIN1	10500	Effective	4818.00	1847.86	1855.04	1857.77	1864.17	0.008063	24.25	198.66	40.34	1.93
MAIN1	10500	Corr Effective	4818.00	1847.86	1855.04	1857.77	1864.17	0.008063	24.25	198.66	40.34	1.93
MAIN1	10300	Effective	4818.00	1846.13	1853.48	1856.26	1862.57	0.007812	24.20	199.09	39.17	1.89
MAIN1	10300	Corr Effective	4818.00	1846.13	1853.48	1856.26	1862.57	0.007812	24.20	199.09	39.17	1.89
MAIN1	10149	Effective	4818.00	1844.88	1851.90	1854.67	1861.31	0.008522	24.61	195.76	40.75	1.98
MAIN1	10149	Corr Effective	4818.00	1844.88	1851.90	1854.67	1861.31	0.008522	24.61	195.76	40.75	1.98
MAIN1	10135	Effective	4818.00	1844.82	1851.82	1854.55	1861.18	0.008526	24.55	196.22	41.10	1.98
MAIN1	10135	Corr Effective	4818.00	1844.82	1851.82	1854.55	1861.18	0.008526	24.55	196.22	41.10	1.98
MAIN1	10000	Effective	4818.00	1844.16	1851.49	1853.96	1859.81	0.007209	23.16	208.06	41.80	1.83
MAIN1	10000	Corr Effective	4818.00	1844.16	1851.49	1853.96	1859.81	0.007209	23.16	208.06	41.80	1.83
MAIN1	9880	Effective	4818.00	1843.74	1851.21	1853.41	1858.77	0.006432	22.07	218.34	43.49	1.74
MAIN1	9880	Corr Effective	4818.00	1843.74	1851.21	1853.41	1858.77	0.006432	22.07	218.34	43.49	1.74
MAIN1	9800	Effective	4818.00	1843.37	1848.88	1851.79	1858.00	0.009123	24.23	198.82	38.05	1.87
MAIN1	9800	Corr Effective	4818.00	1843.37	1848.88	1851.79	1858.00	0.009123	24.23	198.82	38.05	1.87
MAIN1	9756	Effective	5126.00	1842.96	1846.95	1849.91	1857.40	0.013203	25.93	197.67	49.50	2.29
MAIN1	9756	Corr Effective	5126.00	1842.96	1846.95	1849.91	1857.40	0.013203	25.93	197.67	49.50	2.29
MAIN1	9703	Culvert										
MAIN1	9654	Effective	5126.00	1841.92	1846.54	1848.83	1854.35	0.008389	22.44	228.43	49.50	2.29
MAIN1	9654	Corr Effective	5126.00	1841.92	1846.54	1848.83	1854.35	0.008389	22.44	228.43	49.50	2.29
MAIN1	9550	Effective	5126.00	1841.59	1845.55	1847.85	1853.39	0.010335	22.47	228.16	64.17	2.10
MAIN1	9550	Corr Effective	5126.00	1841.59	1845.55	1847.85	1853.39	0.010335	22.47	228.16	64.17	2.10
MAIN1	9500	Effective	5126.00	1841.43	1850.55	1847.78	1851.82	0.000629	9.06	565.83	69.62	0.56
MAIN1	9500	Corr Effective	5126.00	1841.43	1850.55	1847.78	1851.82	0.000629	9.06	565.83	69.62	0.56
MAIN1	9339.55	Effective	5126.00	1840.97	1848.55	1848.55	1851.49	0.001963	13.76	372.57	63.32	1.00
MAIN1	9339.55	Corr Effective	5126.00	1840.97	1848.55	1848.55	1851.49	0.001963	13.76	372.57	63.32	1.00
MAIN1	9146.20	Effective	5126.00	1840.64	1847.81	1847.81	1851.07	0.002094	14.49	353.79	54.75	1.00
MAIN1	9146.20	Corr Effective	5126.00	1840.64	1847.81	1847.81	1851.07	0.002094	14.49	353.79	54.75	1.00
MAIN1	9000	Effective	5126.00	1840.10	1845.02	1846.48	1850.39	0.005227	18.60	275.58	56.01	1.48
MAIN1	9000	Corr Effective	5126.00	1840.10	1845.02	1846.48	1850.39	0.005227	18.60	275.58	56.01	1.48
MAIN1	8822	Effective	5126.00	1839.24	1844.26	1845.62	1849.42	0.004900	18.22	281.33	56.01	1.43
MAIN1	8822	Corr Effective	5126.00	1839.24	1844.26	1845.62	1849.42	0.004900	18.22	281.33	56.01	1.43
MAIN1	8821.99	Effective	5126.00	1837.35	1841.46	1843.72	1849.16	0.009210	22.27	230.21	56.01	1.94
MAIN1	8821.99	Corr Effective	5126.00	1837.35	1841.46	1843.72	1849.16	0.009210	22.27	230.21	56.01	1.94
MAIN1	8783	Effective	5126.00	1836.36	1846.69	1842.73	1847.91	0.000540	8.86	578.78	56.02	0.49
MAIN1	8783	Corr Effective	5126.00	1836.36	1846.69	1842.73	1847.91	0.000540	8.86	578.78	56.02	0.49
MAIN1	8768	Effective	5126.00	1835.64	1844.07	1844.07	1847.66	0.002037	15.21	337.02	47.17	1.00
MAIN1	8768	Corr Effective	5126.00	1835.64	1844.07	1844.07	1847.66	0.002037	15.21	337.02	47.17	1.00
MAIN1	8746	Effective	5126.00	1833.24	1840.48	1842.48	1847.27	0.005094	20.91	245.10	43.04	1.54
MAIN1	8746	Corr Effective	5126.00	1833.24	1840.48	1842.48	1847.27	0.005094	20.91	245.10	43.04	1.54
MAIN1	8730	Effective	5126.00	1831.80	1839.71	1841.90	1847.12	0.005914	21.83	234.77	44.34	1.67
MAIN1	8730	Corr Effective	5126.00	1831.80	1839.71	1841.90	1847.12	0.005914	21.83	234.77	44.34	1.67
MAIN1	8713	Effective	5126.00	1831.31	1838.98	1841.33	1846.95	0.006587	22.66	226.26	43.97	1.76
MAIN1	8713	Corr Effective	5126.00	1831.31	1838.98	1841.33	1846.95	0.006587	22.66	226.26	43.97	1.76
MAIN1	8695	Effective	5126.00	1831.18	1838.98	1841.26	1846.79	0.006323	22.43	228.58	43.61	1.73
MAIN1	8695	Corr Effective	5126.00	1831.18	1838.98	1841.26	1846.79	0.006323	22.43	228.58	43.61	1.73
MAIN1	8500	Effective	5126.00	1828.34	1835.41	1838.25	1845.15	0.008798	25.04	204.69	42.88	2.02
MAIN1	8500	Corr Effective	5126.00	1828.34	1835.41	1838.25	1845.15	0.008798	25.04	204.69	42.88	2.02
MAIN1	8383	Effective	5126.00	1826.76	1833.60	1836.58	1844.00	0.009762	25.88	198.10	42.89	2.12
MAIN1	8383	Corr Effective	5126.00	1826.76	1833.60	1836.58	1844.00	0.009762	25.88	198.10	42.89	2.12
MAIN1	8215	Effective	5126.00	1824.06	1830.72	1833.94	1842.15	0.011043	27.13	188.91	41.74	2.25
MAIN1	8215	Corr Effective	5126.00	1824.06	1830.72	1833.94	1842.15	0.011043	27.13	188.91	41.74	2.25

HEC-RAS Plan: X-Section (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch 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
MAIN1	8200	Effective	5126.00	1823.80	1830.45	1833.69	1841.98	0.011154	27.25	188.11	41.59	2.26
MAIN1	8200	Corr Effective	5126.00	1823.80	1830.45	1833.69	1841.98	0.011154	27.25	188.11	41.59	2.26
MAIN1	8000	Effective	5126.00	1820.72	1827.18	1830.55	1839.54	0.012350	28.21	181.68	41.25	2.37
MAIN1	8000	Corr Effective	5126.00	1820.72	1827.18	1830.55	1839.54	0.012350	28.21	181.68	41.25	2.37
MAIN1	7800	Effective	5126.00	1817.79	1824.17	1827.62	1836.97	0.012945	28.71	178.57	40.94	2.42
MAIN1	7800	Corr Effective	5126.00	1817.79	1824.17	1827.62	1836.97	0.012945	28.71	178.57	40.94	2.42
MAIN1	7600	Effective	5126.00	1814.89	1821.23	1824.72	1834.31	0.013348	29.03	176.58	40.75	2.46
MAIN1	7600	Corr Effective	5126.00	1814.89	1821.23	1824.72	1834.31	0.013348	29.03	176.58	40.75	2.46
MAIN1	7400	Effective	5126.00	1811.91	1818.20	1821.74	1831.57	0.013751	29.35	174.67	40.56	2.49
MAIN1	7400	Corr Effective	5126.00	1811.91	1818.20	1821.74	1831.57	0.013751	29.35	174.67	40.56	2.49
MAIN1	7196	Effective	5172.20	1808.78	1815.07	1818.66	1828.71	0.014023	29.64	174.50	40.50	2.52
MAIN1	7196	Corr Effective	5172.20	1808.78	1815.07	1818.66	1828.71	0.014023	29.64	174.50	40.50	2.52
MAIN1	7000	Effective	5172.20	1805.32	1811.50	1815.19	1825.81	0.014983	30.35	170.39	40.12	2.60
MAIN1	7000	Corr Effective	5172.20	1805.32	1811.50	1815.19	1825.81	0.014983	30.35	170.39	40.12	2.60
MAIN1	6800	Effective	5172.20	1801.65	1807.74	1811.52	1822.67	0.015873	31.00	166.84	39.76	2.67
MAIN1	6800	Corr Effective	5172.20	1801.65	1807.74	1811.52	1822.67	0.015873	31.00	166.84	39.76	2.67
MAIN1	6679	Effective	5172.20	1799.41	1805.52	1809.39	1820.71	0.016049	31.27	165.40	39.10	2.68
MAIN1	6679	Corr Effective	5172.20	1799.41	1805.52	1809.39	1820.71	0.016049	31.27	165.40	39.10	2.68
MAIN1	6600	Effective	5172.20	1798.27	1804.34	1808.14	1819.40	0.016068	31.14	166.10	39.69	2.68
MAIN1	6600	Corr Effective	5172.20	1798.27	1804.34	1808.14	1819.40	0.016068	31.14	166.10	39.69	2.68
MAIN1	6400	Effective	5172.20	1795.39	1801.60	1805.37	1816.12	0.015090	30.58	169.13	39.46	2.60
MAIN1	6400	Corr Effective	5172.20	1795.39	1801.60	1805.37	1816.12	0.015090	30.58	169.13	39.46	2.60
MAIN1	6200	Effective	5172.20	1793.00	1799.28	1802.87	1812.96	0.014088	29.68	174.27	40.52	2.52
MAIN1	6200	Corr Effective	5172.20	1793.00	1799.28	1802.87	1812.96	0.014088	29.68	174.27	40.52	2.52
MAIN1	6000	Effective	5172.20	1790.76	1797.18	1800.63	1810.01	0.012905	28.74	179.95	41.08	2.42
MAIN1	6000	Corr Effective	5172.20	1790.76	1797.18	1800.63	1810.01	0.012905	28.74	179.95	41.08	2.42
MAIN1	5800	Effective	5172.20	1788.12	1794.53	1797.99	1807.41	0.012981	28.80	179.57	41.04	2.43
MAIN1	5800	Corr Effective	5172.20	1788.12	1794.53	1797.99	1807.41	0.012981	28.80	179.57	41.04	2.43
MAIN1	5600	Effective	5172.20	1784.02	1790.21	1793.89	1804.49	0.014948	30.33	170.54	40.14	2.59
MAIN1	5600	Corr Effective	5172.20	1784.02	1790.21	1793.89	1804.49	0.014948	30.33	170.54	40.14	2.59
MAIN1	5462	Effective	5172.20	1782.76	1788.83	1792.32	1802.20	0.014472	29.34	176.25	43.09	2.56
MAIN1	5462	Corr Effective	5172.20	1782.76	1788.83	1792.32	1802.20	0.014472	29.34	176.25	43.09	2.56
MAIN1	5396	Effective	5172.20	1781.46	1787.78	1791.34	1801.23	0.013749	29.43	175.73	40.60	2.49
MAIN1	5396	Corr Effective	5172.20	1781.46	1787.78	1791.34	1801.23	0.013749	29.43	175.73	40.60	2.49
MAIN1	5362	Effective	5172.20	1780.69	1786.95	1790.56	1800.73	0.014220	29.78	173.68	40.46	2.53
MAIN1	5362	Corr Effective	5172.20	1780.69	1786.95	1790.56	1800.73	0.014220	29.78	173.68	40.46	2.53
MAIN1	5196	Effective	5172.20	1777.86	1784.10	1787.80	1798.29	0.014690	30.23	171.11	39.86	2.57
MAIN1	5196	Corr Effective	5172.20	1777.86	1784.10	1787.80	1798.29	0.014690	30.23	171.11	39.86	2.57
MAIN1	5082.67	Effective	5172.20	1775.66	1782.20	1786.15	1796.63	0.014051	30.49	169.62	36.92	2.51
MAIN1	5082.67	Corr Effective	5172.20	1775.66	1782.20	1786.15	1796.63	0.014051	30.49	169.62	36.92	2.51
MAIN1	4820	Effective	5172.20	1770.57	1776.87	1780.97	1792.59	0.015937	31.82	162.54	36.62	2.66
MAIN1	4820	Corr Effective	5172.20	1770.57	1776.87	1780.97	1792.59	0.015937	31.82	162.54	36.62	2.66
MAIN1	4600	Effective	5172.20	1770.21	1776.49	1780.60	1792.26	0.016021	31.86	162.32	36.67	2.67
MAIN1	4600	Corr Effective	5172.20	1770.21	1776.49	1780.60	1792.26	0.016021	31.86	162.32	36.67	2.67
MAIN1	4600	Effective	5172.20	1766.55	1772.74	1776.89	1788.95	0.016737	32.30	160.11	36.70	2.73
MAIN1	4600	Corr Effective	5172.20	1766.55	1772.74	1776.89	1788.95	0.016737	32.30	160.11	36.70	2.73
MAIN1	4400	Effective	5172.20	1762.98	1769.01	1773.10	1785.50	0.017618	32.59	158.73	37.66	2.80
MAIN1	4400	Corr Effective	5172.20	1762.98	1769.01	1773.10	1785.50	0.017618	32.59	158.73	37.66	2.80
MAIN1	4312.10	Effective	5172.20	1761.43	1767.38	1771.44	1783.93	0.017968	32.64	158.46	38.23	2.83
MAIN1	4312.10	Corr Effective	5172.20	1761.43	1767.38	1771.44	1783.93	0.017968	32.64	158.46	38.23	2.83
MAIN1	4312	Effective	5172.20	1759.39	1765.43	1769.92	1783.75	0.019356	34.35	150.57	34.88	2.91
MAIN1	4312	Corr Effective	5172.20	1759.39	1765.43	1769.92	1783.75	0.019356	34.35	150.57	34.88	2.91
MAIN1	4298	Effective	5172.20	1759.34	1765.23	1769.60	1783.44	0.019849	34.24	151.05	36.25	2.96
MAIN1	4298	Corr Effective	5172.20	1759.34	1765.23	1769.60	1783.44	0.019849	34.24	151.05	36.25	2.96

HEC-RAS Plan: X-Section (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch 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
MAIN1	4200	Effective	5172.20	1757.55	1763.24	1767.43	1781.45	0.020637	34.25	151.02	38.07	3.03
MAIN1	4200	Corr Effective	5172.20	1757.55	1763.24	1767.43	1781.45	0.020637	34.25	151.02	38.07	3.03
MAIN1	4000	Effective	5172.20	1753.87	1759.63	1763.75	1777.20	0.019819	33.63	153.80	38.37	2.96
MAIN1	4000	Corr Effective	5172.20	1753.87	1759.63	1763.75	1777.20	0.019819	33.63	153.80	38.37	2.96
MAIN1	3810	Effective	5172.20	1750.47	1756.51	1760.70	1773.41	0.017978	32.99	156.77	36.92	2.82
MAIN1	3810	Corr Effective	5172.20	1750.47	1756.51	1760.70	1773.41	0.017978	32.99	156.77	36.92	2.82
MAIN1	3600	Effective	5172.20	1750.29	1756.11	1760.17	1773.21	0.019105	33.18	155.87	38.59	2.91
MAIN1	3600	Corr Effective	5172.20	1750.29	1756.11	1760.17	1773.21	0.019105	33.18	155.87	38.59	2.91
MAIN1	3600	Effective	5172.20	1746.67	1752.52	1756.55	1769.34	0.018683	32.91	157.15	38.72	2.88
MAIN1	3600	Corr Effective	5172.20	1746.67	1752.52	1756.55	1769.34	0.018683	32.91	157.15	38.72	2.88
MAIN1	3513.01	Effective	5172.20	1745.08	1750.98	1755.03	1767.70	0.018382	32.82	157.61	38.45	2.86
MAIN1	3513.01	Corr Effective	5172.20	1745.08	1750.98	1755.03	1767.70	0.018382	32.82	157.61	38.45	2.86
MAIN1	3513	Effective	5172.20	1743.08	1749.16	1753.71	1767.54	0.019256	34.40	150.34	34.47	2.90
MAIN1	3513	Corr Effective	5172.20	1743.08	1749.16	1753.71	1767.54	0.019256	34.40	150.34	34.47	2.90
MAIN1	3500	Effective	5172.20	1742.91	1748.99	1753.52	1767.25	0.019117	34.29	150.84	34.59	2.89
MAIN1	3500	Corr Effective	5172.20	1742.91	1748.99	1753.52	1767.25	0.019117	34.29	150.84	34.59	2.89
MAIN1	3300	Effective	5172.20	1739.47	1745.41	1749.74	1763.30	0.019327	33.93	152.42	36.29	2.92
MAIN1	3300	Corr Effective	5172.20	1739.47	1745.41	1749.74	1763.30	0.019327	33.93	152.42	36.29	2.92
MAIN1	3290	Effective	5172.20	1739.29	1745.21	1749.52	1763.10	0.019440	33.94	152.38	36.49	2.93
MAIN1	3290	Corr Effective	5172.20	1739.29	1745.21	1749.52	1763.10	0.019440	33.94	152.38	36.49	2.93
MAIN1	3112.1	Effective	5172.20	1736.02	1741.81	1745.99	1759.56	0.019891	33.81	152.98	37.85	2.96
MAIN1	3112.1	Corr Effective	5172.20	1736.02	1741.81	1745.99	1759.56	0.019891	33.81	152.98	37.85	2.96
MAIN1	3112	Effective	5172.20	1734.13	1740.09	1744.74	1759.39	0.020635	35.25	146.71	34.20	3.00
MAIN1	3112	Corr Effective	5172.20	1734.13	1740.09	1744.74	1759.39	0.020635	35.25	146.71	34.20	3.00
MAIN1	3097	Effective	5692.50	1734.01	1740.48	1745.04	1758.82	0.018010	34.36	165.66	36.20	2.83
MAIN1	3097	Corr Effective	5692.50	1734.01	1740.48	1745.04	1758.82	0.018010	34.36	165.66	36.20	2.83
MAIN1	2914	Effective	5692.50	1730.62	1736.95	1741.44	1755.45	0.018682	34.52	164.90	37.12	2.89
MAIN1	2914	Corr Effective	5692.50	1730.62	1736.95	1741.44	1755.45	0.018682	34.52	164.90	37.12	2.89
MAIN1	2900	Effective	5692.50	1730.15	1736.67	1741.22	1755.19	0.018007	34.54	164.81	35.56	2.83
MAIN1	2900	Corr Effective	5692.50	1730.15	1736.67	1741.22	1755.19	0.018007	34.54	164.81	35.56	2.83
MAIN1	2799	Effective	5692.50	1726.76	1732.90	1737.51	1753.07	0.020992	36.04	157.96	36.43	3.05
MAIN1	2799	Corr Effective	5692.50	1726.76	1732.90	1737.51	1753.07	0.020992	36.04	157.96	36.43	3.05
MAIN1	2767	Effective	5692.50	1725.90	1731.87	1736.46	1752.35	0.022103	36.32	156.74	37.50	3.13
MAIN1	2767	Corr Effective	5692.50	1725.90	1731.87	1736.46	1752.35	0.022103	36.32	156.74	37.50	3.13
MAIN1	2700	Effective	5692.50	1723.40	1728.66	1733.58	1750.65	0.024322	37.63	151.26	36.56	3.26
MAIN1	2700	Corr Effective	5692.50	1723.40	1728.66	1733.58	1750.65	0.024322	37.63	151.26	36.56	3.26
MAIN1	2669	Effective	5692.50	1722.22	1728.46	1734.23	1749.99	0.012297	37.23	152.89	39.58	2.63
MAIN1	2669	Corr Effective	5692.50	1722.22	1728.46	1734.23	1749.99	0.012297	37.23	152.89	39.58	2.63
MAIN1	2617		Culvert									
MAIN1	2565	Effective	5692.50	1720.14	1732.04	1732.04	1737.96	0.003537	19.53	291.48	24.50	1.00
MAIN1	2565	Corr Effective	5692.50	1720.14	1732.04	1732.04	1737.96	0.003537	19.53	291.48	24.50	1.00

Upstream Effective Model
2.2.2.1 Reach 3

HEC-RAS Plan: Reach 3 River: Reach 3 Reach: C1NA

u/s EFFECTIVE 7/07/05

Reach	River Sta	Profile	Q Total (cfs)	Min Ch 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
C1NA	5	Effective	1006.50	2235.00	2236.11	2236.42	2237.20	0.028026	8.40	119.79	116.29	1.46
C1NA	5	Corr Effective	726.00	2235.00	2235.91	2236.14	2236.78	0.028044	7.45	97.41	113.42	1.42
C1NA	4	Effective	1006.50	2225.00	2229.84	2228.22	2230.30	0.000565	5.46	184.37	50.33	0.50
C1NA	4	Corr Effective	726.00	2225.00	2229.14	2227.64	2229.50	0.000525	4.83	150.30	46.79	0.47
C1NA	3	Effective	1006.50	2225.00	2228.50	2228.50	2229.79	0.002503	9.13	110.23	42.99	1.00
C1NA	3	Corr Effective	726.00	2225.00	2227.91	2227.91	2229.02	0.002619	8.44	85.99	39.11	1.00
C1NA	2	Effective	1006.50	2215.00	2216.58	2218.51	2226.66	0.047209	25.48	39.50	30.11	3.92
C1NA	2	Corr Effective	726.00	2215.00	2216.23	2217.92	2225.74	0.059465	24.75	29.33	27.86	4.25
C1NA	1	Effective	1006.50	2210.00	2211.89	2213.57	2218.67	0.025391	20.90	48.16	30.92	2.95
C1NA	1	Corr Effective	726.00	2210.00	2211.59	2212.96	2216.96	0.024550	18.60	39.03	29.17	2.83

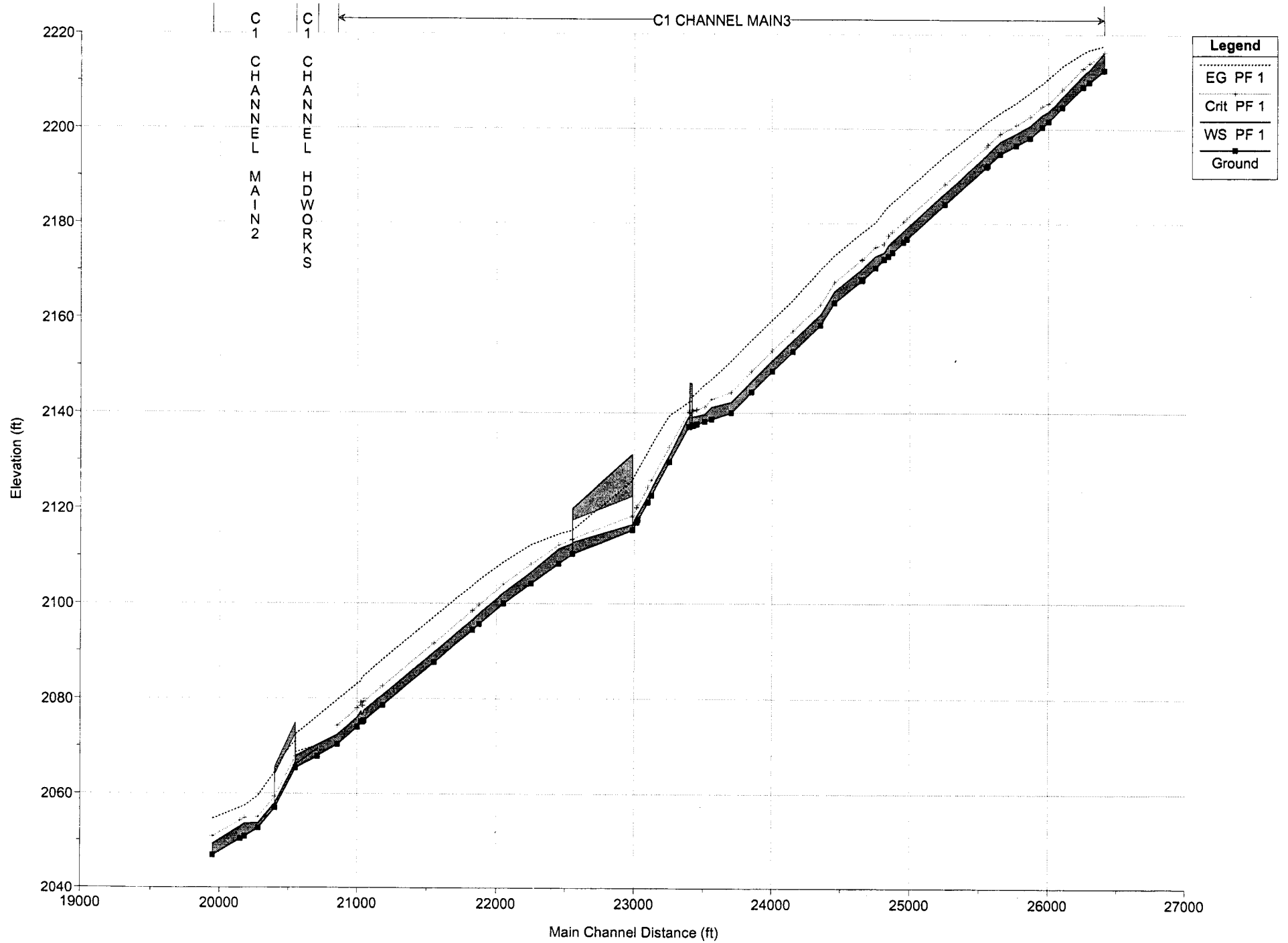
Proposed Effective Model

HEC-RAS Plan: Plan 03 River: C1 CHANNEL Reach: MAIN3 Profile: PF 1

PROPOSED 7/11/05

Reach	River Sta	Profile	Q Total (cfs)	Min Ch 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
MAIN3	26618.9	PF 1	726.00	2214.95	2217.16	2218.84	2223.58	0.022118	20.34	35.69	21.04	2.75
MAIN3	26504.4	PF 1	726.00	2212.42	2214.62	2216.30	2221.13	0.022561	20.48	35.45	20.99	2.78
MAIN3	26395	PF 1	726.00	2210.00	2212.20	2213.88	2218.67	0.022323	20.41	35.58	21.02	2.76
MAIN3	26350	PF 1	726.00	2209.00	2211.20	2212.89	2217.67	0.022323	20.41	35.58	21.02	2.76
MAIN3	26198.52	PF 1	726.00	2204.59	2206.70	2208.47	2213.94	0.026224	21.58	33.64	20.64	2.98
MAIN3	26097.91	PF 1	726.00	2201.66	2203.71	2205.49	2211.17	0.028399	21.92	33.12	21.19	3.09
MAIN3	26063.68	PF 1	878.90	2200.50	2202.98	2204.82	2209.97	0.021072	21.21	41.44	22.04	2.73
MAIN3	25966.13	PF 1	878.90	2198.20	2200.72	2202.60	2208.03	0.022404	21.70	40.50	21.82	2.81
MAIN3	25866.52	PF 1	878.90	2196.60	2199.13	2200.91	2205.71	0.019420	20.57	42.72	22.37	2.62
MAIN3	25750	PF 1	878.90	2194.75	2197.36	2199.06	2203.44	0.017381	19.79	44.42	22.68	2.49
MAIN3	25660	PF 1	878.90	2192.34	2194.92	2196.72	2201.68	0.020234	20.87	42.11	22.30	2.68
MAIN3	25650	PF 1	878.90	2192.07	2194.56	2196.38	2201.46	0.020837	21.09	41.67	22.18	2.71
MAIN3	25350	PF 1	878.90	2184.05	2186.40	2188.36	2194.42	0.025773	22.72	38.68	21.62	2.99
MAIN3	25075	PF 1	878.90	2176.69	2179.02	2181.00	2187.21	0.026556	22.96	38.27	21.54	3.04
MAIN3	25060	PF 1	878.90	2176.03	2178.36	2180.34	2186.55	0.026491	22.96	38.28	21.51	3.03
MAIN3	24969.85	PF 1	878.90	2173.88	2176.21	2178.19	2184.42	0.026602	22.99	38.23	21.50	3.04
MAIN3	24940.19	PF 1	878.90	2173.09	2175.43	2177.34	2183.63	0.026527	22.99	38.23	21.45	3.03
MAIN3	24910.53	PF 1	878.90	2172.40	2173.89	2175.64	2182.59	0.043517	23.67	37.13	29.68	3.73
MAIN3	24850	PF 1	878.90	2170.68	2173.13	2174.99	2180.31	0.021986	21.50	40.87	22.00	2.78
MAIN3	24756.73	PF 1	878.90	2168.16	2170.56	2172.47	2178.14	0.023727	22.09	39.79	21.79	2.88
MAIN3	24750.00	PF 1	878.90	2168.00	2170.40	2172.31	2177.99	0.023767	22.10	39.77	21.79	2.88
MAIN3	24550	PF 1	878.90	2163.28	2165.69	2167.59	2173.24	0.023632	22.06	39.85	21.80	2.88
MAIN3	24350	PF 1	878.90	2158.56	2160.76	2162.87	2170.28	0.032877	24.76	35.50	20.97	3.35
MAIN3	24150	PF 1	878.90	2153.01	2155.30	2157.32	2163.90	0.028409	23.53	37.36	21.33	3.13
MAIN3	24000	PF 1	878.90	2148.85	2151.15	2153.16	2159.64	0.027906	23.38	37.59	21.38	3.11
MAIN3	23850	PF 1	878.90	2144.44	2146.72	2148.75	2155.38	0.028690	23.61	37.23	21.31	3.15
MAIN3	23700	PF 1	878.90	2140.03	2142.31	2144.34	2151.04	0.029040	23.71	37.07	21.28	3.17
MAIN3	23555	PF 1	878.90	2138.61	2141.27	2142.92	2147.07	0.016262	19.34	45.46	22.83	2.41
MAIN3	23505.48	PF 1	878.90	2138.13	2139.74	2141.26	2145.99	0.027686	20.06	43.81	30.00	2.93
MAIN3	23450	PF 1	878.90	2137.59	2139.38	2140.71	2144.34	0.019104	17.87	49.18	30.00	2.46
MAIN3	23445.50	PF 1	878.90	2137.54	2139.28	2140.62	2144.25	0.019266	17.90	49.11	30.00	2.46
MAIN3	23425.50	PF 1	878.90	2137.35	2139.21	2140.48	2143.77	0.016719	17.14	51.28	30.00	2.31
MAIN3	23418.50	PF 1	878.90	2137.28	2139.15	2140.41	2143.64	0.016309	17.01	51.68	30.00	2.28
MAIN3	23413.90	PF 1	878.90	2137.23	2139.11	2140.36	2143.56	0.016068	16.93	51.92	30.00	2.27
MAIN3	23405.50	Bridge										
MAIN3	23397.1	PF 1	878.90	2137.07	2139.28	2140.20	2142.43	0.009284	14.25	61.68	30.00	1.75
MAIN3	23390.00	PF 1	878.90	2137.00	2139.21	2140.13	2142.36	0.009285	14.25	61.68	30.00	1.75
MAIN3	23253	PF 1	878.90	2129.69	2131.11	2132.82	2139.41	0.043750	23.12	38.01	30.00	3.62
MAIN3	23122.96	PF 1	878.90	2122.76	2124.12	2125.89	2133.22	0.050683	24.20	36.32	30.00	3.88
MAIN3	23095.66	PF 1	878.90	2121.30	2122.66	2124.43	2131.81	0.051249	24.28	36.19	30.00	3.90
MAIN3	23025.00	PF 1	878.90	2117.53	2118.88	2120.66	2128.15	0.052268	24.43	35.97	30.00	3.93
MAIN3	23016.33	PF 1	878.90	2117.06	2118.41	2120.19	2127.69	0.052406	24.45	35.94	30.00	3.94
MAIN3	22986.30	PF 1	878.90	2115.46	2116.49	2118.18	2125.93	0.064096	24.66	35.65	34.50	4.27
MAIN3	22768.15	Bridge										
MAIN3	22550	PF 1	878.90	2110.44	2112.72	2113.49	2115.43	0.007604	13.20	66.61	31.33	1.59
MAIN3	22450	PF 1	878.90	2108.35	2111.54	2112.35	2114.68	0.006512	14.24	61.74	20.00	1.43
MAIN3	22250.00	PF 1	878.90	2104.18	2106.54	2108.18	2112.43	0.016975	19.49	45.10	20.00	2.29
MAIN3	22050	PF 1	878.90	2100.00	2102.25	2104.00	2108.73	0.019621	20.42	43.04	20.00	2.45
MAIN3	21875	PF 1	878.90	2095.68	2097.83	2099.68	2104.96	0.022802	21.43	41.00	20.00	2.64
MAIN3	21825	PF 1	878.90	2094.44	2096.58	2098.44	2103.80	0.023255	21.57	40.74	20.00	2.66
MAIN3	21550	PF 1	878.90	2087.65	2089.75	2091.65	2097.22	0.024477	21.93	40.08	20.00	2.73
MAIN3	21186	PF 1	878.90	2078.66	2080.76	2082.67	2088.27	0.024692	21.99	39.97	20.00	2.74
MAIN3	21047	PF 1	878.90	2075.44	2077.57	2079.44	2084.84	0.023490	21.64	40.61	20.00	2.68
MAIN3	21046.9	PF 1	878.90	2075.43	2077.55	2079.44	2084.84	0.021062	21.67	40.56	33.00	2.68
MAIN3	21038.45	PF 1	878.90	2075.22	2076.79	2078.53	2084.57	0.033097	22.38	39.27	33.00	3.27
MAIN3	21030.00	PF 1	878.90	2075.21	2076.82	2078.52	2084.18	0.030193	21.76	40.39	33.00	3.14
MAIN3	21026.87	PF 1	878.90	2075.22	2077.49	2079.21	2083.79	0.016668	20.14	43.63	33.00	2.40
MAIN3	21026.77	PF 1	878.90	2075.17	2077.44	2079.17	2083.79	0.019011	20.21	43.48	20.00	2.42
MAIN3	21000	PF 1	878.90	2074.07	2076.14	2077.97	2083.17	0.022545	21.28	41.30	20.00	2.61
MAIN3	20855.25	PF 1	878.90	2070.49	2072.52	2074.39	2079.80	0.023761	21.65	40.61	20.00	2.68

C-1 Channel Phase II LOMR



HEC-RAS Version 3.1 November 2002
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```

X      X  XXXXXX   XXXX      XXXX      XX      XXXX
X      X  X      X      X      X  X      X  X      X
X      X  X      X      X      X  X      X  X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X      X      X      X  X      X  X      X
X      X  X      X      X      X  X      X  X      X
X      X  XXXXXX   XXXX      X      X      X      X      XXXXXX

```

PROJECT DATA

Project Title: C-1 Channel Phase II LOMR
Project File : c1lomr.prj
Run Date and Time: 6/9/2005 12:32:39 PM

Project in English units

Project Description:

C-1 Channel Phase II Letter of Map Revision

PLAN DATA

Plan Title: Plan 03

Plan File : C:\Louis Berger Projects\c1 LOMR\c1lomr.p03

Geometry Title: C-1 Channel Geometrics

Geometry File : C:\Louis Berger Projects\c1 LOMR\c1lomr.g01

Flow Title : C-1 Channel Phase II LOMR

Flow File : C:\Louis Berger Projects\c1 LOMR\c1lomr.f04

Plan Summary Information:

Number of: Cross Sections	=	66	Multitple Openings	=	0
Culverts	=	1	Inline Structures	=	0
Bridges	=	2	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of interations	=	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: C-1 Channel Phase II LOMR

Flow File : C:\Louis Berger Projects\c1 LOMR\c1lomr.f04

Flow Data (cfs)

```
*****
* River      Reach      RS      •      PF 1 *
* C1 CHANNEL MAIN3      26504.4 *      726 *
* C1 CHANNEL MAIN3      26053.68*      878.9 *
* C1 CHANNEL HDWORKS    20710.41*      416.9 *
* C1 CHANNEL MAIN2      20550.1 *      878.9 *
* C1 CHANNEL MAIN2      20550   *      1295.8 *
*****
```

Boundary Conditions

```
*****
* River      Reach      Profile      *      Upstream      Downstream      *
*****
* C1 CHANNEL MAIN3      PF 1      *      Critical      *
* C1 CHANNEL HDWORKS    PF 1      *      Critical      *
* C1 CHANNEL MAIN2      PF 1      •      Critical      *
*****
```

GEOMETRY DATA

Geometry Title: C-1 Channel Geometrics

Geometry File : C:\Louis Berger Projects\c1 LOMR\c1lomr.g01

Reach Connection Table

```
*****
* River      Reach      *      Upstream Boundary      *      Downstream Boundary      *
*****
* C1 CHANNEL MAIN3      *      *      BLDR HWY      *
* C1 CHANNEL HDWORKS    *      *      BLDR HWY      *
* C1 CHANNEL MAIN2      *      BLDR HWY      *
*****
```

JUNCTION INFORMATION

Name: BLDR HWY

Description: Double 20 x 7' RCB split north of Boulder Highway - zero angle of confluence

Momentum computation Method

Add Friction

Do Not Add Weight

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
C1 CHANNEL	MAIN3	to C1 CHANNEL	MAIN2	305.25	0
C1 CHANNEL	HDWORKS	to C1 CHANNEL	MAIN2	0	0

CROSS SECTION

Plan: Plan 03 C1 CHANNEL MAIN3 RS: 26618.9 Profile: PF 1

E.G. Elev (ft)	2223.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.42	Wt. n-Val.		0.015	
W.S. Elev (ft)	2217.16	Reach Len. (ft)	109.40	109.40	109.40
Crit W.S. (ft)	2218.84	Flow Area (sq ft)		35.69	
E.G. Slope (ft/ft)	0.022118	Area (sq ft)		35.69	
Q Total (cfs)	726.00	Flow (cfs)		726.00	
Top Width (ft)	21.04	Top Width (ft)		21.04	
Vel Total (ft/s)	20.34	Avg. Vel. (ft/s)		20.34	
Max Chl Dpth (ft)	2.21	Hydr. Depth (ft)		1.70	
Conv. Total (cfs)	4881.6	Conv. (cfs)		4881.6	
Length Wtd. (ft)	109.40	Wetted Per. (ft)		22.00	
Min Ch El (ft)	2214.95	Shear (lb/sq ft)		2.24	
Alpha	1.00	Stream Power (lb/ft s)		45.56	
Frctn Loss (ft)		Cum Volume (acre-ft)		5.21	
C & E Loss (ft)		Cum SA (acres)		2.65	

RIVER: C1 CHANNEL
REACH: MAIN3

RS: 26504.4

INPUT

Description: LBG Sta. 139+54.44; begin transition; system headworks of "MAIN 3"

Station Elevation Data num= 5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

0 2217.42 10 2212.55 16.25 2212.42 22.5 2212.55 32.5 2217.42

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .015 0 .015 32.5 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 32.5 109.4 109.4 109.4 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft) * 2217.70 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 1.39 * Wt. n-Val. * 0.015 *
* W.S. Elev (ft) * 2216.30 * Reach Len. (ft) * 109.40 * 109.40 * 109.40 *
* Crit W.S. (ft) * 2216.30 * Flow Area (sq ft) * 76.64 *
* E.G. Slope (ft/ft) * 0.002577 * Area (sq ft) * 76.64 *
* Q Total (cfs) * 726.00 * Flow (cfs) * 726.00 *
* Top Width (ft) * 27.91 * Top Width (ft) * 27.91 *
* Vel Total (ft/s) * 9.47 * Avg. Vel. (ft/s) * 9.47 *
* Max Chl Dpth (ft) * 3.88 * Hydr. Depth (ft) * 2.75 *
* Conv. Total (cfs) * 14300.8 * Conv. (cfs) * 14300.8 *
* Length Wtd. (ft) * 109.40 * Wetted Per. (ft) * 29.64 *
* Min Ch El (ft) * 2212.42 * Shear (lb/sq ft) * 0.42 *
* Alpha * 1.00 * Stream Power (lb/ft s) * 3.94 *
* Frctn Loss (ft) * * Cum Volume (acre-ft) * 5.75 *
* C & E Loss (ft) * * Cum SA (acres) * 2.92 *

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN3

RS: 26395

INPUT

Description: LBG Sta. 138+45.00; corresponds to section A-A of effective model

Station Elevation Data num= 5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

1 2215 11 2210.13 17.25 2210 23.5 2210.13 33.5 2215

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

1 .015 1 .015 33.5 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1 33.5 45 45 45 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft) * 2216.87 * Element * Left OB * Channel * Right OB *

* Vel Head (ft)	* 4.29	* Wt. n-Val.	•	* 0.015	*	*
* W.S. Elev (ft)	* 2212.58	* Reach Len. (ft)	* 45.00	* 45.00	*	* 45.00 *
* Crit W.S. (ft)	* 2213.89	* Flow Area (sq ft)	*	* 43.67	*	*
* E.G. Slope (ft/ft)	* 0.012453	* Area (sq ft)	*	* 43.67	*	*
* Q Total (cfs)	• 726.00	* Flow (cfs)	*	* 726.00	*	*
* Top Width (ft)	• 22.54	* Top Width (ft)	*	* 22.54	*	*
* Vel Total (ft/s)	* 16.63	* Avg. Vel. (ft/s)	*	* 16.63	*	*
* Max Chl Dpth (ft)	* 2.58	* Hydr. Depth (ft)	*	* 1.94	*	*
• Conv. Total (cfs)	• 6505.9	* Conv. (cfs)	*	* 6505.9	*	*
• Length Wtd. (ft)	• 45.00	* Wetted Per. (ft)	•	* 23.67	•	*
* Min Ch El (ft)	* 2210.00	* Shear (lb/sq ft)	*	* 1.43	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 23.84	*	*
* Frctn Loss (ft)	* 0.53	* Cum Volume (acre-ft)	•	* 5.60	*	*
* C & E Loss (ft)	* 0.29	* Cum SA (acres)	•	* 2.86	*	*

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: C1 CHANNEL

REACH: MAIN3

RS: 26350

INPUT

Description: LBG Sta. 138+00.00; Grade Break

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2214	10	2209.13	16.25	2209	22.5	2209.13	32.5	2214

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	32.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.5		151.48	151.48	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2216.22	• Element	• Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 4.74	* Wt. n-Val.	*	* 0.015	*	*
• W.S. Elev (ft)	* 2211.48	* Reach Len. (ft)	* 151.48	* 151.48	* 151.48	*
* Crit W.S. (ft)	* 2212.88	* Flow Area (sq ft)	*	* 41.54	*	*
* E.G. Slope (ft/ft)	* 0.014350	* Area (sq ft)	*	* 41.54	*	*
* Q Total (cfs)	* 726.00	* Flow (cfs)	*	* 726.00	*	•
* Top Width (ft)	• 22.15	* Top Width (ft)	*	* 22.15	*	*
* Vel Total (ft/s)	* 17.48	* Avg. Vel. (ft/s)	*	* 17.48	*	*
* Max Chl Dpth (ft)	* 2.48	* Hydr. Depth (ft)	*	* 1.88	*	*
* Conv. Total (cfs)	* 6060.6	* Conv. (cfs)	•	* 6060.6	*	*
• Length Wtd. (ft)	* 151.48	* Wetted Per. (ft)	*	* 23.24	*	*
* Min Ch El (ft)	* 2209.00	* Shear (lb/sq ft)	*	* 1.60	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 27.99	*	*
* Frctn Loss (ft)	• 0.60	* Cum Volume (acre-ft)	*	* 5.55	•	•
* C & E Loss (ft)	• 0.05	* Cum SA (acres)	*	* 2.84	•	*

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3

RS: 26198.52

INPUT

Description: LBG Sta. 136+48.52; End top transition

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2209.59	10	2204.72	16.25	2204.59	22.5	2204.72	32.5	2209.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	32.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.5		100.61	100.61	100.61	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2213.34	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 6.56	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2206.78	* Reach Len. (ft)	* 100.61	* 100.61	* 100.61
* Crit W.S. (ft)	* 2208.48	* Flow Area (sq ft)	*	* 35.33	*
* E.G. Slope (ft/ft)	* 0.022781	* Area (sq ft)	*	* 35.33	*
* Q Total (cfs)	* 726.00	* Flow (cfs)	*	* 726.00	*
* Top Width (ft)	* 20.97	* Top Width (ft)	*	* 20.97	*
* Vel Total (ft/s)	* 20.55	* Avg. Vel. (ft/s)	*	* 20.55	*
* Max Chl Dpth (ft)	* 2.19	* Hydr. Depth (ft)	*	* 1.68	*
* Conv. Total (cfs)	* 4810.1	* Conv. (cfs)	*	* 4810.1	*
* Length Wtd. (ft)	* 100.61	* Wetted Per. (ft)	*	* 21.92	*
* Min Ch El (ft)	* 2204.59	* Shear (lb/sq ft)	*	* 2.29	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 47.10	*
* Frctn Loss (ft)	* 2.70	* Cum Volume (acre-ft)	*	* 5.42	*
* C & E Loss (ft)	* 0.18	* Cum SA (acres)	*	* 2.76	*

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: C1 CHANNEL
 REACH: MAIN3

RS: 26097.91

INPUT

Description: LBG Sta. 13547.91; Begin Top trans.; 44.23' Upstream of RCB

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2210.43	17.54	2201.79	23.79	2201.66	30.04	2201.79	51.66	2210.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0 .015 0 .015 51.66 .015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	51.66		44.23 44.23	44.23	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2210.83 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)       * 7.08  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)      * 2203.75 * Reach Len. (ft) * 44.23 * 44.23 * 44.23 *
* Crit W.S. (ft)      * 2205.48 * Flow Area (sq ft) *      * 34.00 *      *
* E.G. Slope (ft/ft)   * 0.026338 * Area (sq ft) *      * 34.00 *      *
* Q Total (cfs)        * 726.00 * Flow (cfs) *      * 726.00 *      *
* Top Width (ft)       * 21.38 * Top Width (ft) *      * 21.38 *      *
* Vel Total (ft/s)     * 21.35 * Avg. Vel. (ft/s) *      * 21.35 *      *
* Max Chl Dpth (ft)    * 2.09 * Hydr. Depth (ft) *      * 1.59 *      *
* Conv. Total (cfs)    * 4473.5 * Conv. (cfs) *      * 4473.5 *      *
* Length Wtd. (ft)     * 44.23 * Wetted Per. (ft) *      * 22.22 *      *
* Min Ch El (ft)       * 2201.66 * Shear (lb/sq ft) *      * 2.52 *      *
* Alpha                * 1.00 * Stream Power (lb/ft s) *      * 53.73 *      *
* Frctn Loss (ft)      * 2.46 * Cum Volume (acre-ft) *      * 5.34 *      *
* C & E Loss (ft)      * 0.05 * Cum SA (acres) *      * 2.71 *      *
*****
```

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: C1 CHANNEL

REACH: MAIN3 RS: 26053.68

INPUT

Description: LBG Sta. 135+03.68; Inflow with 2:10'x5' RCB

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		

0 2209.34 17.68 2200.63 23.93 2200.5 30.18 2200.63 51.68 2211.25		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		

