



**Subject: Letter of Map Revision Application
Brooks Flood Control Channel Project**

Hello Recipient,

June 12, 2018

File: BrooksLOMRletter.doc

Reference: Case 16-09-0140R

Attention:

Federal Emergency Management Agency

LOMC Clearinghouse

847 South Pickett Street

Alexandria, VA 22304-4605

On behalf of the City of North Las Vegas (CNLV), Stantec is pleased to submit the attached application for a Letter of Map Revision (LOMR) for the Special Flood Hazard Area (SFHA) approximate Zone "A" encompassing Brooks Channel located within the limits of the City of North Las Vegas. Brooks Avenue and the pertinent Zone "A" are depicted on Flood Insurance Rate Map (FIRM) Number 32003C2160F. This LOMR is a follow up to the previously approved CLOMR (Case No. 16-09-0140R) and is based on the project as-built conditions. This submittal includes FEMA forms MT-2 Form 1, MT-2 Form 2, MT-2 Form 3, a detailed engineering hydrology and hydraulics report, sealed as-built plans, and a CD containing pertinent model runs for as-built conditions.

The current flood zone is modified to be contained within an open channel which has been constructed within Brooks Avenue. If you have any questions regarding the LOMR application or supporting documentation, I can be reached directly at 702-821-4309 or nicholas.natale@stantec.com.

Respectfully,

Nicholas Natale, P.E.

Civil Engineer

Phone: 702-821-4309

Fax: 702-878-7833

Nicholas.natale@stantec.com

Attachment: Engineering Report & Data CD

c. Dan Le, P.E., CFM (CNLV)

Clint Fujii, P.E. (CNLV)

Abigail Mayrena, P.E., CFM (CCRFCD)

Jarah Parke, P.E., PMP, CFM (STANTEC)

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outlines\lomr\brooks lomr letter.docx

**FEDERAL EMERGENCY MANAGEMENT AGENCY
PAYMENT INFORMATION FORM**

Community Name: City of North Las Vegas, Community No. 320007

Project Identifier: Brooks Channel Flood Control Project LOMR

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO THE ADDRESS BELOW OR FAXED TO THE FAX NUMBER BELOW.

Please make check or money order payable to the National Flood Insurance Program.

Type of Request:

☒ MT-1 application }
☒ MT-2 application }

LOMC Clearinghouse
3601 Eisenhower Ave. Suite 500
Alexandria, VA 22304-6426
Attn.: LOMC Manager

☐ EDR application }

FEMA Project Library
3601 Eisenhower Ave. Suite 500
Alexandria, VA 22304-6426
FAX (703) 960-9125

Request No. (if known): Case # 16-09-014R Check No.: 594572 Amount: \$8,250

☐ INITIAL FEE* ☐ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☒ CHECK ☐ MONEY ORDER

*Note: Check only for EDR and/or Alluvial Fan requests (as appropriate).

**Note: Check only if submitting a corrected fee for an ongoing request.

COMPLETE THIS SECTION ONLY IF PAYING BY CREDIT CARD

CARD NUMBER

EXP. DATE

1	2	3	4

 —

5	6	7	8

 —

9	10	11	12

 —

13	14	15	16

Month	

 —

Year	

Date Signature

NAME (AS IT APPEARS ON CARD): _____
(please print or type)

ADDRESS: _____
(for your
credit card
receipt—please
print or type)

DAYTIME PHONE: _____

CITY OF NORTH LAS VEGAS
2250 LAS VEGAS BLVD. N., SUITE 710
NORTH LAS VEGAS, NEVADA 89030

PAYEE PLEASE DETACH AND RETAIN THIS STUB FOR YOUR
RECORDS ATTACHED CHECK IS PAYMENT FOR THE
ITEMS LISTED HEREON.

594572

DATE 07-JUN-2018

VENDOR NUMBER 37033

INVOICE NO.	DATE	DESCRIPTION	NET AMOUNT
04-JUN-18	04-JUN-2018	CHECK/FEE TO FEMA FOR LOMR (LETTER OF MAP REVISION)	8,250.00
			\$ 8,250.00



City of North Las Vegas
NORTH LAS VEGAS, NEVADA
GENERAL OPERATING ACCOUNT

Bank of America
Nevada
NORTH LAS VEGAS, NEVADA
94-72/1224

CHECK NO 594572

DATE
07-JUN-2018

Amount
***\$8,250.00

PAY Eight Thousand Two Hundred Fifty Dollars And Zero Cents*****

TO THE
ORDER OF

NATIONAL FLOOD INSURANCE PROGRAM
FEMA
FEE CHARGE SYSTEM ADMINISTRATOR
HANOVER, MD 21076 US

VOID IF NOT CASHED WITHIN 180 DAYS

Constance
Exborgh

⑈594572⑈ ⑆122400724⑆ ⑈000025119822⑈

SEE REVERSE SIDE FOR OPENING INSTRUCTIONS

CITY OF NORTH LAS VEGAS
ATTN: ACCOUNTS PAYABLE
2250 LAS VEGAS BLVD. N., SUITE 710
NORTH LAS VEGAS, NEVADA 89030

NATIONAL FLOOD INSURANCE PROGRAM
FEMA
FEE CHARGE SYSTEM ADMINISTRATOR
HANOVER, MD 21076 US

PH

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 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 it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). 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.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

- ☐ CLOMR: A letter from DHS-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 DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

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
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
320007	City of North Las Vegas Clark County Nevada	NV	32003C	2160F	11/16/11

2. a. Flooding Source: Unnamed Zone A Channel - from approximately 900 feet upstream of 5th St to approximately 1,500 feet downstream of 5th St

- b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
- ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Brooks Channel (16-09-014R)

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

5. Basis for Request and Type of Revision:

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

- ☒ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
- ☐ Coastal Analysis ☒ Hydraulic Analysis ☒ Hydrologic Analysis ☐ Corrections
- ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
- ☒ New Topographic Data ☐ 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 structures (check all that apply)

Structures:

☒ Channelization

☐ Levee/Floodwall

☒ Bridge/Culvert

☐ Dam

☐ Fill

☐ Other (Attach Description)

6. ☐ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

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

☒ Yes

Fee amount: \$8,250

☐ No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_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: Nicholas Natale, PE

Company: Stantec Consulting

Mailing Address:
3010 West Charleston Boulevard, STE 100
Las Vegas, NV 89102

Daytime Telephone No.: 702-821-4309

Fax No.: 702-878-7833

E-Mail Address: nicholas.natale@stantec.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 requirements for when fill is 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. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. 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: Dan Le, PE, CFM

Community Name: City of North Las Vegas

Mailing Address:
2250 Las Vegas Boulevard North
North Las Vegas, NV 89030

Daytime Telephone No.: 702-633-1932

Fax No.: 702-649-4696

E-Mail Address: LED@CITYOFNORTHLASVEGAS.COM

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 data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. 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: Nicholas Natale, PE

License No.: 24571

Expiration Date: 12/31/19

Company Name: Stantec Consulting

Telephone No.: 702-821-4309

Fax No.: 702-878-7833

Signature:

Date:

E-Mail Address: nicholas.natale@stantec.com

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)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, 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, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). 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.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Unnamed tributary along Brooks Channel to the Central Freeway Channel

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 B)	☒ 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.)	Effective/FIS (cfs)	Revised (cfs)
Brooks Chan @ Cen Fwy Chn	0.82	NONE	869

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

☐ Statistical Analysis of Gage Records	☒ Precipitation/Runoff Model → Specify Model: <u>HEC-1 (USACOE)</u>
☐ 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.

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

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	<u>Tie into Central Fwy Channel</u>	<u>10+11.50</u>	<u>NONE-ZONE "A"</u>	<u>1916.20</u>
Upstream Limit*	<u>Mayflow Ct.</u>	<u>33+98.92</u>	<u>NONE-ZONE "A"</u>	<u>1976.41</u>

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS (USACOE)

3. Pre-Submittal Review of Hydraulic Models*

DHS-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. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

<u>Models Submitted</u>	<u>Natural Run</u>		<u>Floodway Run</u>		<u>Datum</u>
Duplicate Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name: BrooksFGAnalys.prj	Plan Name:	File Name:	Plan Name: 26	NAVD88
Revised or Post-Project Conditions Model	File Name: BrooksFGAnalys.prj	Plan Name:	File Name:	Plan Name: 25	NAVD88
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☐ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work 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.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: See attached certified topographic work map

Source: Brooks channel alignment, provided by CNLV

Date: 4/15/2014

Accuracy: Brooks Chan Topo = +/- 1-ft, County Topo = +/- 5-ft

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**, at the same scale as the original, 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 on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No
- a. 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 compared to pre-project conditions.
 - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.
- b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☒ No
If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.
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 established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)
4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE STRUCTURES FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

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, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). 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.**

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Flooding Source: Unnamed tributary along brooks channel to central freeway channel

Note: Fill out one form for each flooding source studied.