0 .015 0 .015 51.66 .015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	51.68		87.55 87.55	87.55	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2209.73 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)       * 6.70  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)      * 2203.02 * Reach Len. (ft) * 87.55 * 87.55 * 87.55 *
* Crit W.S. (ft)      * 2204.82 * Flow Area (sq ft) *      * 42.30 *      *
* E.G. Slope (ft/ft)   * 0.019886 * Area (sq ft) *      * 42.30 *      *
* Q Total (cfs)        * 878.90 * Flow (cfs) *      * 878.90 *      *
* Top Width (ft)       * 22.20 * Top Width (ft) *      * 22.20 *      *
* Vel Total (ft/s)     * 20.78 * Avg. Vel. (ft/s) *      * 20.78 *      *
* Max Chl Dpth (ft)    * 2.52 * Hydr. Depth (ft) *      * 1.91 *      *
*****
```

• Conv. Total (cfs)	* 6232.6	* Conv. (cfs)	*	* 6232.6	*	*
* Length Wtd. (ft)	* 87.55	* Wetted Per. (ft)	*	* 23.31	*	*
* Min Ch El (ft)	• 2200.50	* Shear (lb/sq ft)	•	* 2.25	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 46.80	*	*
* Frctn Loss (ft)	• 0.99	* Cum Volume (acre-ft)	•	* 5.30	*	•
• C & E Loss (ft)	* 0.11	* Cum SA (acres)	*	* 2.69	*	*

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: C1 CHANNEL
REACH: MAIN3 RS: 25966.13

INPUT

Description: LBG Sta. 134+16.13; End top Trans.; Grade Break

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2207.04	17.68	2198.45	23.93	2198.2	30.18	2198.45	51.68	2208.95

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	51.68	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	51.68		100.61	100.61	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2207.87	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 7.13	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2200.74	* Reach Len. (ft)	* 100.61	* 100.61	* 100.61
* Crit W.S. (ft)	* 2202.60	* Flow Area (sq ft)	*	* 41.02	*
* E.G. Slope (ft/ft)	* 0.021611	* Area (sq ft)	*	* 41.02	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	•	* 878.90	*
* Top Width (ft)	* 21.91	* Top Width (ft)	*	* 21.91	•
* Vel Total (ft/s)	* 21.43	* Avg. Vel. (ft/s)	*	* 21.43	*
* Max Chl Dpth (ft)	* 2.54	* Hydr. Depth (ft)	*	* 1.87	*
* Conv. Total (cfs)	* 5978.7	* Conv. (cfs)	*	* 5978.7	*
* Length Wtd. (ft)	* 100.61	* Wetted Per. (ft)	*	* 22.98	*
* Min Ch El (ft)	* 2198.20	* Shear (lb/sq ft)	*	* 2.41	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 51.60	•
* Frctn Loss (ft)	* 1.81	* Cum Volume (acre-ft)	*	* 5.22	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	*	* 2.65	*

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

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN3 RS: 25865.52

INPUT

Description: LBG Sta. 133+15.52; Begin Top Trans.

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2201.7	10.2	2196.73	16.45	2196.6	22.7	2196.73	32.9	2201.7

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	32.9	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.9		115.52	115.52	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2205.64	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 6.49	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2199.15	* Reach Len. (ft)	* 115.52	* 115.52	* 115.52
* Crit W.S. (ft)	* 2200.91	* Flow Area (sq ft)	*	* 42.98	*
* E.G. Slope (ft/ft)	* 0.019092	* Area (sq ft)	*	* 42.98	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 22.41	* Top Width (ft)	*	* 22.41	*
* Vel Total (ft/s)	* 20.45	* Avg. Vel. (ft/s)	*	* 20.45	*
* Max Chl Dpth (ft)	* 2.55	* Hydr. Depth (ft)	*	* 1.92	*
* Conv. Total (cfs)	* 6360.8	* Conv. (cfs)	*	* 6360.8	*
* Length Wtd. (ft)	* 115.52	* Wetted Per. (ft)	*	* 23.53	*
* Min Ch El (ft)	* 2196.60	* Shear (lb/sq ft)	*	* 2.18	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 44.52	*
* Frctn Loss (ft)	* 2.04	* Cum Volume (acre-ft)	*	* 5.12	*
* C & E Loss (ft)	* 0.19	* Cum SA (acres)	*	* 2.60	*

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: C1 CHANNEL

REACH: MAIN3 RS: 25750

INPUT

Description: LBG Sta. 132+00.00; Grade Break

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2199.85	10.2	2194.88	16.45	2194.75	22.7	2194.88	32.9	2199.85

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	32.9	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.9		90	90	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2203.42	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 6.06	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 2197.36	* Reach Len. (ft)	* 90.00	* 90.00	* 90.00	*
* Crit W.S. (ft)	* 2199.06	* Flow Area (sq ft)	*	* 44.50	*	*
* E.G. Slope (ft/ft)	* 0.017295	* Area (sq ft)	*	* 44.50	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 22.69	* Top Width (ft)	*	* 22.69	*	*
* Vel Total (ft/s)	* 19.75	* Avg. Vel. (ft/s)	*	* 19.75	*	*
* Max Chl Dpth (ft)	* 2.61	* Hydr. Depth (ft)	*	* 1.96	*	*
* Conv. Total (cfs)	* 6683.0	* Conv. (cfs)	*	* 6683.0	*	*
* Length Wtd. (ft)	* 90.00	* Wetted Per. (ft)	*	* 23.84	*	*
* Min Ch El (ft)	* 2194.75	* Shear (lb/sq ft)	*	* 2.02	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 39.81	*	*
* Frctn Loss (ft)	* 2.10	* Cum Volume (acre-ft)	*	* 5.00	*	*
* C & E Loss (ft)	* 0.13	* Cum SA (acres)	*	* 2.54	*	*

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: C1 CHANNEL
REACH: MAIN3

RS: 25660

INPUT

Description: LBG Sta. 131+10.00; End Top Transition

Station	Elevation	Data	num=	5
Sta	Elev	Sta	Elev	Sta
0	2197.44	10.2	2192.59	16.45
		2192.34	22.7	2192.59
			32.9	2197.44

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.015	0	.015
		32.9	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.9		10	10	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2201.68	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 6.76	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 2194.92	* Reach Len. (ft)	* 10.00	* 10.00	* 10.00	*
* Crit W.S. (ft)	* 2196.72	* Flow Area (sq ft)	*	* 42.13	*	*
* E.G. Slope (ft/ft)	* 0.020212	* Area (sq ft)	*	* 42.13	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 22.31	* Top Width (ft)	*	* 22.31	*	*
* Vel Total (ft/s)	* 20.86	* Avg. Vel. (ft/s)	*	* 20.86	*	*
* Max Chl Dpth (ft)	* 2.58	* Hydr. Depth (ft)	*	* 1.89	*	*
* Conv. Total (cfs)	* 6182.1	* Conv. (cfs)	*	* 6182.1	*	*
* Length Wtd. (ft)	* 10.00	* Wetted Per. (ft)	*	* 23.37	*	*
* Min Ch El (ft)	* 2192.34	* Shear (lb/sq ft)	*	* 2.27	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 47.46	*	*
* Frctn Loss (ft)	* 1.68	* Cum Volume (acre-ft)	*	* 4.91	*	*
* C & E Loss (ft)	* 0.07	* Cum SA (acres)	*	* 2.49	*	*

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: C1 CHANNEL
REACH: MAIN3 RS: 25650

INPUT

Description: LBG Sta. 131+00.00; Grade Break; Begin Top Transition

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2197.07	10	2192.2	16.25	2192.07	22.5	2192.2	32.5	2197.07

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	32.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.5		300	300	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2201.46	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 6.90	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2194.56	* Reach Len. (ft)	* 300.00	* 300.00	* 300.00
* Crit W.S. (ft)	* 2196.38	* Flow Area (sq ft)	*	* 41.69	*
* E.G. Slope (ft/ft)	* 0.020814	* Area (sq ft)	*	* 41.69	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 22.18	* Top Width (ft)	*	* 22.18	*
* Vel Total (ft/s)	* 21.08	* Avg. Vel. (ft/s)	*	* 21.08	*
* Max Chl Dpth (ft)	* 2.49	* Hydr. Depth (ft)	*	* 1.88	*
* Conv. Total (cfs)	* 6092.0	* Conv. (cfs)	*	* 6092.0	*
* Length Wtd. (ft)	* 300.00	* Wetted Per. (ft)	*	* 23.27	*
* Min Ch El (ft)	* 2192.07	* Shear (lb/sq ft)	*	* 2.33	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 49.08	*
* Frctn Loss (ft)	* 0.21	* Cum Volume (acre-ft)	*	* 4.90	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 2.48	*

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN3 RS: 25350

INPUT

Description: LBG Sta. 128+00.00

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2189.05	10	2184.18	16.25	2184.05	22.5	2184.18	32.5	2189.05

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	32.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.5		275	275	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

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*****
* E.G. Elev (ft)      * 2194.42 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 8.02  * Wt. n-Val.      *          * 0.015   *          *
* W.S. Elev (ft)      * 2186.40 * Reach Len. (ft) * 275.00 * 275.00 * 275.00 *
* Crit W.S. (ft)      * 2188.36 * Flow Area (sq ft) *          * 38.68   *          *
* E.G. Slope (ft/ft)  * 0.025773 * Area (sq ft)    *          * 38.68   *          *
* Q Total (cfs)       * 878.90 * Flow (cfs)      *          * 878.90 *          *
* Top Width (ft)      * 21.62 * Top Width (ft)   *          * 21.62 *          *
* Vel Total (ft/s)    * 22.72 * Avg. Vel. (ft/s) *          * 22.72 *          *
* Max Chl Dpth (ft)   * 2.35 * Hydr. Depth (ft) *          * 1.79 *          *
* Conv. Total (cfs)   * 5474.6 * Conv. (cfs)     *          * 5474.6 *          *
* Length Wtd. (ft)    * 275.00 * Wetted Per. (ft) *          * 22.64 *          *
* Min Ch El (ft)      * 2184.05 * Shear (lb/sq ft) *          * 2.75 *          *
* Alpha              * 1.00 * Stream Power (lb/ft s) *          * 62.46 *          *
* Frctn Loss (ft)     * 6.93 * Cum Volume (acre-ft) *          * 4.63 *          *
* C & E Loss (ft)     * 0.11 * Cum SA (acres)   *          * 2.33 *          *
*****

```

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: C1 CHANNEL
 REACH: MAIN3

RS: 25075

INPUT

Description: LBG Sta. 125+25.00; End top transition

Station	Elevation	Data	num=	5
Sta	Elev	Sta	Elev	Sta
0	2181.69	10	2176.82	16.25
				2176.69
				22.5
				2176.82
				32.5
				2181.69

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	32.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	32.5		25	25	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2187.21 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 8.19   * Wt. n-Val.      *          * 0.015   *          *
* W.S. Elev (ft)      * 2179.02 * Reach Len. (ft) * 25.00 * 25.00 * 25.00 *
* Crit W.S. (ft)      * 2181.00 * Flow Area (sq ft) *          * 38.27   *          *
* E.G. Slope (ft/ft)  * 0.026556 * Area (sq ft)    *          * 38.27   *          *
* Q Total (cfs)       * 878.90 * Flow (cfs)      *          * 878.90 *          *
* Top Width (ft)      * 21.54 * Top Width (ft)   *          * 21.54 *          *
* Vel Total (ft/s)    * 22.96 * Avg. Vel. (ft/s) *          * 22.96 *          *
* Max Chl Dpth (ft)   * 2.33 * Hydr. Depth (ft) *          * 1.78 *          *
* Conv. Total (cfs)   * 5393.3 * Conv. (cfs)     *          * 5393.3 *          *
*****

```

* Length Wtd. (ft)	* 25.00	* Wetted Per. (ft)	*	* 22.56	*
* Min Ch El (ft)	* 2176.69	* Shear (lb/sq ft)	*	* 2.81	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 64.60	*
* Frctn Loss (ft)	* 7.19	* Cum Volume (acre-ft)	*	* 4.38	*
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 2.20	*

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: C1 CHANNEL
REACH: MAIN3 RS: 25050

INPUT

Description: LBG Sta. 125+00.00; Begin Top Transition

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
0	2182.03	12	2176.16
18.25	2176.03	24.5	2176.16
36.5	2182.03		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.015	0	.015
36.5	.015		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	36.5	80.15	80.15	80.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2186.55	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 8.18	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2178.36	* Reach Len. (ft)	* 80.15	* 80.15	* 80.15
* Crit W.S. (ft)	* 2180.34	* Flow Area (sq ft)	*	* 38.28	*
* E.G. Slope (ft/ft)	* 0.026491	* Area (sq ft)	*	* 38.28	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 21.51	* Top Width (ft)	*	* 21.51	*
* Vel Total (ft/s)	* 22.96	* Avg. Vel. (ft/s)	*	* 22.96	*
* Max Chl Dpth (ft)	* 2.33	* Hydr. Depth (ft)	*	* 1.78	*
* Conv. Total (cfs)	* 5399.9	* Conv. (cfs)	*	* 5399.9	*
* Length Wtd. (ft)	* 80.15	* Wetted Per. (ft)	*	* 22.53	*
* Min Ch El (ft)	* 2176.03	* Shear (lb/sq ft)	*	* 2.81	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 64.51	*
* Frctn Loss (ft)	* 0.66	* Cum Volume (acre-ft)	*	* 4.36	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 2.18	*

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN3 RS: 24969.85

INPUT

Description: LBG Sta. 124+19.85; End Access Ramp

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev

0 2179.88 12 2174.01 18.25 2173.88 24.5 2174.01 36.5 2179.88

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .015 0 .015 36.5 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 36.5 29.66 29.66 29.66 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft) * 2184.42 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 8.21 * Wt. n-Val. * * 0.015 * *
* W.S. Elev (ft) * 2176.21 * Reach Len. (ft) * 29.66 * 29.66 *
* Crit W.S. (ft) * 2178.19 * Flow Area (sq ft) * * 38.23 *
* E.G. Slope (ft/ft) * 0.026602 * Area (sq ft) * * 38.23 *
* Q Total (cfs) * 878.90 * Flow (cfs) * * 878.90 *
* Top Width (ft) * 21.50 * Top Width (ft) * * 21.50 *
* Vel Total (ft/s) * 22.99 * Avg. Vel. (ft/s) * * 22.99 *
* Max Chl Dpth (ft) * 2.33 * Hydr. Depth (ft) * * 1.78 *
* Conv. Total (cfs) * 5388.7 * Conv. (cfs) * * 5388.7 *
* Length Wtd. (ft) * 29.66 * Wetted Per. (ft) * * 22.52 *
* Min Ch El (ft) * 2173.88 * Shear (lb/sq ft) * * 2.82 *
* Alpha * 1.00 * Stream Power (lb/ft s) * * 64.81 *
* Frctn Loss (ft) * 2.13 * Cum Volume (acre-ft) * * 4.29 *
* C & E Loss (ft) * 0.00 * Cum SA (acres) * * 2.15 *

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: C1 CHANNEL
REACH: MAIN3 RS: 24940.19

INPUT

Description: LBG Sta. 123+90.19; midway of ramp configuration

Station Elevation Data num= 7
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

0 2179.44 6 2176.43 18 2176.2 24 2173.22 30.25 2173.09
36.5 2173.22 48.5 2179.09

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .015 0 .015 48.5 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 48.5 29.66 29.66 29.66 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft) * 2183.63 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 8.21 * Wt. n-Val. * * 0.015 * *
* W.S. Elev (ft) * 2175.43 * Reach Len. (ft) * 29.66 * 29.66 *
* Crit W.S. (ft) * 2177.34 * Flow Area (sq ft) * * 38.23 *
* E.G. Slope (ft/ft) * 0.026527 * Area (sq ft) * * 38.23 *

* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 21.45	* Top Width (ft)	•	* 21.45	*	*
* Vel Total (ft/s)	* 22.99	* Avg. Vel. (ft/s)	*	* 22.99	*	*
* Max Chl Dpth (ft)	* 2.33	* Hydr. Depth (ft)	*	* 1.78	*	*
* Conv. Total (cfs)	* 5396.3	* Conv. (cfs)	*	* 5396.3	*	*
* Length Wtd. (ft)	* 29.66	* Wetted Per. (ft)	*	* 22.48	•	*
* Min Ch El (ft)	* 2173.09	* Shear (lb/sq ft)	*	* 2.82	*	*
* Alpha	• 1.00	* Stream Power (lb/ft s)	*	* 64.76	•	•
* Frctn Loss (ft)	* 0.79	* Cum Volume (acre-ft)	•	* 4.27	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 2.13	•	•

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3

RS: 24910.53

INPUT

Description: LBG Sta. 123+60.53; Bottom of Access Ramp

Station Elevation Data		num=	Sta		Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	2178.64	12	2172.61	24	2172.4	36.5	2172.61	48.5	2178.4		

Manning's n Values		num=	Sta		n Val	Sta	n Val	Sta	n Val

0	.015	0	.015	48.5	.015				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
0	48.5	60.53	60.53	60.53	.1	.3	

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2182.59	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 8.70	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2173.89	* Reach Len. (ft)	* 60.53	* 60.53	* 60.53
* Crit W.S. (ft)	* 2175.64	* Flow Area (sq ft)	*	* 37.13	*
* E.G. Slope (ft/ft)	* 0.043517	* Area (sq ft)	*	* 37.13	•
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 29.68	* Top Width (ft)	*	* 29.68	*
* Vel Total (ft/s)	* 23.67	* Avg. Vel. (ft/s)	•	* 23.67	*
* Max Chl Dpth (ft)	* 1.49	* Hydr. Depth (ft)	*	* 1.25	*
* Conv. Total (cfs)	* 4213.2	* Conv. (cfs)	*	* 4213.2	*
* Length Wtd. (ft)	* 60.53	* Wetted Per. (ft)	*	* 30.28	*
* Min Ch El (ft)	* 2172.40	* Shear (lb/sq ft)	*	* 3.33	•
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 78.86	*
* Frctn Loss (ft)	* 0.99	* Cum Volume (acre-ft)	*	* 4.24	•
* C & E Loss (ft)	* 0.05	* Cum SA (acres)	*	* 2.11	•

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: C1 CHANNEL
 REACH: MAIN3

RS: 24850

INPUT

Description: LBG Sta. 123+00.00; Grade Break; Begin Transition to access Ramp

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2176.68	12	2170.81	18.25	2170.68	24.5	2170.81	36.5	2176.68

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	36.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	36.5		93.27	93.27	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2180.31	* Element	* Left OB	* Channel	* Right OB	*			
* Vel Head (ft)	* 7.18	* Wt. n-Val.	*	* 0.015	*	*			
* W.S. Elev (ft)	* 2173.13	* Reach Len. (ft)	* 93.27	* 93.27	* 93.27	*			
* Crit W.S. (ft)	* 2174.99	* Flow Area (sq ft)	*	* 40.87	*	*			
* E.G. Slope (ft/ft)	* 0.021986	* Area (sq ft)	*	* 40.87	*	*			
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*			
* Top Width (ft)	* 22.00	* Top Width (ft)	*	* 22.00	*	*			
* Vel Total (ft/s)	* 21.50	* Avg. Vel. (ft/s)	*	* 21.50	*	*			
* Max Chl Dpth (ft)	* 2.45	* Hydr. Depth (ft)	*	* 1.86	*	*			
* Conv. Total (cfs)	* 5927.4	* Conv. (cfs)	*	* 5927.4	*	*			
* Length Wtd. (ft)	* 93.27	* Wetted Per. (ft)	*	* 23.07	*	*			
* Min Ch El (ft)	* 2170.68	* Shear (lb/sq ft)	*	* 2.43	*	*			
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 52.28	*	*			
* Frctn Loss (ft)	* 1.82	* Cum Volume (acre-ft)	*	* 4.19	*	*			
* C & E Loss (ft)	* 0.46	* Cum SA (acres)	*	* 2.08	*	*			

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

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 24756.73

INPUT

Description: LBG Sta. 122+06.73; Inflow with 5'x3' RCB

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2174.16	12	2168.29	18.25	2168.16	24.5	2168.29	36.5	2174.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	36.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	36.5		6.73	6.73	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2178.14 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 7.58  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)     * 2170.56 * Reach Len. (ft) *      * 6.73 *      * 6.73 *
* Crit W.S. (ft)     * 2172.47 * Flow Area (sq ft) *      *      * 39.79 *      *
* E.G. Slope (ft/ft) * 0.023727 * Area (sq ft) *      *      * 39.79 *      *
* Q Total (cfs)      * 878.90 * Flow (cfs) *      *      * 878.90 *      *
* Top Width (ft)     * 21.79 * Top Width (ft) *      *      * 21.79 *      *
* Vel Total (ft/s)   * 22.09 * Avg. Vel. (ft/s) *      *      * 22.09 *      *
* Max Chl Dpth (ft)  * 2.40 * Hydr. Depth (ft) *      *      * 1.83 *      *
* Conv. Total (cfs)  * 5705.8 * Conv. (cfs) *      *      * 5705.8 *      *
* Length Wtd. (ft)   * 6.73 * Wetted Per. (ft) *      *      * 22.85 *      *
* Min Ch El (ft)     * 2168.16 * Shear (lb/sq ft) *      *      * 2.58 *      *
* Alpha              * 1.00 * Stream Power (lb/ft s) *      *      * 56.98 *      *
* Frctn Loss (ft)    * 2.13 * Cum Volume (acre-ft) *      *      * 4.10 *      *
* C & E Loss (ft)    * 0.04 * Cum SA (acres) *      *      * 2.03 *      *
*****

```

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: C1 CHANNEL

REACH: MAIN3

RS: 24750.00

INPUT

Description: LBG Sta. 122+00.00; Grade Break; 6' Downstream of 5'x3'RCB

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2174	12	2168.13
18.25	2168	24.5	2168.13
36.5	2174		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.015	0	.015
36.5	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	36.5		200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2177.99 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 7.58  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)     * 2170.40 * Reach Len. (ft) *      * 200.00 *      * 200.00 *
* Crit W.S. (ft)     * 2172.31 * Flow Area (sq ft) *      *      * 39.77 *      *
* E.G. Slope (ft/ft) * 0.023767 * Area (sq ft) *      *      * 39.77 *      *
* Q Total (cfs)      * 878.90 * Flow (cfs) *      *      * 878.90 *      *
* Top Width (ft)     * 21.79 * Top Width (ft) *      *      * 21.79 *      *
* Vel Total (ft/s)   * 22.10 * Avg. Vel. (ft/s) *      *      * 22.10 *      *
* Max Chl Dpth (ft)  * 2.40 * Hydr. Depth (ft) *      *      * 1.83 *      *
* Conv. Total (cfs)  * 5701.0 * Conv. (cfs) *      *      * 5701.0 *      *
* Length Wtd. (ft)   * 200.00 * Wetted Per. (ft) *      *      * 22.84 *      *
* Min Ch El (ft)     * 2168.00 * Shear (lb/sq ft) *      *      * 2.58 *      *
* Alpha              * 1.00 * Stream Power (lb/ft s) *      *      * 57.08 *      *
* Frctn Loss (ft)    * 0.16 * Cum Volume (acre-ft) *      *      * 4.09 *      *
* C & E Loss (ft)    * 0.00 * Cum SA (acres) *      *      * 2.03 *      *
*****

```

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3

RS: 24550

INPUT

Description: LBG Sta. 120+00.00

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2169.28	12	2163.41
18.25	2163.28	24.5	2163.41
36.5	2169.28		

Manning's n Values

num= 3	
Sta	n Val
0	.015
36.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	36.5		100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

	* 2173.24	* Element	* Left OB	* Channel	* Right OB
* E.G. Elev (ft)	* 7.55	* Wt. n-Val.	* 100.00	* 100.00	* 100.00
* Vel Head (ft)	* 2165.69	* Reach Len. (ft)	* 39.85	* 39.85	* 39.85
* W.S. Elev (ft)	* 2167.59	* Flow Area (sq ft)	* 878.90	* 878.90	* 878.90
* Crit W.S. (ft)	* 0.023632	* Area (sq ft)	* 21.80	* 21.80	* 21.80
* E.G. Slope (ft/ft)	* 878.90	* Flow (cfs)	* 22.06	* 22.06	* 22.06
* Q Total (cfs)	* 21.80	* Top Width (ft)	* 1.83	* 1.83	* 1.83
* Top Width (ft)	* 22.06	* Avg. Vel. (ft/s)	* 5717.3	* 5717.3	* 5717.3
* Vel Total (ft/s)	* 2.41	* Hydr. Depth (ft)	* 22.86	* 22.86	* 22.86
* Max Chl Dpth (ft)	* 5717.3	* Conv. (cfs)	* 2.57	* 2.57	* 2.57
* Conv. Total (cfs)	* 100.00	* Wetted Per. (ft)	* 3.91	* 3.91	* 3.91
* Length Wtd. (ft)	* 2163.28	* Shear (lb/sq ft)	* 1.93	* 1.93	* 1.93
* Min Ch El (ft)	* 1.00	* Stream Power (lb/ft s)			
* Alpha	* 4.74	* Cum Volume (acre-ft)			
* Frctn Loss (ft)	* 0.01	* Cum SA (acres)			
* C & E Loss (ft)					

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: C1 CHANNEL
 REACH: MAIN3

RS: 24350

INPUT

Description: LBG Sta. 118+00.00; Grade Break

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2164.56	12	2158.69
18.25	2158.56	24.5	2158.69
36.5	2164.56		

Manning's n Values

num= 3	
Sta	n Val
0	.015
36.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	36.5	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2170.28 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)       * 9.52  * Wt. n-Val.   *      *      *      *
* W.S. Elev (ft)      * 2160.76 * Reach Len. (ft) * 200.00 * 200.00 * 200.00 *
* Crit W.S. (ft)      * 2162.87 * Flow Area (sq ft) *      * 35.50 *      *
* E.G. Slope (ft/ft)  * 0.032877 * Area (sq ft) *      * 35.50 *      *
* Q Total (cfs)       * 878.90 * Flow (cfs) *      * 878.90 *      *
* Top Width (ft)      * 20.97 * Top Width (ft) *      * 20.97 *      *
* Vel Total (ft/s)    * 24.76 * Avg. Vel. (ft/s) *      * 24.76 *      *
* Max Chl Dpth (ft)   * 2.20 * Hydr. Depth (ft) *      * 1.69 *      *
* Conv. Total (cfs)   * 4847.2 * Conv. (cfs) *      * 4847.2 *      *
* Length Wtd. (ft)    * 200.00 * Wetted Per. (ft) *      * 21.94 *      *
* Min Ch El (ft)      * 2158.56 * Shear (lb/sq ft) *      * 3.32 *      *
* Alpha              * 1.00 * Stream Power (lb/ft s) *      * 82.24 *      *
* Frctn Loss (ft)     * 2.77 * Cum Volume (acre-ft) *      * 3.82 *      *
* C & E Loss (ft)     * 0.20 * Cum SA (acres) *      * 1.88 *      *
*****

```

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

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3 RS: 24150

INPUT

Description: LBG Sta. 116+00.00

Station	Elevation	Data	num=	5
Sta	Elev	Sta	Elev	Sta Elev Sta Elev
0	2159.01	12	2153.14	18.25 2153.01 24.5 2153.14 36.5 2159.01

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	36.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	36.5	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2163.90 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)       * 8.59  * Wt. n-Val.   *      *      *      *
* W.S. Elev (ft)      * 2155.30 * Reach Len. (ft) * 150.00 * 150.00 * 150.00 *
* Crit W.S. (ft)      * 2157.32 * Flow Area (sq ft) *      * 37.36 *      *
* E.G. Slope (ft/ft)  * 0.028409 * Area (sq ft) *      * 37.36 *      *
* Q Total (cfs)       * 878.90 * Flow (cfs) *      * 878.90 *      *
* Top Width (ft)      * 21.33 * Top Width (ft) *      * 21.33 *      *
* Vel Total (ft/s)    * 23.53 * Avg. Vel. (ft/s) *      * 23.53 *      *
* Max Chl Dpth (ft)   * 2.29 * Hydr. Depth (ft) *      * 1.75 *      *
* Conv. Total (cfs)   * 5214.5 * Conv. (cfs) *      * 5214.5 *      *
* Length Wtd. (ft)    * 150.00 * Wetted Per. (ft) *      * 22.34 *      *
*****

```

* Min Ch El (ft)	* 2153.01	* Shear (lb/sq ft)	*	*	2.97	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	69.79	*	*
* Frctn Loss (ft)	* 6.10	* Cum Volume (acre-ft)	*	*	3.66	*	*
* C & E Loss (ft)	* 0.28	* Cum SA (acres)	*	*	1.78	*	*

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: C1 CHANNEL

REACH: MAIN3

RS: 24000

INPUT

Description: LBG Sta. 114+50.00; Grade Break

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2154.85	12	2148.98	18.25	2148.85	24.5	2148.98
						36.5	2154.85

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	36.5	.015

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	36.5	150	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2159.64	* Element	*	Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 8.49	* Wt. n-Val.	*	0.015	*		*
* W.S. Elev (ft)	* 2151.15	* Reach Len. (ft)	*	150.00	* 150.00	* 150.00	*
* Crit W.S. (ft)	* 2153.16	* Flow Area (sq ft)	*		* 37.59	*	*
* E.G. Slope (ft/ft)	* 0.027906	* Area (sq ft)	*		* 37.59	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*		* 878.90	*	*
* Top Width (ft)	* 21.38	* Top Width (ft)	*		* 21.38	*	*
* Vel Total (ft/s)	* 23.38	* Avg. Vel. (ft/s)	*		* 23.38	*	*
* Max Chl Dpth (ft)	* 2.30	* Hydr. Depth (ft)	*		* 1.76	*	*
* Conv. Total (cfs)	* 5261.3	* Conv. (cfs)	*		* 5261.3	*	*
* Length Wtd. (ft)	* 150.00	* Wetted Per. (ft)	*		* 22.39	*	*
* Min Ch El (ft)	* 2148.85	* Shear (lb/sq ft)	*		* 2.93	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*		* 68.40	*	*
* Frctn Loss (ft)	* 4.22	* Cum Volume (acre-ft)	*		* 3.53	*	*
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*		* 1.71	*	*

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 23850

INPUT

Description: LBG Sta. 113+00.00

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
0	2150.44	12	2144.57	18.25	2144.44	24.5	2144.57	36.5	2150.44

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	36.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	36.5		150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2155.38	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 8.65	* Wt. n-Val.	* 0.015		
* W.S. Elev (ft)	* 2146.72	* Reach Len. (ft)	* 150.00	* 150.00	* 150.00
* Crit W.S. (ft)	* 2148.75	* Flow Area (sq ft)		* 37.23	
* E.G. Slope (ft/ft)	* 0.028690	* Area (sq ft)		* 37.23	
* Q Total (cfs)	* 878.90	* Flow (cfs)		* 878.90	
* Top Width (ft)	* 21.31	* Top Width (ft)		* 21.31	
* Vel Total (ft/s)	* 23.61	* Avg. Vel. (ft/s)		* 23.61	
* Max Chl Dpth (ft)	* 2.28	* Hydr. Depth (ft)		* 1.75	
* Conv. Total (cfs)	* 5188.9	* Conv. (cfs)		* 5188.9	
* Length Wtd. (ft)	* 150.00	* Wetted Per. (ft)		* 22.31	
* Min Ch El (ft)	* 2144.44	* Shear (lb/sq ft)		* 2.99	
* Alpha	* 1.00	* Stream Power (lb/ft s)		* 70.57	
* Frctn Loss (ft)	* 4.24	* Cum Volume (acre-ft)		* 3.40	
* C & E Loss (ft)	* 0.02	* Cum SA (acres)		* 1.63	

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 23700

INPUT

Description: LBG Sta. 111+50.00; Grade Break

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
0	2146.03	12	2140.16	18.25	2140.03	24.5	2140.16	36.5	2146.03

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	36.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	36.5		145	145	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2151.04	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 8.73	* Wt. n-Val.	* 0.015		

* W.S. Elev (ft)	* 2142.31	* Reach Len. (ft)	* 145.00	* 145.00	* 145.00	*
* Crit W.S. (ft)	* 2144.34	* Flow Area (sq ft)	*	* 37.07	*	*
* E.G. Slope (ft/ft)	* 0.029040	* Area (sq ft)	*	* 37.07	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 21.28	* Top Width (ft)	*	* 21.28	*	*
* Vel Total (ft/s)	* 23.71	* Avg. Vel. (ft/s)	*	* 23.71	*	*
* Max Chl Dpth (ft)	* 2.28	* Hydr. Depth (ft)	*	* 1.74	*	*
* Conv. Total (cfs)	* 5157.5	* Conv. (cfs)	*	* 5157.5	*	*
* Length Wtd. (ft)	* 145.00	* Wetted Per. (ft)	*	* 22.27	*	*
* Min Ch El (ft)	* 2140.03	* Shear (lb/sq ft)	*	* 3.02	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 71.54	*	*
* Frctn Loss (ft)	* 4.33	* Cum Volume (acre-ft)	*	* 3.27	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 1.56	*	*

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: C1 CHANNEL

REACH: MAIN3

RS: 23555

INPUT

Description: LBG Sta. 110+05.00; End Transition

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2144.61	12	2138.74	18.25	2138.61	24.5	2138.74
36.5	2144.61						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	36.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	36.5		49.52	49.52	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2147.07	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 5.81	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2141.27	* Reach Len. (ft)	* 49.52	* 49.52	* 49.52
* Crit W.S. (ft)	* 2142.92	* Flow Area (sq ft)	*	* 45.46	*
* E.G. Slope (ft/ft)	* 0.016262	* Area (sq ft)	*	* 45.46	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 22.83	* Top Width (ft)	*	* 22.83	*
* Vel Total (ft/s)	* 19.34	* Avg. Vel. (ft/s)	*	* 19.34	*
* Max Chl Dpth (ft)	* 2.66	* Hydr. Depth (ft)	*	* 1.99	*
* Conv. Total (cfs)	* 6892.1	* Conv. (cfs)	*	* 6892.1	*
* Length Wtd. (ft)	* 49.52	* Wetted Per. (ft)	*	* 24.00	*
* Min Ch El (ft)	* 2138.61	* Shear (lb/sq ft)	*	* 1.92	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 37.17	*
* Frctn Loss (ft)	* 3.09	* Cum Volume (acre-ft)	*	* 3.13	*
* C & E Loss (ft)	* 0.88	* Cum SA (acres)	*	* 1.49	*

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: C1 CHANNEL

REACH: MAIN3

RS: 23505.48

INPUT

Description: LBG Sta. 109+55.48; Begin Transition

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2144.13	0	2138.43	15	2138.13	30	2138.43	30	2144.13

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	30	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	30		55.45	55.45	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2145.99	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 6.25	* Wt. n-Val.	* 0.015		
* W.S. Elev (ft)	* 2139.74	* Reach Len. (ft)	* 55.45	* 55.45	* 55.45
* Crit W.S. (ft)	* 2141.26	* Flow Area (sq ft)		* 43.81	
* E.G. Slope (ft/ft)	* 0.027686	* Area (sq ft)		* 43.81	
* Q Total (cfs)	* 878.90	* Flow (cfs)		* 878.90	
* Top Width (ft)	* 30.00	* Top Width (ft)		* 30.00	
* Vel Total (ft/s)	* 20.06	* Avg. Vel. (ft/s)		* 20.06	
* Max Chl Dpth (ft)	* 1.61	* Hydr. Depth (ft)		* 1.46	
* Conv. Total (cfs)	* 5282.1	* Conv. (cfs)		* 5282.1	
* Length Wtd. (ft)	* 55.45	* Wetted Per. (ft)		* 32.63	
* Min Ch El (ft)	* 2138.13	* Shear (lb/sq ft)		* 2.32	
* Alpha	* 1.00	* Stream Power (lb/ft s)		* 46.56	
* Frctn Loss (ft)	* 1.03	* Cum Volume (acre-ft)		* 3.08	
* C & E Loss (ft)	* 0.04	* Cum SA (acres)		* 1.46	

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: C1 CHANNEL

REACH: MAIN3

RS: 23450

INPUT

Description: LBG Sta. 109+00.00; End Side Channel Entrance Notch

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2143.59	0	2137.89	15	2137.59	30	2137.89	30	2143.59

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val

0 .015 0 .015 30 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 30 4.5 4.5 4.5 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2144.34 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)       * 4.96  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)      * 2139.38 * Reach Len. (ft) * 4.50 * 4.50 * 4.50 *
* Crit W.S. (ft)      * 2140.71 * Flow Area (sq ft) *      * 49.18 *      *
* E.G. Slope (ft/ft)  * 0.019104 * Area (sq ft)    *      * 49.18 *      *
* Q Total (cfs)       * 878.90 * Flow (cfs)      *      * 878.90 *      *
* Top Width (ft)      * 30.00 * Top Width (ft)   *      * 30.00 *      *
* Vel Total (ft/s)    * 17.87 * Avg. Vel. (ft/s) *      * 17.87 *      *
* Max Chl Dpth (ft)   * 1.79 * Hydr. Depth (ft) *      * 1.64 *      *
* Conv. Total (cfs)   * 6358.8 * Conv. (cfs)     *      * 6358.8 *      *
* Length Wtd. (ft)    * 4.50 * Wetted Per. (ft) *      * 32.99 *      *
* Min Ch El (ft)      * 2137.59 * Shear (lb/sq ft) *      * 1.78 *      *
* Alpha              * 1.00 * Stream Power (lb/ft s) *      * 31.78 *      *
* Frctn Loss (ft)     * 1.26 * Cum Volume (acre-ft) *      * 3.02 *      *
* C & E Loss (ft)     * 0.39 * Cum SA (acres)   *      * 1.42 *      *
*****
```

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: C1 CHANNEL

REACH: MAIN3

RS: 23445.50

INPUT

Description: LBG Sta. 108+95.50; Side Channel Entrance Notch

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2143.54	0	2137.74	15	2137.54	30	2137.74	30	2141.54

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	30	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 30 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2144.25 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)       * 4.97  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)      * 2139.28 * Reach Len. (ft) * 20.00 * 20.00 * 20.00 *
* Crit W.S. (ft)      * 2140.62 * Flow Area (sq ft) *      * 49.11 *      *
* E.G. Slope (ft/ft)  * 0.019266 * Area (sq ft)    *      * 49.11 *      *
* Q Total (cfs)       * 878.90 * Flow (cfs)      *      * 878.90 *      *
* Top Width (ft)      * 30.00 * Top Width (ft)   *      * 30.00 *      *
* Vel Total (ft/s)    * 17.90 * Avg. Vel. (ft/s) *      * 17.90 *      *
* Max Chl Dpth (ft)   * 1.74 * Hydr. Depth (ft) *      * 1.64 *      *
*****
```

* Conv. Total (cfs)	* 6332.0	* Conv. (cfs)	*	* 6332.0	*	*
* Length Wtd. (ft)	* 20.00	* Wetted Per. (ft)	*	* 33.08	*	*
* Min Ch El (ft)	* 2137.54	* Shear (lb/sq ft)	*	* 1.79	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 31.96	*	*
* Frctn Loss (ft)	* 0.09	* Cum Volume (acre-ft)	*	* 3.02	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 1.42	*	*

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 23425.50

INPUT

Description: LBG Sta. 108+75.50; Side Channel Entrance Notch

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2143.35	0	2137.65	15	2137.35	30	2137.65	30	2141.35

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	30	.015

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
0	30	7	7	7	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2143.77	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 4.56	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 2139.21	* Reach Len. (ft)	* 7.00	* 7.00	* 7.00	*
* Crit W.S. (ft)	* 2140.48	* Flow Area (sq ft)	*	* 51.28	*	*
* E.G. Slope (ft/ft)	* 0.016719	* Area (sq ft)	*	* 51.28	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 30.00	* Top Width (ft)	*	* 30.00	*	*
* Vel Total (ft/s)	* 17.14	* Avg. Vel. (ft/s)	*	* 17.14	*	*
* Max Chl Dpth (ft)	* 1.86	* Hydr. Depth (ft)	*	* 1.71	*	*
* Conv. Total (cfs)	* 6797.3	* Conv. (cfs)	*	* 6797.3	*	*
* Length Wtd. (ft)	* 7.00	* Wetted Per. (ft)	*	* 33.12	*	*
* Min Ch El (ft)	* 2137.35	* Shear (lb/sq ft)	*	* 1.62	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 27.69	*	*
* Frctn Loss (ft)	* 0.36	* Cum Volume (acre-ft)	*	* 3.00	*	*
* C & E Loss (ft)	* 0.12	* Cum SA (acres)	*	* 1.40	*	*

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 23418.50

INPUT

Description: LBG Sta. 108+68.50; Begin Side Channel Entrance Notch

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2143.28	0	2137.58	15	2137.28	30	2137.58	30	2143.28

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .015 0 .015 30 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 30 4.6 4.6 4.6 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2143.64 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 4.49  * Wt. n-Val.   *      *      *      *
* W.S. Elev (ft)      * 2139.15 * Reach Len. (ft) * 4.60 * 4.60 * 4.60 *
* Crit W.S. (ft)      * 2140.41 * Flow Area (sq ft) *      * 51.68 *      *
* E.G. Slope (ft/ft)  * 0.016309 * Area (sq ft) *      * 51.68 *      *
* Q Total (cfs)       * 878.90 * Flow (cfs) *      * 878.90 *      *
* Top Width (ft)      * 30.00 * Top Width (ft) *      * 30.00 *      *
* Vel Total (ft/s)    * 17.01 * Avg. Vel. (ft/s) *      * 17.01 *      *
* Max Chl Dpth (ft)   * 1.87 * Hydr. Depth (ft) *      * 1.72 *      *
* Conv. Total (cfs)   * 6882.1 * Conv. (cfs) *      * 6882.1 *      *
* Length Wtd. (ft)    * 4.60 * Wetted Per. (ft) *      * 33.15 *      *
* Min Ch El (ft)      * 2137.28 * Shear (lb/sq ft) *      * 1.59 *      *
* Alpha               * 1.00 * Stream Power (lb/ft s) *      * 26.99 *      *
* Frctn Loss (ft)     * 0.12 * Cum Volume (acre-ft) *      * 2.99 *      *
* C & E Loss (ft)     * 0.02 * Cum SA (acres) *      * 1.40 *      *
*****
```

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 23413.90

INPUT

Description: LBG Sta. 108+63.90; End RR Trestle

Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 2143.23 0 2137.53 15 2137.23 30 2137.53 30 2143.23

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .015 0 .015 30 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 30 16.8 16.8 16.8 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2143.56 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 4.45  * Wt. n-Val.   *      *      *      *
* W.S. Elev (ft)      * 2139.11 * Reach Len. (ft) * 0.10 * 0.10 * 0.10 *
* Crit W.S. (ft)      * 2140.36 * Flow Area (sq ft) *      * 51.92 *      *
* E.G. Slope (ft/ft)  * 0.016068 * Area (sq ft) *      * 51.92 *      *
* Q Total (cfs)       * 878.90 * Flow (cfs) *      * 878.90 *      *
* Top Width (ft)      * 30.00 * Top Width (ft) *      * 30.00 *      *
* Vel Total (ft/s)    * 16.93 * Avg. Vel. (ft/s) *      * 16.93 *      *
* Max Chl Dpth (ft)   * 1.88 * Hydr. Depth (ft) *      * 1.73 *      *
* Conv. Total (cfs)   * 6933.6 * Conv. (cfs) *      * 6933.6 *      *
* Length Wtd. (ft)    * 0.10 * Wetted Per. (ft) *      * 33.17 *      *
*****
```

* Min Ch El (ft)	* 2137.23	* Shear (lb/sq ft)	*	*	1.57	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	26.58	*	*
* Frctn Loss (ft)	* 0.07	* Cum Volume (acre-ft)	*	*	2.98	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	*	1.39	*	*

BRIDGE

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 23405.50

INPUT

Description: UPRR Trestle
 Distance from Upstream XS = .1
 Deck/Roadway Width = 16.6
 Weir Coefficient = 2.6
 Upstream Deck/Roadway Coordinates
 num= 2

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
0	2146.23	2143.23			30	2146.23	2143.23		

Upstream Bridge Cross Section Data
 Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
0	2143.23	0	2137.53	15	2137.23	30	2137.53	30	2143.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
*****	*****	*****	*****	*****	*****
0	.015	0	.015	30	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	30	.1	.3

Downstream Deck/Roadway Coordinates
 num= 2

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
0	2146.23	2143.23			30	2146.23	2143.23		

Downstream Bridge Cross Section Data
 Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
0	2143.07	0	2137.37	15	2137.07	30	2137.37	30	2143.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
*****	*****	*****	*****	*****	*****
0	.015	0	.015	30	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	30	.1	.3

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	=	

Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
Pier Station Upstream= 7.5 Downstream= 7.5
Upstream num= 2
Width Elev Width Elev

2.33 36.5 2.33 2143.23
Downstream num= 2
Width Elev Width Elev

2.33 36.5 2.33 2143.23

Pier Data
Pier Station Upstream= 22.5 Downstream= 22.5
Upstream num= 2
Width Elev Width Elev

2.33 36.5 2.33 2143.23
Downstream num= 2
Width Elev Width Elev

2.33 36.5 2.33 2143.23

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Momentum Cd = 1.33
Selected Low Flow Methods = Momentum

High Flow Method
Energy Only

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

```
*****
* E.G. US. (ft) * 2142.43 * Element *Inside BR US *Inside BR DS *
* W.S. US. (ft) * 2139.11 * E.G. Elev (ft) * 2142.63 * 2142.34 *
* Q Total (cfs) * 878.90 * W.S. Elev (ft) * 2140.10 * 2140.12 *
* Q Bridge (cfs) * 878.90 * Crit W.S. (ft) * 2140.74 * 2140.58 *
* Q Weir (cfs) * * * Max Chl Dpth (ft) * 2.87 * 3.05 *
* Weir Sta Lft (ft) * * * Vel Total (ft/s) * 12.77 * 11.95 *
* Weir Sta Rgt (ft) * * * Flow Area (sq ft) * 68.85 * 73.54 *
* Weir Submerg * * * Froude # Chl * 1.36 * 1.24 *
* Weir Max Depth (ft) * * * Specif Force (cu ft) * 442.09 * 433.03 *
* Min El Weir Flow (ft) * 2146.24 * Hydr Depth (ft) * 2.72 * 2.90 *
* Min El Prs (ft) * 2143.23 * W.P. Total (ft) * 41.35 * 42.46 *
* Delta EG (ft) * 0.00 * Conv. Total (cfs) * 9581.1 * 10507.6 *
* Delta WS (ft) * -0.17 * Top Width (ft) * 25.34 * 25.34 *
* BR Open Area (sq ft) * 148.24 * Frctn Loss (ft) * * *
* BR Open Vel (ft/s) * 12.77 * C & E Loss (ft) * * *
```

* Coef of Q	*	* Shear Total (lb/sq ft) *	0.87 *	0.76 *
* Br Sel Method	* Momentum	* Power Total (lb/ft s) *	11.17 *	9.04 *

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: C1 CHANNEL
REACH: MAIN3 RS: 23397.1

INPUT

Description: LBG Sta. 108+47.10; Begin RR Trestle

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		

0 2143.07 0 2137.37 15 2137.07 30 2137.37 30 2143.07		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		

0 .015 0 .015 30 .015		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	30	7.1 7.1	7.1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2142.43	* Element	* Left OB *	* Channel *	* Right OB *
* Vel Head (ft)	* 3.15	* Wt. n-Val.	* *	* 0.015 *	* *
* W.S. Elev (ft)	* 2139.28	* Reach Len. (ft)	* 7.10 *	* 7.10 *	* 7.10 *
* Crit W.S. (ft)	* 2140.20	* Flow Area (sq ft)	* *	* 61.68 *	* *
* E.G. Slope (ft/ft)	* 0.009284	* Area (sq ft)	* *	* 61.68 *	* *
* Q Total (cfs)	* 878.90	* Flow (cfs)	* *	* 878.90 *	* *
* Top Width (ft)	* 30.00	* Top Width (ft)	* *	* 30.00 *	* *
* Vel Total (ft/s)	* 14.25	* Avg. Vel. (ft/s)	* *	* 14.25 *	* *
* Max Chl Dpth (ft)	* 2.21	* Hydr. Depth (ft)	* *	* 2.06 *	* *
* Conv. Total (cfs)	* 9121.5	* Conv. (cfs)	* *	* 9121.5 *	* *
* Length Wtd. (ft)	* 7.10	* Wetted Per. (ft)	* *	* 33.82 *	* *
* Min Ch El (ft)	* 2137.07	* Shear (lb/sq ft)	* *	* 1.06 *	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	* *	* 15.06 *	* *
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	* *	* 2.95 *	* *
* C & E Loss (ft)	*	* Cum SA (acres)	* *	* 1.38 *	* *

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN3 RS: 23390.00

INPUT

Description: LBG Sta. 108+40.00; Grade Break

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		

0 2143 0 2137.3 15 2137 30 2137.3 30 2143		

Manning's n Values	num=	3
--------------------	------	---

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	30	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	30		140	140	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2142.36	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 3.15	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2139.21	* Reach Len. (ft)	* 140.00	* 140.00	* 140.00
* Crit W.S. (ft)	* 2140.13	* Flow Area (sq ft)	*	* 61.68	*
* E.G. Slope (ft/ft)	* 0.009285	* Area (sq ft)	*	* 61.68	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 30.00	* Top Width (ft)	*	* 30.00	*
* Vel Total (ft/s)	* 14.25	* Avg. Vel. (ft/s)	*	* 14.25	*
* Max Chl Dpth (ft)	* 2.21	* Hydr. Depth (ft)	*	* 2.06	*
* Conv. Total (cfs)	* 9121.3	* Conv. (cfs)	*	* 9121.3	*
* Length Wtd. (ft)	* 140.00	* Wetted Per. (ft)	*	* 33.82	*
* Min Ch El (ft)	* 2137.00	* Shear (lb/sq ft)	*	* 1.06	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 15.06	*
* Frctn Loss (ft)	* 0.07	* Cum Volume (acre-ft)	*	* 2.94	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 1.38	*

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 23253

INPUT

Description: LBG Sta. 107+03.00; Minor side inflow point

Station	Elevation	Data	num=	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2135.69			0	2129.99	15	2129.69	30	2129.99	30	2135.69

Manning's n	Values	num=	Sta	n Val	Sta	n Val	Sta	n Val
		3	0	.015	0	.015	30	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	30		130.04	130.04	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2139.41	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 8.30	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2131.11	* Reach Len. (ft)	* 130.04	* 130.04	* 130.04
* Crit W.S. (ft)	* 2132.82	* Flow Area (sq ft)	*	* 38.01	*
* E.G. Slope (ft/ft)	* 0.043750	* Area (sq ft)	*	* 38.01	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 30.00	* Top Width (ft)	*	* 30.00	*
* Vel Total (ft/s)	* 23.12	* Avg. Vel. (ft/s)	*	* 23.12	*
* Max Chl Dpth (ft)	* 1.42	* Hydr. Depth (ft)	*	* 1.27	*
* Conv. Total (cfs)	* 4202.0	* Conv. (cfs)	*	* 4202.0	*
* Length Wtd. (ft)	* 130.04	* Wetted Per. (ft)	*	* 32.24	*
* Min Ch El (ft)	* 2129.69	* Shear (lb/sq ft)	*	* 3.22	*

* Alpha	* 1.00	* Stream Power (lb/ft s)	* 74.46	*
* Frctn Loss (ft)	* 2.44	* Cum Volume (acre-ft)	* 2.78	*
* C & E Loss (ft)	* 0.51	* Cum SA (acres)	* 1.28	*

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

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3 RS: 23122.96

INPUT

Description: LBG Sta. 105+72.96; Minor side inflow point

Station	Elevation	Data	num=	5
Sta	Elev	Sta	Elev	Sta Elev Sta Elev Sta Elev
*****	*****	*****	*****	*****
0	2128.76	0	2123.06	15 2122.76 30 2123.06 30 2128.76

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
*****	*****	*****	*****
0	.015	0	.015
30	.015	30	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	30		27.3 27.3	27.3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2133.22	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 9.09	* Wt. n-Val.	* 0.015	* 0.015	*
* W.S. Elev (ft)	* 2124.12	* Reach Len. (ft)	* 27.30	* 27.30	* 27.30
* Crit W.S. (ft)	* 2125.89	* Flow Area (sq ft)	* 36.32	* 36.32	*
* E.G. Slope (ft/ft)	* 0.050683	* Area (sq ft)	* 36.32	* 36.32	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	* 878.90	* 878.90	*
* Top Width (ft)	* 30.00	* Top Width (ft)	* 30.00	* 30.00	*
* Vel Total (ft/s)	* 24.20	* Avg. Vel. (ft/s)	* 24.20	* 24.20	*
* Max Chl Dpth (ft)	* 1.36	* Hydr. Depth (ft)	* 1.21	* 1.21	*
* Conv. Total (cfs)	* 3904.0	* Conv. (cfs)	* 3904.0	* 3904.0	*
* Length Wtd. (ft)	* 27.30	* Wetted Per. (ft)	* 32.13	* 32.13	*
* Min Ch El (ft)	* 2122.76	* Shear (lb/sq ft)	* 3.58	* 3.58	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 86.56	* 86.56	*
* Frctn Loss (ft)	* 6.12	* Cum Volume (acre-ft)	* 2.67	* 2.67	*
* C & E Loss (ft)	* 0.08	* Cum SA (acres)	* 1.19	* 1.19	*

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: C1 CHANNEL

REACH: MAIN3

RS: 23095.66

INPUT

Description: LBG Sta. 105+45.66; End Top Transition

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2127.3	0	2121.6
15	2121.3	30	2121.6
30	2127.3		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.015	0	.015
30	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	30		70.66	70.66	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

	*	2131.81	*	Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	9.16	*	Wt. n-Val.	*		*	0.015	*		*
* W.S. Elev (ft)	*	2122.66	*	Reach Len. (ft)	*	70.66	*	70.66	*	70.66	*
* Crit W.S. (ft)	*	2124.43	*	Flow Area (sq ft)	*		*	36.19	*		*
* E.G. Slope (ft/ft)	*	0.051249	*	Area (sq ft)	*		*	36.19	*		*
* Q Total (cfs)	*	878.90	*	Flow (cfs)	*		*	878.90	*		*
* Top Width (ft)	*	30.00	*	Top Width (ft)	*		*	30.00	*		*
* Vel Total (ft/s)	*	24.28	*	Avg. Vel. (ft/s)	*		*	24.28	*		*
* Max Chl Dpth (ft)	*	1.36	*	Hydr. Depth (ft)	*		*	1.21	*		*
* Conv. Total (cfs)	*	3882.4	*	Conv. (cfs)	*		*	3882.4	*		*
* Length Wtd. (ft)	*	70.66	*	Wetted Per. (ft)	*		*	32.12	*		*
* Min Ch El (ft)	*	2121.30	*	Shear (lb/sq ft)	*		*	3.61	*		*
* Alpha	*	1.00	*	Stream Power (lb/ft s)	*		*	87.55	*		*
* Frctn Loss (ft)	*	1.39	*	Cum Volume (acre-ft)	*		*	2.65	*		*
* C & E Loss (ft)	*	0.01	*	Cum SA (acres)	*		*	1.17	*		*

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: C1 CHANNEL

REACH: MAIN3

RS: 23025.00

INPUT

Description: LBG Sta. 104+75.00; Minor Side Inflow Point

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2127.3	0	2117.83
15	2117.53	30	2117.83
30	2127.3		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.015	0	.015
30	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	30		8.67	8.67	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2128.15 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 9.27  * Wt. n-Val.      *      *      * 0.015 *      *
* W.S. Elev (ft)     * 2118.88 * Reach Len. (ft)  *      * 8.67 * 8.67 *      *
* Crit W.S. (ft)     * 2120.66 * Flow Area (sq ft) *      *      * 35.97 *      *
* E.G. Slope (ft/ft) * 0.052268 * Area (sq ft)    *      *      * 35.97 *      *
* Q Total (cfs)      * 878.90 * Flow (cfs)      *      *      * 878.90 *      *
* Top Width (ft)     * 30.00 * Top Width (ft)   *      *      * 30.00 *      *
* Vel Total (ft/s)   * 24.43 * Avg. Vel. (ft/s) *      *      * 24.43 *      *
* Max Chl Dpth (ft)  * 1.35  * Hydr. Depth (ft) *      *      * 1.20 *      *
* Conv. Total (cfs)  * 3844.3 * Conv. (cfs)     *      *      * 3844.3 *      *
* Length Wtd. (ft)   * 8.67  * Wetted Per. (ft) *      *      * 32.10 *      *
* Min Ch El (ft)     * 2117.53 * Shear (lb/sq ft) *      *      * 3.66 *      *
* Alpha              * 1.00  * Stream Power (lb/ft s) *      *      * 89.33 *      *
* Frctn Loss (ft)    * 3.66  * Cum Volume (acre-ft) *      *      * 2.59 *      *
* C & E Loss (ft)    * 0.01  * Cum SA (acres)   *      *      * 1.13 *      *
*****

```

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: C1 CHANNEL

REACH: MAIN3

RS: 23016.33

INPUT

Description: LBG Sta. 104+66.33; End Transition

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2127.31	0	2117.36	15	2117.06	30	2117.36	30	2127.31

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	30	.015

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
	0	30	30.03	30.03	30.03	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2127.69 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 9.28  * Wt. n-Val.      *      *      * 0.015 *      *
* W.S. Elev (ft)     * 2118.41 * Reach Len. (ft)  *      * 30.03 * 30.03 *      *
* Crit W.S. (ft)     * 2120.19 * Flow Area (sq ft) *      *      * 35.94 *      *
* E.G. Slope (ft/ft) * 0.052406 * Area (sq ft)    *      *      * 35.94 *      *
* Q Total (cfs)      * 878.90 * Flow (cfs)      *      *      * 878.90 *      *
* Top Width (ft)     * 30.00 * Top Width (ft)   *      *      * 30.00 *      *
* Vel Total (ft/s)   * 24.45 * Avg. Vel. (ft/s) *      *      * 24.45 *      *
* Max Chl Dpth (ft)  * 1.35  * Hydr. Depth (ft) *      *      * 1.20 *      *
* Conv. Total (cfs)  * 3839.3 * Conv. (cfs)     *      *      * 3839.3 *      *
* Length Wtd. (ft)   * 30.03 * Wetted Per. (ft) *      *      * 32.10 *      *
* Min Ch El (ft)     * 2117.06 * Shear (lb/sq ft) *      *      * 3.66 *      *
* Alpha              * 1.00  * Stream Power (lb/ft s) *      *      * 89.57 *      *
* Frctn Loss (ft)    * 0.45  * Cum Volume (acre-ft) *      *      * 2.58 *      *
* C & E Loss (ft)    * 0.00  * Cum SA (acres)   *      *      * 1.12 *      *
*****

```

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3

RS: 22986.30

INPUT

Description: LBG Sta. 104+36.30; End 3:10'x7' RCB; Begin Trans.

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2127.6	0	2115.46	34.5	2115.46	34.5	2127.6

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	34.5	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	34.5		436	436	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

*****		*****		*****		*****	
* E.G. Elev (ft)	* 2125.93	* Element	* Left OB	* Channel	* Right OB	* *	* *
* Vel Head (ft)	* 9.44	* Wt. n-Val.	* *	* 0.015	* *	* *	* *
* W.S. Elev (ft)	* 2116.49	* Reach Len. (ft)	* 0.10	* 0.10	* 0.10	* *	* *
* Crit W.S. (ft)	* 2118.18	* Flow Area (sq ft)	* *	* 35.65	* *	* *	* *
* E.G. Slope (ft/ft)	* 0.064096	* Area (sq ft)	* *	* 35.65	* *	* *	* *
* Q Total (cfs)	* 878.90	* Flow (cfs)	* *	* 878.90	* *	* *	* *
* Top Width (ft)	* 34.50	* Top Width (ft)	* *	* 34.50	* *	* *	* *
* Vel Total (ft/s)	* 24.66	* Avg. Vel. (ft/s)	* *	* 24.66	* *	* *	* *
* Max Chl Dpth (ft)	* 1.03	* Hydr. Depth (ft)	* *	* 1.03	* *	* *	* *
* Conv. Total (cfs)	* 3471.6	* Conv. (cfs)	* *	* 3471.6	* *	* *	* *
* Length Wtd. (ft)	* 0.10	* Wetted Per. (ft)	* *	* 36.57	* *	* *	* *
* Min Ch El (ft)	* 2115.46	* Shear (lb/sq ft)	* *	* 3.90	* *	* *	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	* *	* 96.18	* *	* *	* *
* Frctn Loss (ft)	* 1.74	* Cum Volume (acre-ft)	* *	* 2.56	* *	* *	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* *	* 1.10	* *	* *	* *

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

BRIDGE

RIVER: C1 CHANNEL
 REACH: MAIN3

RS: 22768.15

INPUT

Description: Horizon Drive Bridge

Distance from Upstream XS = .1

Deck/Roadway Width = 435

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 2

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	2131.3	2122.46			34.5	2131.3	2122.56		

Upstream Bridge Cross Section Data

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 2127.6 0 2115.46 34.5 2115.46 34.5 2127.6

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .015 0 .015 34.5 .015

Bank Sta: Left Right Coeff Contr. Expan.
 0 34.5 .1 .3

Downstream Deck/Roadway Coordinates
 num= 2
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 0 2120 2117.44 31.33 2120 2117.44

Downstream Bridge Cross Section Data
 Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 2120.02 0 2110.75 15.67 2110.44 31.33 2110.75 31.33 2120.02

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .015 0 .015 31.33 .015

Bank Sta: Left Right Coeff Contr. Expan.
 0 31.33 .1 .3

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 =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
 Pier Station Upstream= 11.125 Downstream= 10.33
 Upstream num= 2
 Width Elev Width Elev

 2.25 2115 2.25 2122.5
 Downstream num= 2
 Width Elev Width Elev

 .67 2110 .67 2117.5

Pier Data
 Pier Station Upstream= 23.375 Downstream= 21
 Upstream num= 2
 Width Elev Width Elev

 2.25 2115 2.25 2122.5
 Downstream num= 2

Width	Elev	Width	Elev
.67	2110	.67	2117.5

Number of Bridge Coefficient Sets = 2

Low Flow Methods and Data
Momentum Cd = 2
Selected Low Flow Methods = Momentum

High Flow Method
Energy Only

Low Flow Methods and Data
Momentum Cd = 2
Selected Low Flow Methods = Momentum

High Flow Method
Energy Only

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

* E.G. US. (ft)	* 2125.93	* Element	* Inside BR US	* Inside BR DS
* W.S. US. (ft)	* 2116.49	* E.G. Elev (ft)	* 2125.85	* 2115.45
* Q Total (cfs)	* 878.90	* W.S. Elev (ft)	* 2116.66	* 2112.87
* Q Bridge (cfs)	* 878.90	* Crit W.S. (ft)	* 2118.45	* 2113.59
* Q Weir (cfs)		* Max Chl Dpth (ft)	* 1.20	* 2.43
* Weir Sta Lft (ft)		* Vel Total (ft/s)	* 24.33	* 12.88
* Weir Sta Rgt (ft)		* Flow Area (sq ft)	* 36.13	* 68.25
* Weir Submerg		* Froude # Chl	* 3.91	* 1.50
* Weir Max Depth (ft)		* Specif Force (cu ft)	* 685.73	* 429.27
* Min El Weir Flow (ft)	* 2131.31	* Hydr Depth (ft)	* 1.20	* 2.28
* Min El Prs (ft)	* 2122.56	* W.P. Total (ft)	* 37.23	* 43.55
* Delta EG (ft)	* 10.51	* Conv. Total (cfs)	* 3508.5	* 9122.5
* Delta WS (ft)	* 3.77	* Top Width (ft)	* 30.00	* 29.99
* BR Open Area (sq ft)	* 205.22	* Frctn Loss (ft)	* 0.01	* 8.42
* BR Open Vel (ft/s)	* 24.33	* C & E Loss (ft)	* 0.08	* 1.98
* Coef of Q		* Shear Total (lb/sq ft)	* 3.80	* 0.91
* Br Sel Method	* Energy only	* Power Total (lb/ft s)	* 92.49	* 11.69

Warning: There was not enough momentum to compute a supercritical answer through the bridge. The momentum answer has been disregarded.

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

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 22550

INPUT

Description: LBG Sta. 100+00.00; Begin 3:10'x7' RCB

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2120.02	0	2110.75	15.67	2110.44	31.33	2110.75	31.33	2120.02

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	31.33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	31.33		100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2115.43	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 2.70	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 2112.72	* Reach Len. (ft)	* 100.00	* 100.00	* 100.00	*
* Crit W.S. (ft)	* 2113.49	* Flow Area (sq ft)	*	* 66.61	*	*
* E.G. Slope (ft/ft)	* 0.007604	* Area (sq ft)	*	* 66.61	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 31.33	* Top Width (ft)	*	* 31.33	*	*
* Vel Total (ft/s)	* 13.20	* Avg. Vel. (ft/s)	*	* 13.20	*	*
* Max Chl Dpth (ft)	* 2.28	* Hydr. Depth (ft)	*	* 2.13	*	*
* Conv. Total (cfs)	* 10079.4	* Conv. (cfs)	*	* 10079.4	*	*
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	* 35.28	*	*
* Min Ch El (ft)	* 2110.44	* Shear (lb/sq ft)	*	* 0.90	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 11.83	*	*
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	*	* 2.04	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 0.80	*	*

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 22450

INPUT

Description: LBG Sta. 99+00.00; End Top Trans.; Begin Transition to Bridge

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2118.35	0	2108.55	10	2108.35	20	2108.55	20	2118.35

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	20	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	20		200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2114.68	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 3.15	* Wt. n-Val.	*	* 0.015	*	*

* W.S. Elev (ft)	* 2111.54	* Reach Len. (ft)	* 200.00	* 200.00	* 200.00	*
* Crit W.S. (ft)	* 2112.35	* Flow Area (sq ft)	*	* 61.74	*	*
* E.G. Slope (ft/ft)	* 0.006512	* Area (sq ft)	*	* 61.74	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 20.00	* Top Width (ft)	*	* 20.00	*	*
* Vel Total (ft/s)	* 14.24	* Avg. Vel. (ft/s)	*	* 14.24	*	*
* Max Chl Dpth (ft)	* 3.19	* Hydr. Depth (ft)	*	* 3.09	*	*
* Conv. Total (cfs)	* 10891.0	* Conv. (cfs)	*	* 10891.0	*	*
* Length Wtd. (ft)	* 200.00	* Wetted Per. (ft)	*	* 25.98	*	*
* Min Ch El (ft)	* 2108.35	* Shear (lb/sq ft)	*	* 0.97	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 13.76	*	*
* Frctn Loss (ft)	* 0.70	* Cum Volume (acre-ft)	*	* 1.89	*	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	*	* 0.74	*	*

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 22250.00

INPUT

Description: LBG Sta. 97+00.00

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2113.18	0	2104.38	10	2104.18	20	2104.38	20	2113.18

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	20	.015

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
	0	20	200	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

				Left OB	Channel	Right OB
* E.G. Elev (ft)	* 2112.43	* Element	*	*	*	*
* Vel Head (ft)	* 5.90	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 2106.54	* Reach Len. (ft)	* 200.00	* 200.00	* 200.00	*
* Crit W.S. (ft)	* 2108.18	* Flow Area (sq ft)	*	* 45.10	*	*
* E.G. Slope (ft/ft)	* 0.016975	* Area (sq ft)	*	* 45.10	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 20.00	* Top Width (ft)	*	* 20.00	*	*
* Vel Total (ft/s)	* 19.49	* Avg. Vel. (ft/s)	*	* 19.49	*	*
* Max Chl Dpth (ft)	* 2.36	* Hydr. Depth (ft)	*	* 2.26	*	*
* Conv. Total (cfs)	* 6745.8	* Conv. (cfs)	*	* 6745.8	*	*
* Length Wtd. (ft)	* 200.00	* Wetted Per. (ft)	*	* 24.31	*	*
* Min Ch El (ft)	* 2104.18	* Shear (lb/sq ft)	*	* 1.97	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 38.31	*	*
* Frctn Loss (ft)	* 1.99	* Cum Volume (acre-ft)	*	* 1.64	*	*
* C & E Loss (ft)	* 0.27	* Cum SA (acres)	*	* 0.65	*	*

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

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 22050

INPUT

Description: LBG Sta. 95+00.00; Grade Break

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2108.2	0	2100.2
10	2100	20	2100.2
20	2100.2	20	2109

Manning's n Values

num= 3	
Sta	n Val
0	.015
0	.015
20	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	20		175	175	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2108.73	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 6.48	* Wt. n-Val.	* 0.015		
* W.S. Elev (ft)	* 2102.25	* Reach Len. (ft)	* 175.00	* 175.00	* 175.00
* Crit W.S. (ft)	* 2104.00	* Flow Area (sq ft)	* 43.04		
* E.G. Slope (ft/ft)	* 0.019621	* Area (sq ft)	* 43.04		
* Q Total (cfs)	* 878.90	* Flow (cfs)	* 878.90		
* Top Width (ft)	* 20.00	* Top Width (ft)	* 20.00		
* Vel Total (ft/s)	* 20.42	* Avg. Vel. (ft/s)	* 20.42		
* Max Chl Dpth (ft)	* 2.25	* Hydr. Depth (ft)	* 2.15		
* Conv. Total (cfs)	* 6274.5	* Conv. (cfs)	* 6274.5		
* Length Wtd. (ft)	* 175.00	* Wetted Per. (ft)	* 24.11		
* Min Ch El (ft)	* 2100.00	* Shear (lb/sq ft)	* 2.19		
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 44.66		
* Frctn Loss (ft)	* 3.65	* Cum Volume (acre-ft)	* 1.44		
* C & E Loss (ft)	* 0.06	* Cum SA (acres)	* 0.55		

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

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

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 21875

INPUT

Description: LBG Sta. 93+25.00

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2104.66	0	2095.88
10	2095.68	20	2095.88
20	2095.88	20	2103.18

Manning's n Values

num= 3	
Sta	n Val
0	.015
0	.015
20	.015

0 .015 0 .015 20 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 20 50 50 50 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft) * 2104.96 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 7.13 * Wt. n-Val. * * 0.015 * *
* W.S. Elev (ft) * 2097.83 * Reach Len. (ft) * 50.00 * 50.00 * 50.00 *
* Crit W.S. (ft) * 2099.68 * Flow Area (sq ft) * * 41.00 * *
* E.G. Slope (ft/ft) * 0.022802 * Area (sq ft) * * 41.00 * *
* Q Total (cfs) * 878.90 * Flow (cfs) * * 878.90 * *
* Top Width (ft) * 20.00 * Top Width (ft) * * 20.00 * *
* Vel Total (ft/s) * 21.43 * Avg. Vel. (ft/s) * * 21.43 * *
* Max Chl Dpth (ft) * 2.15 * Hydr. Depth (ft) * * 2.05 * *
* Conv. Total (cfs) * 5820.4 * Conv. (cfs) * * 5820.4 * *
* Length Wtd. (ft) * 50.00 * Wetted Per. (ft) * * 23.90 * *
* Min Ch El (ft) * 2095.68 * Shear (lb/sq ft) * * 2.44 * *
* Alpha * 1.00 * Stream Power (lb/ft s) * * 52.34 * *
* Frctn Loss (ft) * 3.70 * Cum Volume (acre-ft) * * 1.27 * *
* C & E Loss (ft) * 0.07 * Cum SA (acres) * * 0.47 * *

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: C1 CHANNEL

REACH: MAIN3 RS: 21825

INPUT

Description: LBG Sta. 92+75.00

Station Elevation Data num= 5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

0 2101.71 0 2094.64 10 2094.44 20 2094.64 20 2103.44

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .015 0 .015 20 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 20 275 275 275 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft) * 2103.80 * Element * Left OB * Channel * Right OB *
* Vel Head (ft) * 7.23 * Wt. n-Val. * * 0.015 * *
* W.S. Elev (ft) * 2096.58 * Reach Len. (ft) * 275.00 * 275.00 * 275.00 *
* Crit W.S. (ft) * 2098.44 * Flow Area (sq ft) * * 40.74 * *
* E.G. Slope (ft/ft) * 0.023255 * Area (sq ft) * * 40.74 * *
* Q Total (cfs) * 878.90 * Flow (cfs) * * 878.90 * *
* Top Width (ft) * 20.00 * Top Width (ft) * * 20.00 * *
* Vel Total (ft/s) * 21.57 * Avg. Vel. (ft/s) * * 21.57 * *

* Max Chl Dpth (ft)	* 2.14	* Hydr. Depth (ft)	* 2.04
* Conv. Total (cfs)	* 5763.5	* Conv. (cfs)	* 5763.5
* Length Wtd. (ft)	* 275.00	* Wetted Per. (ft)	* 23.88
* Min Ch El (ft)	* 2094.44	* Shear (lb/sq ft)	* 2.48
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 53.44
* Frctn Loss (ft)	* 1.15	* Cum Volume (acre-ft)	* 1.23
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.45

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: C1 CHANNEL
REACH: MAIN3 RS: 21550

INPUT

Description: LBG Sta. 90+00.00

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2093.65	0	2087.85	10	2087.65	20	2087.85	20	2095.65

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	20	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	20		364	364	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2097.22	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 7.47	* Wt. n-Val.	* 0.015		
* W.S. Elev (ft)	* 2089.75	* Reach Len. (ft)	* 364.00	* 364.00	* 364.00
* Crit W.S. (ft)	* 2091.65	* Flow Area (sq ft)	* 40.08		
* E.G. Slope (ft/ft)	* 0.024477	* Area (sq ft)	* 40.08		
* Q Total (cfs)	* 878.90	* Flow (cfs)	* 878.90		
* Top Width (ft)	* 20.00	* Top Width (ft)	* 20.00		
* Vel Total (ft/s)	* 21.93	* Avg. Vel. (ft/s)	* 21.93		
* Max Chl Dpth (ft)	* 2.10	* Hydr. Depth (ft)	* 2.00		
* Conv. Total (cfs)	* 5617.7	* Conv. (cfs)	* 5617.7		
* Length Wtd. (ft)	* 364.00	* Wetted Per. (ft)	* 23.81		
* Min Ch El (ft)	* 2087.65	* Shear (lb/sq ft)	* 2.57		
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 56.40		
* Frctn Loss (ft)	* 6.56	* Cum Volume (acre-ft)	* 0.97		
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 0.33		

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: C1 CHANNEL
REACH: MAIN3 RS: 21186

INPUT

Description: LBG Sta. 86+36.00; End Access Ramp

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2086.66	0	2078.86
10	2078.66	20	2078.86
20	2086.66		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.015	0	.015
20	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	20		139	139	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

*****		*****		*****		*****	
* E.G. Elev (ft)	* 2088.27	* Element	* Left OB	* Channel	* Right OB	* *	* *
* Vel Head (ft)	* 7.51	* Wt. n-Val.	* *	* 0.015	* *	* *	* *
* W.S. Elev (ft)	* 2080.76	* Reach Len. (ft)	* 139.00	* 139.00	* 139.00	* *	* *
* Crit W.S. (ft)	* 2082.67	* Flow Area (sq ft)	* *	* 39.97	* *	* *	* *
* E.G. Slope (ft/ft)	* 0.024692	* Area (sq ft)	* *	* 39.97	* *	* *	* *
* Q Total (cfs)	* 878.90	* Flow (cfs)	* *	* 878.90	* *	* *	* *
* Top Width (ft)	* 20.00	* Top Width (ft)	* *	* 20.00	* *	* *	* *
* Vel Total (ft/s)	* 21.99	* Avg. Vel. (ft/s)	* *	* 21.99	* *	* *	* *
* Max Chl Dpth (ft)	* 2.10	* Hydr. Depth (ft)	* *	* 2.00	* *	* *	* *
* Conv. Total (cfs)	* 5593.2	* Conv. (cfs)	* *	* 5593.2	* *	* *	* *
* Length Wtd. (ft)	* 139.00	* Wetted Per. (ft)	* *	* 23.80	* *	* *	* *
* Min Ch El (ft)	* 2078.66	* Shear (lb/sq ft)	* *	* 2.59	* *	* *	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	* *	* 56.92	* *	* *	* *
* Frctn Loss (ft)	* 8.95	* Cum Volume (acre-ft)	* *	* 0.64	* *	* *	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* *	* 0.16	* *	* *	* *

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: C1 CHANNEL

REACH: MAIN3

RS: 21047

INPUT

Description: LBG Sta. 84+97.00; Begin Divider Wall for Ramp

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	2081.44	0	2075.64
10	2075.44	20	2075.64
20	2083.44		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.015	0	.015
20	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	20		.1	.1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

*****		*****		*****		*****	
* E.G. Elev (ft)	* 2084.84	* Element	* Left OB	* Channel	* Right OB	* *	* *

* Vel Head (ft)	* 7.27	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 2077.57	* Reach Len. (ft)	* 0.10	* 0.10	* 0.10	*
* Crit W.S. (ft)	* 2079.44	* Flow Area (sq ft)	*	* 40.61	*	*
* E.G. Slope (ft/ft)	* 0.023490	* Area (sq ft)	*	* 40.61	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*
* Top Width (ft)	* 20.00	* Top Width (ft)	*	* 20.00	*	*
* Vel Total (ft/s)	* 21.64	* Avg. Vel. (ft/s)	*	* 21.64	*	*
* Max Chl Dpth (ft)	* 2.13	* Hydr. Depth (ft)	*	* 2.03	*	*
* Conv. Total (cfs)	* 5734.5	* Conv. (cfs)	*	* 5734.5	*	*
* Length Wtd. (ft)	* 0.10	* Wetted Per. (ft)	*	* 23.87	*	*
* Min Ch El (ft)	* 2075.44	* Shear (lb/sq ft)	*	* 2.50	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 54.01	*	*
* Frctn Loss (ft)	* 3.35	* Cum Volume (acre-ft)	*	* 0.51	*	*
* C & E Loss (ft)	* 0.07	* Cum SA (acres)	*	* 0.09	*	*

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: C1 CHANNEL

REACH: MAIN3

RS: 21046.9

INPUT

Description: LBG Sta. 84+80.00; just D/S of divider wall

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2081.39	0	2075.89	16.5	2075.43	33	2075.63	33	2081.39

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	33		8.45	8.45	.1	.3

Ineffective Flow		num= 1			
Sta L	Sta R	Elev	Permanent		
0	13	2081.39	T		

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2084.84	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 7.29	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2077.55	* Reach Len. (ft)	* 8.45	* 8.45	* 8.45
* Crit W.S. (ft)	* 2079.44	* Flow Area (sq ft)	*	* 40.56	*
* E.G. Slope (ft/ft)	* 0.021062	* Area (sq ft)	*	* 64.49	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 33.00	* Top Width (ft)	*	* 33.00	*
* Vel Total (ft/s)	* 21.67	* Avg. Vel. (ft/s)	*	* 21.67	*
* Max Chl Dpth (ft)	* 2.12	* Hydr. Depth (ft)	*	* 2.03	*
* Conv. Total (cfs)	* 6056.1	* Conv. (cfs)	*	* 6056.1	*
* Length Wtd. (ft)	* 8.45	* Wetted Per. (ft)	*	* 21.92	*
* Min Ch El (ft)	* 2075.43	* Shear (lb/sq ft)	*	* 2.43	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 52.72	*
* Frctn Loss (ft)	* 0.00	* Cum Volume (acre-ft)	*	* 0.51	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 0.09	*

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 21038.45

INPUT

Description: LBG Sta. 84+80.00; just D/S of divider wall

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2081.18	0	2075.68	16.5	2075.22	33	2075.42	33	2081.18

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
0	33	8.45	8.45	8.45	.1	.3	

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	6	2081.18	T

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2084.57	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 7.78	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 2076.79	* Reach Len. (ft)	* 8.45	* 8.45	* 8.45
* Crit W.S. (ft)	* 2078.53	* Flow Area (sq ft)	*	* 39.27	*
* E.G. Slope (ft/ft)	* 0.033097	* Area (sq ft)	*	* 46.45	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*
* Top Width (ft)	* 33.00	* Top Width (ft)	*	* 33.00	*
* Vel Total (ft/s)	* 22.38	* Avg. Vel. (ft/s)	*	* 22.38	*
* Max Chl Dpth (ft)	* 1.57	* Hydr. Depth (ft)	*	* 1.45	*
* Conv. Total (cfs)	* 4831.1	* Conv. (cfs)	*	* 4831.1	*
* Length Wtd. (ft)	* 8.45	* Wetted Per. (ft)	*	* 28.38	*
* Min Ch El (ft)	* 2075.22	* Shear (lb/sq ft)	*	* 2.86	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 63.99	*
* Frctn Loss (ft)	* 0.22	* Cum Volume (acre-ft)	*	* 0.50	*
* C & E Loss (ft)	* 0.05	* Cum SA (acres)	*	* 0.09	*

CROSS SECTION

RIVER: C1 CHANNEL

REACH: MAIN3

RS: 21030.00

INPUT

Description: LBG Sta. 84+80.00; End Trans.; Bottom of Access Ramp

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2081.17	0	2075.67	16.5	2075.21	33	2075.41	33	2081.17

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	33		3.13	3.13	.1	.3
Ineffective Flow	num=		1				
Sta L	Sta R	Elev	Permanent				
0	6	2081.17	T				

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2084.18 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 7.35  * Wt. n-Val.       *          * 0.015 *          *
* W.S. Elev (ft)      * 2076.82 * Reach Len. (ft)  * 3.13    * 3.13 *          *
* Crit W.S. (ft)      * 2078.52 * Flow Area (sq ft) *          * 40.39 *          *
* E.G. Slope (ft/ft)  * 0.030193 * Area (sq ft)     *          * 47.82 *          *
* Q Total (cfs)       * 878.90 * Flow (cfs)       *          * 878.90 *          *
* Top Width (ft)      * 33.00 * Top Width (ft)    *          * 33.00 *          *
* Vel Total (ft/s)    * 21.76 * Avg. Vel. (ft/s)  *          * 21.76 *          *
* Max Chl Dpth (ft)   * 1.61 * Hydr. Depth (ft)  *          * 1.50 *          *
* Conv. Total (cfs)   * 5058.1 * Conv. (cfs)       *          * 5058.1 *          *
* Length Wtd. (ft)    * 3.13 * Wetted Per. (ft)  *          * 28.42 *          *
* Min Ch El (ft)      * 2075.21 * Shear (lb/sq ft)  *          * 2.68 *          *
* Alpha              * 1.00 * Stream Power (lb/ft s) *          * 58.29 *          *
* Frctn Loss (ft)     * 0.27 * Cum Volume (acre-ft) *          * 0.49 *          *
* C & E Loss (ft)     * 0.13 * Cum SA (acres)    *          * 0.08 *          *
*****

```

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 21026.87

INPUT

Description: LBG Sta. 84+80.00; Bottom of Access Ramp

Station Elevation Data	num=		5				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2081.18	0	2075.68	16.5	2075.22	33	2075.42
						33	2081.18

Manning's n Values	num=		3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	33	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	33		.1	.1	.1	.3
Ineffective Flow	num=		1				
Sta L	Sta R	Elev	Permanent				
0	13	2081.18	T				

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2083.79 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 6.30  * Wt. n-Val.       *          * 0.015 *          *
* W.S. Elev (ft)      * 2077.49 * Reach Len. (ft)  * 0.10    * 0.10 *          *
* Crit W.S. (ft)      * 2079.21 * Flow Area (sq ft) *          * 43.63 *          *
* E.G. Slope (ft/ft)  * 0.016668 * Area (sq ft)     *          * 69.55 *          *
* Q Total (cfs)       * 878.90 * Flow (cfs)       *          * 878.90 *          *
* Top Width (ft)      * 33.00 * Top Width (ft)    *          * 33.00 *          *
* Vel Total (ft/s)    * 20.14 * Avg. Vel. (ft/s)  *          * 20.14 *          *
* Max Chl Dpth (ft)   * 2.27 * Hydr. Depth (ft)  *          * 2.18 *          *
*****

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• Conv. Total (cfs)	* 6807.7	• Conv. (cfs)	*	*	6807.7	*	*
• Length Wtd. (ft)	* 0.10	• Wetted Per. (ft)	*	*	22.08	*	*
* Min Ch El (ft)	* 2075.22	* Shear (lb/sq ft)	*	*	2.06	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	41.43	*	*
• Frctn Loss (ft)	* 0.07	* Cum Volume (acre-ft)	*	*	0.48	*	*
* C & E Loss (ft)	* 0.32	* Cum SA (acres)	*	*	0.08	*	*

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

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 21026.77

INPUT

Description: LBG Sta. 84+76.77; Bottom of Access Ramp

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
0	2081.17	10	2075.17
20	2075.37	20	2081.17

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.015	20	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	20		26.77	26.77	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2083.79	* Element	• Left OB	• Channel	* Right OB
* Vel Head (ft)	* 6.34	* Wt. n-Val.	•	0.015	*
* W.S. Elev (ft)	* 2077.44	* Reach Len. (ft)	* 26.77	* 26.77	• 26.77 •
* Crit W.S. (ft)	* 2079.17	* Flow Area (sq ft)	*	43.48	*
* E.G. Slope (ft/ft)	* 0.019011	* Area (sq ft)	*	43.48	*
* Q Total (cfs)	• 878.90	* Flow (cfs)	*	878.90	*
* Top Width (ft)	* 20.00	* Top Width (ft)	*	20.00	*
* Vel Total (ft/s)	* 20.21	* Avg. Vel. (ft/s)	•	20.21	*
* Max Chl Dpth (ft)	* 2.27	* Hydr. Depth (ft)	*	2.17	•
* Conv. Total (cfs)	* 6374.4	* Conv. (cfs)	•	6374.4	*
* Length Wtd. (ft)	* 26.77	* Wetted Per. (ft)	*	24.15	*
* Min Ch El (ft)	* 2075.17	* Shear (lb/sq ft)	*	2.14	•
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	43.19	•
* Frctn Loss (ft)	* 0.00	* Cum Volume (acre-ft)	*	0.48	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	0.08	•

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN3 RS: 21000

INPUT

Description: LBG Sta 84+50 - Headworks of C-1 Ph.1, rect. sect., 20' bottom

width	
Station Elevation Data	num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2080	.99	2080	1	2074.07	21	2074.07	21	2080

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	.99	.015	21	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	.99	21		144.75	144.75	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2083.17	* Element	* Left OB	* Channel	* Right OB	*	*	*	*
* Vel Head (ft)	* 7.03	* Wt. n-Val.	*	* 0.015	*	*	*	*	*
* W.S. Elev (ft)	* 2076.14	* Reach Len. (ft)	* 144.75	* 144.75	* 144.75	*	*	*	*
* Crit W.S. (ft)	* 2077.97	* Flow Area (sq ft)	*	* 41.30	*	*	*	*	*
* E.G. Slope (ft/ft)	* 0.022545	* Area (sq ft)	*	* 41.30	*	*	*	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	*	* 878.90	*	*	*	*	*
* Top Width (ft)	* 20.00	* Top Width (ft)	*	* 20.00	*	*	*	*	*
* Vel Total (ft/s)	* 21.28	* Avg. Vel. (ft/s)	*	* 21.28	*	*	*	*	*
* Max Chl Dpth (ft)	* 2.06	* Hydr. Depth (ft)	*	* 2.06	*	*	*	*	*
* Conv. Total (cfs)	* 5853.5	* Conv. (cfs)	*	* 5853.5	*	*	*	*	*
* Length Wtd. (ft)	* 144.75	* Wetted Per. (ft)	*	* 24.13	*	*	*	*	*
* Min Ch El (ft)	* 2074.07	* Shear (lb/sq ft)	*	* 2.41	*	*	*	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 51.27	*	*	*	*	*
* Frctn Loss (ft)	* 0.55	* Cum Volume (acre-ft)	*	* 0.46	*	*	*	*	*
* C & E Loss (ft)	* 0.07	* Cum SA (acres)	*	* 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: C1 CHANNEL

REACH: MAIN3 RS: 20855.25

INPUT

Description: LBG Sta 83+05.25 - Grade Break - rectangular section upstream of Boulder Highway, 20' bw

Station	Elevation	Data	num=	Sta	Elev	Sta	Elev	Sta	Elev
0	2076.5	.99	2075	1	2070.49	21	2070.49	21	2076.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	.99	.015	21	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	.99	21		305.25	305.25	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2079.80	* Element	* Left OB	* Channel	* Right OB	*	*	*	*
* Vel Head (ft)	* 7.27	* Wt. n-Val.	*	* 0.015	*	*	*	*	*
* W.S. Elev (ft)	* 2072.52	* Reach Len. (ft)	*	*	*	*	*	*	*

* Crit W.S. (ft)	• 2074.39	* Flow Area (sq ft)	*	*	40.61	*	*
* E.G. Slope (ft/ft)	* 0.023761	* Area (sq ft)	*	*	40.61	*	*
* Q Total (cfs)	* 878.90	* Flow (cfs)	•	*	878.90	*	*
* Top Width (ft)	* 20.00	* Top Width (ft)	•	*	20.00	*	*
* Vel Total (ft/s)	• 21.65	* Avg. Vel. (ft/s)	*	•	21.65	•	•
* Max Chl Dpth (ft)	* 2.03	* Hydr. Depth (ft)	*	*	2.03	*	*
* Conv. Total (cfs)	* 5701.7	* Conv. (cfs)	*	*	5701.7	*	*
* Length Wtd. (ft)	•	* Wetted Per. (ft)	*	*	24.06	*	•
* Min Ch El (ft)	• 2070.49	* Shear (lb/sq ft)	•	•	2.50	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	•	*	54.19	*	*
* Frctn Loss (ft)	* 3.35	* Cum Volume (acre-ft)	*	•	0.32	*	•
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	*		*	*

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: C1 CHANNEL
REACH: HDWORKS

RS: 20710.41

INPUT

Description: LBG Sta 83+60.41 - System Headworks, Rectangular

Station Elevation Data		num= 8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
21.67	2078	21.67	2068	41.67	2068	41.67	2078	42.33	2078
42.33	2068	62.33	2068	62.33	2078				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
21.67	.015	21.67	.015	62.33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	21.67	62.33		174.24	160.31	146.38	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2070.25	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	• 0.75	* Wt. n-Val.	•	* 0.015	•
* W.S. Elev (ft)	* 2069.50	* Reach Len. (ft)	* 174.24	* 160.31	* 146.38
* Crit W.S. (ft)	* 2069.50	* Flow Area (sq ft)	*	* 59.84	•
* E.G. Slope (ft/ft)	* 0.003481	* Area (sq ft)	•	* 59.84	*
* Q Total (cfs)	* 416.90	* Flow (cfs)	*	* 416.90	*
* Top Width (ft)	* 40.00	* Top Width (ft)	*	* 40.00	•
* Vel Total (ft/s)	* 6.97	* Avg. Vel. (ft/s)	*	* 6.97	*
* Max Chl Dpth (ft)	* 1.50	* Hydr. Depth (ft)	*	* 1.50	*
* Conv. Total (cfs)	* 7066.3	* Conv. (cfs)	*	* 7066.3	*
* Length Wtd. (ft)	• 160.31	* Wetted Per. (ft)	*	* 45.98	*
* Min Ch El (ft)	* 2068.00	* Shear (lb/sq ft)	*	* 0.28	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.97	*
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	• 0.17	•
* C & E Loss (ft)	*	* Cum SA (acres)	•	• 0.15	*

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: C1 CHANNEL
REACH: HDWORKS

RS: 20550.1

INPUT

Description: LBG Sta 82+00 upstream of Boulder Highway, Rectangular Section

Station Elevation Data		num= 8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
21.67	2075	21.67	2065.5	41.67	2065.5	41.67	2075	42.33	2075
42.33	2065.5	62.33	2065.5	62.33	2075				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
21.67	.015	21.67	.015	62.33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	21.67	62.33		.1	.1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2068.89	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 2.58	* Wt. n-Val.	* 0.015		
* W.S. Elev (ft)	* 2066.31	* Reach Len. (ft)	* 305.25	* 305.25	* 305.25
* Crit W.S. (ft)	* 2067.00	* Flow Area (sq ft)		* 32.32	
* E.G. Slope (ft/ft)	* 0.024979	* Area (sq ft)		* 32.32	
* Q Total (cfs)	* 416.90	* Flow (cfs)		* 416.90	
* Top Width (ft)	* 40.00	* Top Width (ft)		* 40.00	
* Vel Total (ft/s)	* 12.90	* Avg. Vel. (ft/s)		* 12.90	
* Max Chl Dpth (ft)	* 0.81	* Hydr. Depth (ft)		* 0.81	
* Conv. Total (cfs)	* 2637.8	* Conv. (cfs)		* 2637.8	
* Length Wtd. (ft)	* 305.25	* Wetted Per. (ft)		* 43.23	
* Min Ch El (ft)	* 2065.50	* Shear (lb/sq ft)		* 1.17	
* Alpha	* 1.00	* Stream Power (lb/ft s)		* 15.04	
* Frctn Loss (ft)	* 1.18	* Cum Volume (acre-ft)			
* C & E Loss (ft)	* 0.18	* Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

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

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN2

RS: 20550.1

INPUT

Description: LBG Sta 80+00 upstream of Boulder Highway--begin rectangular section, 20' bw

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2075	.99	2075	1	2065.5	21	2065.5	21	2075

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .015 .99 .015 21 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .99 21 .1 .1 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2072.63 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 4.57  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)     * 2068.06 * Reach Len. (ft) *      * 0.10 *      * 0.10 *
* Crit W.S. (ft)     *      * Flow Area (sq ft) *      *      * 51.24 *      *
* E.G. Slope (ft/ft) * 0.011589 * Area (sq ft) *      *      * 51.24 *      *
* Q Total (cfs)      * 878.90 * Flow (cfs) *      *      * 878.90 *      *
* Top Width (ft)     * 20.00 * Top Width (ft) *      *      * 20.00 *      *
* Vel Total (ft/s)   * 17.15 * Avg. Vel. (ft/s) *      *      * 17.15 *      *
* Max Chl Dpth (ft) * 2.56  * Hydr. Depth (ft) *      *      * 2.56 *      *
* Conv. Total (cfs) * 8164.2 * Conv. (cfs) *      *      * 8164.2 *      *
* Length Wtd. (ft)  * 0.10  * Wetted Per. (ft) *      *      * 25.12 *      *
* Min Ch El (ft)    * 2065.50 * Shear (lb/sq ft) *      *      * 1.48 *      *
* Alpha             * 1.00  * Stream Power (lb/ft s) *      *      * 25.31 *      *
* Frctn Loss (ft)   *      * Cum Volume (acre-ft) *      *      * 0.97 *      *
* C & E Loss (ft)   *      * Cum SA (acres) *      *      * 0.68 *      *
*****
```

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN2 RS: 20550

INPUT

Description: LBG Sta 80+00 Upstream face of Boulder Highway Bridge

Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 2075 .99 2075 1 2065.5 62.33 2065.5 62.33 2075
 63.33 2075

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .015 .99 .015 62.33 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .99 62.33 150 150 150 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