A. GENERAL

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

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

Description Of Modeled Structure

1. Name of Structure: Brooks Channel

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

Location of Structure: Along Brooks Channel Alignment, between North 5th Street & UPRR Tracks

Downstream Limit/Cross Section: 10+34.38

Upstream Limit/Cross Section: 25+01.48

2. Name of Structure: Brooks Channel Losee Crossing

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

Location of Structure: Along Brooks Channel Alignment, beneath Losee Road Crossing

Downstream Limit/Cross Section: 15+29.80

Upstream Limit/Cross Section: 16+67.40

3. Name of Structure: _____

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

Location of Structure: _____

Downstream Limit/Cross Section: _____

Upstream Limit/Cross Section: _____

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: Unnamed tributary along Brooks Channel to Central Freeway Channel

Name of Structure: Brooks Channel

1. Hydraulic Considerations

The channel was designed to carry 869 (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): _____

2. Channel Design Plans

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

3. 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 [Attach Section D (Dam/Basin)] ☐ Energy dissipator
☐ Weir ☐ Other (Describe): _____

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ 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.

C. BRIDGE/CULVERT

Flooding Source: Unnamed tributary along Brooks Channel to Central Freeway Channel

Name of Structure: Brooks Channel Losee Crossing

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS
☐ Modified bridge/culvert previously modeled in the FIS
☐ Revised 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)	☒ Distances Between Cross Sections
☒ Shape (culverts only)	☐ Erosion Protection
☒ Material	☐ Low Chord Elevations – Upstream and Downstream
☐ Beveling or Rounding	☐ Top of Road Elevations – Upstream and Downstream
☐ Wing Wall Angle	☒ Structure Invert Elevations – Upstream and Downstream
☐ Skew Angle	☒ Stream Invert Elevations – Upstream and Downstream
	☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

D. DAM/BASIN

Flooding Source: _____

Name of Structure: _____

1. This request is for (check one): ☐ Existing dam/basin ☐ New dam/basin ☐ Modification of existing dam/basin
2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☐ Local government agency

Name of the agency or organization: _____

3. The Dam was permitted as (check one): ☐ Federal Dam ☐ State Dam

Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

Permit or ID number _____ Permitting Agency or Organization _____

- a. ☐ Local Government Dam ☐ Private Dam

Provided related drawings, specification and supporting design information.

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

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

Was the dam/basin designed using critical duration storm? (must account for the maximum volume of runoff)

- ☐ Yes, provide supporting documentation with your completed Form 2.
- ☐ No, provide a written explanation and justification for not using the critical duration storm.

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

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

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☐ Yes ☐ No

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

FREQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin	
	FIS	REVISED
10-year (10%)	_____	_____
50-year (2%)	_____	_____
100-year (1%)	_____	_____
500-year (0.2%)	_____	_____
Normal Pool Elevation	_____	_____

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

E. LEVEE/FLOODWALL

1. System Elements

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

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

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

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

c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling
☐ Other (describe): _____

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

☐ Yes ☐ No

If Yes, by which agency? _____

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

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

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

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

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

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

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

3. Closures

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

If opening exists, list all closures:

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

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

Note: Geotechnical and geologic data

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

4. Embankment Protection

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

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

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

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

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

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

- ☐ Overall height: Sta.: _____, height _____ ft.
- ☐ Limiting foundation soil strength:
- Strength ϕ = _____ degrees, c = _____ psf
- Slope: SS = _____ (h) to _____ (v)
- (Repeat as needed on an added sheet for additional locations)
- b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

- c. Summary of stability analysis results:

E. LEVEE/FLOODWALL (CONTINUED)

5. Embankment And Foundation Stability (continued)

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

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

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

If Yes, describe methodology used:

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

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

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

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

Attach engineering analysis to support construction plans.

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one): ☐ UBC (1988) ☐ Other (specify): _____

b. Stability analysis submitted provides for: ☐ Overturning ☐ Sliding If not, explain: _____

c. Loading included in the analyses were: ☐ Lateral earth @ $P_A =$ _____ psf; $P_p =$ _____ psf

☐ Surcharge-Slope @ _____, ☐ surface _____ psf

☐ Wind @ $P_w =$ _____ psf

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

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

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

d. Summary of Stability Analysis Results: Factors of Safety.
Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

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

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability (continued)

e. Foundation bearing strength for each soil type:

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

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

Attach engineering analysis to support construction plans.

7. Settlement

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

Attach engineering analysis to support construction plans.

8. Interior Drainage

- a. Specify size of each interior watershed:

Draining to pressure conduit: _____ acres

Draining to ponding area: _____ acres

- b. Relationships Established

Ponding elevation vs. storage

☐ Yes ☐ No

Ponding elevation vs. gravity flow

☐ Yes ☐ No

Differential head vs. gravity flow

☐ Yes ☐ No

- c. The river flow duration curve is enclosed: ☐ Yes ☐ No

- d. Specify the discharge capacity of the head pressure conduit: _____ cfs

- e. Which flooding conditions were analyzed?

- Gravity flow (Interior Watershed) ☐ Yes ☐ No
- Common storm (River Watershed) ☐ Yes ☐ No
- Historical ponding probability ☐ Yes ☐ No
- Coastal wave overtopping ☐ Yes ☐ No

If No for any of the above, attach explanation.

- e. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No If No, attach explanation.
- g. The rate of seepage through the levee system for the base flood is _____ cfs
- h. The length of levee system used to drive this seepage rate in item g: _____ ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

- i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

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

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

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

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

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

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem

Hydrocompaction ☐ is ☐ is not a problem

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

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

Attach supporting documentation

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

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No

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

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.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan

Please attach a copy of the formal maintenance plan for the levee/floodwall

12. Operations and Maintenance Plan

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

CERTIFICATION OF THE LEVEE DOCUMENTATION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. 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: _____ License No.: _____ Expiration Date: _____

Company Name: _____ Telephone No.: _____ Fax No.: _____

Signature: _____ Date: _____ E-Mail Address: _____

F. SEDIMENT TRANSPORT

Flooding Source: _____

Name of Structure: _____

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

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

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

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: _____

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

Method used to estimate scour and/or deposition: _____

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

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

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



**BROOKS CHANNEL FLOOD
CONTROL PROJECT LOMR**

June 12, 2018

Prepared for:

CITY OF NORTH LAS VEGAS
PUBLIC WORKS DEPARTMENT

Prepared by:

STANTEC CONSULTING

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- *Figure 1- Location Map*
- *Figure 1A – Clark County Regional Flood Control District MPU Map*
- *Figure 2 – FIRM Map*
- *Figure 3 - Existing Condition 100-Year Flood Plain Exhibit*
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Appendix C – Hydraulic Analyses and Calculations

- *C-1: Existing Condition HEC-RAS Analysis (BrooksFGAnalysis.prj – Plan 26)*
- *C-2: Existing Condition HY8 Analysis for Downstream Tail Water Elevation at UPRR Embankment*
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- *C-5: As Built Condition Losee Road Storm Drain Hydraulic Analysis and Drop Inlet Calculations*
- *C-6: As Built Condition WSPG Analysis: As-built conditions for the Central Freeway Channel at the Cheyenne Crossing and Brooks Confluence Structure (FWCI2CC.out)*

Appendix D – Reference Material*

- *D-1: Louis Berger Group (LBG), 90% Technical Drainage Study for the North 5th Street Improvements, Losee Road to Cheyenne Avenue; March 2012**
- *D-2: Central Freeway Channel 100-Year HEC-1 Model**

Appendix E – As-Built Construction Plans*

Appendix F – Environmental Screening Assessment and Permits

- *F-1: Section 8 Environmental Screening Report*
- *F-2: Section 8 Approval Email*
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Appendix G – Notification Letter to Residents

APPENDIX H – Data CD

Single Asterisk (*) Denotes appendix material is only included electronically on the attached Data CD

1.0 INTRODUCTION

1.1 BACKGROUND

This technical report presents a hydrologic and hydraulic analysis performed in support of the Brooks Channel Flood Control Project Letter of Map Revision (LOMR). The LOMR is being submitted to the Federal Emergency Management Agency (FEMA) by the City of North Las Vegas (CNLV). This LOMR for the Brooks Channel Flood Control Project consists of construction of both storm drain infrastructure and open channel within public right of way. Improvements span from 112-feet west of Losee Road and extend easterly 635-feet to an existing Union Pacific Rail Road (UPRR) track embankment. A new storm drain culvert crossing was constructed beneath Losee Road, the UPRR embankment, as well as a confluence structure within an existing channel adjacent to Interstate-15 (I-15), herein referred to as the Central Freeway Channel (see **Figure 1 in Appendix A**). Additionally, the Freeway Channel crossing at Cheyenne was improved to permit the 100 year flow to be conveyed from the confluence at Brooks across the Cheyenne underpass to downstream facilities.

The alignment of Brooks Channel is currently categorized as a Special Flood Hazard Area (SFHA) “Zone A” per **Figure 2 in Appendix A**, (Federal Emergency Management Agency (FEMA) Flood Insurance Map (FIRM) Panel Number 32003C2160F.

Improvements constructed with this LOMR are categorized as Clark County Regional Flood Control District (CCRFCD) facilities: LVBR 0011, LVBR 0005, and LVBR 0000 per the Las Vegas Valley Master Plan Update (MPU) of 2013 (see **Figure 1A in Appendix A**)

This LOMR is a follow up to the previously approved CLOMR (Case No. 16-09-0140R). The CLOMR approval letter is provided in **Appendix B** for reference.

1.2 OBJECTIVES

Infrastructure improvements have been constructed to accomplish the following primary objectives:

- Upsized the existing RCB storm drain crossing located below Losee Road to convey 100-year flows.
- Reconstructed the existing and deteriorated trapezoidal channel located east of Losee Road, all the way to the UPRR embankment to increase capacity and convey 100-year flow.
- Constructed an additional storm drain crossing beneath the UPRR embankment to convey the 100-year flow.
- Collected additional surface flows within Losee Road via a constructed storm drain system and convey them below grade into Brooks Channel.
- Contained the Flood Zone within the constructed open channel facility, thereby removing adjacent commercial and industrial properties from the SFHA.