```
*****
* E.G. Elev (ft)      * 2072.50 * Element      * Left OB * Channel * Right OB *
* Vel Head (ft)      * 5.92  * Wt. n-Val.   *      *      * 0.015 *      *
* W.S. Elev (ft)     * 2066.58 * Reach Len. (ft) *      * 150.00 *      * 150.00 *
* Crit W.S. (ft)     * 2067.89 * Flow Area (sq ft) *      *      * 66.39 *      *
* E.G. Slope (ft/ft) * 0.036577 * Area (sq ft) *      *      * 66.39 *      *
* Q Total (cfs)      * 1295.80 * Flow (cfs) *      *      * 1295.80 *      *
* Top Width (ft)     * 61.33 * Top Width (ft) *      *      * 61.33 *      *
* Vel Total (ft/s)   * 19.52 * Avg. Vel. (ft/s) *      *      * 19.52 *      *
* Max Chl Dpth (ft) * 1.08  * Hydr. Depth (ft) *      *      * 1.08 *      *
```

* Conv. Total (cfs)	* 6775.4	* Conv. (cfs)	*	* 6775.4	*
* Length Wtd. (ft)	* 150.00	* Wetted Per. (ft)	*	* 63.50	*
* Min Ch El (ft)	* 2065.50	* Shear (lb/sq ft)	*	* 2.39	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 46.60	*
* Frctn Loss (ft)	* 0.00	* Cum Volume (acre-ft)	*	* 0.97	*
* C & E Loss (ft)	* 0.13	* Cum SA (acres)	*	* 0.68	*

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

CULVERT

RIVER: C1 CHANNEL
 REACH: MAIN2 RS: 20475

INPUT

Description: Boulder Highway Bridge
 Distance from Upstream XS = .1
 Deck/Roadway Width = 149.8
 Weir Coefficient = 2.6
 Upstream Deck/Roadway Coordinates

num= 2

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	2075	2072.5	62.33	2075	2072.5				

Upstream Bridge Cross Section Data

Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2075	.99	2075	1	2065.5	62.33	2065.5	62.33	2075
63.33	2075								

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	.99	.015	62.33	.015

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	.99	62.33	.1		.3

Downstream Deck/Roadway Coordinates

num= 2

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	2065.58	2064	62.33	2065.58	2064				

Downstream Bridge Cross Section Data

Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2065.58	.99	2065.58	1	2057	62.33	2057	62.33	2065.58
63.33	2065.58								

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	.99	.015	62.33	.015

Bank Sta: Left Right Coeff Contr. Expan.
 .99 62.33 .1 .3

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 =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Culvert #1 Box 7 20
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 .1 149.9 .015 .015 0 .3 1
 Number of Barrels = 3
 Upstream Elevation = 2065.5
 Centerline Stations
 Sta. Sta. Sta.
 11 31.67 52.33
 Downstream Elevation = 2057
 Centerline Stations
 Sta. Sta. Sta.
 11 31.67 52.33

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #1

```
*****
* Q Culv Group (cfs)      * 1295.80 * Culv Full Len (ft)      *      *
* # Barrels              *      3  * Culv Vel US (ft/s)      * 16.89 *
* Q Barrel (cfs)         * 431.93 * Culv Vel DS (ft/s)      * 21.22 *
* E.G. US. (ft)          * 2072.50 * Culv Inv El Up (ft)      * 2065.50 *
* W.S. US. (ft)          * 2072.50 * Culv Inv El Dn (ft)      * 2057.00 *
* E.G. DS (ft)           * 2064.67 * Culv Frctn Ls (ft)      * 6.20 *
* W.S. DS (ft)           * 2058.02 * Culv Exit Loss (ft)      * 0.34 *
* Delta EG (ft)          * 7.82  * Culv Entr Loss (ft)      * 1.29 *
* Delta WS (ft)          * 14.48 * Q Weir (cfs)            *      *
* E.G. IC (ft)           *      * Weir Sta Lft (ft)        *      *
* E.G. OC (ft)           *      * Weir Sta Rgt (ft)        *      *
* Culvert Control        * Outlet * Weir Submerg            *      *
* Culv WS Inlet (ft)      * 2066.78 * Weir Max Depth (ft)      *      *
* Culv WS Outlet (ft)     * 2058.02 * Weir Avg Depth (ft)      *      *
* Culv Nml Depth (ft)     * 0.99  * Weir Flow Area (sq ft)   *      *
* Culv Crt Depth (ft)     * 2.44  * Min El Weir Flow (ft)    * 2075.01 *
*****
```

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN2 RS: 20400

INPUT

Description: LBG sta. 7850, begin rectangular channel section, grade break,
 channel bottom width 61'4" per plans; outlet of Boulder Highway
 crossing.

Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2065.58	.99	2065.58	1	2057	62.33	2057	62.33	2065.58
63.33	2065.58								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	.99	.015	62.33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	.99	62.33		120	120	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2064.67	* Element	* Left OB	* Channel	* Right OB	*			*
* Vel Head (ft)	* 6.65	* Wt. n-Val.	*	* 0.015	*	*			*
* W.S. Elev (ft)	* 2058.02	* Reach Len. (ft)	* 120.00	* 120.00	* 120.00	*			*
* Crit W.S. (ft)	* 2059.39	* Flow Area (sq ft)	*	* 62.60	*	*			*
* E.G. Slope (ft/ft)	* 0.044375	* Area (sq ft)	*	* 62.60	*	*			*
* Q Total (cfs)	* 1295.80	* Flow (cfs)	*	* 1295.80	*	*			*
* Top Width (ft)	* 61.33	* Top Width (ft)	*	* 61.33	*	*			*
* Vel Total (ft/s)	* 20.70	* Avg. Vel. (ft/s)	*	* 20.70	*	*			*
* Max Chl Dpth (ft)	* 1.02	* Hydr. Depth (ft)	*	* 1.02	*	*			*
* Conv. Total (cfs)	* 6151.3	* Conv. (cfs)	*	* 6151.3	*	*			*
* Length Wtd. (ft)	* 120.00	* Wetted Per. (ft)	*	* 63.37	*	*			*
* Min Ch El (ft)	* 2057.00	* Shear (lb/sq ft)	*	* 2.74	*	*			*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 56.65	*	*			*
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	* 0.75	*	*			*
* C & E Loss (ft)	*	* Cum SA (acres)	*	* 0.47	*	*			*

CROSS SECTION

RIVER: C1 CHANNEL
 REACH: MAIN2 RS: 20280

INPUT

Description: LBG sta. 7730, begin rectangular channel section, grade break,
 channel bottom width 61'4" per plans

Station	Elevation	Data	num=	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2060.16		6	.99	2060.16	1	2052.66	62.33	2052.66	62.33	2060.16
63.33	2060.16										

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	.99	.015	62.33	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	.99	62.33		100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2059.63	* Element	* Left OB	* Channel	* Right OB	*			*
* Vel Head (ft)	* 5.89	* Wt. n-Val.	*	* 0.015	*	*			*
* W.S. Elev (ft)	* 2053.75	* Reach Len. (ft)	* 100.00	* 100.00	* 100.00	*			*
* Crit W.S. (ft)	* 2055.05	* Flow Area (sq ft)	*	* 66.54	*	*			*

* E.G. Slope (ft/ft)	* 0.036307	* Area (sq ft)	*	* 66.54	*	*
* Q Total (cfs)	* 1295.80	* Flow (cfs)	*	* 1295.80	*	•
* Top Width (ft)	* 61.33	* Top Width (ft)	*	* 61.33	*	*
* Vel Total (ft/s)	* 19.47	* Avg. Vel. (ft/s)	*	* 19.47	*	*
* Max Chl Dpth (ft)	* 1.08	* Hydr. Depth (ft)	*	* 1.08	*	*
* Conv. Total (cfs)	* 6800.5	* Conv. (cfs)	*	* 6800.5	*	*
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	* 63.50	*	*
* Min Ch El (ft)	* 2052.66	* Shear (lb/sq ft)	*	* 2.38	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 46.25	*	•
* Frctn Loss (ft)	* 4.80	* Cum Volume (acre-ft)	*	* 0.57	*	*
* C & E Loss (ft)	* 0.23	* Cum SA (acres)	•	* 0.30	•	*

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: C1 CHANNEL

REACH: MAIN2

RS: 20180

INPUT

Description: lbg sta 7630, begin transition to rectangular section

Station Elevation Data		num=	4
Sta	Elev	Sta	Elev
0	2058.43	15	2050.93
40	2050.93	55	2058.43

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.015	0	.015
55	.015		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	55		30	30	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2057.45	* Element	• Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 3.80	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 2053.65	* Reach Len. (ft)	* 30.00	* 30.00	* 30.00	*
* Crit W.S. (ft)	* 2054.83	* Flow Area (sq ft)	*	* 82.79	•	•
* E.G. Slope (ft/ft)	* 0.008581	* Area (sq ft)	*	* 82.79	*	*
* Q Total (cfs)	* 1295.80	* Flow (cfs)	*	* 1295.80	*	*
* Top Width (ft)	* 35.88	* Top Width (ft)	*	* 35.88	*	*
* Vel Total (ft/s)	* 15.65	* Avg. Vel. (ft/s)	*	* 15.65	*	*
* Max Chl Dpth (ft)	* 2.72	* Hydr. Depth (ft)	*	* 2.31	*	*
* Conv. Total (cfs)	* 13988.4	* Conv. (cfs)	*	* 13988.4	*	*
* Length Wtd. (ft)	* 30.00	* Wetted Per. (ft)	*	* 37.16	*	*
* Min Ch El (ft)	* 2050.93	* Shear (lb/sq ft)	*	* 1.19	*	•
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 18.68	*	*
* Frctn Loss (ft)	* 1.55	* Cum Volume (acre-ft)	•	* 0.40	*	*
* C & E Loss (ft)	* 0.63	* Cum SA (acres)	*	* 0.19	•	*

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

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN2

RS: 20150

INPUT

Description: lbg sta 7600, bottom width 25', depth 7.5 typical

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2057.92	15	2050.42	40	2050.42	55	2057.92

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	55	.015

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	55		200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2057.15	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 4.10	* Wt. n-Val.	* *	* 0.015	* *
* W.S. Elev (ft)	* 2053.06	* Reach Len. (ft)	* 200.00	* 200.00	* 200.00
* Crit W.S. (ft)	* 2054.32	* Flow Area (sq ft)	* *	* 79.77	* *
* E.G. Slope (ft/ft)	* 0.009580	* Area (sq ft)	* *	* 79.77	* *
* Q Total (cfs)	* 1295.80	* Flow (cfs)	* *	* 1295.80	* *
* Top Width (ft)	* 35.54	* Top Width (ft)	* *	* 35.54	* *
* Vel Total (ft/s)	* 16.24	* Avg. Vel. (ft/s)	* *	* 16.24	* *
* Max Chl Dpth (ft)	* 2.64	* Hydr. Depth (ft)	* *	* 2.24	* *
* Conv. Total (cfs)	* 13239.1	* Conv. (cfs)	* *	* 13239.1	* *
* Length Wtd. (ft)	* 200.00	* Wetted Per. (ft)	* *	* 36.79	* *
* Min Ch El (ft)	* 2050.42	* Shear (lb/sq ft)	* *	* 1.30	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	* *	* 21.07	* *
* Frctn Loss (ft)	* 0.27	* Cum Volume (acre-ft)	* *	* 0.34	* *
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* *	* 0.16	* *

CROSS SECTION

RIVER: C1 CHANNEL
REACH: MAIN2

RS: 19950

INPUT

Description: lbg sta 74+00, grade break, bottom width 25'

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2054.49	15	2046.99	40	2046.99	55	2054.49

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	55	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	55	163.51 163.51	163.51	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

```

*****
* E.G. Elev (ft)      * 2054.71 * Element          * Left OB * Channel * Right OB *
* Vel Head (ft)      * 5.37  * Wt. n-Val.      *          * 0.015 *          *
* W.S. Elev (ft)     * 2049.34 * Reach Len. (ft) *          *          *          *
* Crit W.S. (ft)     * 2050.89 * Flow Area (sq ft) *          * 69.69 *          *
* E.G. Slope (ft/ft) * 0.014331 * Area (sq ft)    *          * 69.69 *          *
* Q Total (cfs)      * 1295.80 * Flow (cfs)      *          * 1295.80 *          *
* Top Width (ft)     * 34.39  * Top Width (ft)  *          * 34.39 *          *
* Vel Total (ft/s)   * 18.59  * Avg. Vel. (ft/s) *          * 18.59 *          *
* Max Chl Dpth (ft)  * 2.35   * Hydr. Depth (ft) *          * 2.03 *          *
* Conv. Total (cfs)  * 10824.2 * Conv. (cfs)     *          * 10824.2 *          *
* Length Wtd. (ft)   *          * Wetted Per. (ft) *          * 35.50 *          *
* Min Ch El (ft)     * 2046.99 * Shear (lb/sq ft) *          * 1.76 *          *
* Alpha              * 1.00   * Stream Power (lb/ft s) *          * 32.66 *          *
* Frctn Loss (ft)    * 2.32   * Cum Volume (acre-ft) *          *          *          *
* C & E Loss (ft)    * 0.13   * Cum SA (acres)      *          *          *          *
*****

```

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:C1 CHANNEL

```

*****
* Reach      * River Sta. * n1      * n2      * n3      *
*****
*MAIN3      * 26504.4    * .015*   .015*   .015*
*MAIN3      * 26395      * .015*   .015*   .015*
*MAIN3      * 26350      * .015*   .015*   .015*
*MAIN3      * 26198.52   * .015*   .015*   .015*
*MAIN3      * 26097.91   * .015*   .015*   .015*
*MAIN3      * 26053.68   * .015*   .015*   .015*
*MAIN3      * 25966.13   * .015*   .015*   .015*
*MAIN3      * 25865.52   * .015*   .015*   .015*
*MAIN3      * 25750      * .015*   .015*   .015*
*MAIN3      * 25660      * .015*   .015*   .015*
*MAIN3      * 25650      * .015*   .015*   .015*
*MAIN3      * 25350      * .015*   .015*   .015*
*MAIN3      * 25075      * .015*   .015*   .015*
*MAIN3      * 25050      * .015*   .015*   .015*
*MAIN3      * 24969.85   * .015*   .015*   .015*
*MAIN3      * 24940.19   * .015*   .015*   .015*
*MAIN3      * 24910.53   * .015*   .015*   .015*
*MAIN3      * 24850      * .015*   .015*   .015*
*MAIN3      * 24756.73   * .015*   .015*   .015*
*MAIN3      * 24750.00   * .015*   .015*   .015*
*MAIN3      * 24550      * .015*   .015*   .015*
*MAIN3      * 24350      * .015*   .015*   .015*
*MAIN3      * 24150      * .015*   .015*   .015*
*MAIN3      * 24000      * .015*   .015*   .015*
*MAIN3      * 23850      * .015*   .015*   .015*

```

*MAIN3	*	23700	*	.015*	.015*	.015*
*MAIN3	*	23555	*	.015*	.015*	.015*
*MAIN3	*	23505.48	*	.015*	.015*	.015*
*MAIN3	*	23450	*	.015*	.015*	.015*
*MAIN3	*	23445.50	*	.015*	.015*	.015*
*MAIN3	*	23425.50	*	.015*	.015*	.015*
*MAIN3	*	23418.50	*	.015*	.015*	.015*
*MAIN3	*	23413.90	*	.015*	.015*	.015*
*MAIN3	*	23405.50	*Bridge	*	*	*
*MAIN3	*	23397.1	*	.015*	.015*	.015*
*MAIN3	*	23390.00	*	.015*	.015*	.015*
*MAIN3	*	23253	*	.015*	.015*	.015*
*MAIN3	*	23122.96	*	.015*	.015*	.015*
*MAIN3	*	23095.66	*	.015*	.015*	.015*
*MAIN3	*	23025.00	*	.015*	.015*	.015*
*MAIN3	*	23016.33	*	.015*	.015*	.015*
*MAIN3	*	22986.30	*	.015*	.015*	.015*
*MAIN3	*	22768.15	*Bridge	*	*	*
*MAIN3	*	22550	*	.015*	.015*	.015*
*MAIN3	*	22450	*	.015*	.015*	.015*
*MAIN3	*	22250.00	*	.015*	.015*	.015*
*MAIN3	*	22050	*	.015*	.015*	.015*
*MAIN3	*	21875	*	.015*	.015*	.015*
*MAIN3	*	21825	*	.015*	.015*	.015*
*MAIN3	*	21550	*	.015*	.015*	.015*
*MAIN3	*	21186	*	.015*	.015*	.015*
*MAIN3	*	21047	*	.015*	.015*	.015*
*MAIN3	*	21046.9	*	.015*	.015*	.015*
*MAIN3	*	21038.45	*	.015*	.015*	.015*
*MAIN3	*	21030.00	*	.015*	.015*	.015*
*MAIN3	*	21026.87	*	.015*	.015*	.015*
*MAIN3	*	21026.77	*	.015*	.015*	.015*
*MAIN3	*	21000	*	.015*	.015*	.015*
*MAIN3	*	20855.25	*	.015*	.015*	.015*
*HDWORKS	*	20710.41	*	.015*	.015*	.015*
*HDWORKS	*	20550.1	*	.015*	.015*	.015*
*MAIN2	*	20550.1	*	.015*	.015*	.015*
*MAIN2	*	20550	*	.015*	.015*	.015*
*MAIN2	*	20475	*Culvert	*	*	*
*MAIN2	*	20400	*	.015*	.015*	.015*
*MAIN2	*	20280	*	.015*	.015*	.015*
*MAIN2	*	20180	*	.015*	.015*	.015*
*MAIN2	*	20150	*	.015*	.015*	.015*
*MAIN2	*	19950	*	.015*	.015*	.015*

SUMMARY OF REACH LENGTHS

River: C1 CHANNEL

* Reach	* River Sta.	* Left	* Channel	* Right
MAIN3	26504.4	109.4	109.4*	109.4*
MAIN3	26395	45	45*	45*
MAIN3	26350	151.48	151.48*	151.48*
MAIN3	26198.52	100.61	100.61*	100.61*
MAIN3	26097.91	44.23	44.23*	44.23*
MAIN3	26053.68	87.55	87.55*	87.55*
MAIN3	25966.13	100.61	100.61*	100.61*

*MAIN3	*	25865.52	*	115.52*	115.52*	115.52*
*MAIN3	*	25750	*	90*	90*	90*
*MAIN3	*	25660	*	10*	10*	10*
*MAIN3	*	25650	*	300*	300*	300*
*MAIN3	*	25350	*	275*	275*	275*
*MAIN3	*	25075	*	25*	25*	25*
*MAIN3	*	25050	*	80.15*	80.15*	80.15*
*MAIN3	*	24969.85	*	29.66*	29.66*	29.66*
*MAIN3	*	24940.19	*	29.66*	29.66*	29.66*
*MAIN3	*	24910.53	*	60.53*	60.53*	60.53*
*MAIN3	*	24850	*	93.27*	93.27*	93.27*
*MAIN3	*	24756.73	*	6.73*	6.73*	6.73*
*MAIN3	*	24750.00	*	200*	200*	200*
*MAIN3	*	24550	*	100*	100*	100*
*MAIN3	*	24350	*	200*	200*	200*
*MAIN3	*	24150	*	150*	150*	150*
*MAIN3	*	24000	*	150*	150*	150*
*MAIN3	*	23850	*	150*	150*	150*
*MAIN3	*	23700	*	145*	145*	145*
*MAIN3	*	23555	*	49.52*	49.52*	49.52*
*MAIN3	*	23505.48	*	55.45*	55.45*	55.45*
*MAIN3	*	23450	*	4.5*	4.5*	4.5*
*MAIN3	*	23445.50	*	20*	20*	20*
*MAIN3	*	23425.50	*	7*	7*	7*
*MAIN3	*	23418.50	*	4.6*	4.6*	4.6*
*MAIN3	*	23413.90	*	16.8*	16.8*	16.8*
*MAIN3	*	23405.50	*Bridge	*	*	*
*MAIN3	*	23397.1	*	7.1*	7.1*	7.1*
*MAIN3	*	23390.00	*	140*	140*	140*
*MAIN3	*	23253	*	130.04*	130.04*	130.04*
*MAIN3	*	23122.96	*	27.3*	27.3*	27.3*
*MAIN3	*	23095.66	*	70.66*	70.66*	70.66*
*MAIN3	*	23025.00	*	8.67*	8.67*	8.67*
*MAIN3	*	23016.33	*	30.03*	30.03*	30.03*
*MAIN3	*	22986.30	*	436*	436*	436*
*MAIN3	*	22768.15	*Bridge	*	*	*
*MAIN3	*	22550	*	100*	100*	100*
*MAIN3	*	22450	*	200*	200*	200*
*MAIN3	*	22250.00	*	200*	200*	200*
*MAIN3	*	22050	*	175*	175*	175*
*MAIN3	*	21875	*	50*	50*	50*
*MAIN3	*	21825	*	275*	275*	275*
*MAIN3	*	21550	*	364*	364*	364*
*MAIN3	*	21186	*	139*	139*	139*
*MAIN3	*	21047	*	.1*	.1*	.1*
*MAIN3	*	21046.9	*	8.45*	8.45*	8.45*
*MAIN3	*	21038.45	*	8.45*	8.45*	8.45*
*MAIN3	*	21030.00	*	3.13*	3.13*	3.13*
*MAIN3	*	21026.87	*	.1*	.1*	.1*
*MAIN3	*	21026.77	*	26.77*	26.77*	26.77*
*MAIN3	*	21000	*	144.75*	144.75*	144.75*
*MAIN3	*	20855.25	*	305.25*	305.25*	305.25*
*HDWORKS	*	20710.41	*	174.24*	160.31*	146.38*
*HDWORKS	*	20550.1	*	.1*	.1*	.1*
*MAIN2	*	20550.1	*	.1*	.1*	.1*
*MAIN2	*	20550	*	150*	150*	150*
*MAIN2	*	20475	*Culvert	*	*	*
*MAIN2	*	20400	*	120*	120*	120*
*MAIN2	*	20280	*	100*	100*	100*
*MAIN2	*	20180	*	30*	30*	30*
*MAIN2	*	20150	*	200*	200*	200*

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*MAIN2      *    19950      *   163.51*   163.51*   163.51*
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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: C1 CHANNEL

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*****
* Reach      * River Sta. * Contr. * Expan. *
*****
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*MAIN3	*	26504.4	*.1*	.3*
*MAIN3	*	26395	*.1*	.3*
*MAIN3	*	26350	*.1*	.3*
*MAIN3	*	26198.52*	.1*	.3*
*MAIN3	*	26097.91*	.1*	.3*
*MAIN3	*	26053.68*	.1*	.3*
*MAIN3	*	25966.13*	.1*	.3*
*MAIN3	*	25865.52*	.1*	.3*
*MAIN3	*	25750	*.1*	.3*
*MAIN3	*	25660	*.1*	.3*
*MAIN3	*	25650	*.1*	.3*
*MAIN3	*	25350	*.1*	.3*
*MAIN3	*	25075	*.1*	.3*
*MAIN3	*	25050	*.1*	.3*
*MAIN3	*	24969.85*	.1*	.3*
*MAIN3	*	24940.19*	.1*	.3*
*MAIN3	*	24910.53*	.1*	.3*
*MAIN3	*	24850	*.1*	.3*
*MAIN3	*	24756.73*	.1*	.3*
*MAIN3	*	24750.00*	.1*	.3*
*MAIN3	*	24550	*.1*	.3*
*MAIN3	*	24350	*.1*	.3*
*MAIN3	*	24150	*.1*	.3*
*MAIN3	*	24000	*.1*	.3*
*MAIN3	*	23850	*.1*	.3*
*MAIN3	*	23700	*.1*	.3*
*MAIN3	*	23555	*.1*	.3*
*MAIN3	*	23505.48*	.1*	.3*
*MAIN3	*	23450	*.1*	.3*
*MAIN3	*	23445.50*	.1*	.3*
*MAIN3	*	23425.50*	.1*	.3*
*MAIN3	*	23418.50*	.1*	.3*
*MAIN3	*	23413.90*	.1*	.3*
*MAIN3	*	23405.50*Bridge	*	*
*MAIN3	*	23397.1	*.1*	.3*
*MAIN3	*	23390.00*	.1*	.3*
*MAIN3	*	23253	*.1*	.3*
*MAIN3	*	23122.96*	.1*	.3*
*MAIN3	*	23095.66*	.1*	.3*
*MAIN3	*	23025.00*	.1*	.3*
*MAIN3	*	23016.33*	.1*	.3*
*MAIN3	*	22986.30*	.1*	.3*
*MAIN3	*	22768.15*Bridge	*	*
*MAIN3	*	22550	*.1*	.3*
*MAIN3	*	22450	*.1*	.3*
*MAIN3	*	22250.00*	.1*	.3*
*MAIN3	*	22050	*.1*	.3*
*MAIN3	*	21875	*.1*	.3*
*MAIN3	*	21825	*.1*	.3*
*MAIN3	*	21550	*.1*	.3*

*MAIN3	*	21186	*	.1*	.3*
*MAIN3	*	21047	*	.1*	.3*
*MAIN3	*	21046.9	•	.1*	.3*
*MAIN3	*	21038.45	*	.1*	.3*
*MAIN3	*	21030.00	*	.1*	.3*
*MAIN3	*	21026.87	*	.1*	.3*
*MAIN3	*	21026.77	*	.1*	.3*
*MAIN3	*	21000	*	.1*	.3*
*MAIN3	*	20855.25	*	.1*	.3*
*HDWORKS	*	20710.41	*	.1*	.3*
*HDWORKS	*	20550.1	*	.1*	.3*
*MAIN2	*	20550.1	*	.1*	.3*
*MAIN2	*	20550	•	.1*	.3*
*MAIN2	*	20475	*Culvert	•	*
*MAIN2	*	20400	*	.1*	.3*
*MAIN2	*	20280	*	.1*	.3*
*MAIN2	*	20180	•	.1*	.3*
*MAIN2	*	20150	*	.1*	.3*
*MAIN2	*	19950	*	.1*	.3*

Profile Output Table - Standard Table 1

* 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)
*	*	*	*	*	*	*	*	*	*	*	*

• MAIN3	* 26504.4	* PF 1	* 726.00	* 2212.42	* 2216.30	* 2216.30	* 2217.70	* 0.002577	• 9.47	* 76.64	* 27.91
1.01	*										
* MAIN3	* 26395	* PF 1	* 726.00	• 2210.00	* 2212.58	* 2213.89	* 2216.87	* 0.012453	* 16.63	* 43.67	* 22.54
2.11	*										
* MAIN3	• 26350	• PF 1	* 726.00	* 2209.00	* 2211.48	• 2212.88	* 2216.22	* 0.014350	* 17.48	* 41.54	* 22.15
2.25	*										
* MAIN3	* 26198.52	* PF 1	* 726.00	* 2204.59	* 2206.78	* 2208.48	• 2213.34	* 0.022781	* 20.55	* 35.33	* 20.97
2.79	*										
* MAIN3	* 26097.91	* PF 1	* 726.00	* 2201.66	• 2203.75	* 2205.48	* 2210.83	* 0.026338	* 21.35	* 34.00	* 21.38
2.98	*										
* MAIN3	• 26053.68	• PF 1	* 878.90	* 2200.50	* 2203.02	* 2204.82	* 2209.73	* 0.019886	* 20.78	* 42.30	* 22.20
2.65	*										
* MAIN3	* 25966.13	* PF 1	* 878.90	* 2198.20	* 2200.74	* 2202.60	* 2207.87	• 0.021611	* 21.43	* 41.02	* 21.91
2.76	*										
* MAIN3	* 25865.52	* PF 1	* 878.90	* 2196.60	* 2199.15	* 2200.91	* 2205.64	* 0.019092	* 20.45	* 42.98	* 22.41
2.60	*										
* MAIN3	* 25750	* PF 1	* 878.90	* 2194.75	* 2197.36	* 2199.06	• 2203.42	* 0.017295	• 19.75	* 44.50	* 22.69
2.49	*										
* MAIN3	• 25660	* PF 1	* 878.90	* 2192.34	* 2194.92	• 2196.72	* 2201.68	* 0.020212	* 20.86	* 42.13	* 22.31
2.68	*										
* MAIN3	* 25650	* PF 1	• 878.90	* 2192.07	* 2194.56	* 2196.38	* 2201.46	* 0.020814	* 21.08	• 41.69	* 22.18
2.71	*										
* MAIN3	* 25350	* PF 1	• 878.90	* 2184.05	* 2186.40	* 2188.36	* 2194.42	* 0.025773	* 22.72	• 38.68	* 21.62
2.99	*										
* MAIN3	* 25075	* PF 1	* 878.90	* 2176.69	* 2179.02	* 2181.00	* 2187.21	* 0.026556	* 22.96	* 38.27	* 21.54
3.04	*										
• MAIN3	* 25050	* PF 1	• 878.90	* 2176.03	* 2178.36	• 2180.34	* 2186.55	* 0.026491	* 22.96	* 38.28	* 21.51
3.03	*										
• MAIN3	* 24969.85	* PF 1	* 878.90	* 2173.88	* 2176.21	* 2178.19	* 2184.42	* 0.026602	* 22.99	* 38.23	* 21.50
3.04	*										
* MAIN3	• 24940.19	* PF 1	* 878.90	* 2173.09	* 2175.43	* 2177.34	* 2183.63	* 0.026527	* 22.99	* 38.23	* 21.45

3.03	MAIN3	24910.53	PF 1	878.90	2172.40	2173.89	2175.64	2182.59	0.043517	23.67	37.13	29.68
3.73	MAIN3	24850	PF 1	878.90	2170.68	2173.13	2174.99	2180.31	0.021986	21.50	40.87	22.00
2.78	MAIN3	24756.73	PF 1	878.90	2168.16	2170.56	2172.47	2178.14	0.023727	22.09	39.79	21.79
2.88	MAIN3	24750.00	PF 1	878.90	2168.00	2170.40	2172.31	2177.99	0.023767	22.10	39.77	21.79
2.88	MAIN3	24550	PF 1	878.90	2163.28	2165.69	2167.59	2173.24	0.023632	22.06	39.85	21.80
3.35	MAIN3	24350	PF 1	878.90	2158.56	2160.76	2162.87	2170.28	0.032877	24.76	35.50	20.97
3.13	MAIN3	24150	PF 1	878.90	2153.01	2155.30	2157.32	2163.90	0.028409	23.53	37.36	21.33
3.11	MAIN3	24000	PF 1	878.90	2148.85	2151.15	2153.16	2159.64	0.027906	23.38	37.59	21.38
3.15	MAIN3	23850	PF 1	878.90	2144.44	2146.72	2148.75	2155.38	0.028690	23.61	37.23	21.31
3.17	MAIN3	23700	PF 1	878.90	2140.03	2142.31	2144.34	2151.04	0.029040	23.71	37.07	21.28
2.41	MAIN3	23555	PF 1	878.90	2138.61	2141.27	2142.92	2147.07	0.016262	19.34	45.46	22.83
2.93	MAIN3	23505.48	PF 1	878.90	2138.13	2139.74	2141.26	2145.99	0.027686	20.06	43.81	30.00
2.46	MAIN3	23450	PF 1	878.90	2137.59	2139.38	2140.71	2144.34	0.019104	17.87	49.18	30.00
2.46	MAIN3	23445.50	PF 1	878.90	2137.54	2139.28	2140.62	2144.25	0.019266	17.90	49.11	30.00
2.31	MAIN3	23425.50	PF 1	878.90	2137.35	2139.21	2140.48	2143.77	0.016719	17.14	51.28	30.00
2.28	MAIN3	23418.50	PF 1	878.90	2137.28	2139.15	2140.41	2143.64	0.016309	17.01	51.68	30.00
2.27	MAIN3	23413.90	PF 1	878.90	2137.23	2139.11	2140.36	2143.56	0.016068	16.93	51.92	30.00
	MAIN3	23405.50		Bridge								
1.75	MAIN3	23397.1	PF 1	878.90	2137.07	2139.28	2140.20	2142.43	0.009284	14.25	61.68	30.00
1.75	MAIN3	23390.00	PF 1	878.90	2137.00	2139.21	2140.13	2142.36	0.009285	14.25	61.68	30.00
3.62	MAIN3	23253	PF 1	878.90	2129.69	2131.11	2132.82	2139.41	0.043750	23.12	38.01	30.00
3.88	MAIN3	23122.96	PF 1	878.90	2122.76	2124.12	2125.89	2133.22	0.050683	24.20	36.32	30.00
3.90	MAIN3	23095.66	PF 1	878.90	2121.30	2122.66	2124.43	2131.81	0.051249	24.28	36.19	30.00
3.93	MAIN3	23025.00	PF 1	878.90	2117.53	2118.88	2120.66	2128.15	0.052268	24.43	35.97	30.00
3.94	MAIN3	23016.33	PF 1	878.90	2117.06	2118.41	2120.19	2127.69	0.052406	24.45	35.94	30.00
4.27	MAIN3	22986.30	PF 1	878.90	2115.46	2116.49	2118.18	2125.93	0.064096	24.66	35.65	34.50
	MAIN3	22768.15		Bridge								
1.59	MAIN3	22550	PF 1	878.90	2110.44	2112.72	2113.49	2115.43	0.007604	13.20	66.61	31.33
1.43	MAIN3	22450	PF 1	878.90	2108.35	2111.54	2112.35	2114.68	0.006512	14.24	61.74	20.00
2.29	MAIN3	22250.00	PF 1	878.90	2104.18	2106.54	2108.18	2112.43	0.016975	19.49	45.10	

* MAIN3 2.45 *	* 22050	* PF 1	•	878.90 *	2100.00 *	2102.25 *	2104.00 *	2108.73 *	0.019621 *	20.42 *	43.04 *	20.00 *
• MAIN3 2.64 *	* 21875	* PF 1	*	878.90 *	2095.68 *	2097.83 *	2099.68 *	2104.96 *	0.022802 *	21.43 *	41.00 *	20.00 *