- Constructed additional 12'x10' RCB within the Freeway Channel at the Cheyenne Avenue crossing to convey 100-year flow downstream of the Brooks confluence to the Freeway Channel.

1.3 REVIEW OF HISTORIC FLOOD INSURANCE STUDIES

Historic FEMA Flood Insurance Studies (FIS) were reviewed to determine if a 100-year discharge rate has been previously quantified for the SFHA "Zone A" along the Brooks Channel alignment. Specifically, the following FIS were reviewed:

- FIS for Clark County Nevada, and Incorporated Areas Volume 1 and 2, dated November 2011 (covers City of North Las Vegas, Community Number 320007).
- FIS for City of North Las Vegas 1983 (Community Number 320007).

After reviewing the aforementioned FIS, it was determined that a 100-year discharge rate has not been established for this Zone A.

2.0 DESIGN CRITERIA

2.1 HYDROLOGY

The Brooks Channel Flood Control Project was designed based on the ultimate condition 100-year flood. Peak discharge flows tributary to Brooks Channel were determined by referencing previous hydrology studies performed near the project alignment, as well as by performing a detailed hydrology analysis for the remaining tributary watershed area. The CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM) was referenced to prepare the design hydrology for additional tributary area.

No deviations have been made to the hydrology analysis between the CLOMR and LOMR submittal. For a detailed summary of hydrology, reference the CLOMR submittal.

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3.0 FLOOD CONTROL CHANNEL AND STORM DRAIN

The flood control channel and storm drain are described in detail within the CLOMR submittal. This section highlights any deviations or additions since the initial CLOMR submittal.

A set of As-built plans is provided in **Appendix E**.

3.1 CENTRAL FREEWAY CHANNEL AT CHEYENNE CROSSING

Improvements were made to the freeway channel at Cheyenne crossing expanding existing capacity to allow conveyance of the 100-year flow downstream of Brooks Channel. A new 12'x10' RCB was installed within the westerly lanes of the I-15 to accomplish this.

The storm water runoff, that each facility will convey, was determined by allocating enough flow into each facility until similar headwater depths (elevations) are obtained in each of the WSPG models at the upstream common RCB entrance headwall confluence structure (reference **Figure 8 in Appendix A**). This similar headwater is obtained when headloss through each facility is equal. Small discrepancies in headwater elevation are expected due to the limitations of the software used during the iterative flow splitting process. The difference in headwater is relatively small (within 0.011-feet) and therefore deemed acceptable. The common RCB entrance channel and flow separation vane wall confluence structure will tie both the existing dual 8-foot by 10-foot and new 12-foot by 10-foot RCB together. At the outlet end, the same tail water surface elevation was used for both WSPG analyses. The results of the flow allocation (capacities) into each facility are summarized in the table below.

Table 3.6: WSPG Summary

WSPG Analysis	Analysis Description	WSPG Station at Entrance Headwall Confluence Structure	Headwater Water Surface Elevation at Common RCB entrance headwall confluence (feet) NAVD88	Q, Flow Rate (cfs)
FWCI2CA-.out	Existing dual 8-foot x 10-foot RCB's	53+88.27	1912.91	2,388
FWCI2CB-.out	New 12-foot by 10-foot RCB	53+88.27 (As-Built Plans Sta: 10+60.00)	1912.80	1,888
			Sum of Total Conveyed Flow =	4,276

The water surface elevation reported at the entrance headwall confluence structure is used as the input downstream water surface elevation control for WSPG analysis *FWCI2CC-.out*. Analysis *FWCI2CC-.out* cross sections extend upstream of the Cheyenne Interchange crossing past the Brooks Channel Confluence.

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4.0 LOMR HYDRAULICS

This section highlights any deviation from the initial CLOMR hydraulics. A HEC-RAS analysis was prepared for Brooks Channel for both the existing and as-built conditions. The hydraulic software model utilized for analysis of the Brooks Channel alignment is the U.S. Army Corps of Engineers (USCOE) HEC-RAS. The Losee Road Storm Drain was modeled using Water Surface Pressure Gradient (WSPG) developed by the Los Angeles County Flood Control District. WSPG utilizes the energy equation methodology for closed conduit flow and the standard step method for open channel flow.

A CD is provided in **Appendix H**, which includes all electronic files for the hydraulic models performed with this LOMR, as well as the existing and proposed SFHA boundary files in DWG and SHP format.

4.1 EXISTING CONDITION CHANNEL HYDRAULICS

No deviation to the existing hydraulic model has been made for this LOMR submittal. For convenience, pertinent channel analyses and culvert calculations are provided in **Appendix C**.

4.2 AS-BUILT CONDITION CHANNEL HYDRAULICS

Constructed elevations for the Central Freeway Channel confluence structure vary slightly from the initial CLOMR submittal causing minor tail water boundary condition differences in Brooks Channel. The analysis for the headwater at the entrance for both the 8'x4' RCB and the 96" diameter steel pipe draining into the Central Freeway Channel from Brooks Channel were revised to account for this change. The updates to the analysis are described below and are highlighted in **Table 4-2** and **Table 4-3**.

The tailwater for the improved crossing energy loss calculations is referenced from the WSPG analysis for Central Freeway Channel discussed previously in **Section 3.1**. The confluence geometry at the Brooks Channel junction is incorporated into the Central Freeway Channel Analysis WSPG to determine the crossing tailwater elevation. The Cheyenne Avenue interchange culvert crossing is upsized according to the CCRFCD MPU Facility LV15 0051, as well as the channel segment from Cheyenne Avenue to the Brooks Channel confluence (Facility LV15 0079). **Figure 6** provided in **Appendix A** depicts the confluence channel station/cross section locations. Two separate junction cards are modeled in WSPG, one for each of the crossings.

The WSPG hydraulic analysis is modeled as described below:

- WSPG Model "FWCI2.out" Brooks Channel Watershed attenuated flow through improved crossing (Q100 = 551 cfs); Freeway Channel watershed peak flow through improved confluence (Q100 = 3,915 cfs).

Results from the confluence WSPG hydraulic analysis are presented in **Table 4-2**.

Table 4-2: Improved Central Freeway Channel Water Surface Elevation at Brooks Channel Confluence Summary

WSPG Model	Crossing Facility	WSPG Station	Freeway Channel Water Surface Elevation (NAVD 88 Datum, feet)	Flow Depth (ft)
FWCI2CC-.out	Ex 8'x4' RCB	67+72.87	1914.92	10.81
	96" Diameter Pipe	67+17.28	1915.05	11.05

Each crossing was then analyzed for energy loss calculations to determine the headwater elevations.

Results from the energy loss computations are presented in **Table 4-3**.

Table 4-3: Improved Central Freeway Channel Water Surface Elevation at Brooks Channel Confluence Summary

Crossing Facility	UPRR Crossing Headwater Elevation (NAVD 88 Datum, feet)	UPRR Crossing Headwater Depth (NAVD 88 Datum, feet)
Ex 8-foot by 4-foot RCB	1916.30	8.46
96" Diameter Pipe	1916.30	7.89

The worst case computed UPRR culvert crossing headwater elevation (1916.30-feet) is used as the downstream boundary condition for the as-built condition Brooks Channel HEC-RAS analysis (*BrooksFGAnalysis.prj Plan-25*). The post improvement Brooks Channel HEC-RAS analysis cross sections reflect the as-built channel geometry.

Based on the as-built condition, the storm flows are contained within the channel. A comparison in BFE between existing and as-built conditions is summarized in **Section 4.4** of this report. Changes to BFE from the CLOMR submittal to the LOMR submittal are seen between cross sections 80 through 83 depicted in bold in **Table 4-4**. An annotated FEMA FIRM is provided as **Figure 5**. All aforementioned figures are provided in **Appendix A**. Pertinent WSPG and channel analyses along with drop inlet calculations, lateral analyses, and street normal depth calculations are provided in **Appendix C**.

4.3 AS-BUILT CONDITION LOCAL STORM DRAIN

There are no deviations to the local storm drain hydraulics in Losee Road from the initial CLOMR submittal as documented in the WSPG analysis (*LOSSD100.out*). The downstream boundary condition for the Losee Road storm drain is referenced from the Brooks Channel HEC-RAS analysis described in the previous section. There is no change to the downstream water surface elevation at the referenced location for the LOMR hydraulics. **Figure 7** in **Appendix A** depicts the location of the storm drain system and summarizes inlet interception capacities. Pertinent storm drain analyses, drop inlet calculations, and street normal depth calculations are provided in **Appendix C** for reference.

4.4 AS-BUILT CONDITION FREEWAY CHANNEL AT CHEYENNE

In the as-built condition, the 12'X10' is constructed within I-15 at the Cheyenne Avenue crossing. A WSPG analysis (*FWCI2CC.out*) was performed for the Central Freeway Channel storm drain system. The downstream boundary condition for the Freeway Channel at Cheyenne is referenced from the Central Freeway Channel at Cheyenne Avenue Final design report. **Figure 8** in **Appendix A** depicts the location of the storm drain within I-15 and associated hydraulic cross sections. Pertinent storm drain analyses, drop inlet calculations, and street normal depth calculations are provided in **Appendix C**.