* MAIN3 2.66 *	* 21825	* PF 1	*	878.90 *	2094.44 *	2096.58 *	2098.44 *	2103.80 *	0.023255 *	21.57 *	40.74 *	20.00 *
* MAIN3 2.73 *	* 21550	* PF 1	*	878.90 *	2087.65 *	2089.75 *	2091.65 *	2097.22 *	0.024477 *	21.93 *	40.08 *	20.00 *
* MAIN3 2.74 *	* 21186	* PF 1	*	878.90 *	2078.66 *	2080.76 *	2082.67 *	2088.27 *	0.024692 •	21.99 *	39.97 *	20.00 *
* MAIN3 2.68 *	* 21047	* PF 1	*	878.90 *	2075.44 *	2077.57 *	2079.44 *	2084.84 *	0.023490 *	21.64 *	40.61 •	20.00 *
* MAIN3 2.68 *	* 21046.9	* PF 1	*	878.90 *	2075.43 *	2077.55 *	2079.44 *	2084.84 *	0.021062 *	21.67 *	40.56 *	33.00 *
* MAIN3 3.27 *	* 21038.45	* PF 1	*	878.90 *	2075.22 •	2076.79 *	2078.53 *	2084.57 *	0.033097 *	22.38 *	39.27 *	33.00 *
* MAIN3 3.14 *	* 21030.00	* PF 1	*	878.90 *	2075.21 *	2076.82 *	2078.52 *	2084.18 *	0.030193 *	21.76 *	40.39 *	33.00 *
* MAIN3 2.40 *	* 21026.87	* PF 1	•	878.90 *	2075.22 *	2077.49 *	2079.21 *	2083.79 *	0.016668 *	20.14 *	43.63 •	33.00 *
* MAIN3 2.42 *	* 21026.77	* PF 1	*	878.90 *	2075.17 *	2077.44 *	2079.17 *	2083.79 *	0.019011 *	20.21 *	43.48 *	20.00 *
* MAIN3 2.61 *	• 21000	* PF 1	*	878.90 •	2074.07 *	2076.14 *	2077.97 *	2083.17 *	0.022545 *	21.28 •	41.30 *	20.00 *
* MAIN3 2.68 *	* 20855.25	• PF 1	*	878.90 *	2070.49 *	2072.52 *	2074.39 *	2079.80 *	0.023761 *	21.65 •	40.61 •	20.00 *
* HDWORKS 1.00 •	* 20710.41	* PF 1	*	416.90 *	2068.00 *	2069.50 *	2069.50 *	2070.25 •	0.003481 *	6.97 *	59.84 *	40.00 *
• HDWORKS 2.53 *	* 20550.1	* PF 1	*	416.90 •	2065.50 *	2066.31 *	2067.00 *	2068.89 *	0.024979 *	12.90 *	32.32 •	40.00 •
* MAIN2 1.89 *	* 20550.1	* PF 1	*	878.90 *	2065.50 *	2068.06 *		2072.63 *	0.011589 *	17.15 *	51.24 *	20.00 *
* MAIN2 3.31 *	* 20550	* PF 1	•	1295.80 *	2065.50 •	2066.58 *	2067.89 *	2072.50 *	0.036577 *	19.52 *	66.39 *	61.33 *
* MAIN2	* 20475	*	*	Culvert *	*	*	*	*	*	*	*	*
* MAIN2 3.31 *	* 20400	* PF 1	•	1295.80 *	2057.00 *	2058.02 *	2059.39 *	2064.67 *	0.044375 *	20.70 *	62.60 *	61.33 *
* MAIN2 3.29 *	* 20280	* PF 1	*	1295.80 *	2052.66 *	2053.75 *	2055.05 *	2059.63 *	0.036307 *	19.47 *	66.54 *	61.33 *
* MAIN2 1.82 *	* 20180	• PF 1	*	1295.80 *	2050.93 *	2053.65 •	2054.83 *	2057.45 *	0.008581 •	15.65 *	82.79 *	35.88 *
* MAIN2 1.91 *	* 20150	* PF 1	*	1295.80 *	2050.42 *	2053.06 *	2054.32 *	2057.15 *	0.009580 *	16.24 *	79.77 *	35.54 *
* MAIN2 2.30 *	* 19950	* PF 1	*	1295.80 *	2046.99 *	2049.34 *	2050.89 *	2054.71 *	0.014331 *	18.59 *	69.69 •	34.39 *

Profile Output Table - Standard Table 2

* Reach	* River Sta	* Profile	*	E.G. Elev (ft) *	*W.S. Elev (ft) *	• Vel Head (ft) *	*Frctn Loss (ft) *	*C & E Loss (ft) *	• Q Left (cfs) *	*Q Channel (cfs) *	* Q Right (cfs) *	*Top Width (ft) *

* MAIN3	• 26504.4	• PF 1	•	2217.70 *	2216.30 *	1.39 *				726.00 *		27.91 *
* MAIN3	* 26395	* PF 1	*	2216.87 *	2212.58 *	4.29 *	0.53 *	0.29 *		726.00 *	*	22.54 *
* MAIN3	* 26350	* PF 1	*	2216.22 *	2211.48 *	4.74 *	0.60 *	0.05 *		726.00 *	•	22.15 *
* MAIN3	* 26198.52	* PF 1	*	2213.34 *	2206.78 *	6.56 *	2.70 *	0.18 •		726.00 *	*	20.97 *
* MAIN3	* 26097.91	* PF 1	*	2210.83 *	2203.75 *	7.08 *	2.46 *	0.05 *		726.00 *	*	21.38 *
* MAIN3	* 26053.68	* PF 1	*	2209.73 *	2203.02 *	6.70 *	0.99 •	0.11 *		878.90 *	*	22.20 *
* MAIN3	• 25966.13	* PF 1	*	2207.87 •	2200.74 *	7.13 *	1.81 *	0.04 *		878.90 *	*	21.91 *

* MAIN3	* 25865.52	• PF 1	•	2205.64	* 2199.15	* 6.49	•	2.04	•	0.19	*	* 878.90	*	* 22.41	•
* MAIN3	* 25750	* PF 1	*	2203.42	* 2197.36	* 6.06	*	2.10	*	0.13	*	* 878.90	*	* 22.69	*
• MAIN3	* 25660	* PF 1	*	2201.68	* 2194.92	* 6.76	*	1.68	*	0.07	*	* 878.90	*	* 22.31	*
* MAIN3	* 25650	• PF 1	*	2201.46	• 2194.56	* 6.90	*	0.21	*	0.01	*	* 878.90	•	* 22.18	•
* MAIN3	* 25350	* PF 1	*	2194.42	* 2186.40	* 8.02	*	6.93	*	0.11	*	* 878.90	*	* 21.62	*
* MAIN3	* 25075	* PF 1	*	2187.21	* 2179.02	* 8.19	*	7.19	*	0.02	*	* 878.90	*	* 21.54	*
* MAIN3	* 25050	* PF 1	*	2186.55	* 2178.36	* 8.18	*	0.66	•	0.00	*	* 878.90	•	* 21.51	*
* MAIN3	* 24969.85	* PF 1	*	2184.42	* 2176.21	* 8.21	*	2.13	*	0.00	*	* 878.90	*	* 21.50	*
* MAIN3	* 24940.19	* PF 1	*	2183.63	* 2175.43	* 8.21	*	0.79	*	0.00	*	* 878.90	*	* 21.45	*
* MAIN3	* 24910.53	* PF 1	•	2182.59	* 2173.89	* 8.70	*	0.99	*	0.05	*	* 878.90	*	* 29.68	*
* MAIN3	* 24850	* PF 1	•	2180.31	• 2173.13	• 7.18	•	1.82	•	0.46	*	* 878.90	*	• 22.00	*
* MAIN3	* 24756.73	* PF 1	*	2178.14	* 2170.56	* 7.58	•	2.13	*	0.04	*	* 878.90	•	* 21.79	*
* MAIN3	* 24750.00	* PF 1	*	2177.99	* 2170.40	* 7.58	*	0.16	*	0.00	*	* 878.90	*	* 21.79	*
* MAIN3	* 24550	* PF 1	*	2173.24	* 2165.69	* 7.55	*	4.74	*	0.01	*	* 878.90	*	* 21.80	*
* MAIN3	* 24350	* PF 1	•	2170.28	* 2160.76	* 9.52	*	2.77	*	0.20	*	* 878.90	*	* 20.97	*
* MAIN3	* 24150	• PF 1	*	2163.90	* 2155.30	* 8.59	*	6.10	*	0.28	*	* 878.90	*	* 21.33	*
* MAIN3	* 24000	* PF 1	*	2159.64	* 2151.15	* 8.49	*	4.22	*	0.03	*	* 878.90	*	• 21.38	*
* MAIN3	* 23850	* PF 1	*	2155.38	* 2146.72	* 8.65	*	4.24	*	0.02	•	* 878.90	*	* 21.31	•
* MAIN3	* 23700	* PF 1	*	2151.04	* 2142.31	* 8.73	*	4.33	*	0.01	*	* 878.90	*	* 21.28	*
• MAIN3	* 23555	* PF 1	•	2147.07	• 2141.27	• 5.81	*	3.09	*	0.88	*	* 878.90	*	* 22.83	•
* MAIN3	* 23505.48	* PF 1	*	2145.99	* 2139.74	* 6.25	*	1.03	•	0.04	*	* 878.90	*	* 30.00	*
* MAIN3	* 23450	* PF 1	*	2144.34	* 2139.38	* 4.96	•	1.26	*	0.39	*	* 878.90	*	* 30.00	*
* MAIN3	• 23445.50	* PF 1	*	2144.25	* 2139.28	* 4.97	*	0.09	*	0.00	*	* 878.90	*	* 30.00	*
* MAIN3	* 23425.50	* PF 1	*	2143.77	* 2139.21	* 4.56	•	0.36	*	0.12	*	* 878.90	*	* 30.00	*
* MAIN3	* 23418.50	• PF 1	*	2143.64	* 2139.15	* 4.49	*	0.12	*	0.02	*	• 878.90	*	* 30.00	*
* MAIN3	* 23413.90	• PF 1	*	2143.56	* 2139.11	* 4.45	*	0.07	*	0.01	*	• 878.90	*	* 30.00	•
• MAIN3	* 23405.50	*	*	Bridge	•	*	*	*	*	*	*	* 878.90	*	•	*
* MAIN3	* 23397.1	* PF 1	*	2142.43	* 2139.28	* 3.15	*	*	*	*	*	* 878.90	*	* 30.00	*
• MAIN3	* 23390.00	* PF 1	*	2142.36	* 2139.21	* 3.15	*	0.07	*	0.00	•	* 878.90	*	* 30.00	*
* MAIN3	* 23253	* PF 1	*	2139.41	* 2131.11	* 8.30	*	2.44	*	0.51	*	* 878.90	*	* 30.00	*
• MAIN3	* 23122.96	* PF 1	*	2133.22	* 2124.12	* 9.09	*	6.12	*	0.08	*	* 878.90	*	* 30.00	*
* MAIN3	* 23095.66	* PF 1	*	2131.81	• 2122.66	* 9.16	*	1.39	*	0.01	*	* 878.90	*	* 30.00	*
• MAIN3	* 23025.00	• PF 1	*	2128.15	* 2118.88	* 9.27	*	3.66	*	0.01	*	* 878.90	*	* 30.00	*
* MAIN3	* 23016.33	• PF 1	*	2127.69	* 2118.41	* 9.28	*	0.45	*	0.00	*	* 878.90	*	* 30.00	*
* MAIN3	* 22986.30	* PF 1	*	2125.93	* 2116.49	* 9.44	*	1.74	*	0.02	•	* 878.90	*	* 34.50	*
* MAIN3	* 22768.15	*	*	Bridge	*	*	*	*	*	•	*	* 878.90	*	*	*
* MAIN3	* 22550	* PF 1	*	2115.43	* 2112.72	* 2.70	*	0.01	*	0.01	*	* 878.90	*	* 31.33	*
* MAIN3	* 22450	* PF 1	•	2114.68	* 2111.54	* 3.15	*	0.70	*	0.04	*	* 878.90	*	* 20.00	*
* MAIN3	* 22250.00	* PF 1	*	2112.43	* 2106.54	* 5.90	*	1.99	*	0.27	*	* 878.90	*	• 20.00	*
* MAIN3	• 22050	* PF 1	*	2108.73	* 2102.25	* 6.48	*	3.65	*	0.06	*	• 878.90	*	* 20.00	*
• MAIN3	* 21875	* PF 1	•	2104.96	* 2097.83	* 7.13	*	3.70	*	0.07	•	* 878.90	•	* 20.00	*
* MAIN3	* 21825	* PF 1	*	2103.80	• 2096.58	* 7.23	*	1.15	*	0.01	*	• 878.90	*	* 20.00	*
* MAIN3	* 21550	* PF 1	*	2097.22	* 2089.75	* 7.47	*	6.56	*	0.02	*	* 878.90	*	* 20.00	*
* MAIN3	* 21186	• PF 1	•	2088.27	* 2080.76	* 7.51	*	8.95	*	0.00	*	* 878.90	*	* 20.00	*
* MAIN3	* 21047	* PF 1	*	2084.84	* 2077.57	* 7.27	*	3.35	*	0.07	*	* 878.90	*	* 20.00	*
• MAIN3	* 21046.9	* PF 1	*	2084.84	* 2077.55	* 7.29	*	0.00	*	0.00	*	* 878.90	*	* 33.00	*
* MAIN3	* 21038.45	* PF 1	•	2084.57	* 2076.79	* 7.78	*	0.22	*	0.05	*	* 878.90	*	* 33.00	•
* MAIN3	* 21030.00	* PF 1	*	2084.18	* 2076.82	* 7.35	•	0.27	*	0.13	*	• 878.90	*	• 33.00	*
* MAIN3	* 21026.87	* PF 1	*	2083.79	* 2077.49	* 6.30	*	0.07	*	0.32	•	* 878.90	*	* 33.00	*
* MAIN3	* 21026.77	* PF 1	•	2083.79	• 2077.44	* 6.34	*	0.00	*	0.00	*	* 878.90	*	* 20.00	*
* MAIN3	* 21000	* PF 1	*	2083.17	• 2076.14	* 7.03	*	0.55	•	0.07	*	* 878.90	*	* 20.00	*
* MAIN3	* 20855.25	* PF 1	*	2079.80	* 2072.52	* 7.27	*	3.35	*	0.02	*	* 878.90	*	* 20.00	*
* HDWORKS	* 20710.41	* PF 1	*	2070.25	* 2069.50	* 0.75	*	*	*	*	*	• 416.90	*	* 40.00	*
* HDWORKS	* 20550.1	* PF 1	•	2068.89	• 2066.31	• 2.58	*	1.18	*	0.18	*	* 416.90	*	* 40.00	*
• MAIN2	• 20550.1	* PF 1	*	2072.63	* 2068.06	* 4.57	*	*	*	*	*	• 878.90	*	* 20.00	*
* MAIN2	* 20550	* PF 1	*	2072.50	* 2066.58	* 5.92	*	0.00	*	0.13	*	* 1295.80	*	* 61.33	*
* MAIN2	* 20475	*	•	Culvert	•	*	*	•	*	*	*	* 1295.80	*	*	*
* MAIN2	* 20400	* PF 1	*	2064.67	* 2058.02	* 6.65	*	*	*	•	*	* 1295.80	•	• 61.33	*
* MAIN2	* 20280	* PF 1	•	2059.63	* 2053.75	* 5.89	*	4.80	*	0.23	*	* 1295.80	*	* 61.33	•
* MAIN2	* 20180	* PF 1	•	2057.45	* 2053.65	* 3.80	*	1.55	*	0.63	*	* 1295.80	*	* 35.88	*
• MAIN2	* 20150	* PF 1	*	2057.15	* 2053.06	* 4.10	*	0.27	*	0.03	*	* 1295.80	*	• 35.54	*

* MAIN2 * 19950 * PF 1 * 2054.71 * 2049.34 * 5.37 * 2.32 * 0.13 * * 1295.80 * * 34.39 *

ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : Plan 03

River: C1 CHANNEL Reach: MAIN3 RS: 26395 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 26198.52 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 26097.91 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 26053.68 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 25966.13 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 25865.52 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 25750 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 25660 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 25350 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 25075 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 24969.85 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 24910.53 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 24850 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 24756.73 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 24550 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 24350 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN3 RS: 24150 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 24000 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23850 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23700 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23555 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23505.48 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23450 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23405.50 Profile: PF 1 Upstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

River: C1 CHANNEL Reach: MAIN3 RS: 23253 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: C1 CHANNEL Reach: MAIN3 RS: 23122.96 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23095.66 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 23025.00 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 22986.30 Profile: PF 1
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.

River: C1 CHANNEL Reach: MAIN3 RS: 22768.15 Profile: PF 1
Warning:There was not enough momentum to compute a supercritical answer through the bridge. The momentum answer has been disregarded.

River: C1 CHANNEL Reach: MAIN3 RS: 22768.15 Profile: PF 1 Downstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

River: C1 CHANNEL Reach: MAIN3 RS: 22250.00 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

River: C1 CHANNEL Reach: MAIN3 RS: 22050 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN3 RS: 21875 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN3 RS: 21825 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN3 RS: 21550 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN3 RS: 21186 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN3 RS: 21047 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN3 RS: 21026.87 Profile: PF 1

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

River: C1 CHANNEL Reach: MAIN3 RS: 21000 Profile: PF 1

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

River: C1 CHANNEL Reach: MAIN3 RS: 20855.25 Profile: PF 1

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.

River: C1 CHANNEL Reach: HDWORKS RS: 20710.41 Profile: PF 1

Warning: Divided flow computed for this cross-section.

River: C1 CHANNEL Reach: HDWORKS RS: 20550.1 Profile: PF 1

Warning: Divided flow computed for this cross-section.

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

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

River: C1 CHANNEL Reach: MAIN2 RS: 20550 Profile: PF 1

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

River: C1 CHANNEL Reach: MAIN2 RS: 20280 Profile: PF 1

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.

River: C1 CHANNEL Reach: MAIN2 RS: 20180 Profile: PF 1

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