4.5 PRE AND POST CONSTRUCTION COMPARISON

The results of both existing versus as-built conditions BFE's are summarized in **Table 4-4** below:

Table 4-4: BFE Summary

HEC-RAS Reference Number	HEC-RAS Cross Section	Existing Condition BFE (feet NAVD88)	As-Built Condition BFE (feet NAVD88)	BFE Difference (feet)
1	3398.92	1976.41	1976.41	0.00
2	3373.92	1975.72	1975.76	0.04
3	3348.92	1974.98	1975.01	0.03
4	3323.92	1974.18	1974.16	-0.02
5	3298.92	1975.16	1975.18	0.02
6	3273.6	1975.18	1975.21	0.03
7	3248.92	1975.18	1975.21	0.03
8	3223.92	1975.17	1975.2	0.03
9	3210.22	1975.14	1975.16	0.02
10	3198.92	1975.10	1975.05	-0.05
11	3173.92	1974.98	1974.98	0.00
12	3148.92	1974.62	1974.62	0.00
13	3098.95	1968.32	1968.32	0.00
14	3073.97	1963.45	1963.45	0.00
15	3048.96	1958.55	1958.55	0.00
16	3023.98	1954.97	1954.97	0.00
17	2998.98	1954.29	1954.29	0.00
18	2973.99	1952.83	1952.83	0.00
19	2948.99	1951.86	1951.86	0.00
20	2923.99	1951.45	1951.45	0.00
21	2898.97	1951.45	1951.45	0.00
22	2874.04	1951.42	1951.42	0.00
23	2849.1	1950.85	1950.85	0.00
24	2824.82	1949.75	1949.75	0.00
25	2799.78	1948.93	1948.93	0.00
26	2774.63	1948.21	1948.21	0.00

BROOKS CHANNEL FLOOD CONTROL PROJECT LOMR

HEC-RAS Reference Number	HEC-RAS Cross Section	Existing Condition BFE (feet NAVD88)	As-Built Condition BFE (feet NAVD88)	BFE Difference (feet)
27	2750.44	1948.23	1948.23	0.00
28	2725.42	1947.23	1947.23	0.00
29	2700.17	1945.80	1945.8	0.00
30	2675.8	1946.78	1946.78	0.00
31	2650.79	1946.73	1946.73	0.00
32	2626.19	1946.40	1946.4	0.00
33	2601.78	1946.20	1946.2	0.00
34	2576.59	1945.95	1945.95	0.00
35	2551.36	1945.38	1945.38	0.00
36	2526.44	1943.55	1943.55	0.00
37	2501.48	1937.68	1937.68	0.00
38	2485.61	1930.78	1930.78	0.00
39	2399.9	1929.90	1929.86	-0.04
40	2376.49	1929.79	1929.75	-0.04
41	2351.49	1929.55	1929.52	-0.03
42	2301.49	1929.06	1929.03	-0.03
43	2276.48	1928.85	1928.82	-0.03
44	2226.48	1928.33	1928.31	-0.02
45	2201.48	1928.06	1928.04	-0.02
46	2176.48	1927.80	1927.79	-0.01
47	2151.48	1927.59	1927.58	-0.01
48	2126.48	1927.29	1927.29	0.00
49	2101.47	1927.03	1927.02	-0.01
50	2076.46	1926.75	1926.75	0.00
51	2051.45	1926.61	1926.61	0.00
52	2026.52	1926.31	1926.3	-0.01
53	2001.52	1926.01	1926.01	0.00
54	1976.52	1925.73	1925.72	-0.01
55	1951.52	1924.81	1924.81	0.00
56	1876.56	1927.82	1924.67	-3.15
57	1851.56	1927.86	1924.38	-3.48
58	1826.56	1927.87	1924.19	-3.68
59	1801.56	1927.89	1923.88	-4.01
60	1776.56	1927.91	1923.57	-4.34
61	1751.58	1927.94	1922.98	-4.96
62	1726.57	1927.80	1922.47	-5.33
63	1701.57	1926.51	1922.55	-3.96
64	1667.4	1927.22	1921.79	-5.43
65	1529.8	1923.23	1919.87	-3.36
66	1501.53	1921.42	1919.65	-1.77
67	1476.5	1920.21	1918.67	-1.54

BROOKS CHANNEL FLOOD CONTROL PROJECT LOMR

HEC-RAS Reference Number	HEC-RAS Cross Section	Existing Condition BFE (feet NAVD88)	As-Built Condition BFE (feet NAVD88)	BFE Difference (feet)
68	1451.37	1922.75	1917.69	-5.06
69	1426.37	1922.82	1917.08	-5.74
70	1401.35	1922.86	1916.5	-6.36
71	1376.2	1922.87	1915.92	-6.95
72	1351.17	1922.92	1915.35	-7.57
73	1326.16	1922.94	1914.77	-8.17
74	1301.14	1922.95	1914.21	-8.74
75	1276.14	1922.96	1913.66	-9.3
76	1251.15	1922.97	1913.11	-9.86
77	1226.18	1922.97	1912.55	-10.42
78	1201.34	1922.97	1912.01	-10.96
79	1151.6	1922.97	1911.94	-11.03
80	1101.71	1922.97	1916.10	-6.87
81	1076.62	1922.97	1916.20	-6.77
82	1051.67	1922.97	1916.23	-6.74
83	1034.38	1922.97	1916.30	-6.67

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5.0 ENVIRONMENTAL SCREENING ANALYSIS AND PERMITS

No deviation has been made to the initial environmental report since the initial CLOMR submittal or the USACOE issued 404 Permit (File No. SPK-2014-00276-SG) in June of 2014. A copy of the USACOE 404 Permit and the Newfields environmental report is included in the attached CD as **Appendix F**.

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6.0 NOTIFICATION TO PROPERTY OWNERS

A notification letter has been sent to property owners adjacent to the Brooks Channel alignment which may be affected by widening and shifting of the base (1-percent-annual-chance) floodplain. The notification letter is provided in both English and Spanish. This notification letter has been mailed to property owners by the City of North Las Vegas Project Manager (Mr. Dan Le, PE, CFM) overseeing the Brooks Channel Flood Control Project. A copy of the notification letter is attached as **Appendix G**.

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7.0 CONCLUSION

The Brooks Channel Flood Control Project and Central Freeway Channel segments LV15 0051 and LV15 0079 (shown in **Figure 1A**), as constructed, removes the existing SFHA “Zone A” depicted on Panel Number 32003C2160F located along the channel alignment, between Losee Road Crossing and the UPRR tracks. The proposed BFE’s are substantially lower when compared to the existing BFE’s.

The portion of the SFHA “Zone A” located east and west of Losee Road Crossing is mapped incorrectly as shown in the FEMA FIRM number 32003C2160F. The 100-year HEC-RAS hydraulic analysis model for the existing conditions indicated the 8’x3’ RCB at the Losee Road crossing creates a back water effect causing water to flood Losee Road, overtopping both curbs and affecting a larger area than previously mapped. The proposed conditions indicate the dual 9’x3’ RCB culverts and channel improvements contain the 100-year projected flows within the Brooks Channel.

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8.0 REFERENCES

Clark County Regional Flood Control District (CCRFCDD) *Hydrologic Criteria Drainage Design Manual* (HCCDM). 1999

Clark County Regional Flood Control District (CCRFCDD) *Las Vegas Valley Master Plan Update* (MPU). 2008

Louis Berger Group (LBG), *90% Technical Drainage Study for the North 5th Street Improvements, Losee Road to Cheyenne Avenue*. March 2012.

MWH Americas, Inc., *Brooks Channel Design Hydrology Technical Memorandum (TM) No. 1*. August 2012

National Resources Conservation Service (NRCS), *Soil Survey of the Las Vegas Valley Area (Soil Survey No. 788)*. 1988

MWH Americas, Inc., *Final Technical Memorandum No. 1 Central Freeway Channel Hydrologic/ Hydraulic Analysis Memorandum*. December 2013

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Appendix A

Figures



2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 27
FLOOD CONTROL FACILITIES

LEGEND

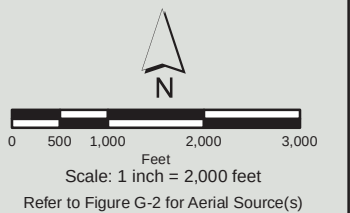
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- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin

- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

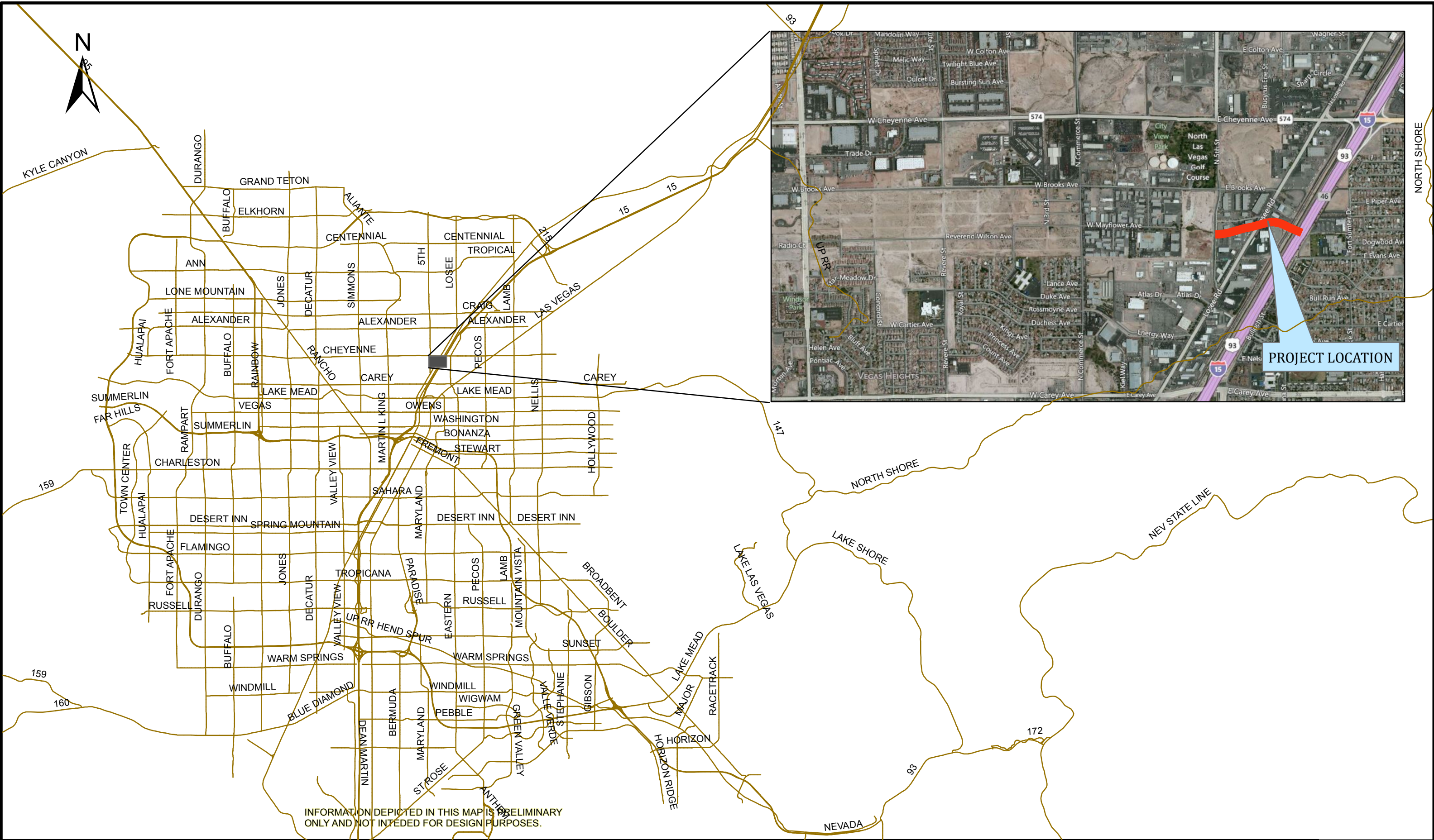
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Channel	Channel
Stormdrain	Stormdrain

REPORT - FIGURE 1A
SHEET 1 OF 2



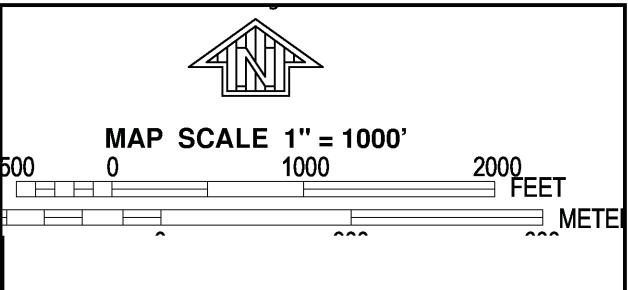
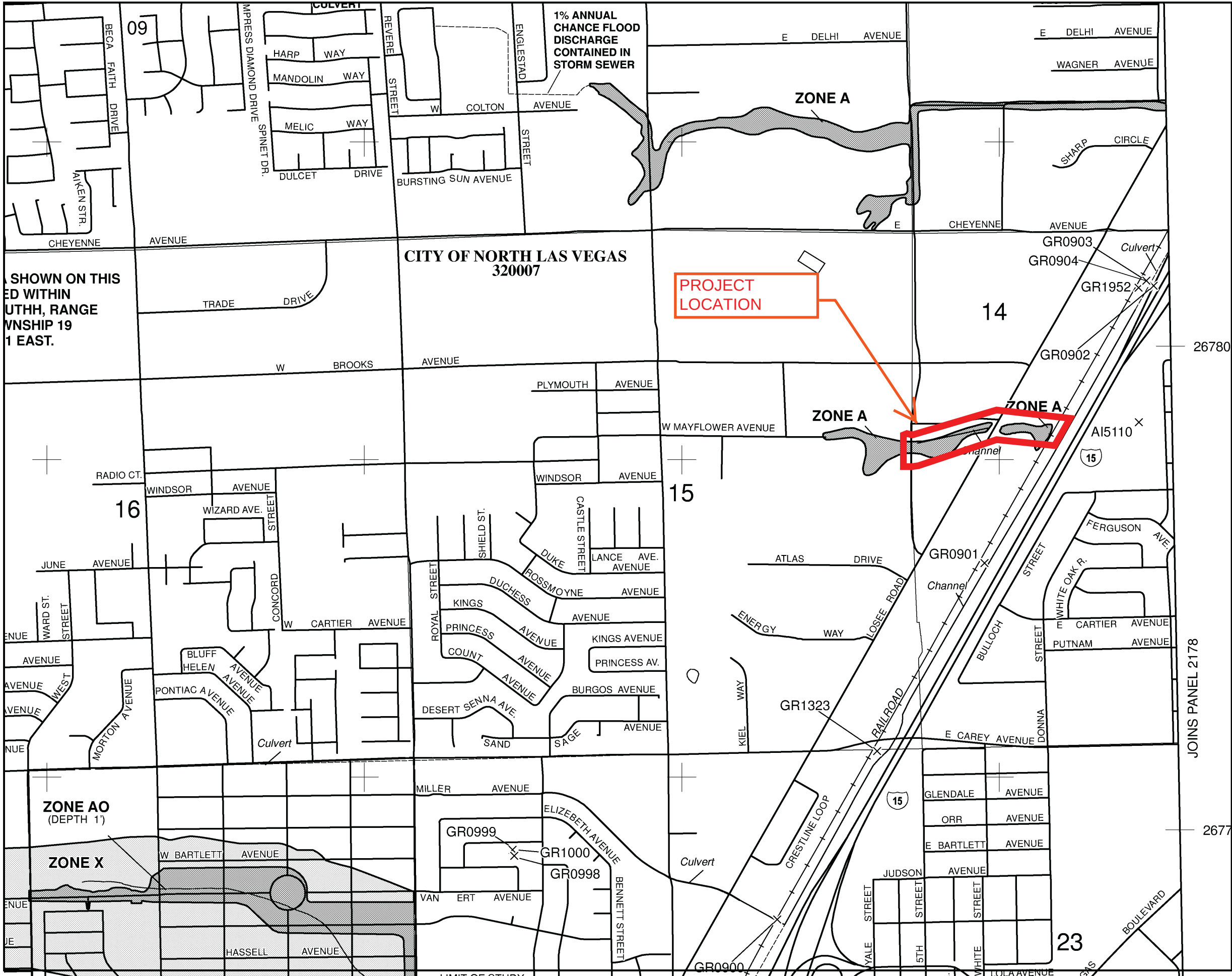
US95			I-15		
2	3		A1	A2	
4	5	6	A3	A4	
7	8	9	10	A5	A6
11	12	13	14	15	16
17	18	19	20	21	22
23	24	25	26	27	28
29	30	31	32	33	34
35	36	37	38	39	40
41	42	43	44	45	46
47	48	49	50	51	52
53	54	55	56		
57	58	59			