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

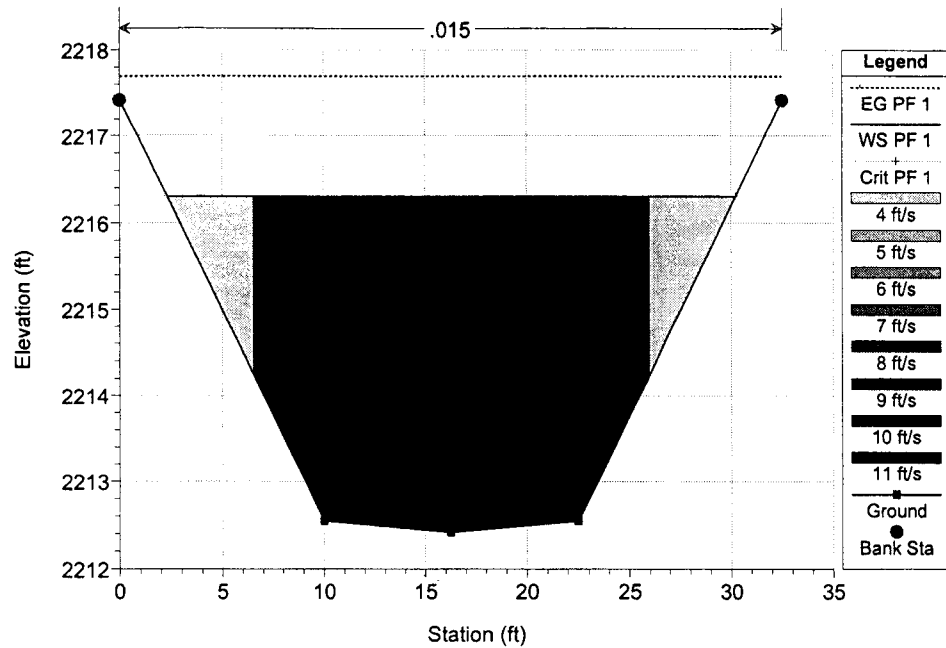
River: C1 CHANNEL Reach: MAIN2 RS: 19950 Profile: PF 1

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.

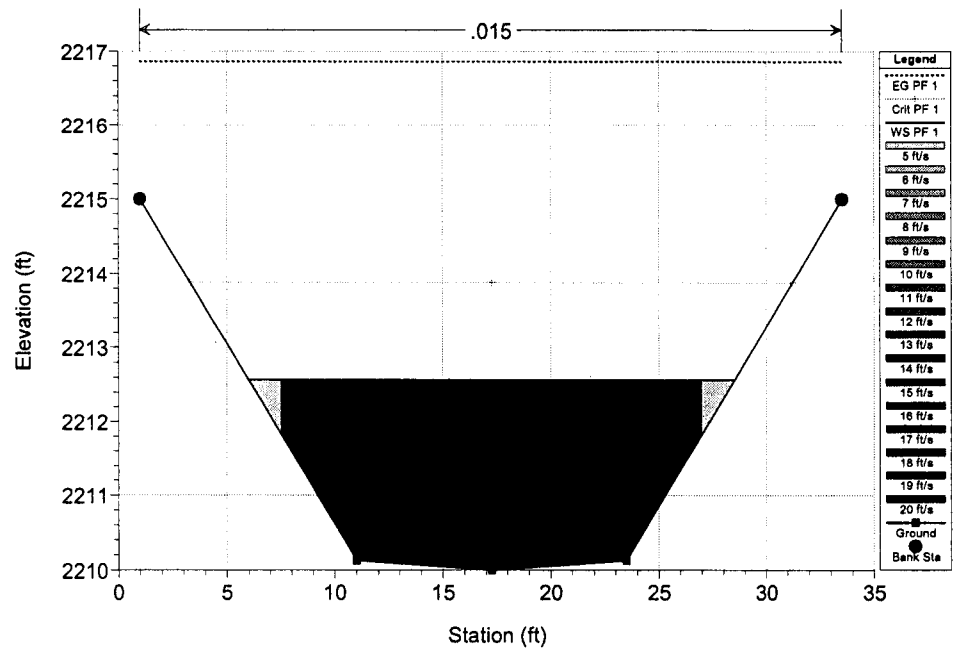
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 26504.4 LBG Sta. 139+54.44; begin transition; system headworks of MAIN



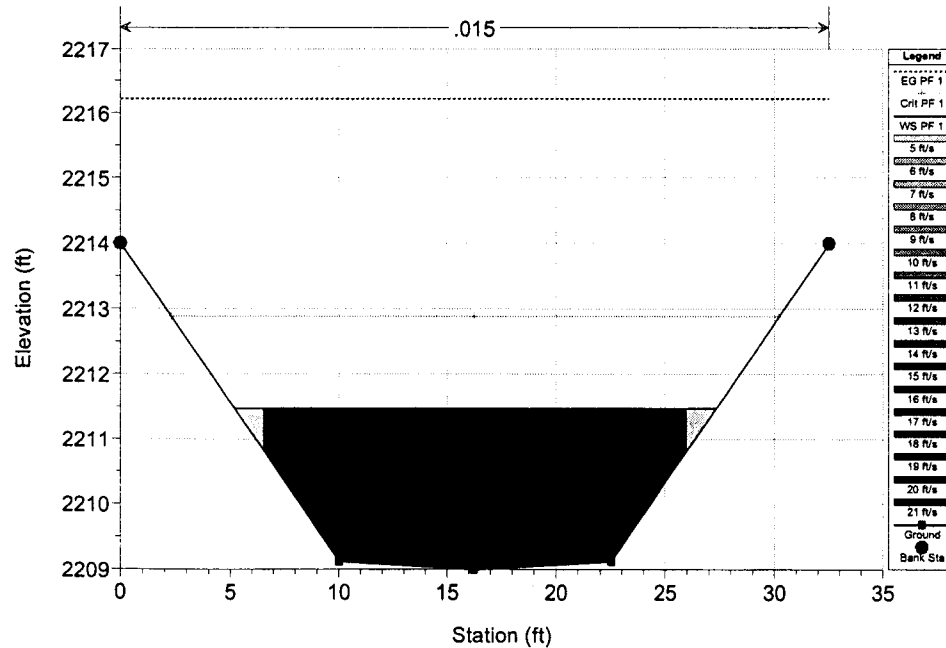
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 26395 LBG Sta. 138+45.00; corresponds to section A-A of effective mode



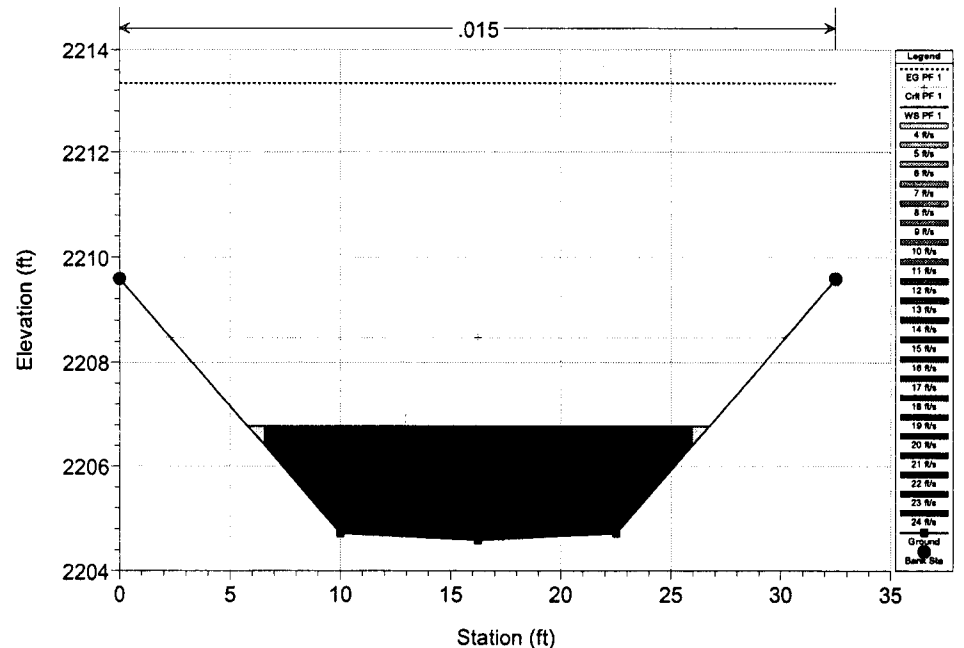
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 26350 LBG Sta. 138+00.00; Grade Break



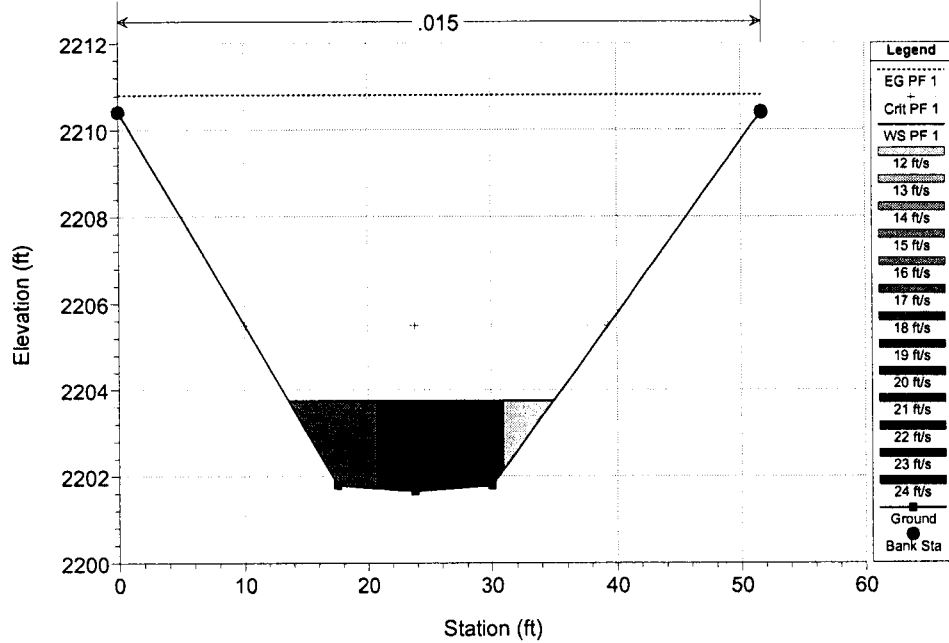
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 26198.52 LBG Sta. 136+48.52; End top transition



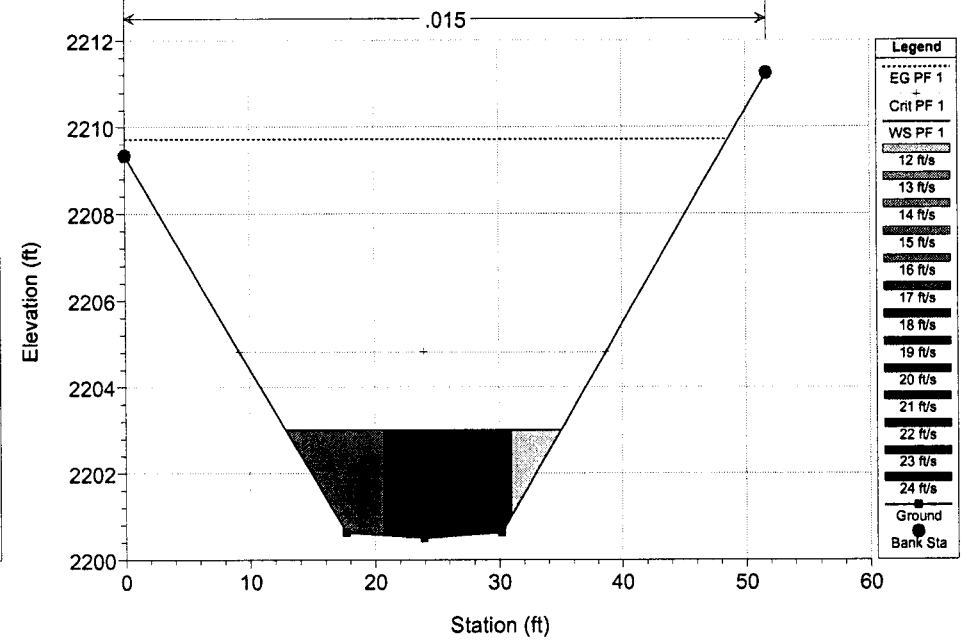
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 26097.91 LBG Sta. 13547.91; Begin Top trans.; 44.23' Upstream of RCB



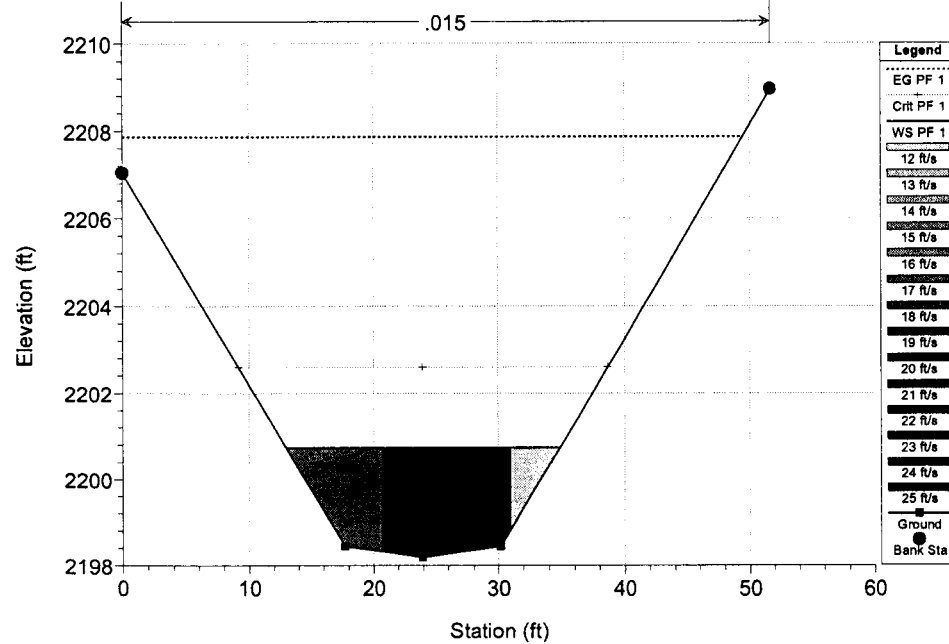
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 26053.68 LBG Sta. 135+03.68; Inflow with 2:10'x5' RCB



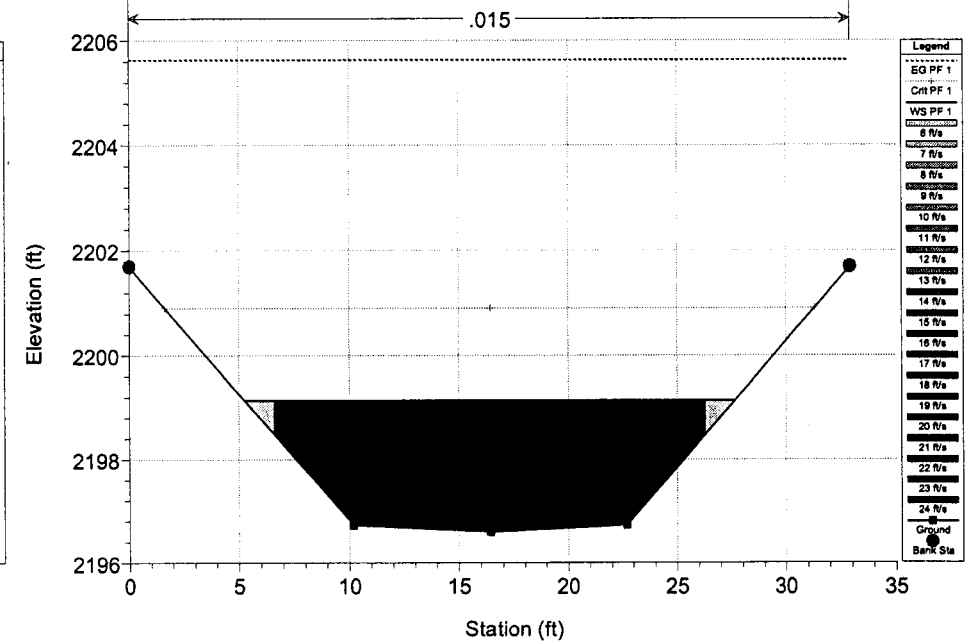
C-1 Channel Phase II LOMR

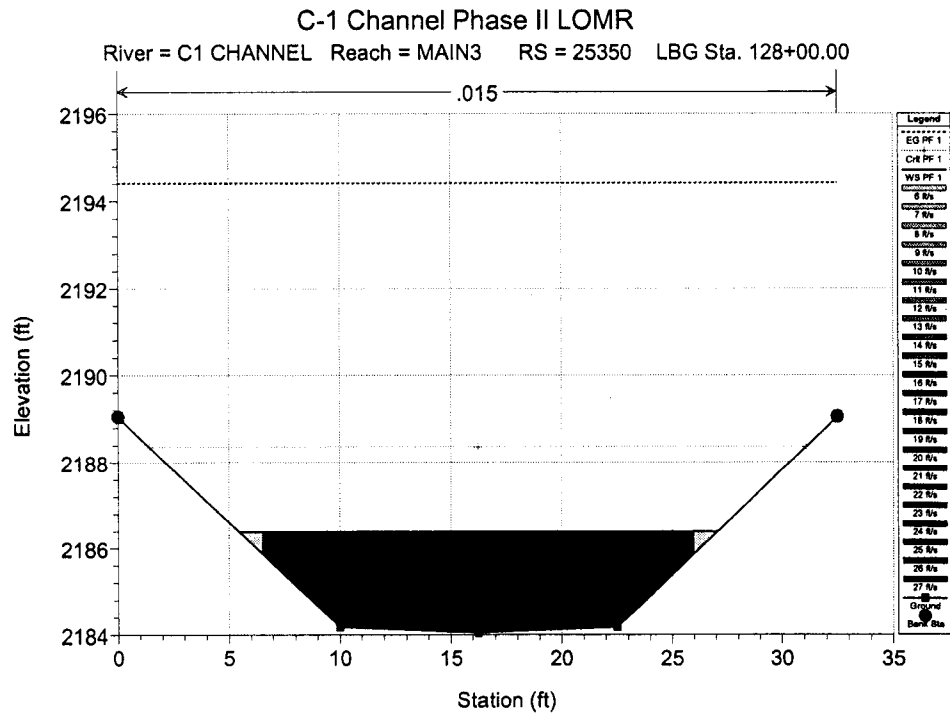
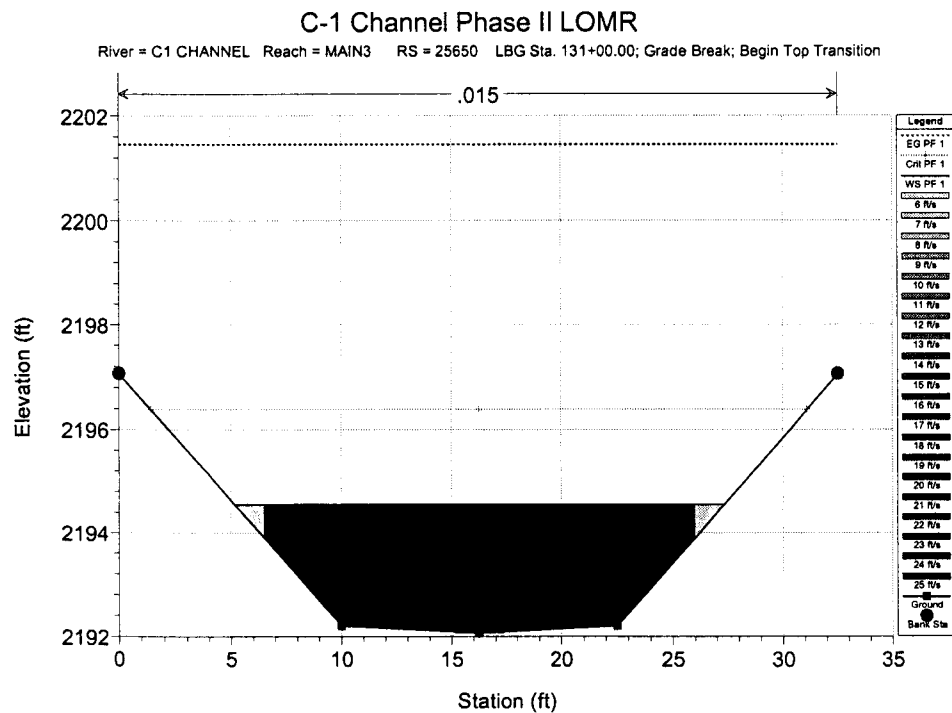
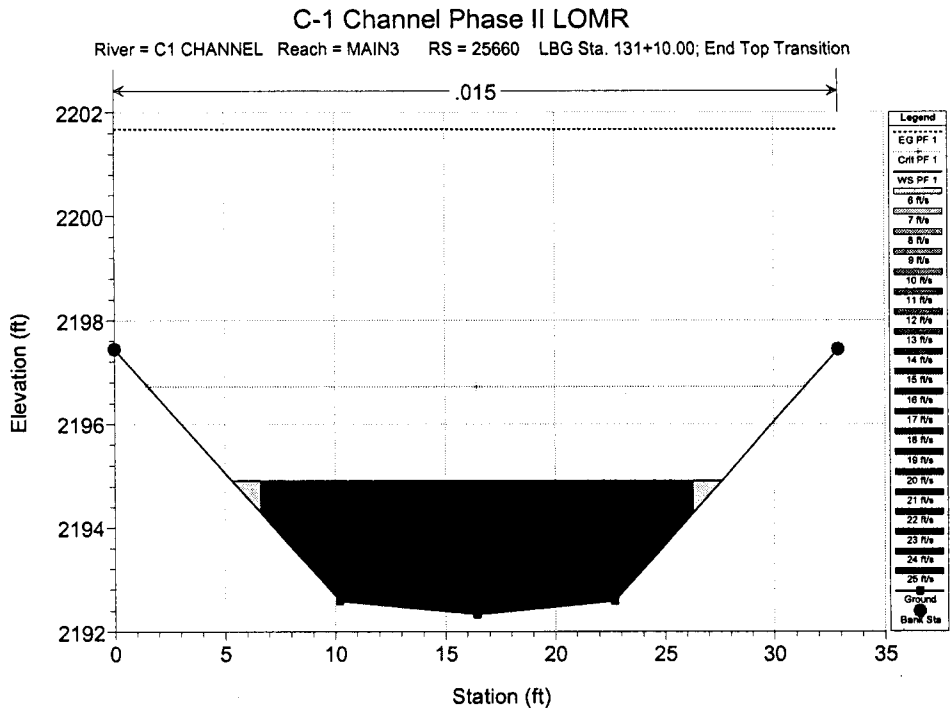
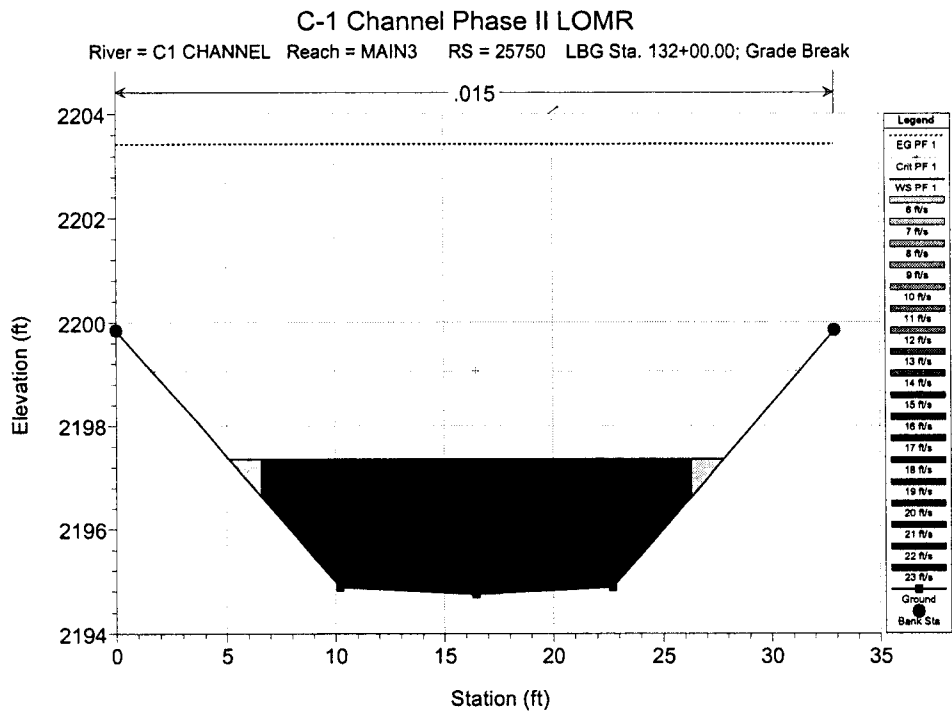
River = C1 CHANNEL Reach = MAIN3 RS = 25966.13 LBG Sta. 134+16.13; End top Trans.; Grade Break



C-1 Channel Phase II LOMR

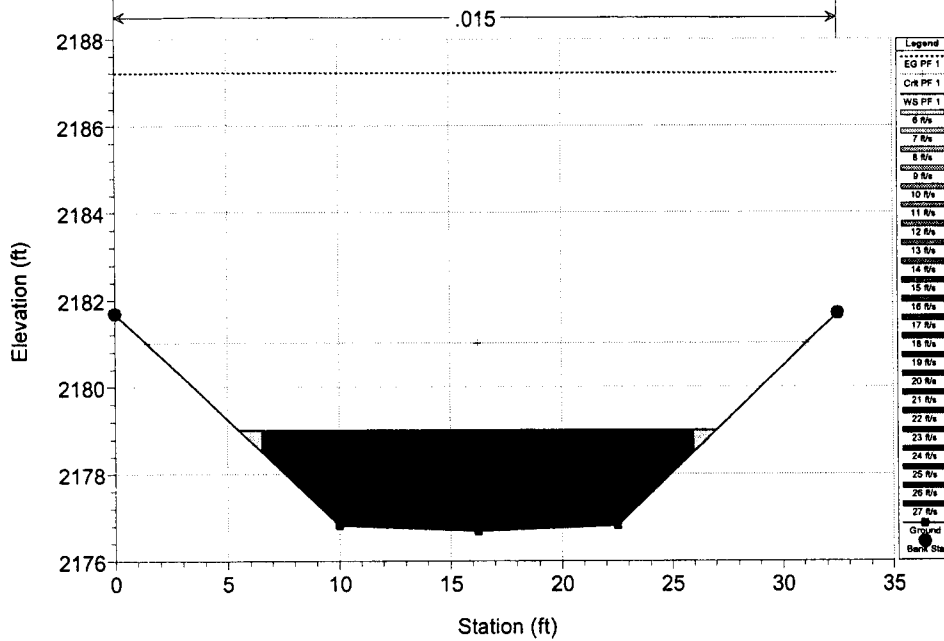
River = C1 CHANNEL Reach = MAIN3 RS = 25865.52 LBG Sta. 133+15.52; Begin Top Trans.





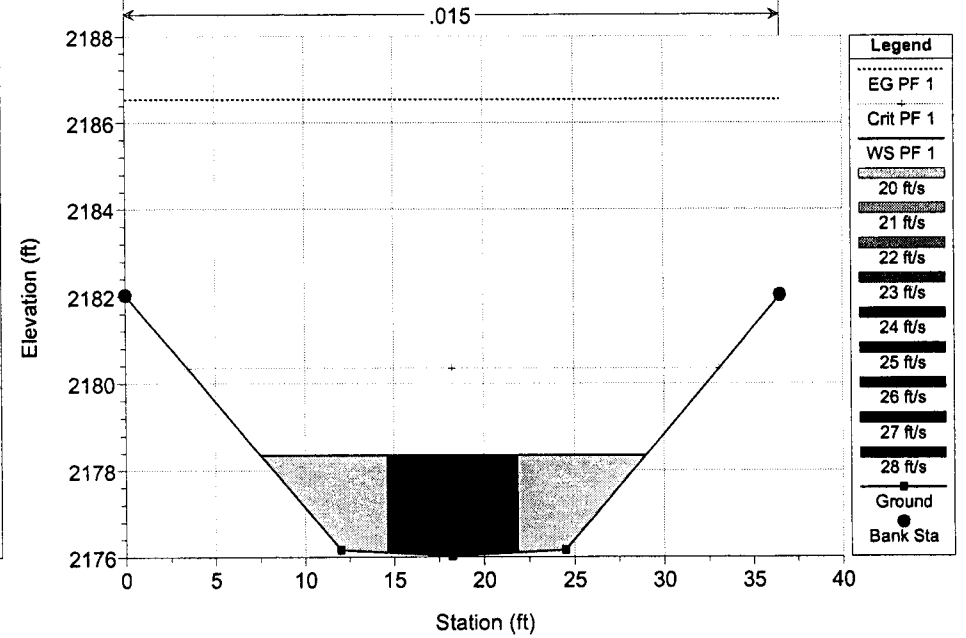
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 25075 LBG Sta. 125+25.00; End top transition



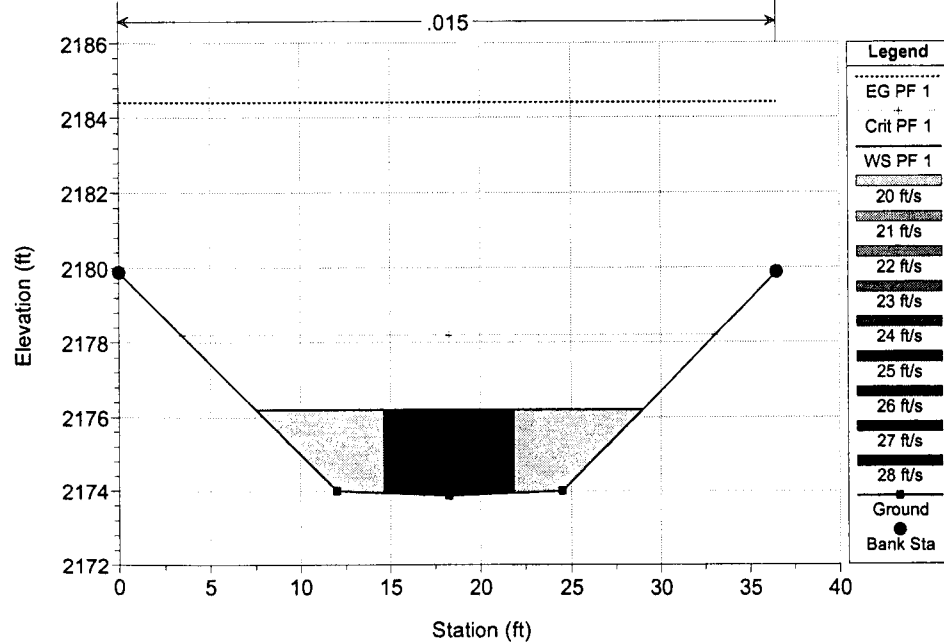
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 25050 LBG Sta. 125+00.00; Begin Top Transition



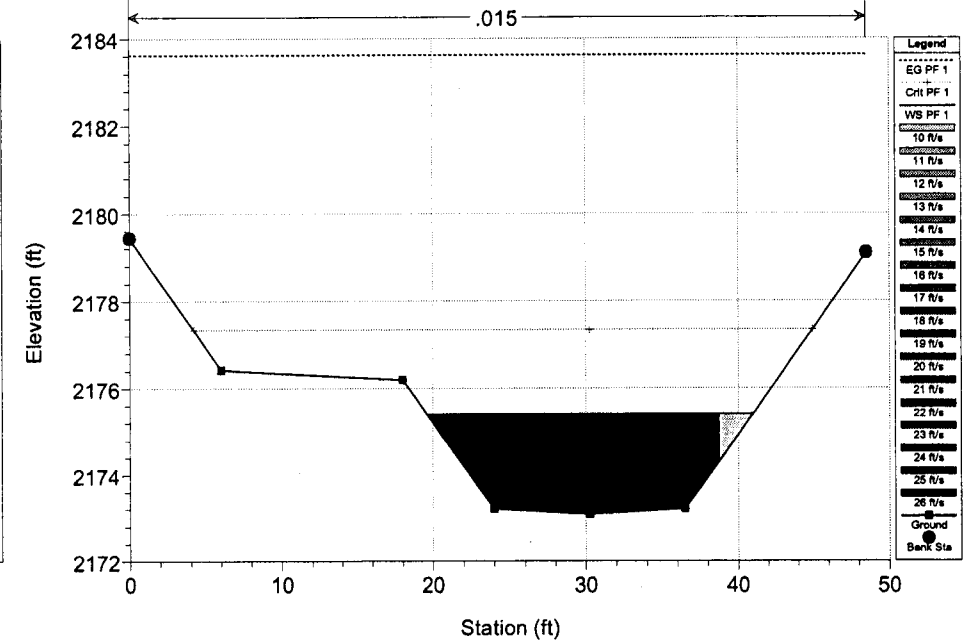
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 24969.85 LBG Sta. 124+19.85; End Access Ramp



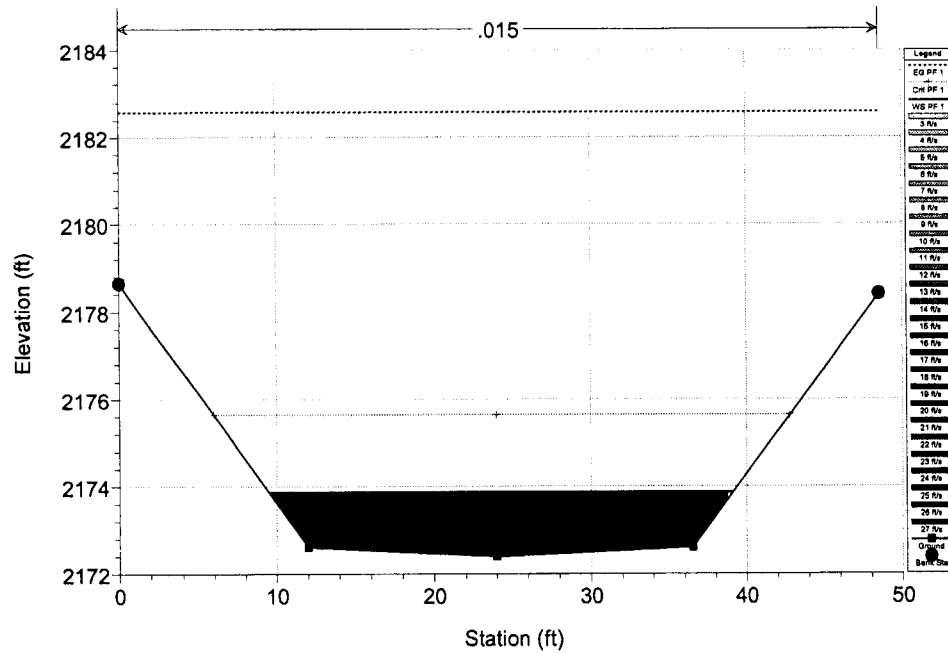
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 24940.19 LBG Sta. 123+90.19; midway of ramp configuration



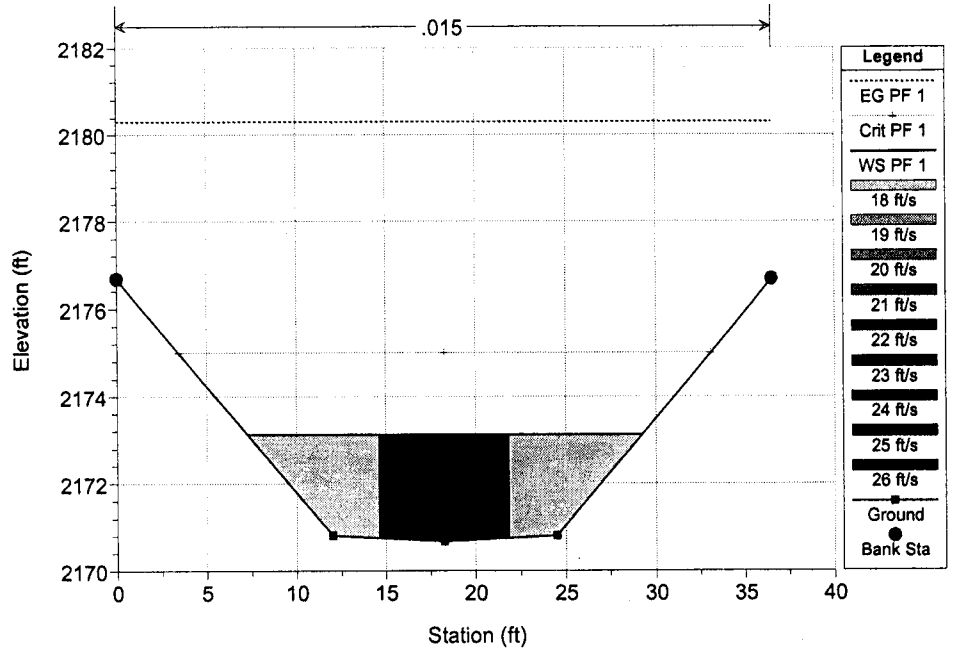
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 24910.53 LBG Sta. 123+60.53; Bottom of Access Ramp



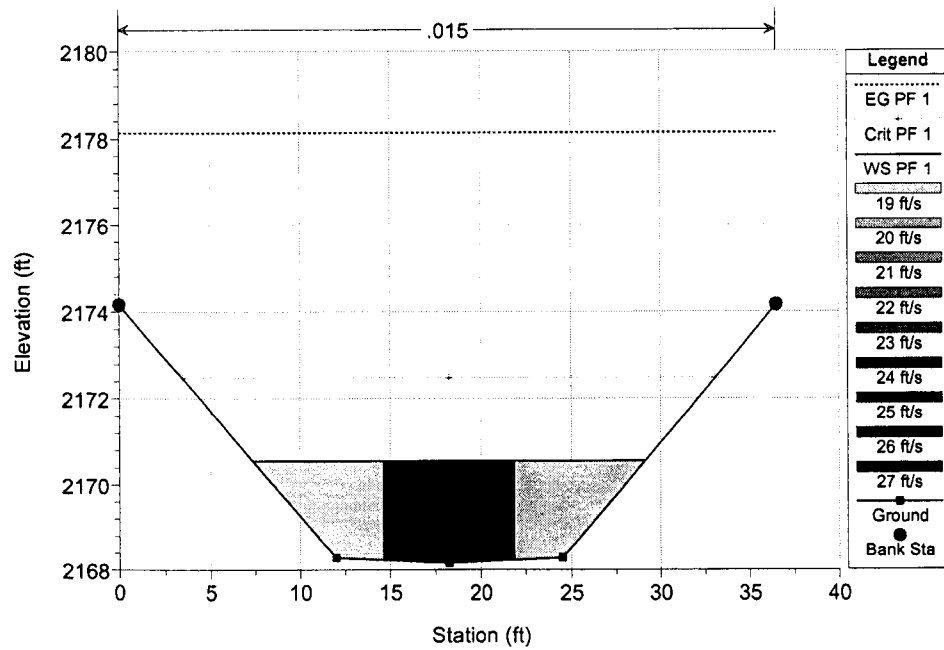
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 24850 LBG Sta. 123+00.00; Grade Break; Begin Transition to access Ramp



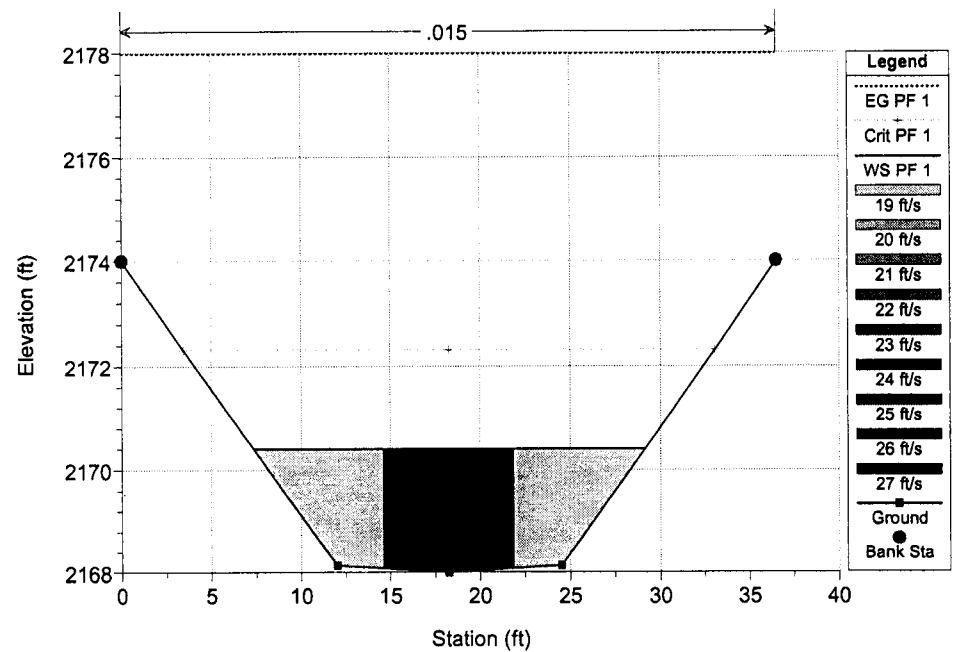
C-1 Channel Phase II LOMR

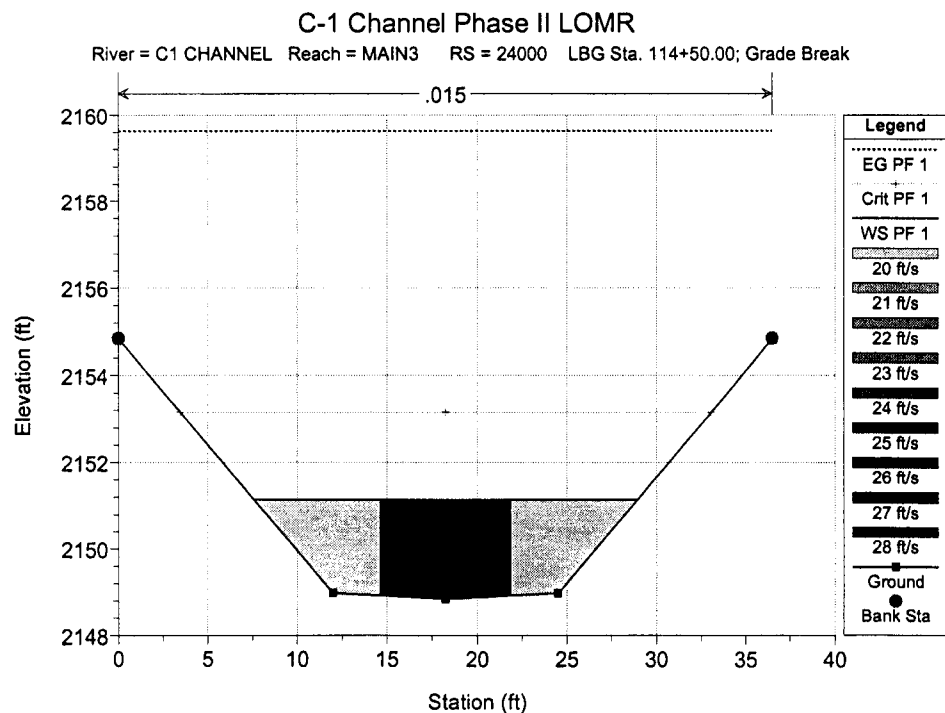
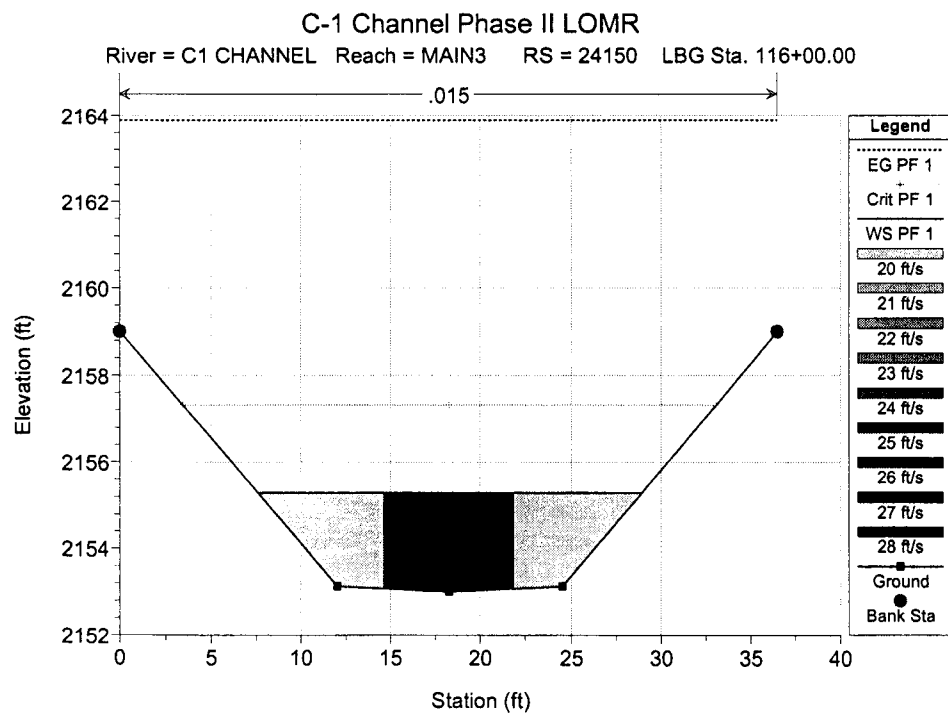
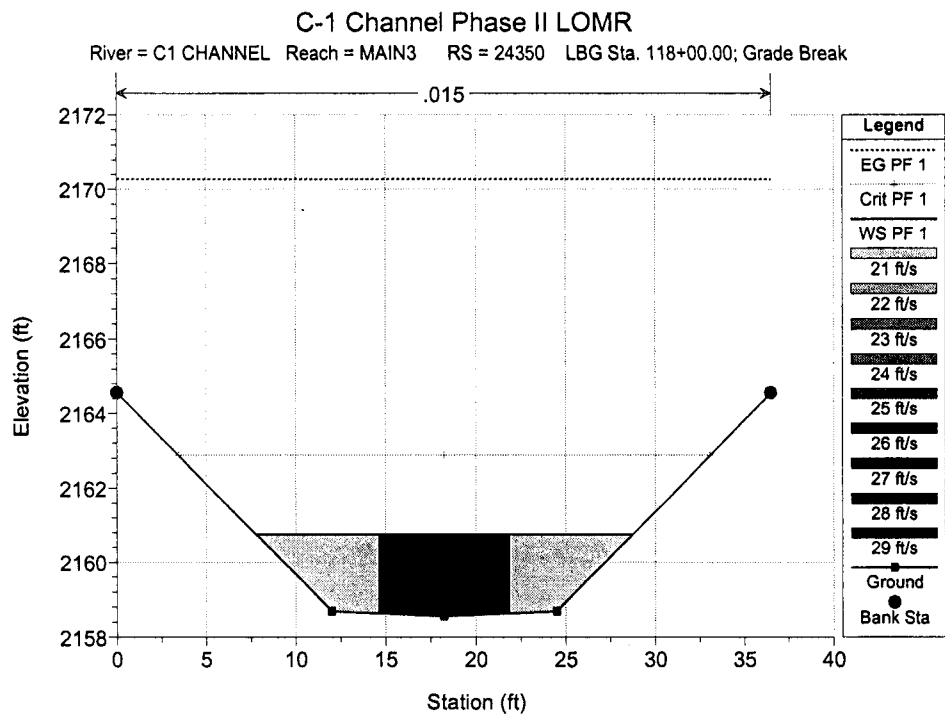
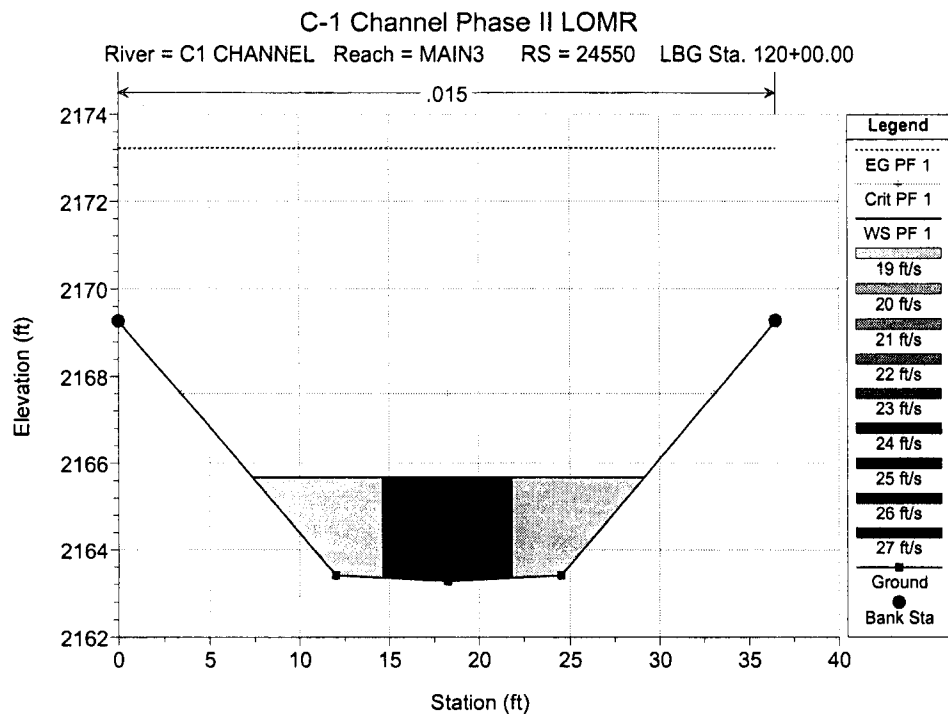
River = C1 CHANNEL Reach = MAIN3 RS = 24756.73 LBG Sta. 122+06.73; Inflow with 5'x3' RCB

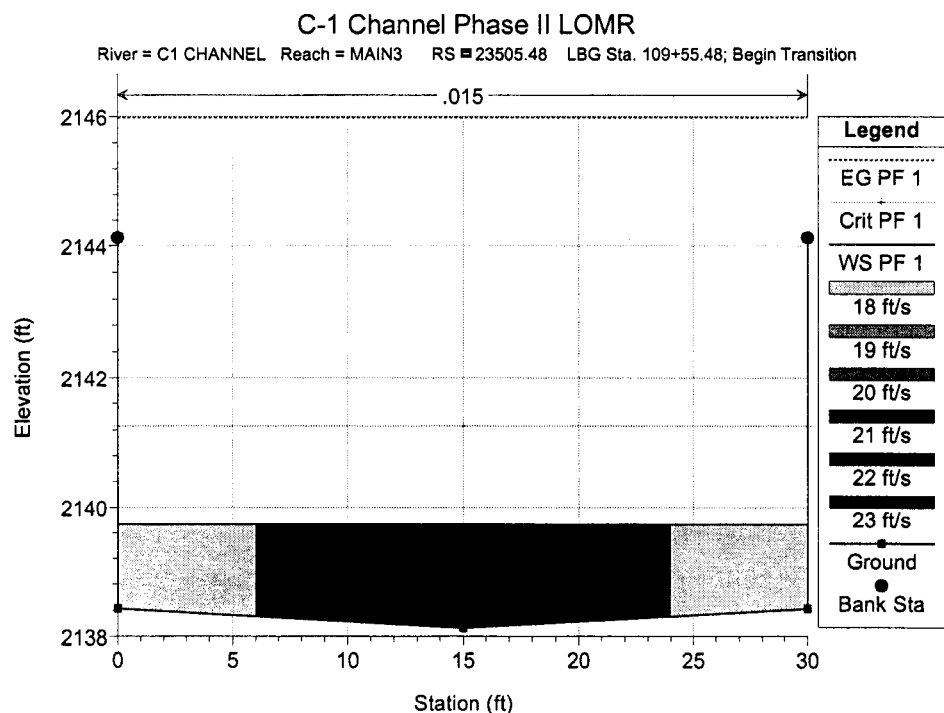
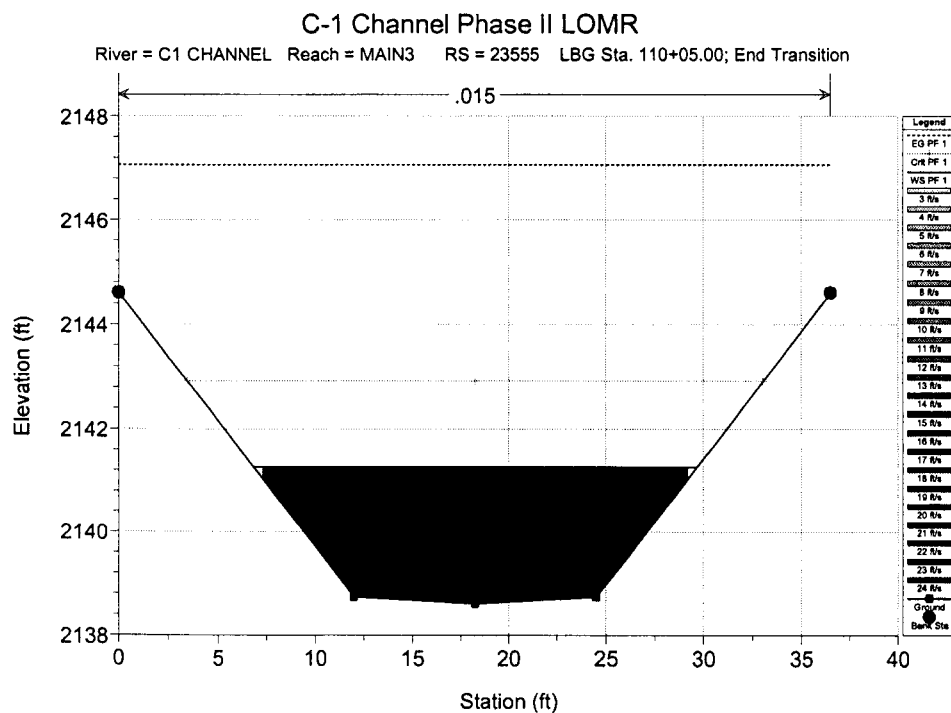
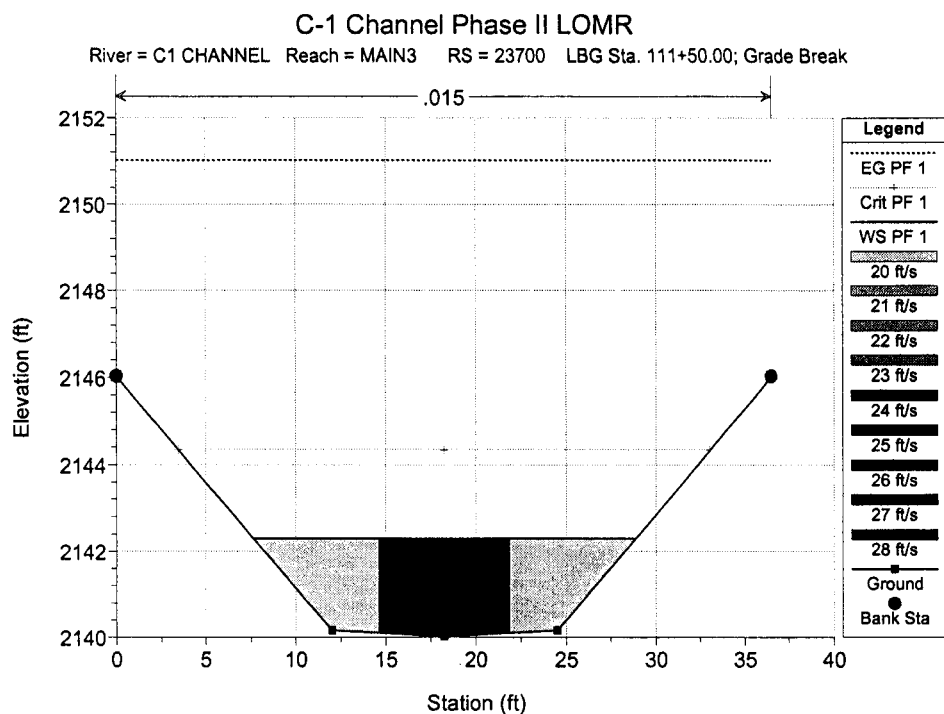
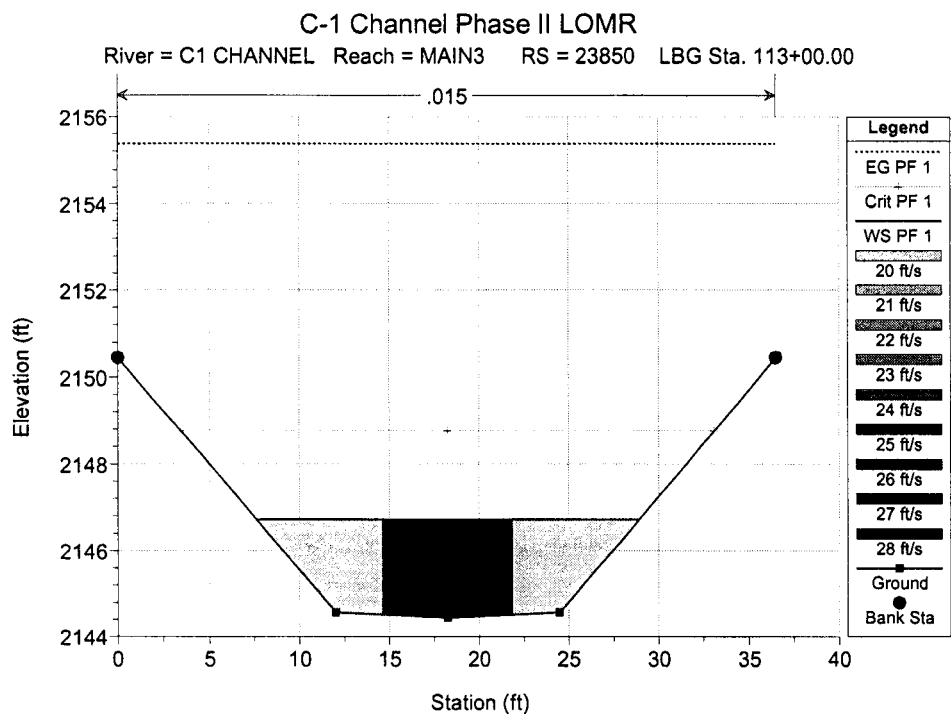


C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 24750.00 LBG Sta. 122+00.00; Grade Break; 6' Downstream of 5'x3'RCB

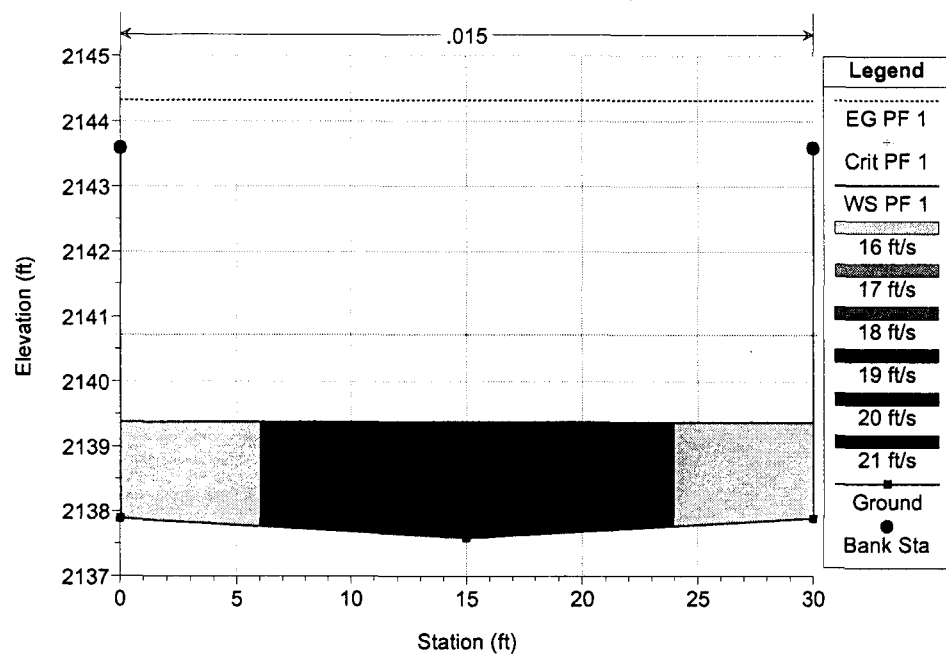






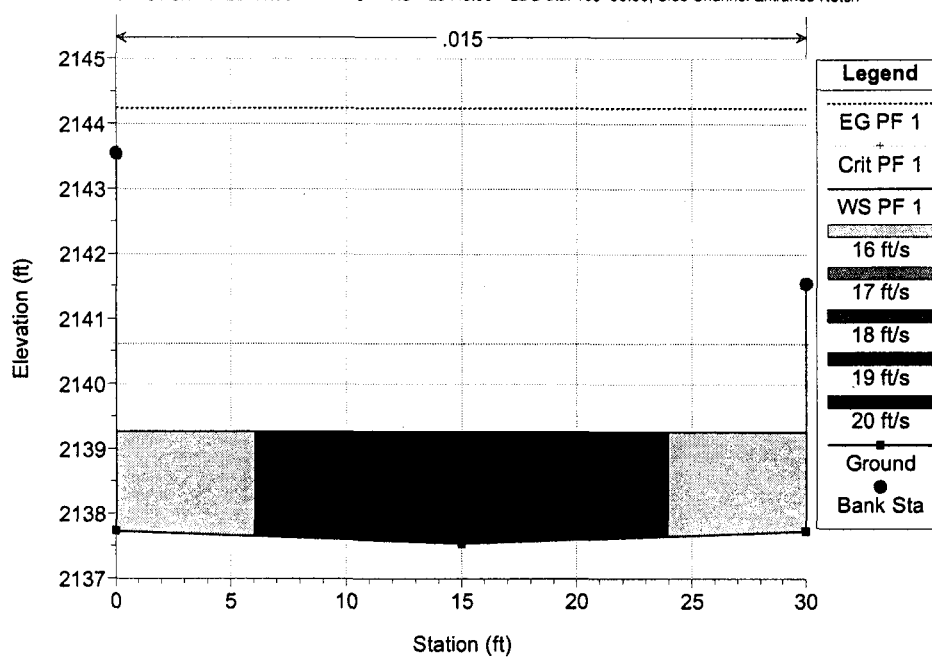
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23450 LBG Sta. 109+00.00; End Side Channel Entrance Notch



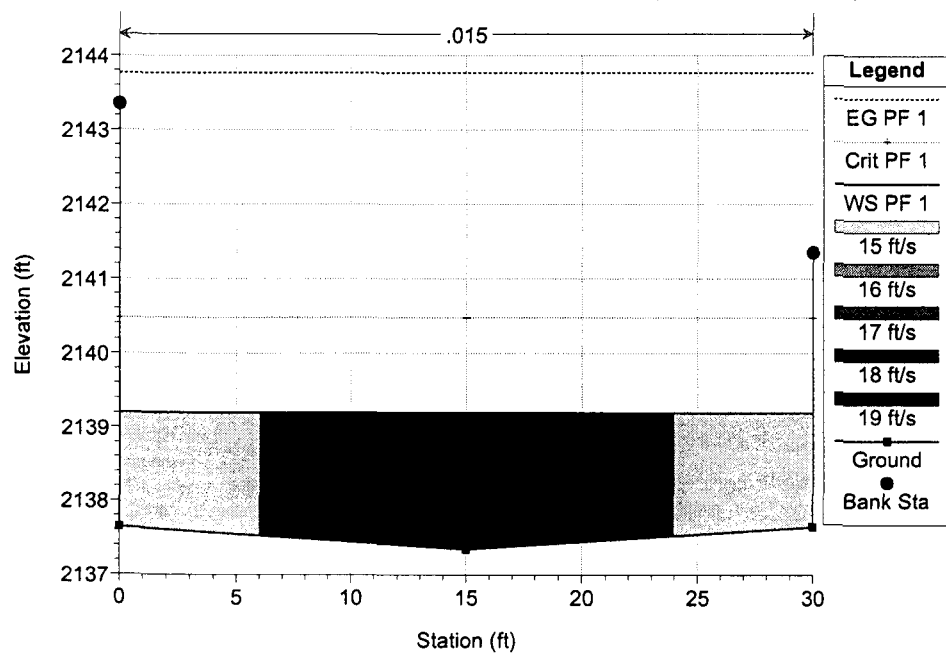
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23445.50 LBG Sta. 108+95.50; Side Channel Entrance Notch



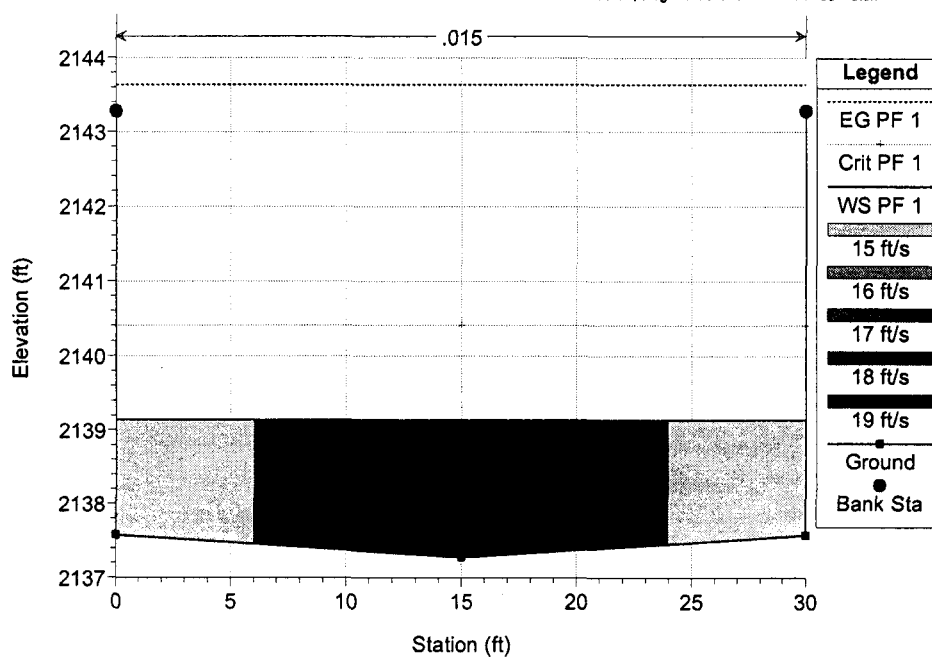
C-1 Channel Phase II LOMR

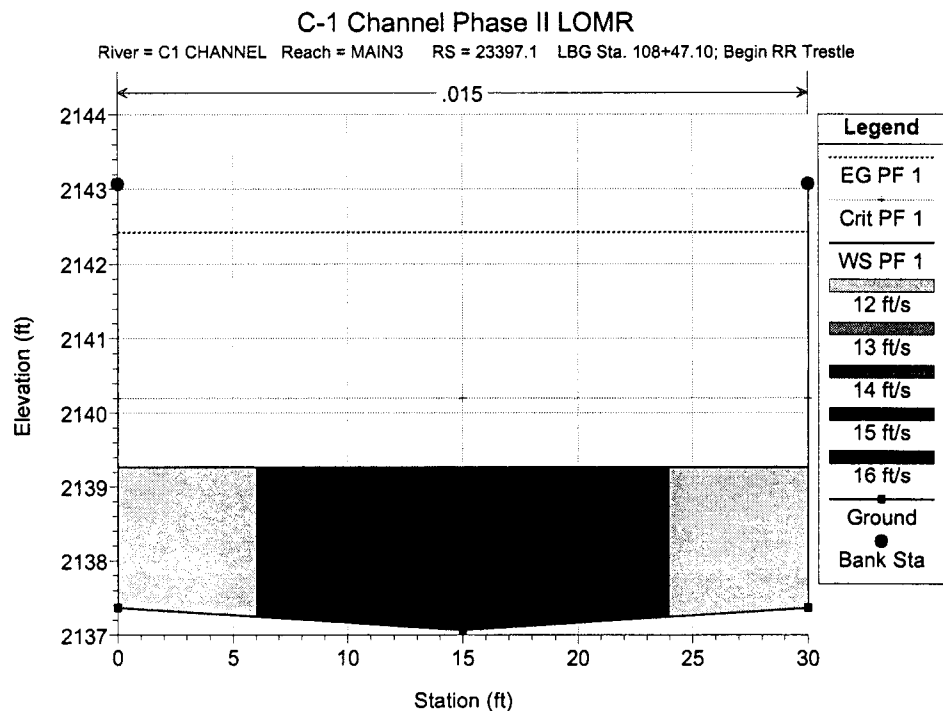
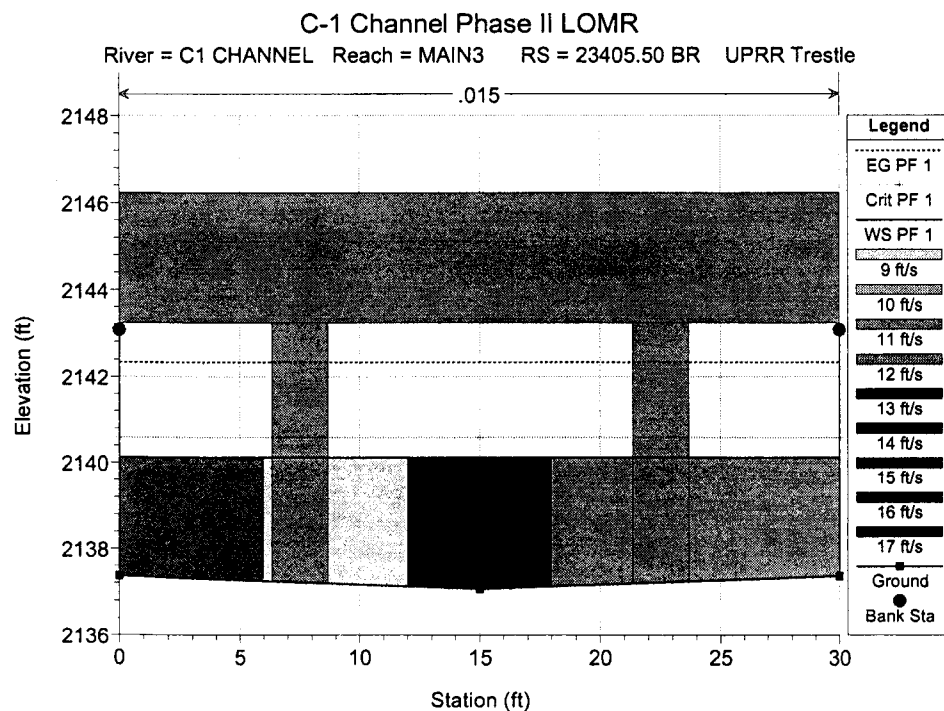
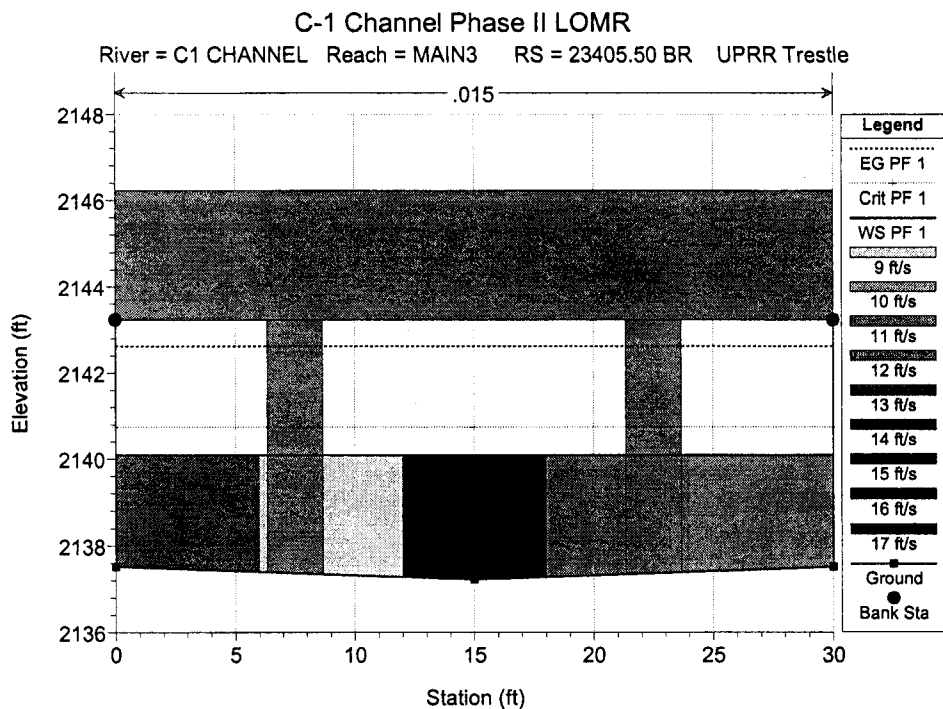
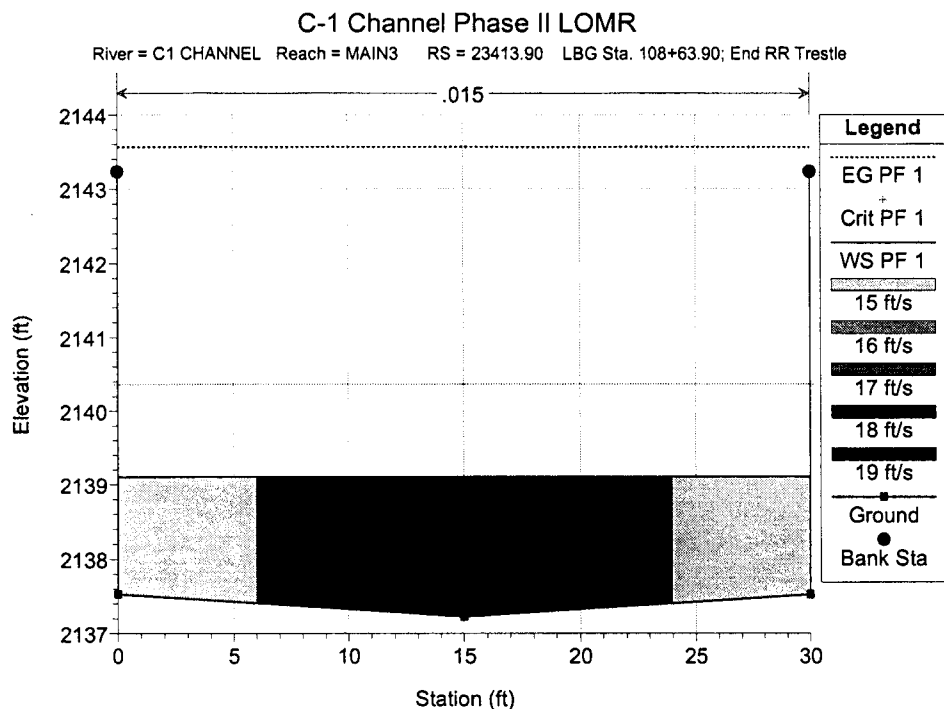
River = C1 CHANNEL Reach = MAIN3 RS = 23425.50 LBG Sta. 108+75.50; Side Channel Entrance Notch



C-1 Channel Phase II LOMR

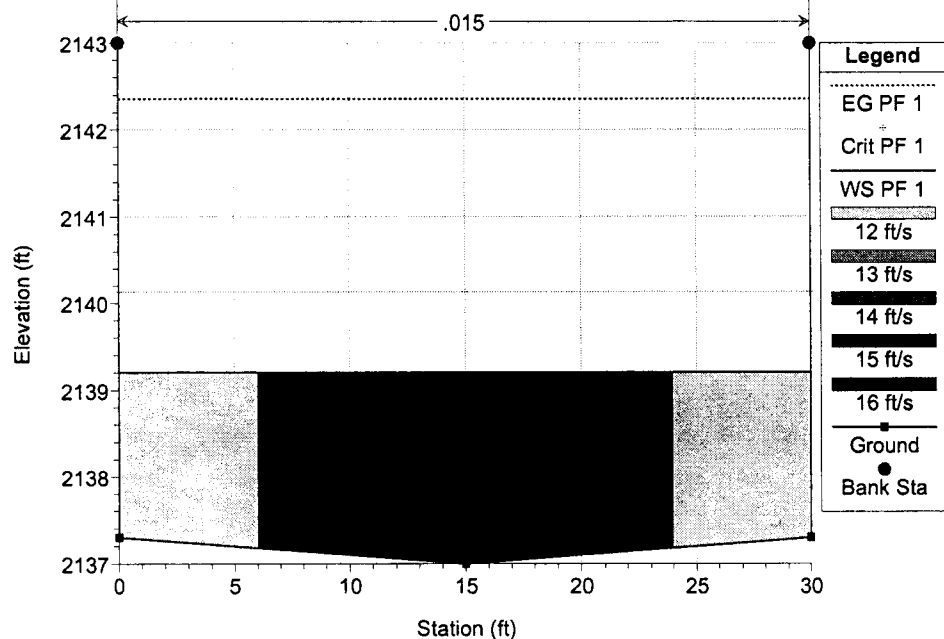
River = C1 CHANNEL Reach = MAIN3 RS = 23418.50 LBG Sta. 108+68.50; Begin Side Channel Entrance Notch





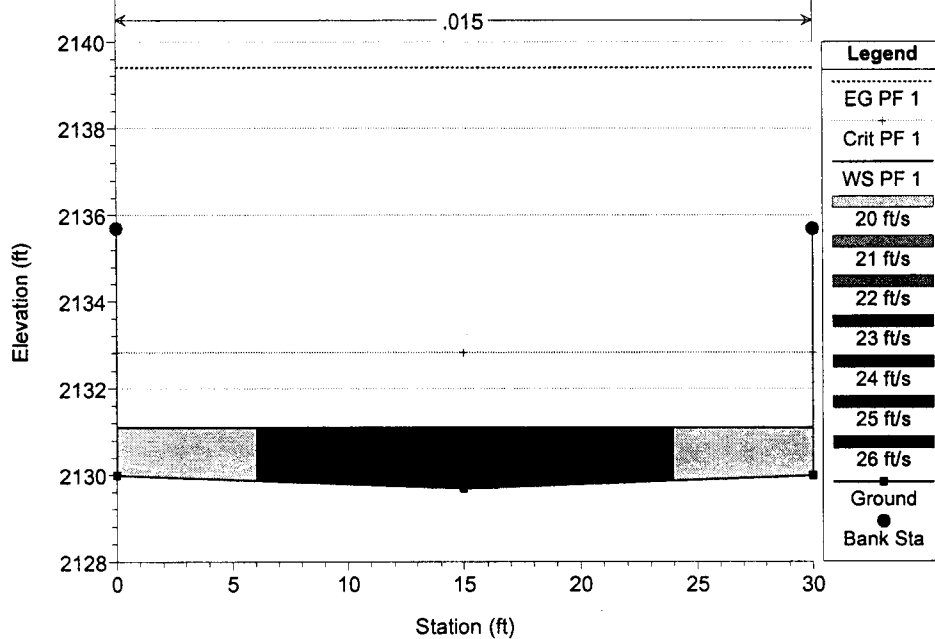
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23390.00 LBG Sta. 108+40.00; Grade Break



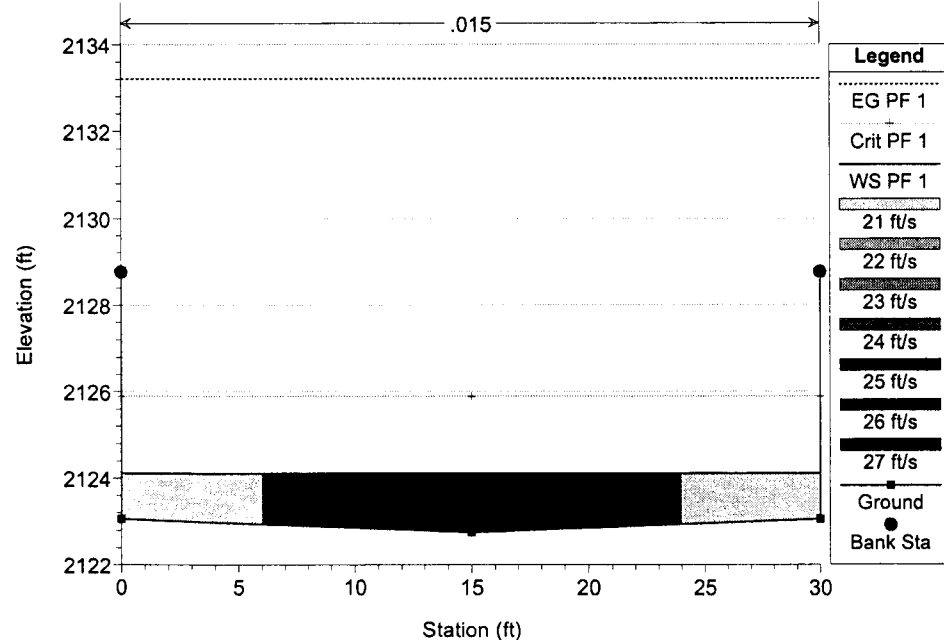
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23253 LBG Sta. 107+03.00; Minor side inflow point



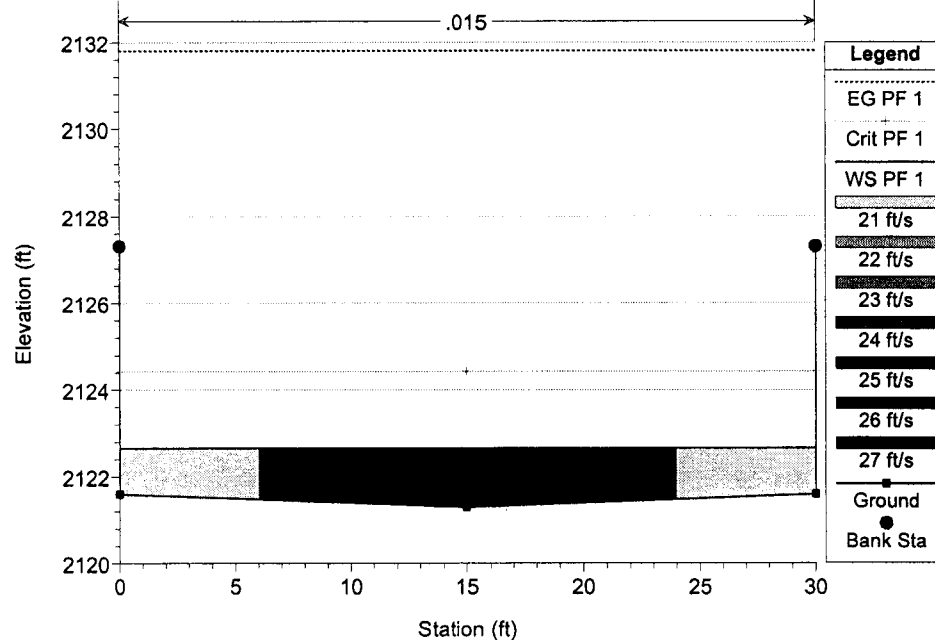
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23122.96 LBG Sta. 105+72.96; Minor side inflow point



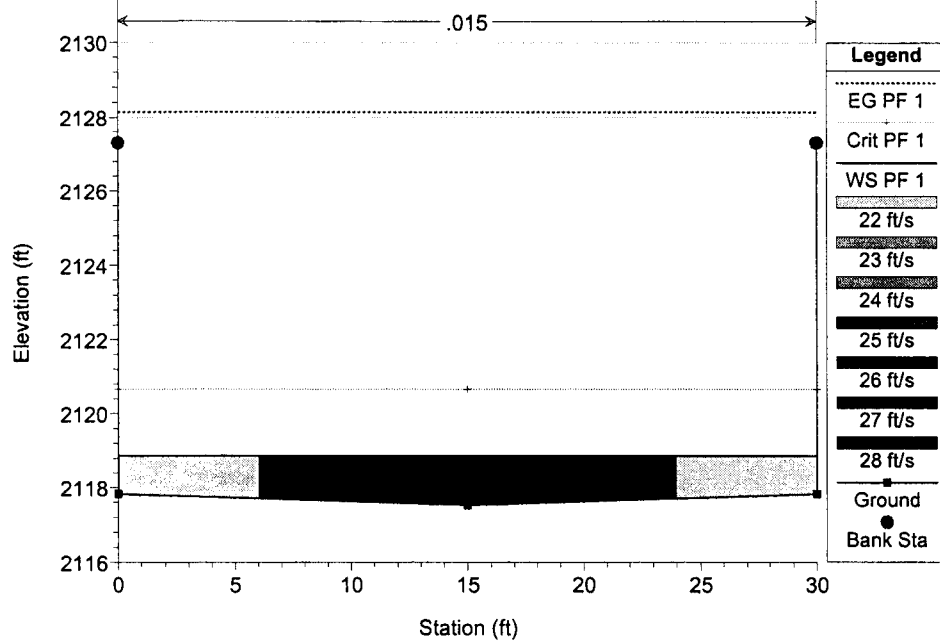
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23095.66 LBG Sta. 105+45.66; End Top Transition



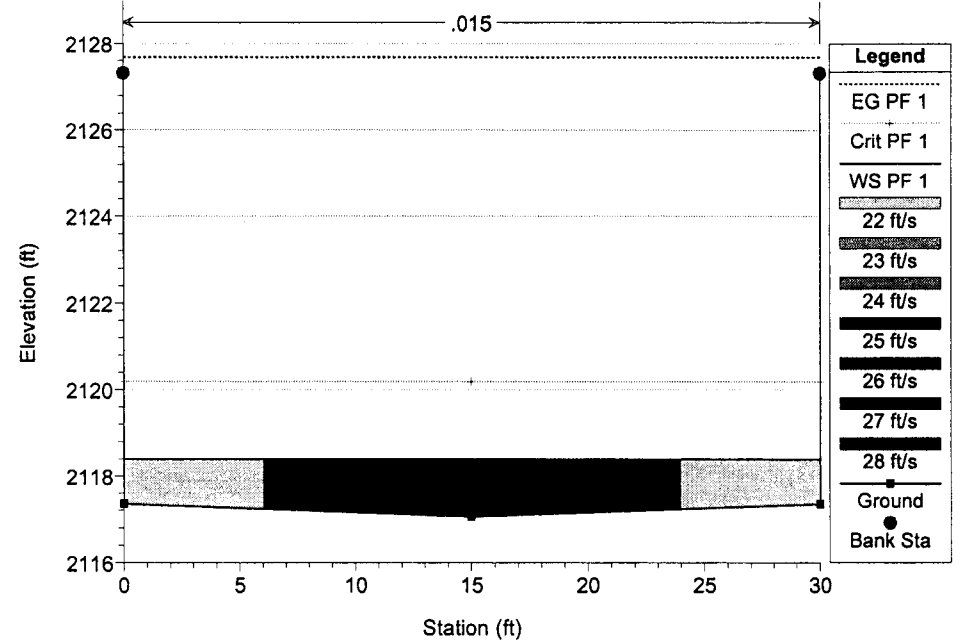
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23025.00 LBG Sta. 104+75.00; Minor Side Inflow Point



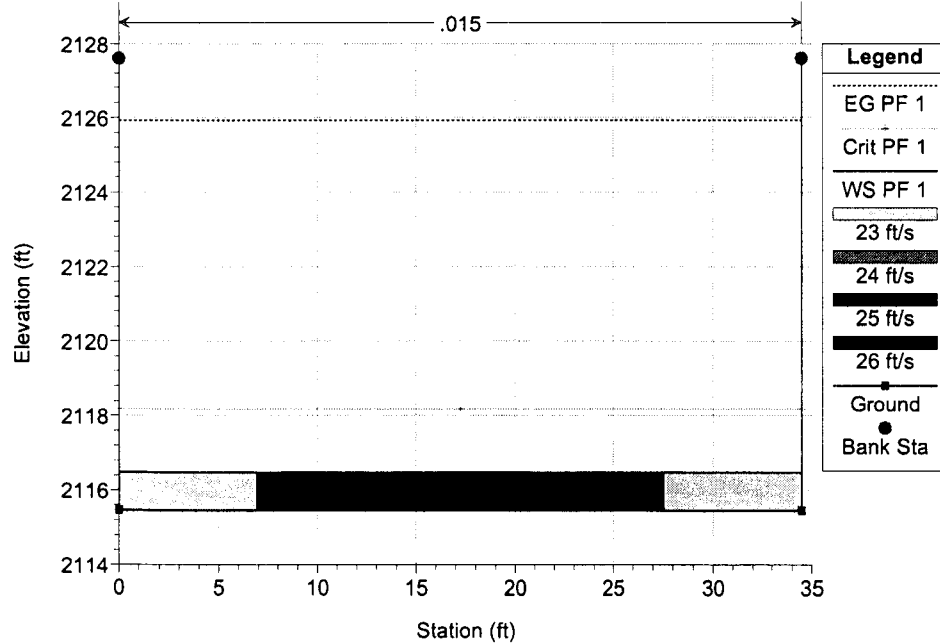
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 23016.33 LBG Sta. 104+66.33; End Transition



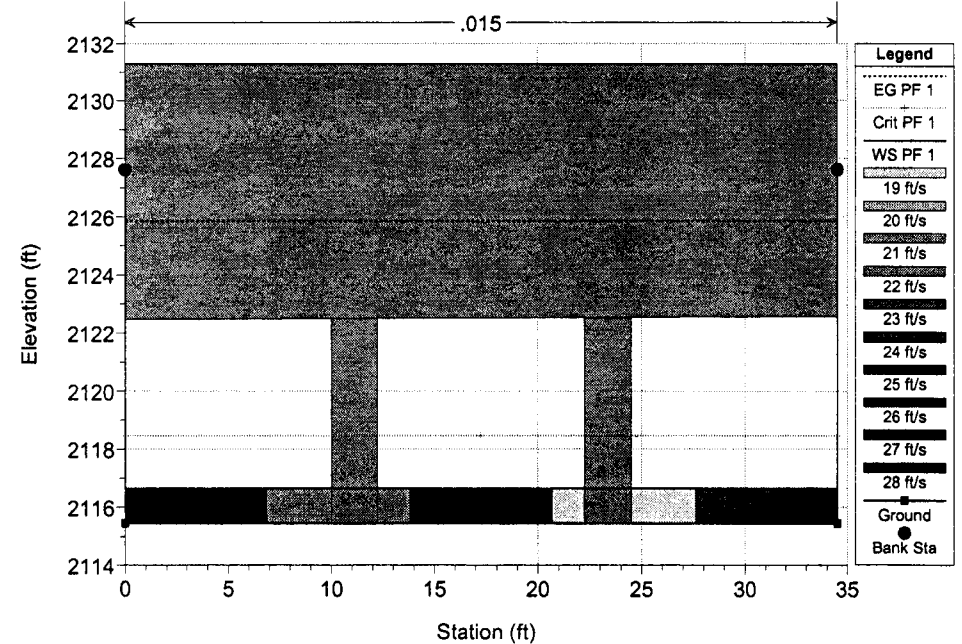
C-1 Channel Phase II LOMR

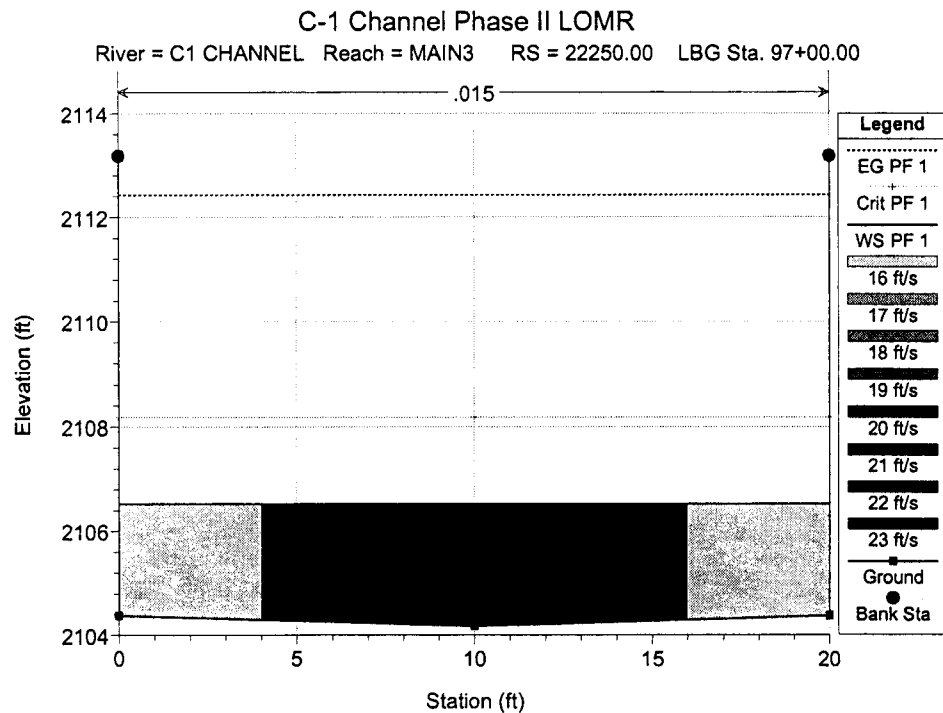
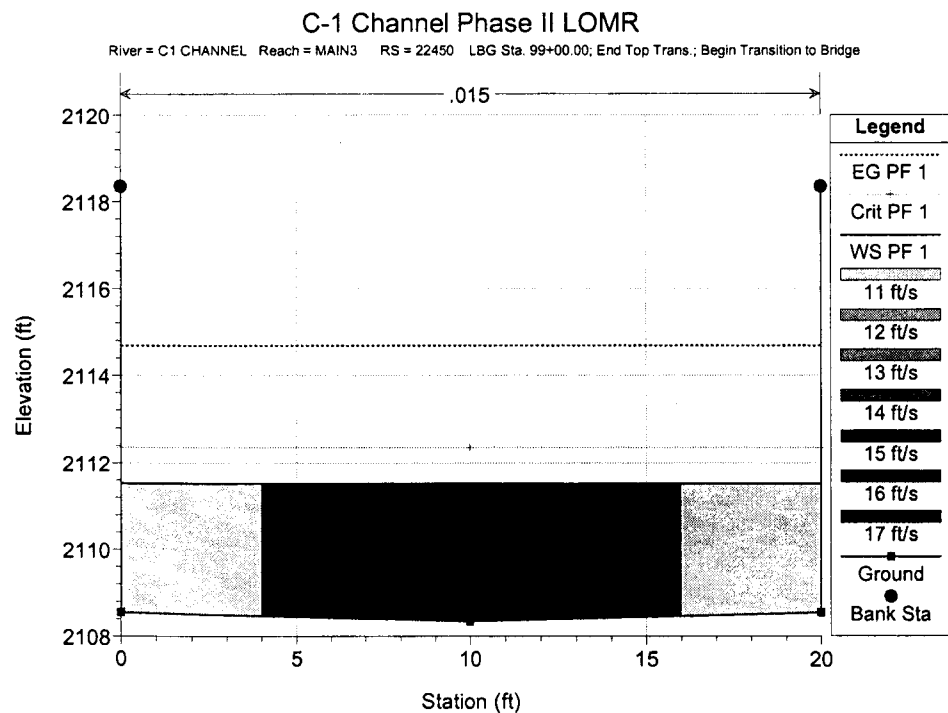
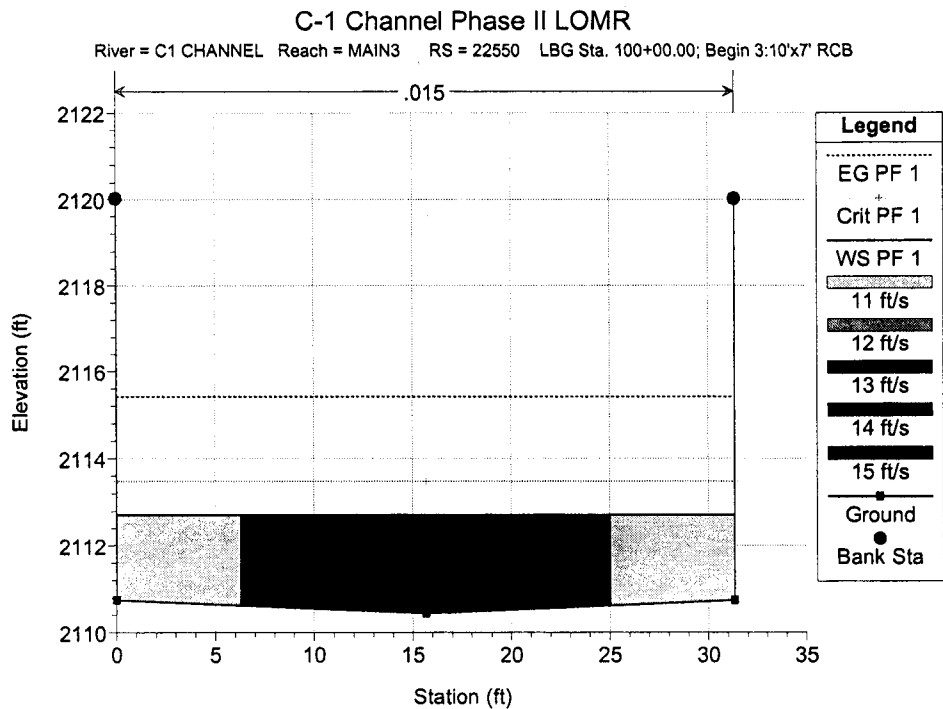
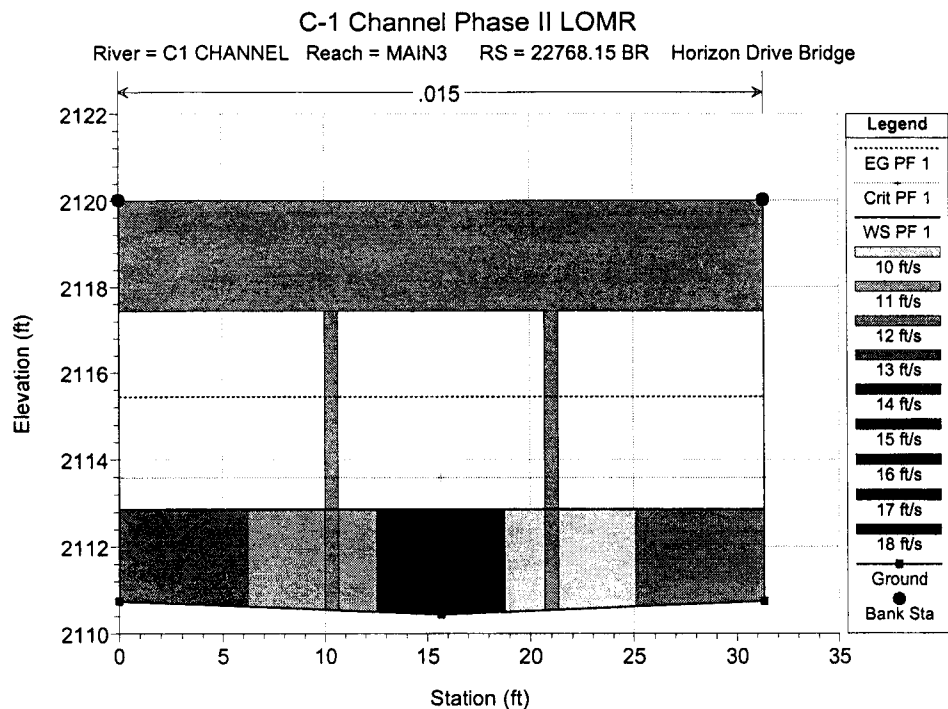
River = C1 CHANNEL Reach = MAIN3 RS = 22986.30 LBG Sta. 104+36.30; End 3:10'x7' RCB; Begin Trans.

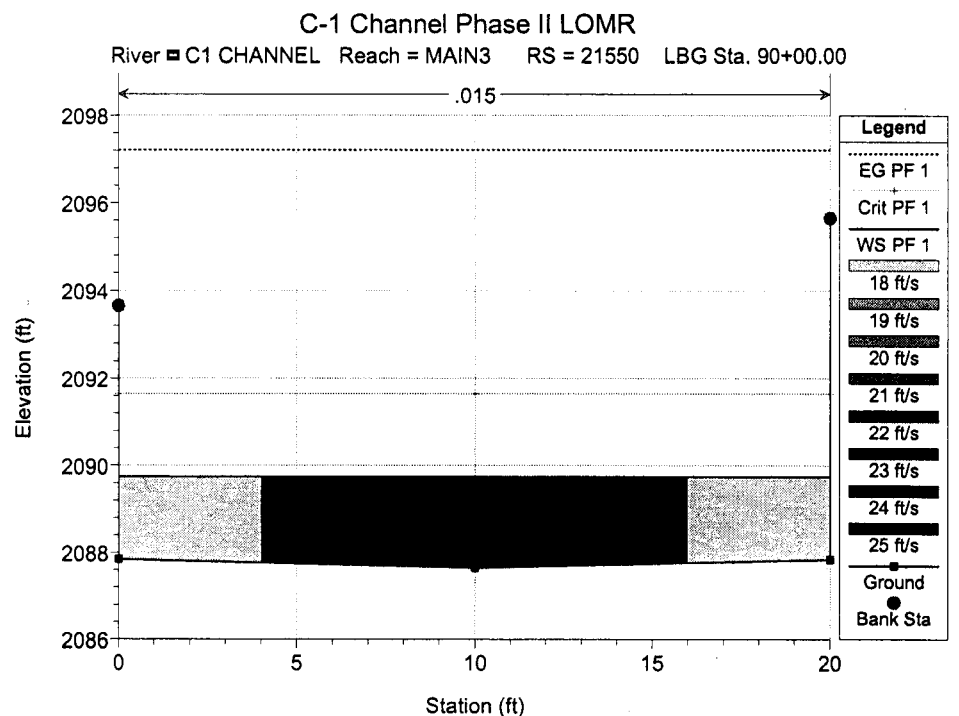
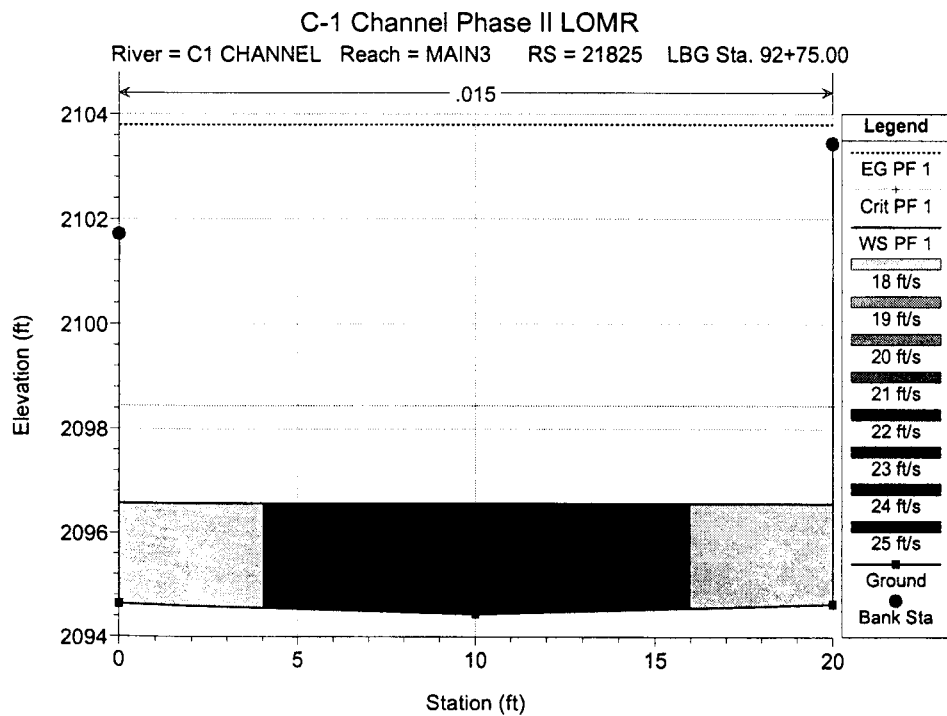
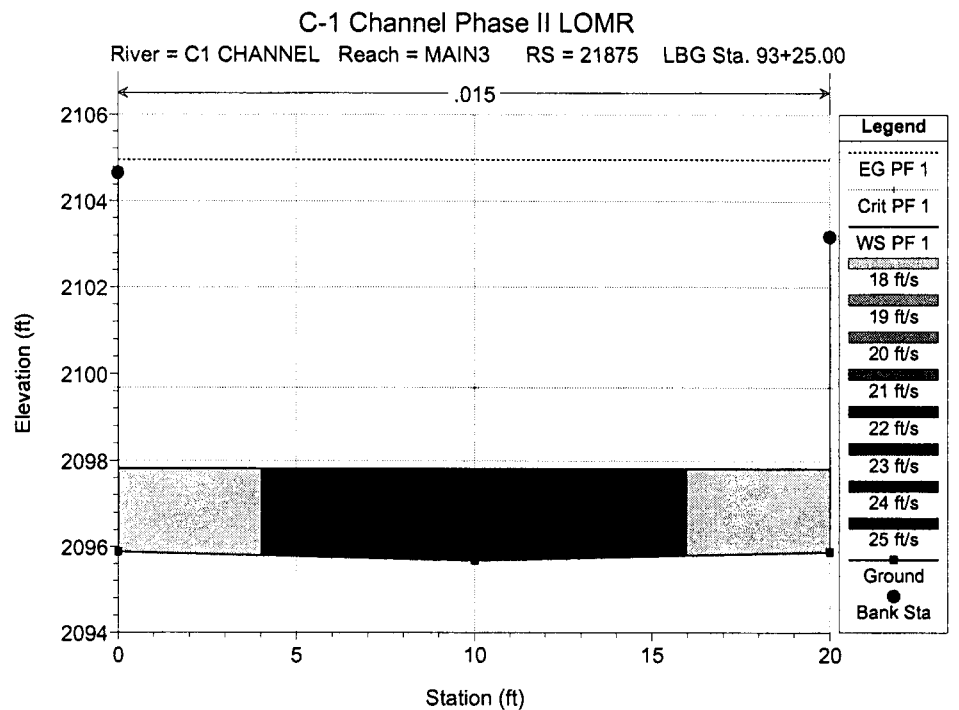
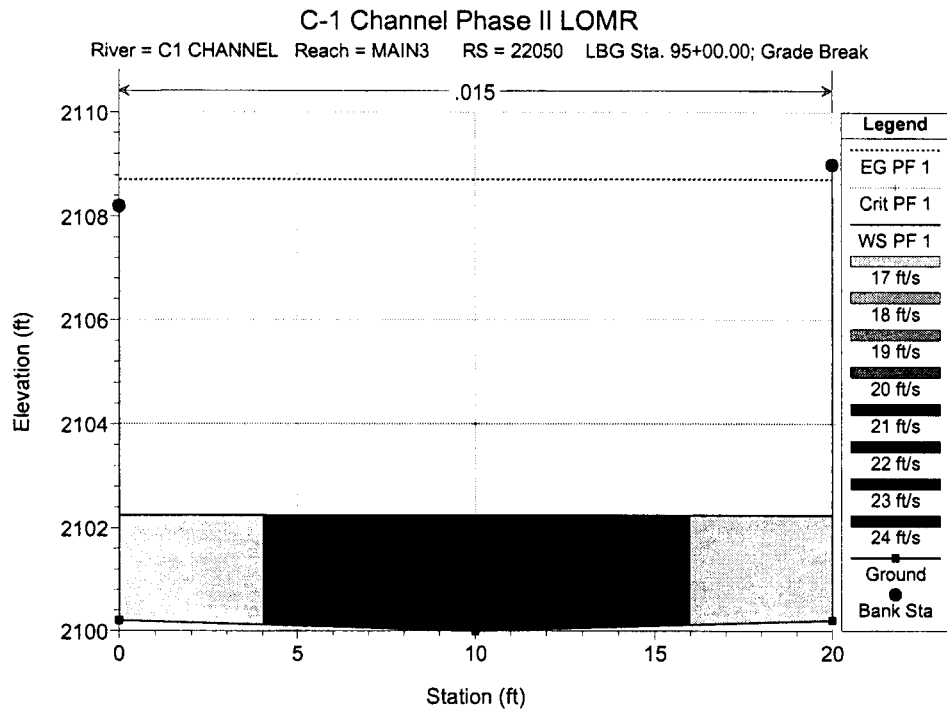


C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 22768.15 BR Horizon Drive Bridge

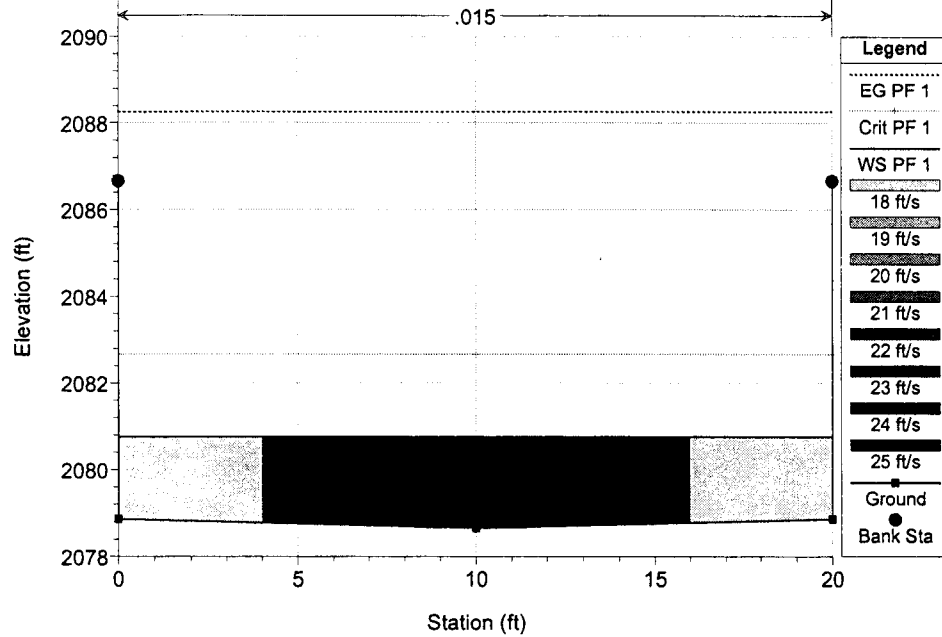






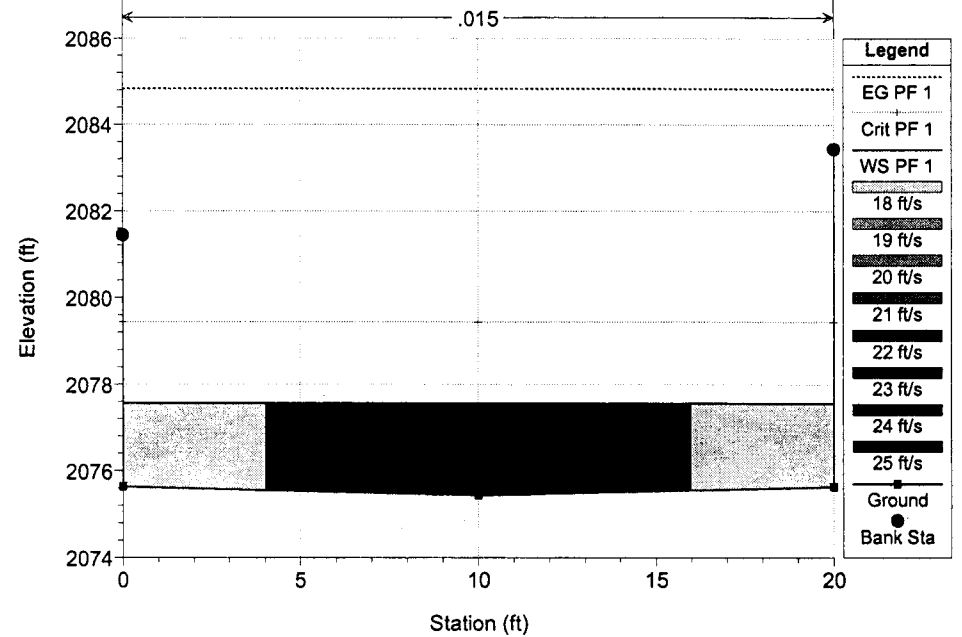
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21186 LBG Sta. 86+36.00; End Access Ramp



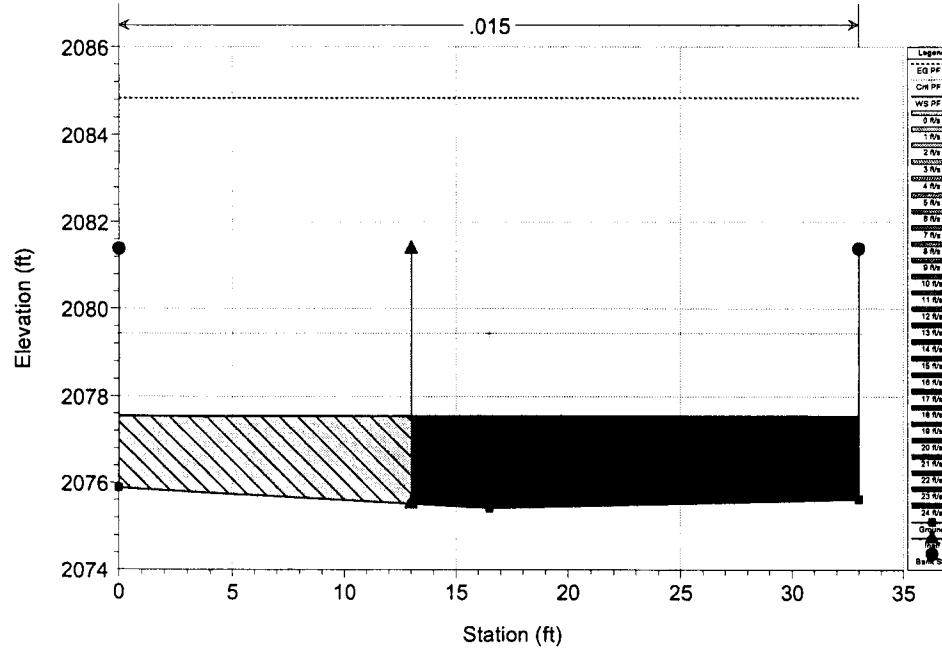
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21047 LBG Sta. 84+97.00; Begin Divider Wall for Ramp



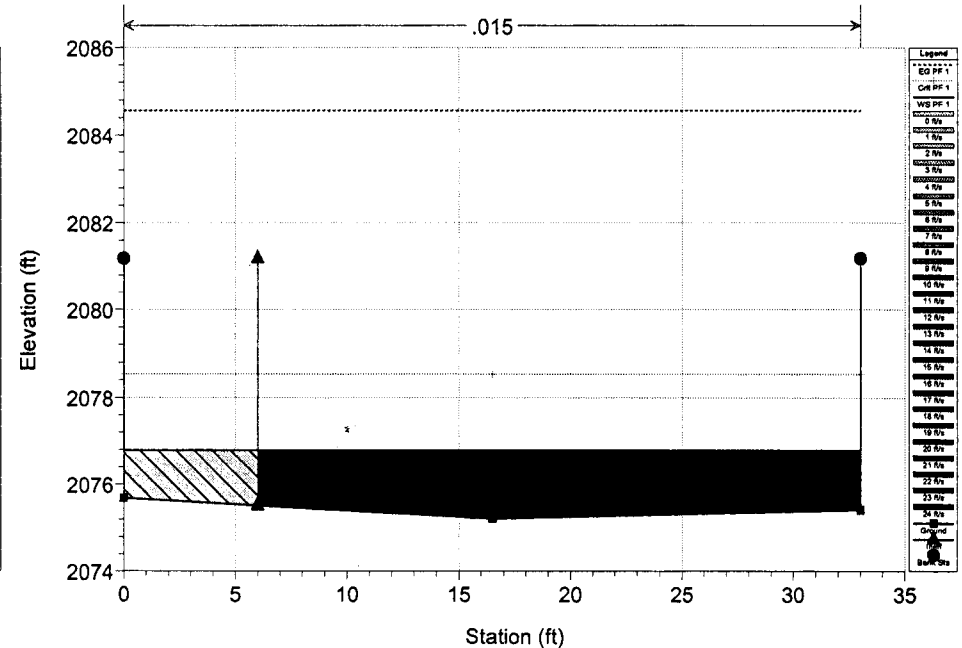
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21046.9 LBG Sta. 84+80.00; just D/S of divider wall



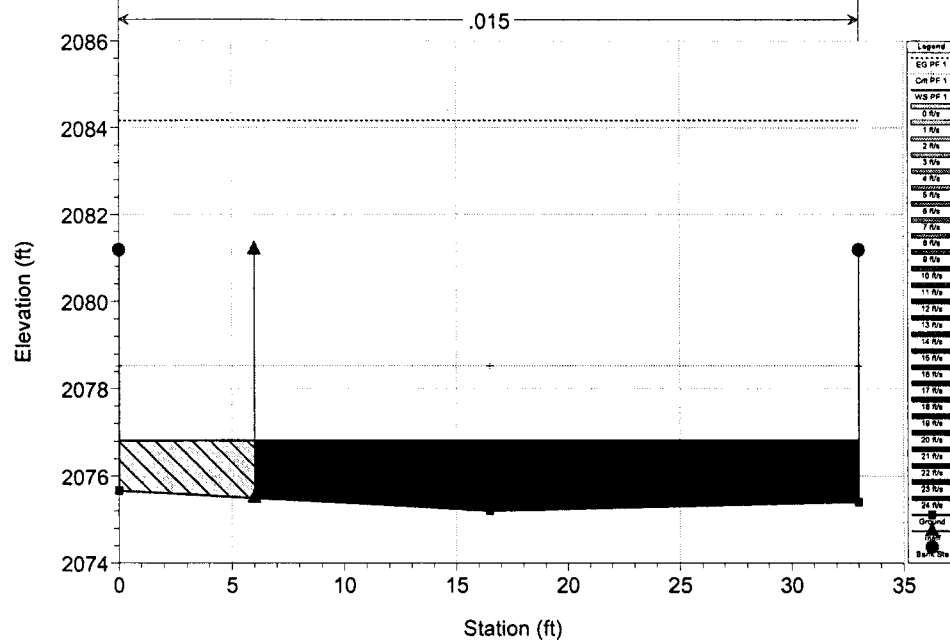
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21038.45 LBG Sta. 84+80.00; just D/S of divider wall



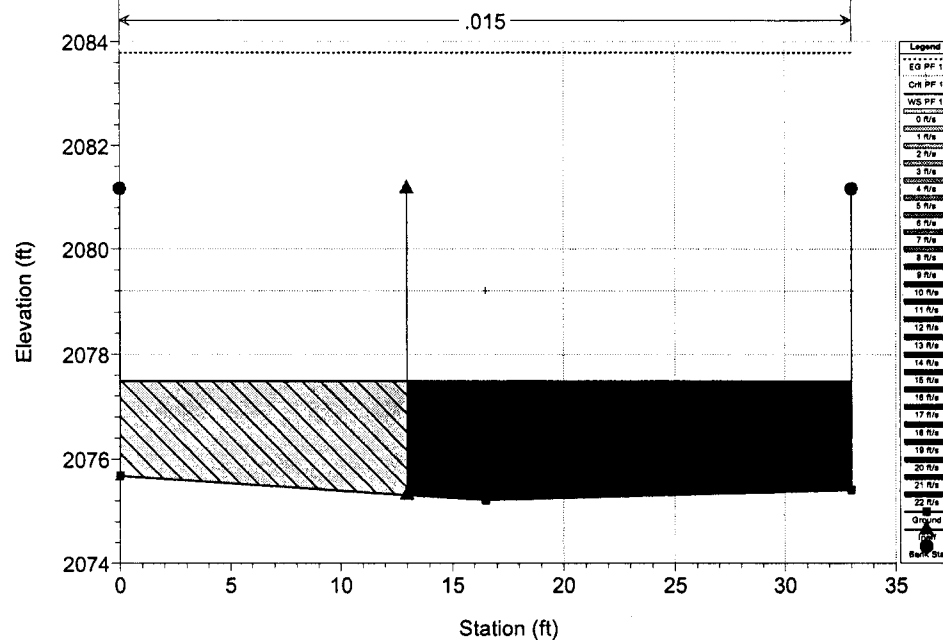
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21030.00 LBG Sta. 84+80.00; End Trans.; Bottom of Access Ramp



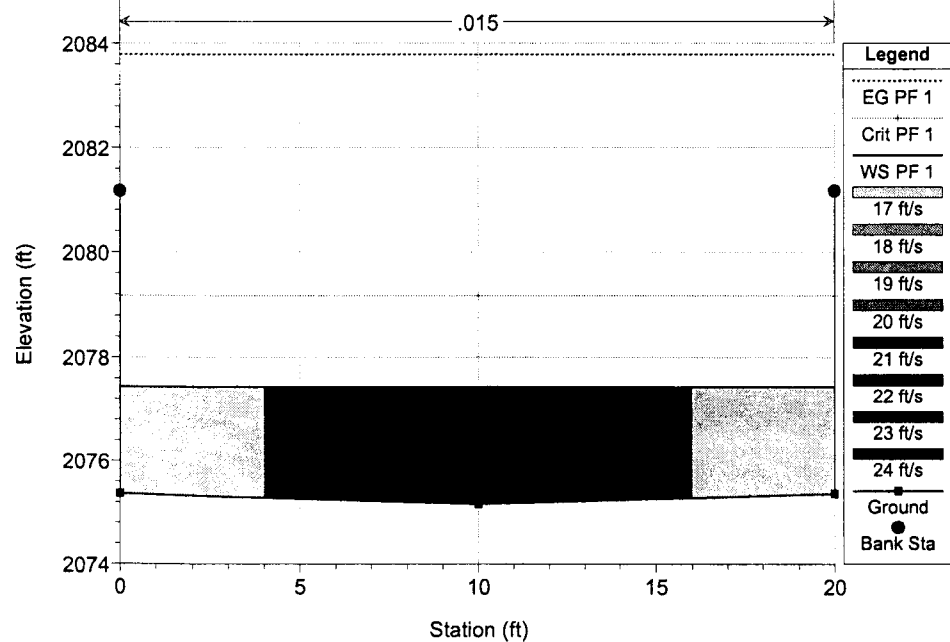
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21026.87 LBG Sta. 84+80.00; Bottom of Access Ramp



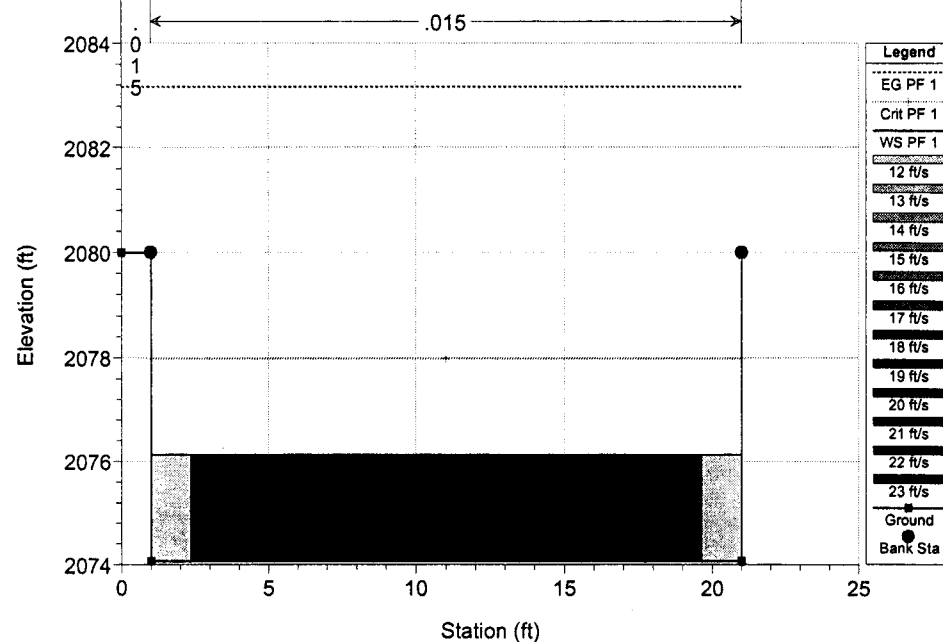
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21026.77 LBG Sta. 84+76.77; Bottom of Access Ramp



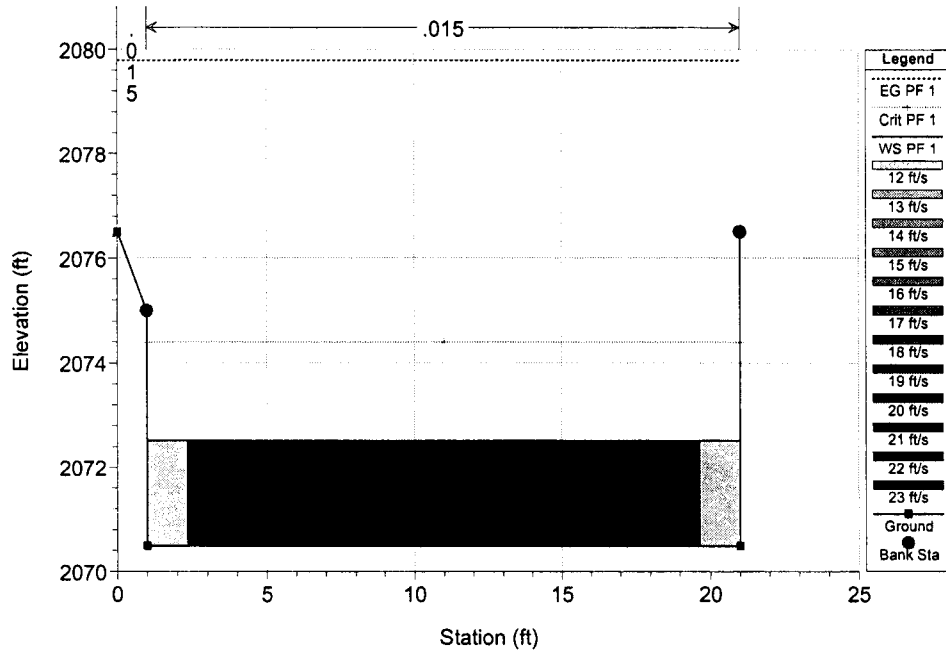
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 21000 LBG Sta 84+50 - Headworks of C-1 Ph.1, rect. sect., 20' bottom w



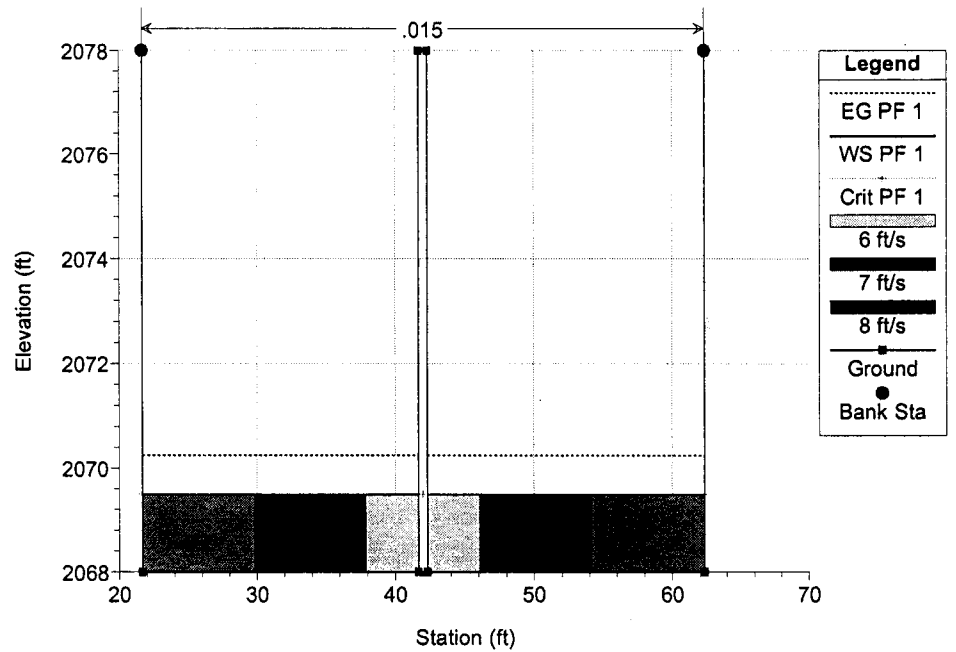
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN3 RS = 20855.25 LBG Sta 83+05.25 - Grade Break - rectangular section upstream of



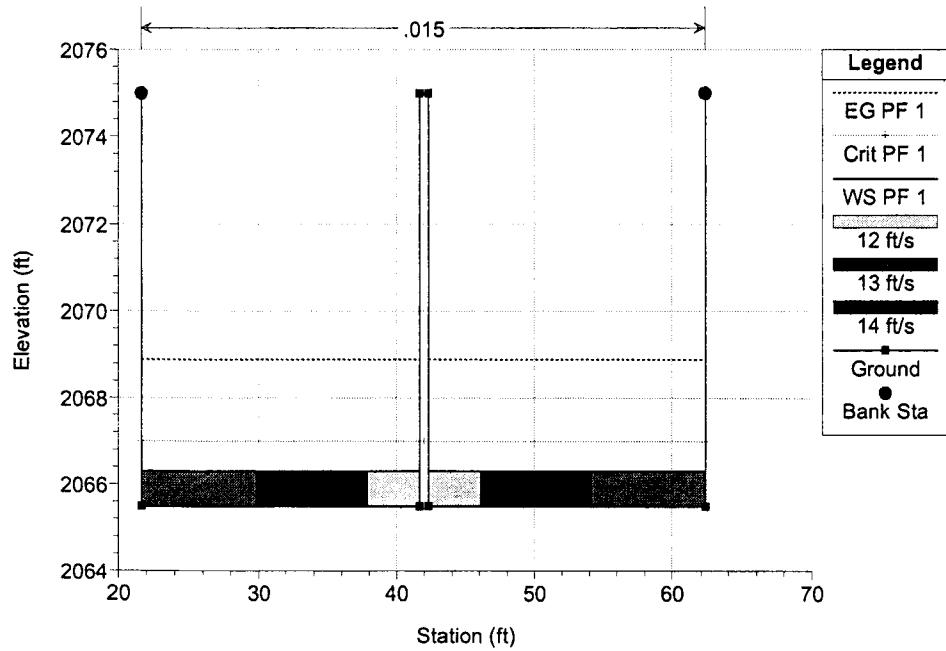
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = HDWORKS RS = 20710.41 LBG Sta 83+60.41 - System Headworks, Rectangular



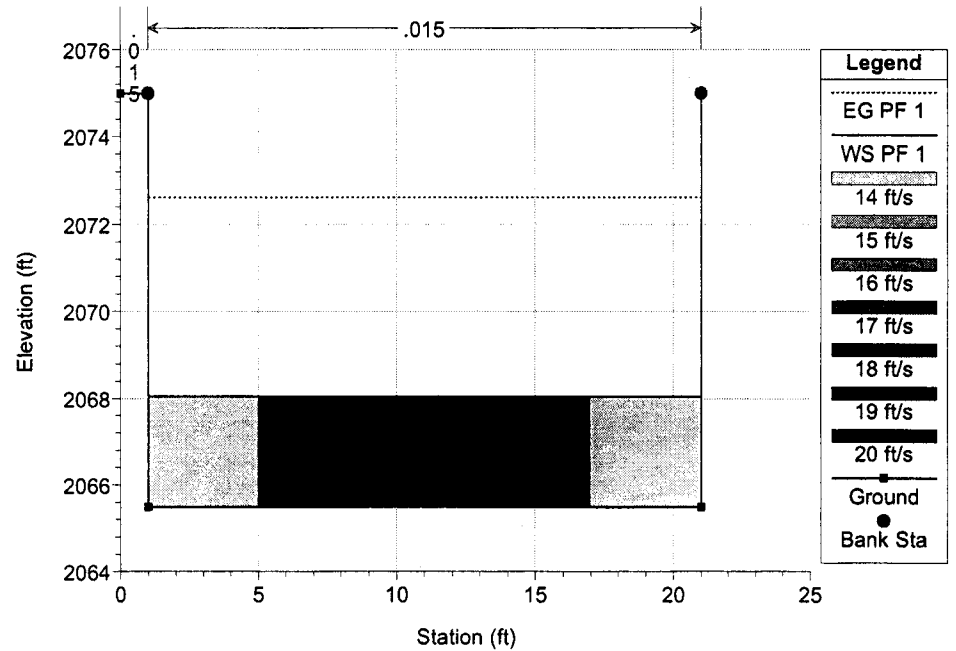
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = HDWORKS RS = 20550.1 LBG Sta 82+00 upstream of Boulder Highway, Rectangular Section



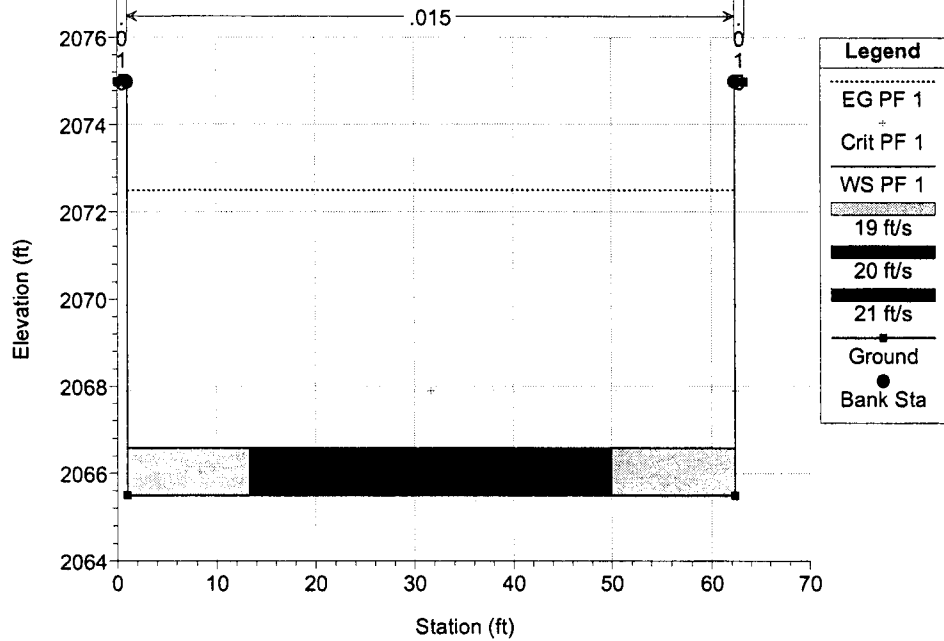
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20550.1 LBG Sta 80+00 upstream of Boulder Highway--begin rectangular se



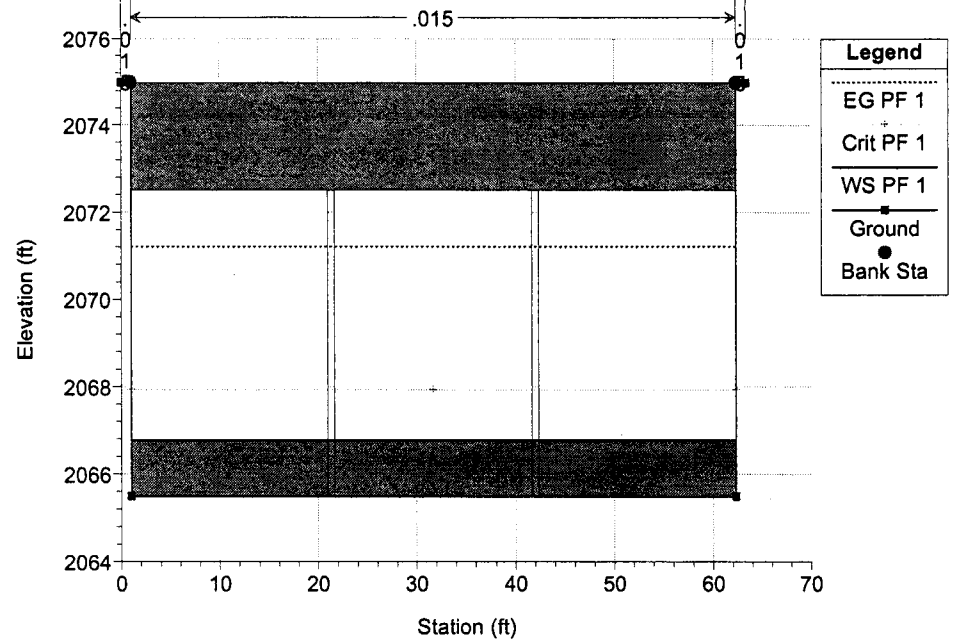
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20550 LBG Sta 80+00 Upstream face of Boulder Highway Bridge



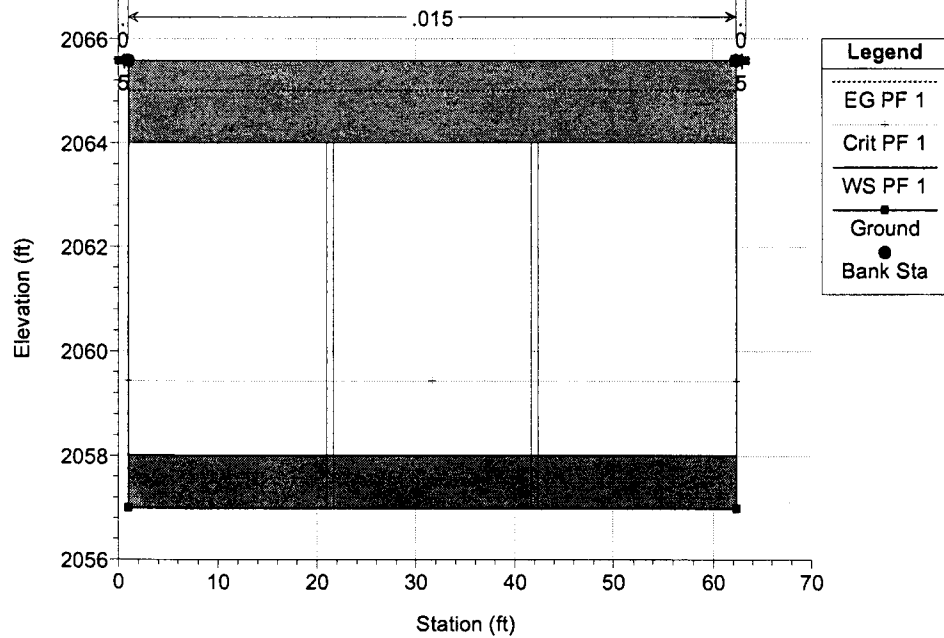
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20475 Culv Boulder Highway Bridge



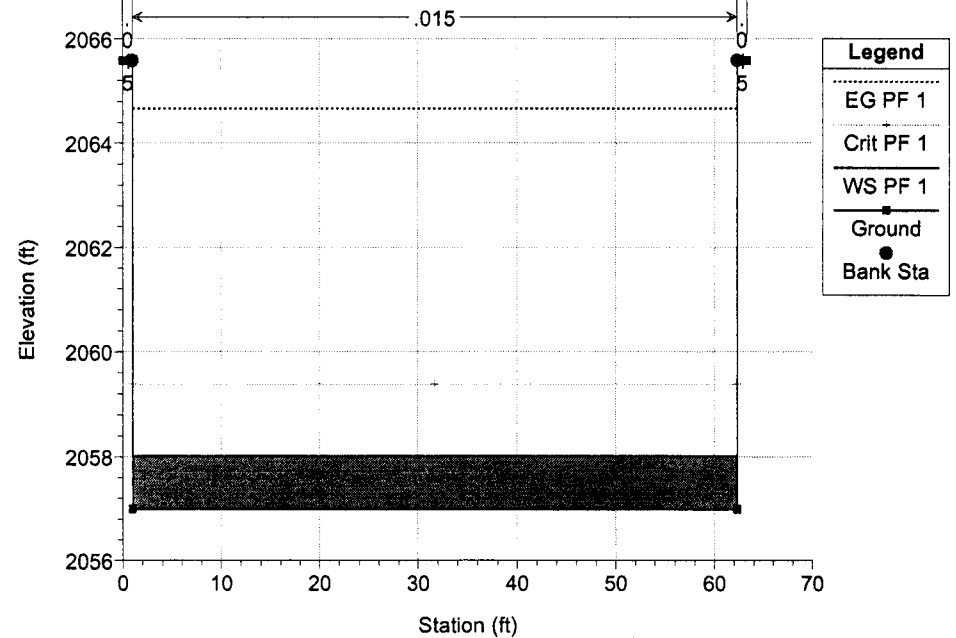
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20475 Culv Boulder Highway Bridge



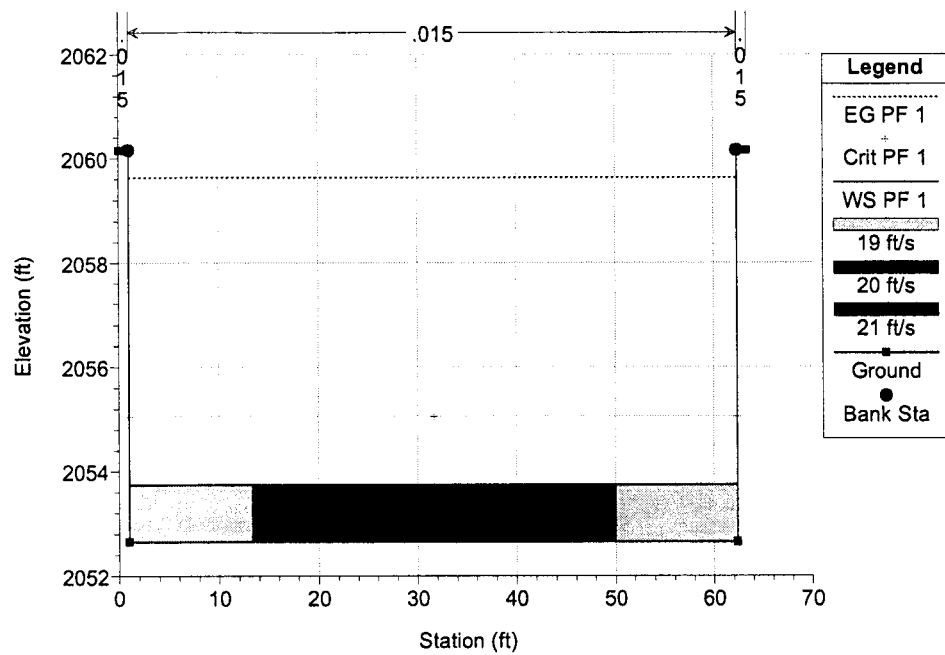
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20400 LBG sta. 7850, begin rectangular channel section, grade break, c



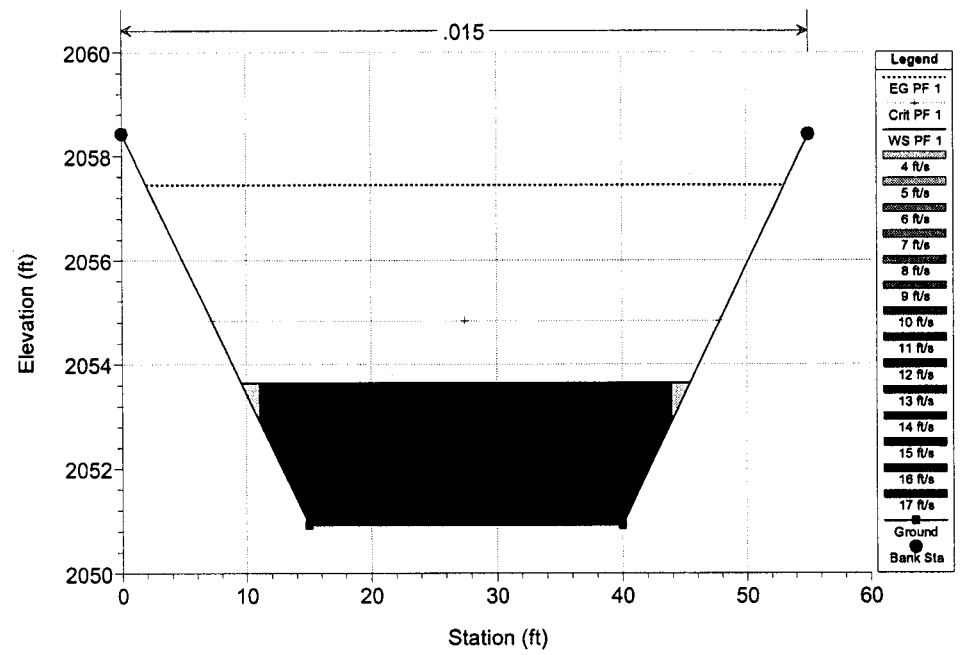
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20280 Lbg sta. 7730, begin rectangular channel section, grade break, c



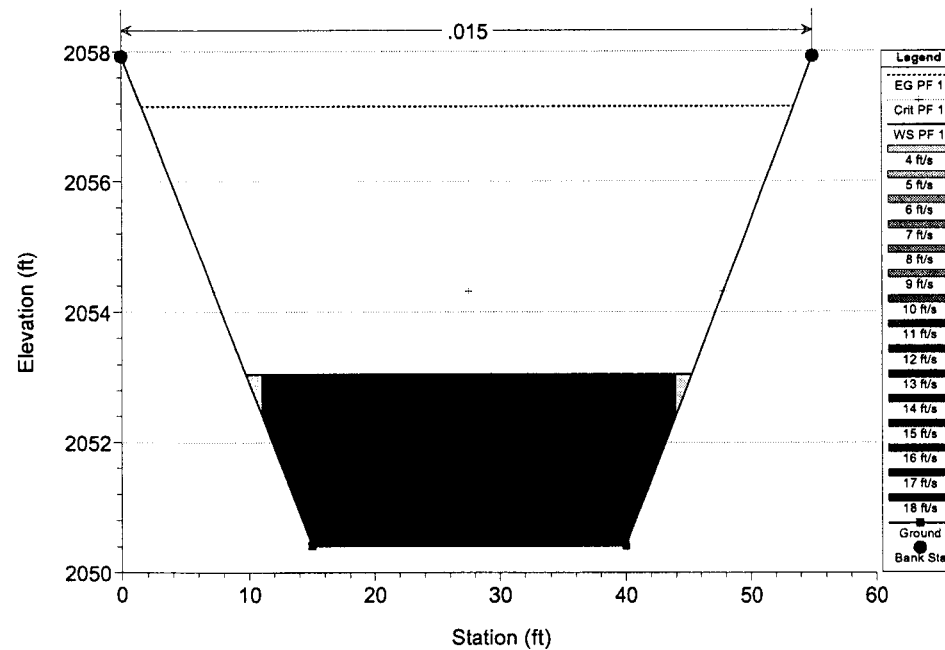
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20180 lbg sta 7630, begin transition to rectangular section



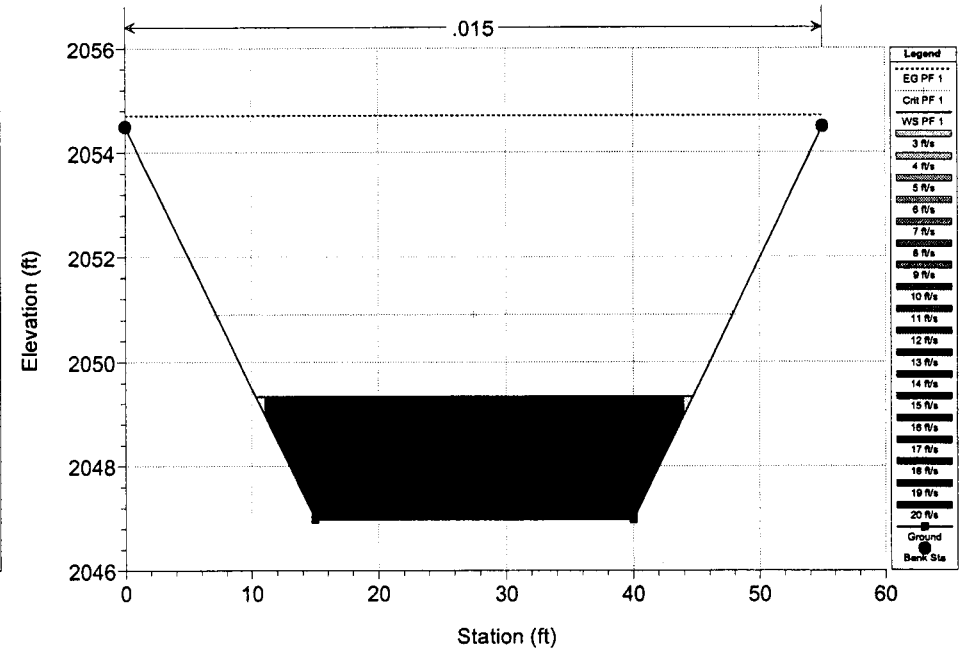
C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 20150 lbg sta 7600, bottom width 25', depth 7.5 typical



C-1 Channel Phase II LOMR

River = C1 CHANNEL Reach = MAIN2 RS = 19950 lbg sta 74+00, grade break, bottom width 25'



THE Louis Berger Group, INC.

APPENDIX E

Check-RAS Hydraulic Model Checker Output

CHECK-RAS Program: Structure Check

Project File: C:\Louis Berger Projects\c1 LOMR\cllomr.prj
 Plan File: C:\Louis Berger Projects\c1 LOMR\cllomr.p03
 Geometry File: C:\Louis Berger Projects\c1 LOMR\cllomr.g01
 Flow File: C:\Louis Berger Projects\c1 LOMR\cllomr.f04
 Report File: C:\Louis Berger Projects\c1 LOMR\cllomr.br
 Selected profiles: PF 1
 Date: 6/9/2005
 Time: 1:29:11 PM

RS	MaxLoChord	MnTpRd	EGEL	WSEL	MinChEl	Structure
C1 CHANNEL,MAIN3						
26504.4			2217.7	2216.3	2212.42	
26395			2216.87	2212.58	2210	
26350			2216.22	2211.48	2209	
26198.52			2213.34	2206.78	2204.59	
26097.91			2210.83	2203.75	2201.66	
26053.68			2209.73	2203.02	2200.5	
25966.13			2207.87	2200.74	2198.2	
25865.52			2205.64	2199.15	2196.6	
25750			2203.42	2197.36	2194.75	
25660			2201.68	2194.92	2192.34	
25650			2201.46	2194.56	2192.07	
25350			2194.42	2186.4	2184.05	
25075			2187.21	2179.02	2176.69	
25050			2186.55	2178.36	2176.03	
24969.85			2184.42	2176.21	2173.88	
24940.19			2183.63	2175.43	2173.09	
24910.53			2182.59	2173.89	2172.4	
24850			2180.31	2173.13	2170.68	
24756.73			2178.14	2170.56	2168.16	
24750			2177.99	2170.4	2168	
24550			2173.24	2165.69	2163.28	
24350			2170.28	2160.76	2158.56	
24150			2163.9	2155.3	2153.01	
24000			2159.64	2151.15	2148.85	
23850			2155.38	2146.72	2144.44	
23700			2151.04	2142.31	2140.03	
23555			2147.07	2141.27	2138.61	
23505.48			2145.99	2139.74	2138.13	
23450			2144.34	2139.38	2137.59	
23445.5			2144.25	2139.28	2137.54	
23425.5			2143.77	2139.21	2137.35	
23418.5			2143.64	2139.15	2137.28	
23413.9			2143.56	2139.11	2137.23	
23405.5						
	2143.23	2146.23	2142.63	2140.1	2137.23	Bridge #1-Up
23405.5						
	2143.23	2146.23	2142.34	2140.12	2137.07	Bridge #1-Dn
23397.1			2142.43	2139.28	2137.07	
23390			2142.36	2139.21	2137	
23253			2139.41	2131.11	2129.69	
23122.96			2133.22	2124.12	2122.76	
23095.66			2131.81	2122.66	2121.3	
23025			2128.15	2118.88	2117.53	
23016.33			2127.69	2118.41	2117.06	
22986.3			2125.93	2116.49	2115.46	
22768.15						
	2122.56	2131.3	2125.85	2116.66	2115.46	Bridge #1-Up
22768.15						
	2117.44	2120	2115.45	2112.87	2110.44	Bridge #1-Dn
22550			2115.43	2112.72	2110.44	

22450			2114.68	2111.54	2108.35	
22250			2112.43	2106.54	2104.18	
22050			2108.73	2102.25	2100	
21875			2104.96	2097.83	2095.68	
21825			2103.8	2096.58	2094.44	
21550			2097.22	2089.75	2087.65	
21186			2088.27	2080.76	2078.66	
21047			2084.84	2077.57	2075.44	
21046.9			2084.84	2077.55	2075.43	
21038.45			2084.57	2076.79	2075.22	
21030			2084.18	2076.82	2075.21	
21026.87			2083.79	2077.49	2075.22	
21026.77			2083.79	2077.44	2075.17	
21000			2083.17	2076.14	2074.07	
20855.25			2079.8	2072.52	2070.49	
C1 CHANNEL, HDWORKS						
20710.41			2070.25	2069.5	2068	
20550.1			2068.89	2066.31	2065.5	
C1 CHANNEL, MAIN2						
20550.1			2072.63	2068.06	2065.5	
20550			2072.5	2066.58	2065.5	
20475	2072.5	2065.5	0	2066.78	2065.5	Culvert #1-Up
20475	2064	2057	0	2058.02	2057	Culvert #1-Dn
20400			2064.67	2058.02	2057	
20280			2059.63	2053.75	2052.66	
20180			2057.45	2053.65	2050.93	
20150			2057.15	2053.06	2050.42	
19950			2054.71	2049.34	2046.99	

RIVER/REACH: C1 CHANNEL, MAIN3
RIVER STATION: 23405.5
TYPE OF STRUCTURE: Bridge

Description: UPRR Trestle
Distance from Upstream XS: 0.1
Deck/Roadway Width: 16.6
Weir Coefficient: 2.6
Maximum allowable submergence for weir flow: 0.95
Elevation at which weir flow begins: 0
Weir crest shape: Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	23418.5	4.60	2139.15		2143.64	30	
3	23413.9	16.80	2139.11		2143.56	30	
	23405.5	16.60	2140.1		2142.63	25.34	Bridge #1-Up
	23405.5	0.10	2140.12		2142.34	25.34	Bridge #1-Dn
2	23397.1	7.10	2139.28		2142.43	30	
1	23390	140.00	2139.21		2142.36	30	

Ineffective Flow, Section 3			Ineffective Flow, Section 2		
Sta L	Sta R	Elev	Sta L	Sta R	Elev

```
-----
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
-----
```

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LifStaS	RifStaS
Bridge						U

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Bridge #1	878.9	878.9	0	Momentum	Sluicagate Pressure Flow

```
RS:      23405.5
ST GD 04 There is only one bridge. This is downstream bridge section.
         However, the low chord line crosses the ground line at more than
         two locations.
         CHECKRAS can not check other messages.
         The ground and deck/roadway data should be checked.
```

Description:	Horizon Drive Bridge
Distance from Upstream XS:	0.1
Deck/Roadway Width:	435
Weir Coefficient:	2.6
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	0
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual
-----	------------------	-------------------	------	--------	------	--------------------

3	22986.1	436.00	2116.49	2125.93	34.5	
	22768.15	435.00	2116.66	2125.85	30	Bridge #1-Up
	22768.15	0.90	2112.87	2115.45	29.99	Bridge #1-Dn
2	22550	100.00	2112.72	2115.43	31.33	
1	22450	200.00	2111.54	2114.68	20	

Ineffective Flow, Section 3
Sta L Sta R Elev

Ineffective Flow, Section 2
Sta L Sta R Elev

BRIDGE:
Bridge Name: Bridge #1
LowFlowMethod: Momentum
Momentum Cd: 2
HighFlowMethod: Energy Only
SluiceGate Cd: 0 Submerged Cd: 0

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

MaxLowChord: 2122.56 MinTopRd: 2131.31 MinElPrs: 2122.56

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Bridge						U D
	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd
Bridge #1	34.50 0.00	34.50 31.33	2131.30 2120.00	2131.30 2120.00	2131.30 2120.00	2122.56 U 2117.44 D

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Bridge #1	878.9	878.9	0	Energy only	Sluicagate Pressure Flow

GEOMETRIC CHECK

RS: 22768.15 Bridge-Dn
ST GD 09 Left and/or Right Abutment station computed
by the CHECK-RAS program is equal to zero.
CHECK-RAS cannot evaluate this structure

TYPE OF FLOW CHECK

RS: 22768.15 This is Bridge #1
BR PF 01 Type of flow is sluicagate pressure flow because,

3. WSEL 2 of 2112.72 is less than MxLoCdD of 2117.44.

DISTANCE CHECK

RS: 22768.15 This is Bridge #1
ST DT 01 'Distance from Upstream XS' of 0.10 is less than the height of the bridge opening of 7.10
Section 3 should be placed at the foot of the road embankment or wing walls.
Distances at Sections 4 & 3, and 'Distance from Upstream XS' should be adjusted.

RS: 22768.15 This is Bridge #1
ST DT 02 The channel distance of 0.9 at Downstream Internal Section is less than the height of the bridge opening of 12.12
Section 2 should be placed at the foot of the road embankment or wing walls.
Distances at Sections 4, 3 & 2 should be adjusted.

INEFFECTIVE FLOW CHECK

RS: 22986.3 This is Section 3
ST GD 06 Pressure flow occurs at Bridge
The velocity head at Section 3 is more than 0.5 foot and more than the velocity head at Section 4.
Section 3 should be recoded to represent the natural valley cross section.

RIVER/REACH: C1 CHANNEL, MAIN2
RIVER STATION: 20475
TYPE OF STRUCTURE: Culvert

Description: Boulder Highway Bridge
Distance from Upstream XS: 0.1
Deck/Roadway Width: 149.8
Weir Coefficient: 2.6
Maximum allowable submergence for weir flow: 0.95
Elevation at which weir flow begins: 0
Weir crest shape: Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual
4	20550.1	0.10	2068.06		2072.63	20
3	20550	150.00	2066.58		2072.5	61.33
	20475	149.90	2066.78		0	0
	20475	0.00	2058.02		0	0
2	20400	120.00	2058.02		2064.67	61.33
1	20280	100.00	2053.75		2059.63	61.33

Ineffective Flow, Section 3
Sta L Sta R Elev

Ineffective Flow, Section 2
Sta L Sta R Elev

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LifStaS	RifStaS
Culvert Group						U D

CULVERT:

Culvert Name: Culvert #1
 Shape: Box Rise: 7 Span: 20 Barrels: 3
 FHWA Chart #: # 8 - flared wingwalls
 FHWA Scale #: # 1 - Wingwall flared 30 to 75 deg.
 Solution Crit: Highest U.S. EG

UpstrmDist:	0.1	Length:	149.9	n-Value:	0.015	
EntLossCoef:	0.3	ExtLossCoef:	1	CulvInvElU	2065.5	CulvInvElD 2057
LCntStaU:	11	RCntStaU:	52.33	LCntStaD	11	RCntStaD 52.33
Culvert Depth Blocked:	0					

Culv Area:	420	CulvQ:	1295.8	MinTopRd:	2075.01
------------	-----	--------	--------	-----------	---------

	LAButSt	RAButSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #1	1	62.33	2065.5	2065.5	2065.5	2072.5	U
	1	62.33	2057	2057	2057	2064	D

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Culvert #1		1295.8	0	Highest U.S. EG	Low Flow

GEOMETRIC CHECK

RS: 20475
 ST GD 03 The end station of 62.33 from upstream road/weir data
 is less than the end station of 63.33 from upstream internal
 section/section 3.
 The high chord elevation of 2075 for the end road/weir station is
 greater than the ground elevation of 2065.5 for the same ground station.
 The road/weir profile may need to be extended.

RS: 20475
 ST GD 03 The end station of 62.33 from downstream road/weir data
 is less than the end station of 63.33 from downstream internal
 section.
 The high chord elevation of 2065.58 for the end road/weir station is
 greater than the ground elevation of 2057 for the same ground station.
 The road/weir profile may need to be extended.

TYPE OF FLOW CHECK

RS: 20475 This is Culvert #1
 CV LF 01 Type of flow is low flow because,
 1. EGEL 3 of 2072.5 is less than or equal to MinTopRd of 2075.01.
 2. CulvWSIn of 2066.78 is less than MxLoCdU of 2072.50.
 3. CulvWSout of 2058.02 is less than MxLoCdD of 2064.00.
 4. $Q/AD^{0.5}$ of 1.17 is less than 4.0.

RS: 20475 This is Culvert #1
ST DT 01 'Culvert Upstrm Dist' of 0.1 is less than the height of the
culvert opening of 7 .
Section 3 should be placed at the foot of the road embankment or
wing walls.
Distances at Sections 4 & 3, and 'Distance from Upstream XS'
should be adjusted.

RS: 20475 This is Culvert #1
ST DT 02 The channel distance of 6.102026E-06 at Downstream Internal Section is less than
the height of the culvert opening of 7
Section 2 should be placed at the foot of the road embankment or
wing walls.
Distances at Sections 4, 3 & 2 should be adjusted.

CULVERT COEFFICIENT CHECK

RS: 20475 This is Culvert #1
CV CF 01 Culvert Chart # is 8 and Scale # is 1
Culvert entrance shape is Wingwall flared 30 to 75 deg.
Culvert entrance loss coefficient is 0.3 It should be equal
to 0.4
Please refer to Table 6.3 on page 6-22 and Tabble 6.4 on page 6-23
of HEC-RAS Hydraulic Reference Manual, September 1998.

CULVERT CRITERIA CHECK

INEFFECTIVE FLOW CHECK

---END

CHECK-RAS Program, XS Check
Cross Section Location and Alignment Review

Project File: C:\Louis Berger Projects\c1 LOMR\c1lomr.prj
Plan File: C:\Louis Berger Projects\c1 LOMR\c1lomr.p03
Geometry File: C:\Louis Berger Projects\c1 LOMR\c1lomr.g01
Flow File: C:\Louis Berger Projects\c1 LOMR\c1lomr.f04
Report File: C:\Louis Berger Projects\c1 LOMR\c1lomr.xls
Selected profiles: PF 1
Date: 6/9/2005
Time: 1:35:24 PM

SECNO	Len Lob	Len Chl	Len Rob	TopWdthAct	Q Total	Flow Code

C1 CHANNEL, MAIN3						
26504.4	109.4	109.4	109.4	27.91	726	C
26395	45	45	45	22.54	726	
26350	151.48	151.48	151.48	22.15	726	
26198.52	100.61	100.61	100.61	20.97	726	
26097.91	44.23	44.23	44.23	21.38	726	
26053.68	87.55	87.55	87.55	22.2	878.9	
25966.13	100.61	100.61	100.61	21.91	878.9	
25865.52	115.52	115.52	115.52	22.41	878.9	
25750	90	90	90	22.69	878.9	
25660	10	10	10	22.31	878.9	
25650	300	300	300	22.18	878.9	
25350	275	275	275	21.62	878.9	
25075	25	25	25	21.54	878.9	
25050	80.15	80.15	80.15	21.51	878.9	
24969.85	29.66	29.66	29.66	21.5	878.9	
24940.19	29.66	29.66	29.66	21.45	878.9	
24910.53	60.53	60.53	60.53	29.68	878.9	
24850	93.27	93.27	93.27	22	878.9	
24756.73	6.73	6.73	6.73	21.79	878.9	
24750	200	200	200	21.79	878.9	
24550	100	100	100	21.8	878.9	
24350	200	200	200	20.97	878.9	
24150	150	150	150	21.33	878.9	
24000	150	150	150	21.38	878.9	
23850	150	150	150	21.31	878.9	
23700	145	145	145	21.28	878.9	
23555	49.52	49.52	49.52	22.83	878.9	
23505.48	55.45	55.45	55.45	30	878.9	
23450	4.5	4.5	4.5	30	878.9	
23445.5	20	20	20	30	878.9	
23425.5	7	7	7	30	878.9	
23418.5	4.6	4.6	4.6	30	878.9	
23413.9	16.8	16.8	16.8	30	878.9	
23405.5	Bridge #1-Up					
23405.5	Bridge #1-Dn					
23397.1	7.1	7.1	7.1	30	878.9	
23390	140	140	140	30	878.9	
23253	130.04	130.04	130.04	30	878.9	
23122.96	27.3	27.3	27.3	30	878.9	
23095.66	70.66	70.66	70.66	30	878.9	
23025	8.67	8.67	8.67	30	878.9	
23016.33	30.03	30.03	30.03	30	878.9	
22986.3	436	436	436	34.5	878.9	
22768.15	Bridge #1-Up					
22768.15	Bridge #1-Dn					
22550	100	100	100	31.33	878.9	
22450	200	200	200	20	878.9	
22250	200	200	200	20	878.9	

22050	.	175	175	20	878.9	
21875	50	50	50	20	878.9	
21825	275	275	275	20	878.9	
21550	364	364	364	20	878.9	
21186	139	139	139	20	878.9	
21047	0.1	0.1	0.1	20	878.9	
21046.9	8.45	8.45	8.45	20	878.9	
21038.45	8.45	8.45	8.45	27	878.9	
21030	3.13	3.13	3.13	27	878.9	
21026.87	0.1	0.1	0.1	20	878.9	
21026.77	26.77	26.77	26.77	20	878.9	
21000	144.75	144.75	144.75	20	878.9	
20855.25	305.25	305.25	305.25	20	878.9	
C1 CHANNEL,HDWORKS						
20710.41	174.24	160.31	146.38	40	416.9	D,C
20550.1	0.1	0.1	0.1	40	416.9	D
C1 CHANNEL,MAIN2						
20550.1	0.1	0.1	0.1	20	878.9	
20550	150		150	61.33	1295.8	
20475	Culvert #1-Up					
20475	Culvert #1-Dn					
20400	120	120	120	61.33	1295.8	
20280	100	100	100	61.33	1295.8	
20180	30	30	30	35.88	1295.8	
20150	200	200	200	35.54	1295.8	
19950	163.51	163.51	163.51	34.39	1295.8	

B=blocked obstruction XS SC 05
C=critical depth XS SC 03
D=divided flow XS SC 01
E=cross section extended XS SC 02
K=known water-surface XS SC 04

DISTANCE CHECK

XS JT 01 Junction option is used.
For flood insurance study, this option should be used
if the tributary and main stream can have coincident peaks,
or it may be used for the stream without floodway.
It may also be used if the discharges at different time periods
are known from the rainfall-runoff model.
How to remove the junction is explained under Help.

XS JT 02 The name of junction is : BLDR HWY
The length from C1 CHANNEL HDWORKS to C1 CHANNEL MAIN2
is equal to zero.
Please insert the length across the junction if junction can be considered.

XS JT 03 The name of junction is : BLDR HWY
The reach length at the most downstream cross section for the
'C1 CHANNEL and MAIN3' is not equal to zero.
Please set the reach length equal to zero if junction can be considered.

XS JT 03 The name of junction is : BLDR HWY
The reach length at the most downstream cross section for the
'C1 CHANNEL and HDWORKS' is not equal to zero.
Please set the reach length equal to zero if junction can be considered.

SPACING CHECK

INEFFECTIV OW CHECK

DISCHARGE CHECK

XS DC 02 Constant discharge used for the C1 CHANNEL,HDWORKS

LOCATION CHECK

BOUNDARY CONDITION CHECK

XS BC 02 The name of the stream is C1 CHANNEL,MAIN3
Critical is specified as the upstream boundary
for profile PF 1

XS BC 02 The name of the stream is C1 CHANNEL,HDWORKS
Critical is specified as the upstream boundary
for profile PF 1

XS BC 02 The name of the stream is C1 CHANNEL,MAIN2
Critical is specified as the downstream boundary
for profile PF 1

XS FR 01 The profile is computed as supercritical flow regime.

LATERAL WEIRS CHECK

---END---

CHECK-RAS Program: NT Check
Manning's n Value and Transition Loss Coefficient Review

Project File: C:\Louis Berger Projects\c1 LOMR\c1lomr.prj
Plan File: C:\Louis Berger Projects\c1 LOMR\c1lomr.p03
Geometry File: C:\Louis Berger Projects\c1 LOMR\c1lomr.g01
Flow File: C:\Louis Berger Projects\c1 LOMR\c1lomr.f04
Report File: C:\Louis Berger Projects\c1 LOMR\c1lomr.nt
Selected profiles: PF 1
Date: 6/9/2005
Time: 1:28:45 PM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP

C1	CHANNEL,MAIN3					
26504.4		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
26395		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
26350		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
26198.52		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
26097.91		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
26053.68		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25966.13		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25865.52		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25750		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25660		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25650		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25350		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25075		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
25050		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24969.85		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24940.19		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24910.53		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24850		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24756.73		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24750		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24550		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24350		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24150		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
24000		-----	0.015	0.015	0.1	0.3
		-----	0.015	-----		
23850		-----	0.015	0.015	0.1	0.3

23700	-----	0.015	-----		
	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23555	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23505.48	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23450	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23445.5	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23425.5	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23418.5	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23413.9	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23405.5 Bridge-Up	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23405.5 Bridge-Dn	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23397.1	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23390	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23253	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23122.96	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23095.66	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23025	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
23016.33	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
22986.3	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
22768.15Bridge-Up	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
22768.15Bridge-Dn	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
22550	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
22450	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
22250	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
22050	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21875	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21825	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21550	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21186	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21047	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21046.9	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21038.45	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21030	-----	0.015	0.015	0.1	0.3

21026.87	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21026.77	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
21000	0.015	0.015	0.015	0.1	0.3
C1 CHANNEL, HDWORKS					
20855.25	0.015	0.015	0.015	0.1	0.3
20710.41	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
C1 CHANNEL, MAIN2					
20550.1	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
	0.015	0.015	0.015		
20550	0.015	0.015	0.015	0.1	0.3
20475 Culvert-Up	0.015	0.015	0.015	0.1	0.3
20475 Culvert-Dn	0.015	0.015	0.015	0.1	0.3
20400	0.015	0.015	0.015	0.1	0.3
20280	0.015	0.015	0.015	0.1	0.3
20180	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
20150	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		
19950	-----	0.015	0.015	0.1	0.3
	-----	0.015	-----		

---Summary of Statistics---

	Minimum	Maximum
Left Overbank n Value:	0.015	0.015
Right Overbank n Value:	0.015	0.015
Channel n Value:	0.015	0.015
Contraction Coefficient:	0.1	0.1
Expansion Coefficient:	0.3	0.3

ROUGHNESS COEFFICIENT CHECK

RS: 26504.4

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 26504.4

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 26395

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 26395

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 26350

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.

RS: 26198.52
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 26198.52
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26198.52
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 26097.91
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26097.91
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 26053.68
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26053.68
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25966.13
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25966.13
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25865.52
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25865.52
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25750
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.

T1 value should be reevaluated.

RS: 25750

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25660

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25660

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25650

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25650

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25350

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25350

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25075

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25075

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25050

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25050

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24969.85

NT RC 01 Right overbank n value is less than 0.035

T value for overbank is usually larger than 0.035.
T₁ value should be reevaluated.

RS: 24969.85

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24940.19

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 24940.19

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24910.53

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 24910.53

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24850

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 24850

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24756.73

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 24756.73

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24750

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 24750

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24550

NT RC 01 R overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.
 The n value should be reevaluated.

RS: 24550

NT RC 03 Channel n value is equal to or less than 0.025
 The n value of the channel is usually larger than 0.025.
 The n value should be reevaluated it if is not representing a
 concrete lined channel.

RS: 24350

NT RC 01 Right overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.
 The n value should be reevaluated.

RS: 24350

NT RC 03 Channel n value is equal to or less than 0.025
 The n value of the channel is usually larger than 0.025.
 The n value should be reevaluated it if is not representing a
 concrete lined channel.

RS: 24150

NT RC 01 Right overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.
 The n value should be reevaluated.

RS: 24150

NT RC 03 Channel n value is equal to or less than 0.025
 The n value of the channel is usually larger than 0.025.
 The n value should be reevaluated it if is not representing a
 concrete lined channel.

RS: 24000

NT RC 01 Right overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.
 The n value should be reevaluated.

RS: 24000

NT RC 03 Channel n value is equal to or less than 0.025
 The n value of the channel is usually larger than 0.025.
 The n value should be reevaluated it if is not representing a
 concrete lined channel.

RS: 23850

NT RC 01 Right overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.
 The n value should be reevaluated.

RS: 23850

NT RC 03 Channel n value is equal to or less than 0.025
 The n value of the channel is usually larger than 0.025.
 The n value should be reevaluated it if is not representing a
 concrete lined channel.

RS: 23700

NT RC 01 Right overbank n value is less than 0.035
 The n value for overbank is usually larger than 0.035.
 The n value should be reevaluated.

RS: 23700

NT RC 03 Channel n value is equal to or less than 0.025
 The n value of the channel is usually larger than 0.025.
 The n value should be reevaluated it if is not representing a
 concrete lined channel.

RS: 2:
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 23555
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 23505.48
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 23505.48
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 23450
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 23450
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 23445.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 23445.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 23425.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 23425.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 23418.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 23418.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 2. .9
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23413.9
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23405.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23405.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23405.5
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23405.5
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23397.1
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23397.1
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23390
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23390
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23253
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23253
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a

cc .te lined channel.

RS: 23122.96

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23122.96

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23095.66

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23095.66

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23025

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23025

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23016.33

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23016.33

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22986.3

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22986.3

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22768.15

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22768.15

NT RC 03 Channel n value is equal to or less than 0.025

Th value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22768.15

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22768.15

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22550

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22550

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22450

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22450

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22250

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22250

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22050

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22050

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 21875

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21875

NT RC 03 Channel n value is equal to or less than 0.025

T value of the channel is usually larger than 0.025.
T value should be reevaluated if it is not representing a concrete lined channel.

RS: 21825
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 21825
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 21550
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 21550
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 21186
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 21186
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 21047
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 21047
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 21046.9
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 21046.9
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a concrete lined channel.

RS: 21038.45
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 21038.45

NT RC 03 C' el n value is equal to or less than 0.025
T value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 21030

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21030

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 21026.87

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21026.87

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 21026.77

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21026.77

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 21000

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21000

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21000

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 21000

NT RC 05 The left overbank n value of 0.015 and the right overbank n value
of 0.015 are less than or equal to the channel n value of 0.015
The overbank n values should be reevaluated.

RS: 20855.25

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 20855.25

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20855.25

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20855.25

NT RC 05 The left overbank n value of 0.015 and the right overbank n value
of 0.015 are less than or equal to the channel n value of 0.015
The overbank n values should be reevaluated.

RS: 20710.41

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20710.41

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20550.1

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20550.1

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20550.1

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20550

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20550

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20550

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20550

NT RC 05 The left overbank n value of 0.015 and the right overbank n value
of 0.015 are less than or equal to the channel n value of 0.015
The overbank n values should be reevaluated.

The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20475

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20475

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20475

NT RC 05 The left overbank n value of 0.015 and the right overbank n value
of 0.015 are less than or equal to the channel n value of 0.015
The overbank n values should be reevaluated.

RS: 20475

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20475

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20475

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20475

NT RC 05 The left overbank n value of 0.015 and the right overbank n value
of 0.015 are less than or equal to the channel n value of 0.015
The overbank n values should be reevaluated.

RS: 20400

NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20400

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20400

NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20400

NT RC 05 The left overbank n value of 0.015 and the right overbank n value
of 0.015 are less than or equal to the channel n value of 0.015
The overbank n values should be reevaluated.

RS: 20280

NT RC 01 Left overbank n value is less than 0.035

RS: 20280
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20280
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20280
NT RC 05 The left overbank n value of 0.015 and the right overbank n value
of 0.015 are less than or equal to the channel n value of 0.015
The overbank n values should be reevaluated.

RS: 20180
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20180
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

RS: 20150
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 20150
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated if it is not representing a
concrete lined channel.

TRANSITION LOSS COEFFICIENT CHECK

RS: 23418.5
NT TL 01 This is section 4
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 23413.9
NT TL 01 This is section 3
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 23405.5
NT TL 01 This is section Bridge-Up
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 23405.5
NT TL 01 This is section Bridge-Dn
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 23397.1

NT TL 01 This is section 2

T should be equal to 0.3 and 0.5 respectively.

RS: 23016.33

NT TL 01 This is section 4
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 22986.3

NT TL 01 This is section 3
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 22768.15

NT TL 01 This is section Bridge-Up
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 22768.15

NT TL 01 This is section Bridge-Dn
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 22550

NT TL 01 This is section 2
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 20550.1

NT TL 01 This is section 4
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 20550

NT TL 01 This is section 3
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 20400

NT TL 01 This is section 2
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

ROUGHNESS COEFFICIENT AT STRUCTURES

RS: 23405.5

NT RS 02 The channel n value of 0.015 for the upstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 3.
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 3.
The selection of the n value(s) should be reevaluated.

RS: 23405.5

NT RS 02 The channel n value of 0.015 for the downstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 2
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 2.
The selection of the n value(s) should be reevaluated.

RS: 22768.15

NT RS 02 The channel n value of 0.015 for the upstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 3.
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 3.
The selection of the n value(s) should be reevaluated.

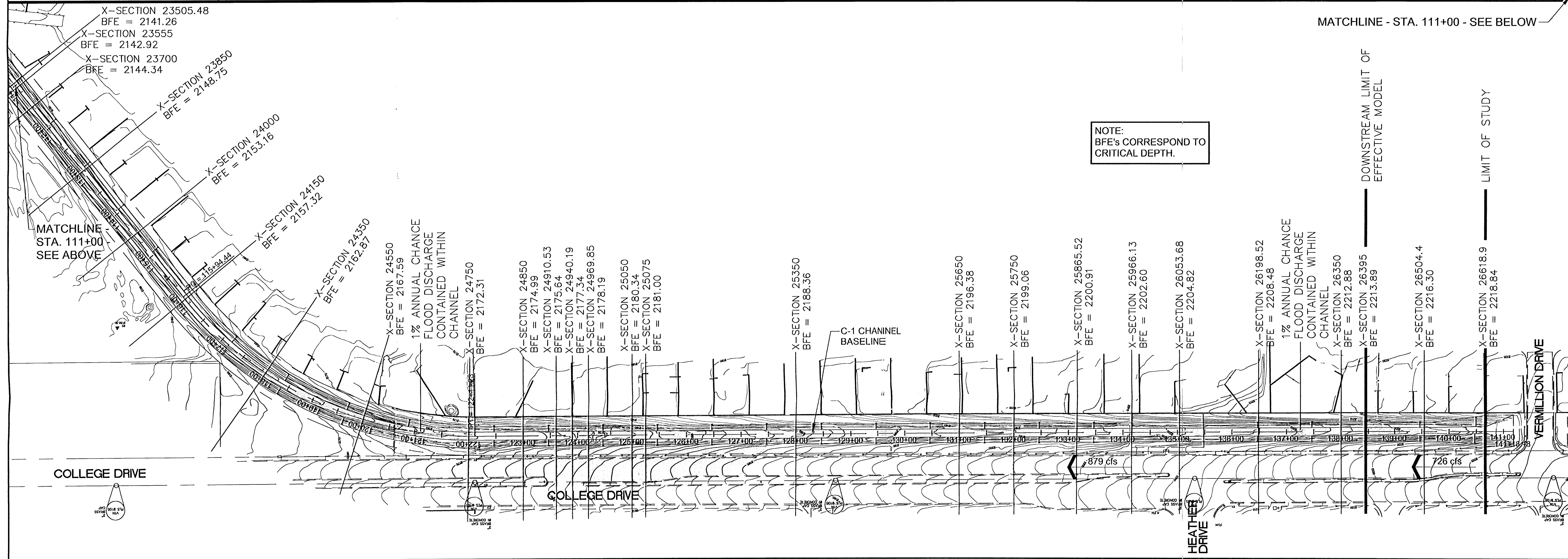
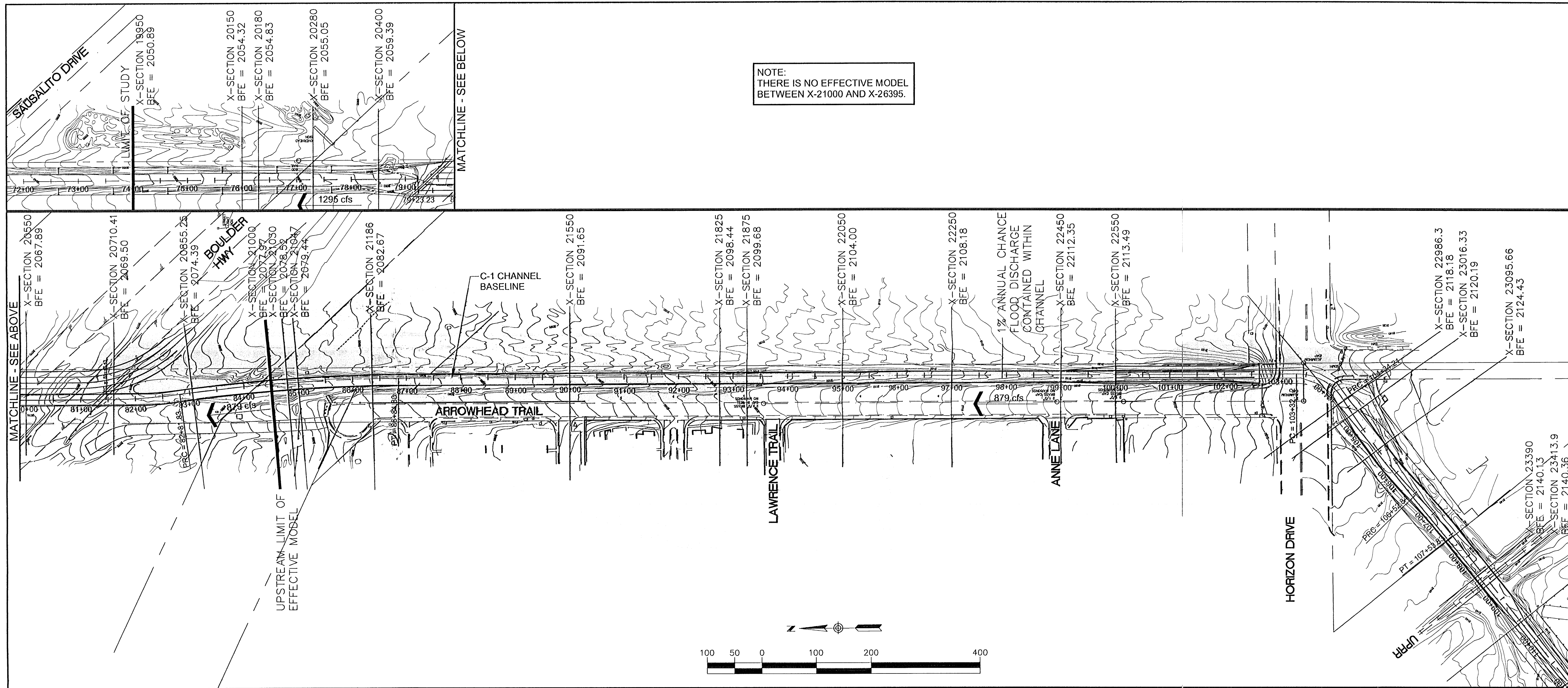
RS: 2 .15
NT RS 02 The channel n value of 0.015 for the downstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 2
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 2.
The selection of the n value(s) should be reevaluated.

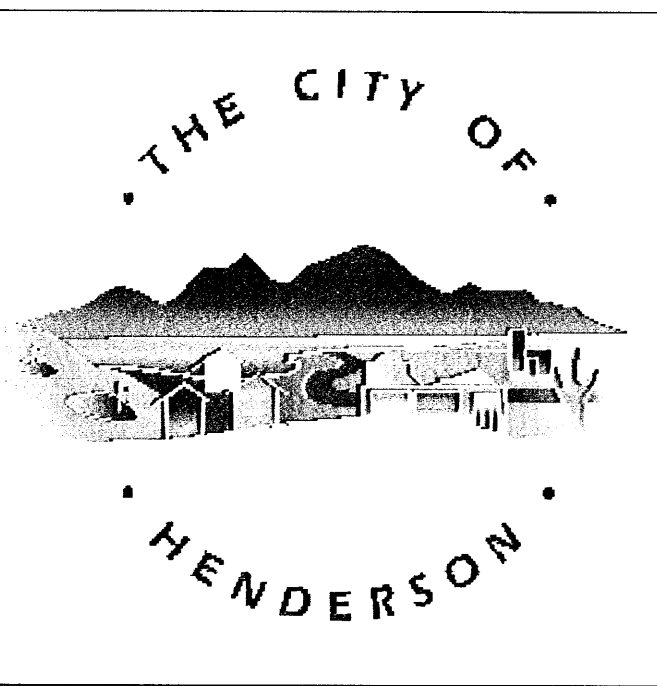
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THE Louis Berger Group, INC.

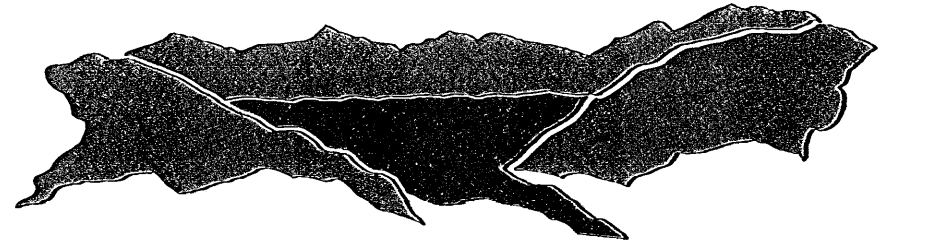
APPENDIX F

Work Map





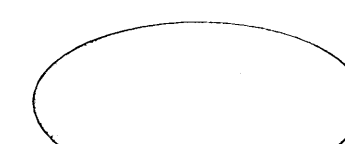
CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT



C-1 CHANNEL PHASE 2 FLOOD INSURANCE STUDY WORK MAP



EFFECTIVE 100-YEAR,
ZONE A FLOOD ZONE
(TO BE REMOVED)

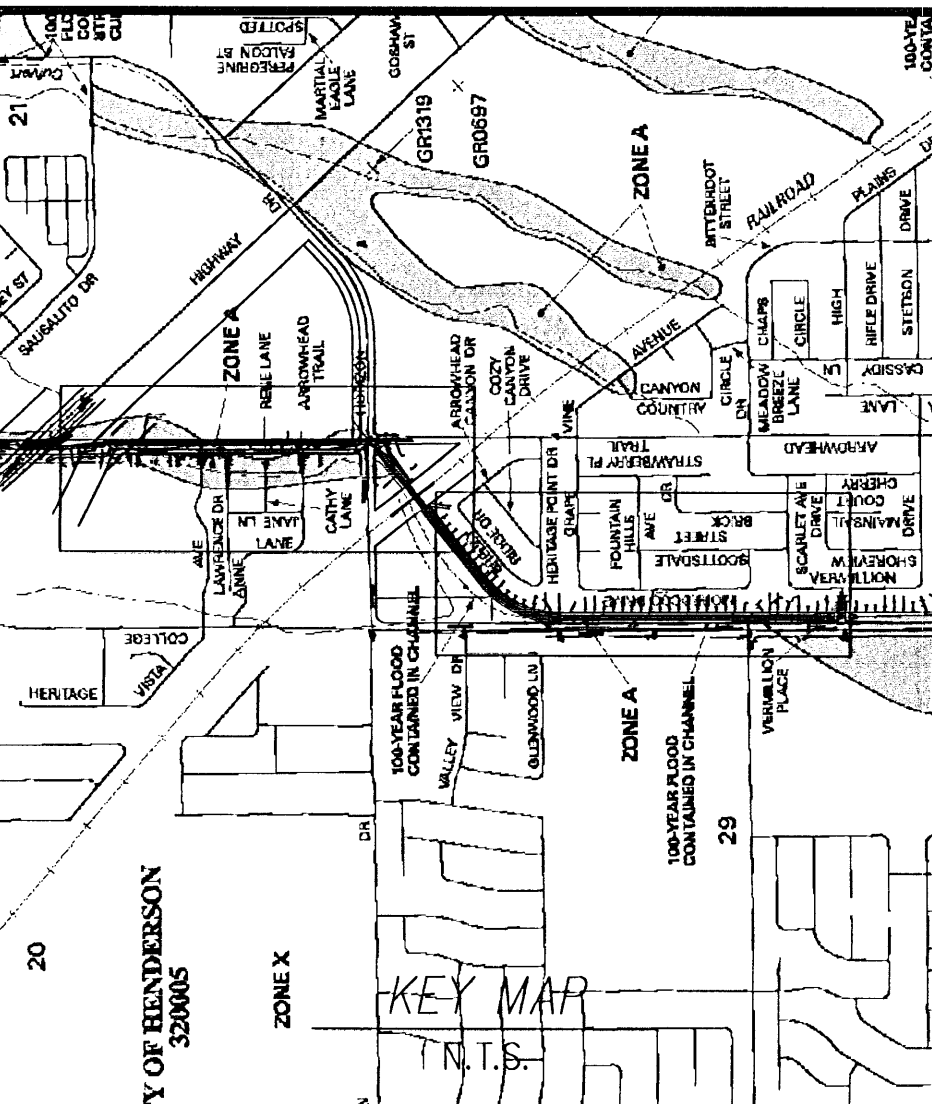


PROPOSED 100-YEAR,
ZONE A FLOOD ZONE
CONTAINED IN CHANNEL

204 cfs 100-YEAR FLOW INDICATOR

20.8' AERIAL TOPOGRAPHY SPOT
ELEVATION AND MARKER

1 FOOT CONTOUR
LINES



BENCHMARK:
CITY OF HENDERSON BENCHMARK #18, BEING A BOLT AND
WASHER IN THE NORTH LEG OF A TEEL TRANSMISSION
TOWER, #9-4M 0.3 MILES +/- NORTHWEST OF HORIZON DR.
ON THE WEST SIDE OF HIGHWAY 93.
ELEV = 639.256 METERS (2097.30 FEET) NAVD 88

LETTER OF MAP REVISION
CONTOUR INTERVAL = 1 FOOT.
ALL ELEVATIONS ARE BASED ON
NORTH AMERICAN VERTICAL DATUM
OF 1988.

THE Louis Berger Group, INC.

APPENDIX G

As-Built Drawings

As-Built Drawings will be provided for FEMA submittal.

THE Louis Berger Group, INC.

APPENDIX H

LOMR Data Disk