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **	ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **	ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **	ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **	
CABZ 0010	E	CEDAR AVENUE - BONANZA 60" RCP	1450					0.30	LVLVLE		LAKE MEAD DRAIN TO LAS VEGAS WASH							LVMDD		LAS VEGAS WASH - MIDDLE							RWSSL		RANGE WASH - SLOAN							
LV15 0000	E	Conc Chnl 24.5W 10'D 1.5:1 SS (Replace w/ LV150001)	1800	4778	2CLV1E-3	CWEST4	11.12	0.18	0000	P1	12" X 8" RCB	2500	1030	CLV1B-2	WEST3	1.20	0.40	1677	E	Conc Chnl 80W 10'D 2:1 SS	119	7358	CLV99B-5	WEST5	48.77	0.37	0577	P1	Conc Chnl 40W 8'D 2:1 SS (Replaces RWSL0576)	3000	5187	CCSLNL	RW4SC	8.62	0.38	
0001	P0	Conc Chnl 20W 10'D 1.5:1 SS (Replaces LV150000)	1859	4778	2CLV1E-3	CWEST4	11.12	0.12	0047	P1	12" X 6" RCB	2400	845	CLV1B-1	WEST3	0.89	0.50	1679	E	4 Span Bridge 100W 12'D 2:1 SS @ Losee	120	7358	CLV99B-5	WEST5	48.77	0.37	0670	E	3: 10' X 7' RCBC @ Nellis	100	3178*	CCSLNL^	RW4SC	8.62	0.56	
0035	E	Conc Chnl 20W 10'D 1:1 SS (Replace w/ LV150036)	200	4301	2CLV1D-5	CWEST4	10.22	0.18	LVLML		LAS VEGAS WASH - LAKE MEAD							1680	E	Conc Chnl 80W 10'D 2:1 SS	480	7358	CLV99B-5	WEST5	48.77	0.37	0671	P1	Add 3: 12' X 7' RCBC @ Nellis	100	2009*	CCSLNL^	RW4SC	8.62	0.56	
0036	P0	Conc Chnl 20W 10'D 1.5:1 SS (Replaces LV150035)	799	4301	2CLV1D-5	CWEST4	10.22	0.16	0000	E	43"X 68" HERCP (Replace w/ LVLMO001)	847	994	CLM20-C	NW3SC	1.36	4.60	LVNMC		LAS VEGAS WASH - N CHANNEL							0672	E	Conc Chnl 14W 8'D 1.5:1 SS	1130	2924	CC47C-4	RW3SC	3.94	0.56	
0050	E	2: 8' X 10' RCB (Replace w/ LV150051)	2200	4301	2CLV1D-5	CWEST4	10.22	0.75	0001	P0	12" X 5' RCB (Replaces LVLMO000)	847	994	CLM20-C	NW3SC	1.36	4.60	0001	E	18' X 6' RCB	173	1182	CLW100	CWEST5	13.62	0.45	0694	E	Conc Chnl 10W 8'D 1.5:1 SS	1500	1696	C47C4	RW3SC	2.40	0.56	
0051	P0	2: 13' X 10' RCB (Replaces LV150050)	1504	4301	2CLV1D-5	CWEST4	10.22	0.75	0016	E	54" RCP (Replace w/ LVLMO017)	965	994	CLM20-C	NW3SC	1.36	4.38	0007	E	Drop Structure 18W 2.8'D 3:1 SS	50	1182	CLW100	CWEST5	13.62	0.70	0727	E	3: 10' X 8' RCBC	100	1601	C307E3	RW3SC	2.25	0.56	
0078	E	Conc Chnl 20W 10'D 1:1 SS (Replace w/ LV150079)	1600	4301	2CLV1D-5	CWEST4	10.22	0.18	0017	P0	12" X 5' RCB (Replaces LVLMO033)	1186	994	CLM20-C	NW3SC	1.36	1.62	0008	E	Conc Chnl 18W 10'D 2:1 SS	1385	1182	CLW100	CWEST5	13.62	0.70	SLEB		SLOAN CHANNEL EAST BRANCH							
0079	P0	Conc Chnl 20W 10'D 1.5:1 SS (Replaces LV150078)	1608	4301	2CLV1D-5	CWEST4	10.22	0.14	0034	P0	12" X 5' RCB (Replaces LVLMO060)	5952	994	CLM20-C	NW3SC	1.36	0.66	0037	E	2: 132" CMPC @ Cheyenne	120	1182	CLW100	CWEST5	13.62	0.70	0000	E	Conc Chnl 10W 8'D 1.5:1 SS	840	1322	C310B2	RW3	1.54	0.43	
0109	E	Conc Chnl 20W 10'D 1:1 SS (Replace w/ LV150110)	4300	3953	CLV1D-4	CWEST4	9.42	0.18	0038	P1	72" RCP (Replace w/ LVLMO059)	5952	994	CLM20-C	NW3SC	1.36	0.66	0038	P1	Conc Chnl 12W 5.5'D 2:1 SS	2590	1182	CLW100	CWEST5	13.62	0.70	WAGC		WASHINGTON AVENUE CHANNEL - GRAND CENTRAL							
0110	P0	Conc Chnl 15-20W 10'D 1.5:1 SS (Replaces LV150109)	1576	3953	CLV1D-4	CWEST4	9.42	0.11	0060	P0	12" X 6" RCB (Replaces LVLMO059)	5952	994	CLM20-C	NW3SC	1.36	0.66	0090	E	3: 12" X 6" RCB	120	1182	CLW100	CWEST5	13.62	0.70	0000	E	2: 12' X 4' RCB	700	557	LC21	SW3	0.60	0.20	
0139	E	Conc Chnl 15W 10'D 1.5:1 SS (Replace w/ LV150140)	3565	3953	CLV1D-4	CWEST4	9.42	0.18	LVLV		LAS VEGAS BLVD DRAIN							0091	E	14' X 6" RCAP	1325	1182	CLW100	CWEST5	13.62	0.52	0014	E	1: 12' X 4' RCB and 1: 11' X 4' RCB	2440	557	LC21	SW3	0.60	0.20	
0140	P0	Conc Chnl 15W 10'D 1.5:1 SS (Replaces LV150139)	3565	3953	CLV1D-4	CWEST4	9.42	0.18	0000	P1	2: 10' X 9' RCB	2600	987	CLW075-4	WEST3	1.03	0.10	LVNVE		LAS VEGAS WASH - NELLIS							WAPR		WASHINGTON AVENUE CHANNEL PARALLEL							
0190	E	Conc Chnl 20W 10'D 1:1 SS	1500	3776	CW1C2	NW4SC	8.84	0.18	LVMDD		LAS VEGAS WASH - MIDDLE							0000	P1	2: 13' X 10' RCB	4675	2303	CNEL02-C	WEST3	3.39	0.20	0000	E	12' X 8' RCB	2100	1607	(1/2) CV1-C	SW5SC	15.16	2.20	
0206	P0	Conc Chnl 48W 13'D 0:1 SS	329	3776	CW1C2	NW4SC	8.84	0.46	1148	E	Earth Chnl 70W 18'-20'D 1.5:1 SS (Replace w/ LVMD1149)	1675	13944	CCBN15-C	CLVWASH5	112.59	0.41	0089	P1	13' X 12' RCB	2700	2187	CNEL01-C	WEST3	3.11	0.37	0037	E	12' X 8' RCB	590	1607	(1/2) CV1-C	SW5SC	15.16	5.60	
0208	P0	Confluence Structure 64'-48W 10'-13'D 0:1 SS	298	3776	CW1C2	NW4SC	8.84	0.42	1149	P1	Conc Chnl 70W 10'D 1.5:1 SS (Replaces LVMD1148)	1675	13944	CCBN15-C	CLVWASH5	112.59	0.41	0140	P1	13' X 12' RCB	2700	2094	COA03-C	WEST3	2.83	0.37	0051	E	12' X 8' RCB	1200	1607	(1/2) CV1-C	SW5SC	15.16	0.80	
0210	E	3: 12' X 9' RCB	911	3123	CCVG24	NW3SC	7.07	0.25	1176	E	5 Span Bridge 110W 20'D 2:1 SS @ Bonanza	120	12690	CLVW04-C	CLVWASH5	106.80	0.57	0191	P1	12' X 11' RCB	2700	1745	CLV53-2	WEST3	2.27	0.40	0074	E	12' X 8' RCB	550	1607	(1/2) CV1-C	SW5SC	15.16	1.60	
0230	E	12' X 4.5' RCBC @ Lake Mead	177	1011	DRAILRD	NW3	5.22	1.16	1178	E	Earth Chnl 30W 18'-20'D 2:1 SS (Replace w/ LVMD1179)	1500	12690	CLVW04-C	CLVWASH5	106.80	0.57	0242	P1	12' X 9' RCB	2700	1367	C321A-3	WEST3	1.72	0.56	0089	E	14' X 8' RCB	395	1607	(1/2) CV1-C	SW5SC	15.16	0.55	
0231	E	Conc Chnl 8W 8'D 0:1 SS	900	1011	DRAILRD	NW3	5.22	2.50	1208	E	Bank-Stab. Chnl 65W 15'D 2:1 SS (Replace w/ LVMD1209)	1420	12690	CLVW04-C	CLVWASH5	106.80	0.32	LVVOE		OWENS AVENUE - EAST							0097	E	14' X 8' RCB	1835	1607	(1/2) CV1-C	SW5SC	15.16	1.24	
0248	E	8' X 8' RCBC @ UPRR	350	1011	DRAILRD	NW3	5.22	1.34	1209	P1	Conc Chnl 60W 10.5'D 2:1 SS (Replaces LVMD1208)	1420	12690	CLVW04-C	CLVWASH5	106.80	0.32	0000	P1	13' X 12' RCB	4700	2728	CK-C1	SW5	24.24	0.47	0132	E	2: 9' X 8' RCB	387	1607	(1/2) CV1-C	SW5SC	15.16	1.67	
0255	E	Conc Chnl 8W 8'D 0:1 SS	1330	1011	DRAILRD	NW3	5.22	2.00	1230	E	4 Span Bridge 162W 13'D @ Washington	105	12654	CCLVW03	CLVWASH5	106.53	0.73	0085	P1	13' X 12' RCB	2540	2657	CG	SW5	23.92	0.62										
0280	E	Conc Chnl 30W 8'D 0:1 SS	200	2022	CCVG10	NW3	5.22	2.00	1232	E	Bank-Stab. Chnl 48W 8'D 2:1 SS (Replace w/ LVMD1233)	1900	12654	CCLVW03	CLVWASH5	106.53	0.73	0134	P1	12' X 11' RCB	5380	2607	CE-C	SW5	23.69	1.00										
0284	E	14' X 6' RCB	1790	1221	CVG10-C	NW3	4.84	0.50	1233	P1	Conc Chnl 90W 8'D 0:1 SS (Replaces LVMD1232)	1900	12654	CCLVW03	CLVWASH5	106.53	0.73	0236	P1	13' X 8' RCB	5000	2427	CH-C1	SW5	23.08	1.50										
0316	E	11' X 6' RCB	3010	985	CWA20-C	NW3	4.46	0.59	1271	E	4 Span Bridge 94W 10'-12'D 2:1 SS @ Lamb	120	11954	CCLVW01C	CLVWASH5	103.23	0.38	0331	P1	13' X 11' RCB	750	2369	DLVOE	SW5	22.79	0.60										
0372	E	9' X 6' RCB	1970	985	CWA20-C	NW3	4.46	0.66	1272	E	Earth Chnl 80W 10'D 2:1 SS (Replace w/ LVMD1273)	2400	11954	CCLVW01C	CLVWASH5	103.23	0.38	0345	P1	13' X 11' RCB	1685	2369	DLVOE	SW5	22.79	0.60										
LVBR 0000	P1	Conc Chnl 12W 4.5'D 2:1 SS	285	989	CLV1D-5	WEST3	0.80	2.90	1273	P1	Conc Chnl 80W 9'D 2:1 SS (Replaces LVMD1272)	2400	11954	CCLVW01C	CLVWASH5	103.23	0.38	LVVOW		OWENS AVENUE SYSTEM							0000	E	10' X 6' RCB	145	1089	CLM16B-C	NW3	2.40	0.76	
0005	E	Conc Chnl 9W 5'D 2:1 SS	375	989	CLV1D-5	WEST3	0.80	2.67	1320	E	Gabion Chnl 100W 10'D 2:1 SS (Replace w/ LVMD1321)	1950	8636	CCK-C1	CLVWASH5	100.94	0.38	0003	E	96" RCP	7500	1089	CLM16B-C	NW3	2.40	0.70										
0011	E	11' X 3' RCBC @ Losee	150	989	CLV1D-5	WEST3	0.80	2.90	1321	P1	Conc Chnl 80W 7.5'D 2:1 SS (Replaces LVMD1320)	1950	8636	CCK-C1	CLVWASH5	100.94	0.38	LVLSR		LAS VEGAS WASH - SMOKE RANCH							0000	E	Conc Chnl 22W 8'D 0:1 SS	79	1244	CS1-C	NW3SC	1.42	2.32	
0013	E	Conc Chnl 12W 4.5'D 2:1 SS	750	989	CLV1D-5	WEST3	0.80	1.50	1354	E	5 Span Bridge 110W 7'-8'D 2:1 SS @ Owens	120	8504	2CLV1B-2	CCWEST5	78.09	0.58	0001	E	Free Span Bridge 22W 10'D	50	1244	CS1-C	NW3SC	1.42	2.32										
0014	E	12' X 4' RCBC @ N. 5th St	100	989	CLV1D-5	WEST3	0.80	2.60	1355	E	Gabion Chnl 100W 10'D 2:1 SS	3122	8504	2CLV1B-2	CCWEST5	78.09	0.58	0002	E	Conc Chnl 22W 8'D 0:1 SS	468	1244	CS1-C	NW3SC	1.42	2.32										
0026	P1	Conc Chnl 12W 4.5'D 2:1 SS	850	989	CLV1D-5	WEST3	0.80	4.30	1390	E	Energy Dissipator	137	8291	CLW64-4	CCWEST5	76.89	0.10	0009	E	72" RCP (Replace w/ LVSR0010)	702	1244	CS1-C	NW3SC	1.42	2.32										
LVBZ 0000	P1	2: 12' X 7' RCB	3400	1636	CBN15-C	SW3	2.40	0.40	1400	E	Conc Chnl 90W 12'D 0:1 SS	173	8291	CLW64-4	CCWEST5	76.89	0.50	0010	P1	10' X 6' RCB (Replaces LVSR0009)	702	1244	CS1-C	NW3SC	1.42	2.32										
0064	P1	2: 12' X 6' RCB	2630	1449	CBN12-C	SW3	2.12	0.40	1424	E	Conc Chnl 84W 13'D 0:1 SS	1060	8291	CLW64-4	CCWEST5	76.89	0.34	0020	E	60" RCP (Replace w/ LVSR0021)	1320	1244	CS1-C	NW3SC	1.42	3.03										
0114	P1	2: 12' X 6' RCB	2740	1256	CBN10-C	SW3	1.79	0.40	1444	E	Conc Chnl 84W 8'D 0:1 SS	2000	8291	CLW64-4	CCWEST5	76.89	0.34	0021	P1	10' X 5' RCB (Replaces LVSR0020)	1320	1244	CS1-C	NW3SC	1.42	3.03										
0166	E	54" RCP (Replace w/ LVBZ0167)	1095	1051	CBN09	SW3	1.54	0.45	1482	E	1 Span Bridge 99W 7'D @ Carey	72	8291	CLW64-4	CCWEST5	76.89	1.00	0045	E	54" RCP (Replace w/ LVSR0046)	1180	1244	CS1-C	NW3SC	1.42	3.41										
0167	P0	10' X 9' RCB (Replaces LVBZ0166)	1095	1051	CBN09	SW3	1.54	0.45	1484	E	Conc Chnl 84W 8'-9'D 0:1 SS	1950	8291	CLW64-4	CCWEST5	76.89	0.37	0046	P1	10' X 5' RCB (Replaces LVSR0045)	1180	1244	CS1-C	NW3SC	1.42	3.41										
0187	E	48" RCP (Replace w/ LVBZ0188)	1235	1051	CBN09	SW3	1.54	0.71	1522	E	Conc Chnl 95W 8'D 0:1 SS	680	8241	2CLW1A-3	CCWEST5	76.53	0.53																			



INFORMATION DEPICTED IN THIS MAP IS PRELIMINARY ONLY AND NOT INTENDED FOR DESIGN PURPOSES.

	Scale: 1" = 16,500'	Drawn By: SM	City of North Las Vegas Brooks Flood Control Channel	Figure 1: Location Map	
	Job #: BROOKS CHAN	Checked By: RV			
	Date: 08/06/12	Designed By: N/A			



PANEL 2160F

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

PANEL 2160 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	2160	F
LAS VEGAS, CITY OF	325276	2160	F
NORTH LAS VEGAS, CITY OF	320007	2160	F

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



MAP NUMBER
32003C2160F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

FIGURE 2 - FIRM MAP

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



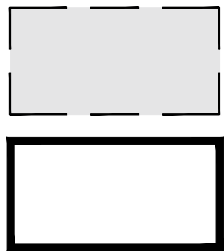
NOTES:

- FLOODZONE "A" FROM MAP 32003C2160F.
- TOPOGRAPHY (5 & 25 FOOT INTERVAL) ADJACENT TO PROJECT AREA IS OBTAINED FROM 2005 CLARK COUNTY GIS DEPARTMENT. TOPOGRAPHY WITHIN THE PROJECT AREA HAS BEEN OBTAINED FROM THE CITY OF NORTH LAS VEGAS SURVEY DEPARTMENT.
- DRAWING COORDINATES ARE IN THE CITY OF NORTH LAS VEGAS USER DEFINED TRANSVERSE MERCATOR PROJECTION SYSTEM.

CITY OF NORTH LAS VEGAS USER DEFINED
MERCATOR PROJECTION PARAMETERS:
CENTRAL MERIDIAN = 115°05'53.002040" WEST
LATITUDE OF ORIGIN = 36°15'00.000603" NORTH
ORIGIN NORTHING = 75000.000 U.S. FEET
ORIGIN EASTING = 75000.000 U.S. FEET
SCALE ALONG CENTRAL MERIDIAN = 1.000093468437
CONVERGENCE ANGLE = 0°17'13.033030" WEST
REFERENCE ELLIPSOID = GRS-80
SEMI-MAJOR AXIS = 20,925,604.474 U.S. FEET

FLATTENING (1/f) = 298.25722154
X TRANSLATION = 0.0000
Y TRANSLATION = 0.0000
Z TRANSLATION = 0.0000
NAVD88 BENCHMARK:
NLV011SES ELEVATION 1981.306
RIVET AND 2" ROUND ALUMINUM DISK, STAMPED NORTH LAS VEGAS BM
NO. NLV0110SES, SET IN THE TOP OF CURB, LOCATED AT THE
NORTHWEST CORNER OF THE INTERSECTION OF CHEYENNE AVE. AND N.
5TH STREET.

LEGEND



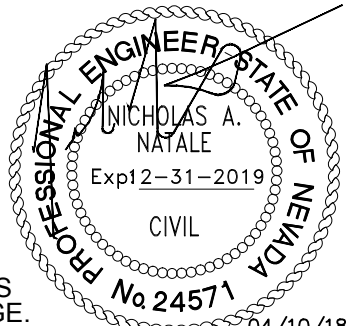
EFFECTIVE FEMA
FLOODPLAIN AREA

EXISTING FLOODPLAIN
AREA

2501.48 — HEC-RAS CROSS SECTION NUMBER

— HEC-RAS CROSS SECTION

I CERTIFY THAT THE INFORMATION SHOWN ON THIS
PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE.



REV	DATE	BY	DESCRIPTION

SCALE
1"=60'

WARNING
0 1/2 1
IF THIS BAR DOES
NOT MEASURE 1"
THEN DRAWING IS
NOT TO SCALE

DESIGNED N. NATALE
DRAWN S. WILLIAMSON
CHECKED J. PARKE

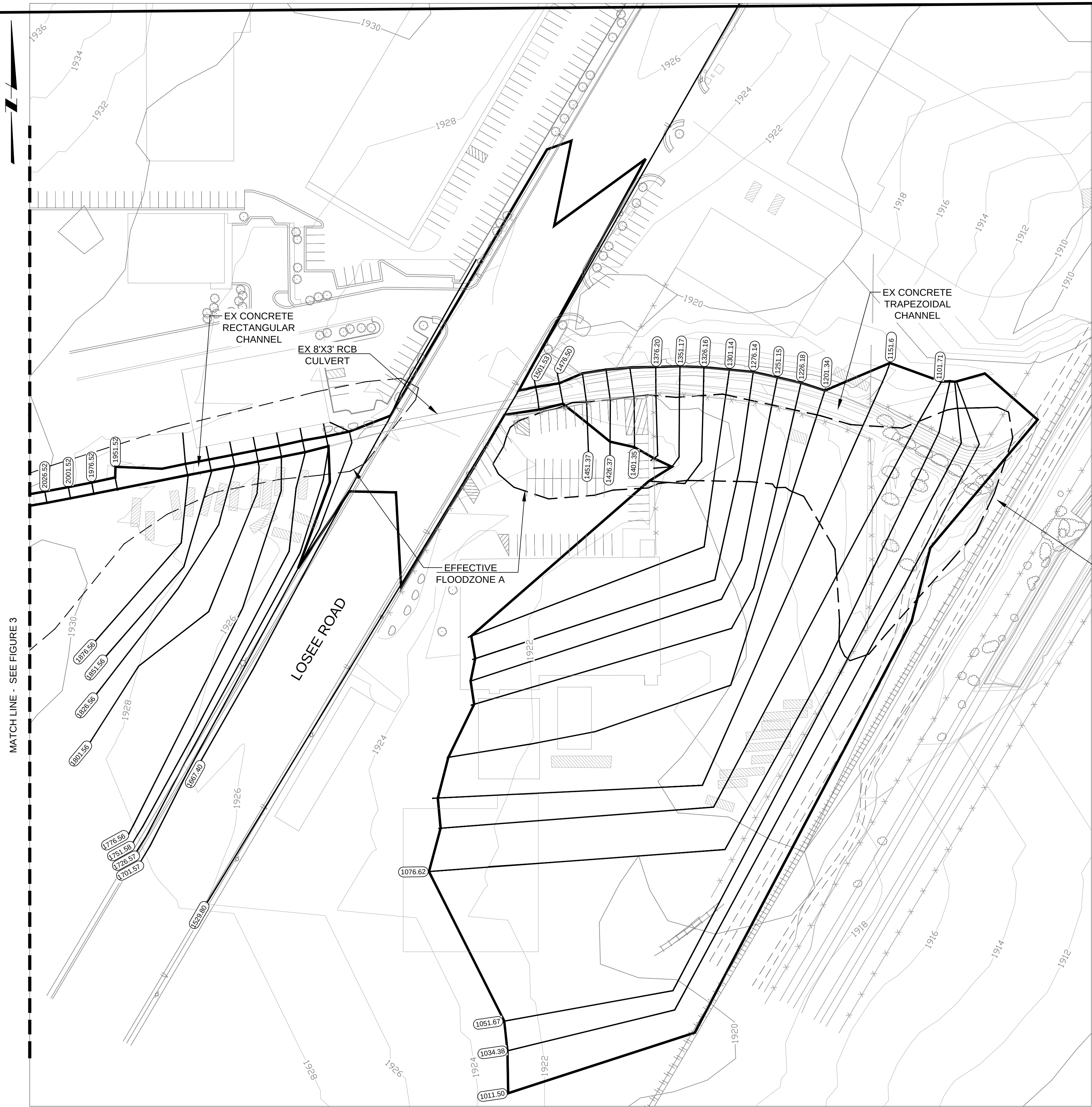


CITY OF NORTH LAS VEGAS

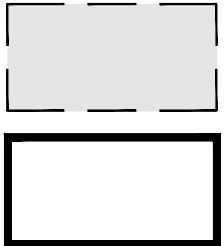
BROOKS CHANNEL FLOOD CONTROL IMPROVEMENTS
LOMR

EXISTING CONDITION 100-YEAR
FLOOD PLAIN EXHIBIT 1

FIGURE
3



LEGEND



EFFECTIVE FEMA
FLOODPLAIN AREA

EXISTING FLOODPLAIN
AREA

2501.48 — HEC-RAS CROSS SECTION NUMBER

— HEC-RAS CROSS SECTION

CITY OF NORTH LAS VEGAS USER DEFINED
MERCATOR PROJECTION PARAMETERS:

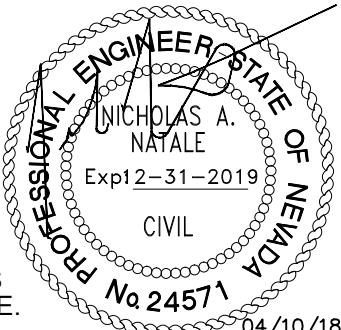
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I CERTIFY THAT THE INFORMATION SHOWN ON THIS
PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE.

REV	DATE	BY	DESCRIPTION

SCALE

1"=60'

WARNING

0 1/2 1

IF THIS BAR DOES
NOT MEASURE 1"
THEN DRAWING IS
NOT TO SCALE

DESIGNED N. NATALE

DRAWN S. WILLIAMSON

CHECKED J. PARKE



CITY OF NORTH LAS VEGAS

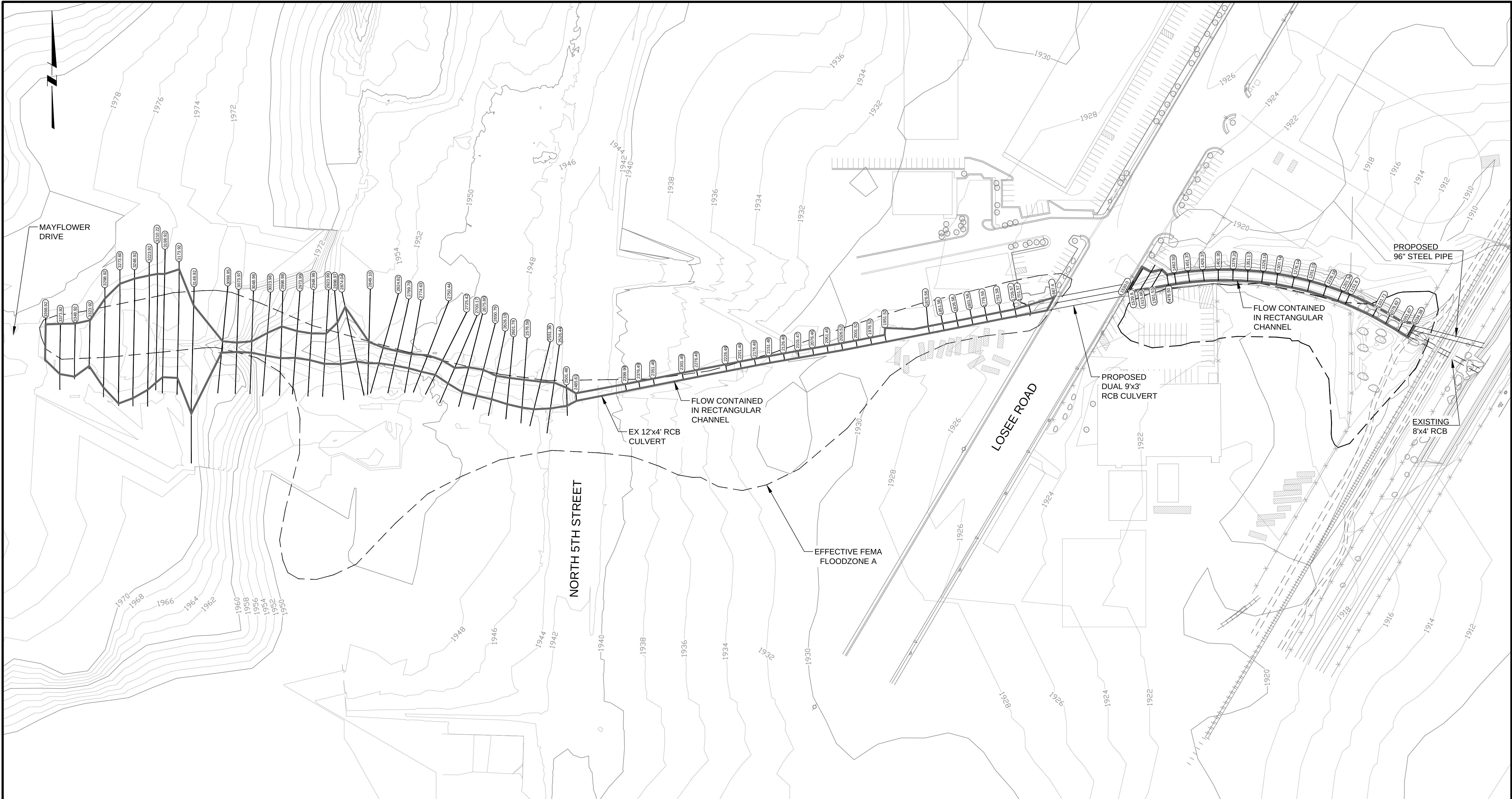
BROOKS CHANNEL FLOOD CONTROL IMPROVEMENTS

LOMR

EXISTING CONDITION 100-YEAR
FLOOD PLAIN EXHIBIT 1-A

FIGURE

3A



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LEGEND

EFFECTIVE FEMA FLOODPLAIN AREA

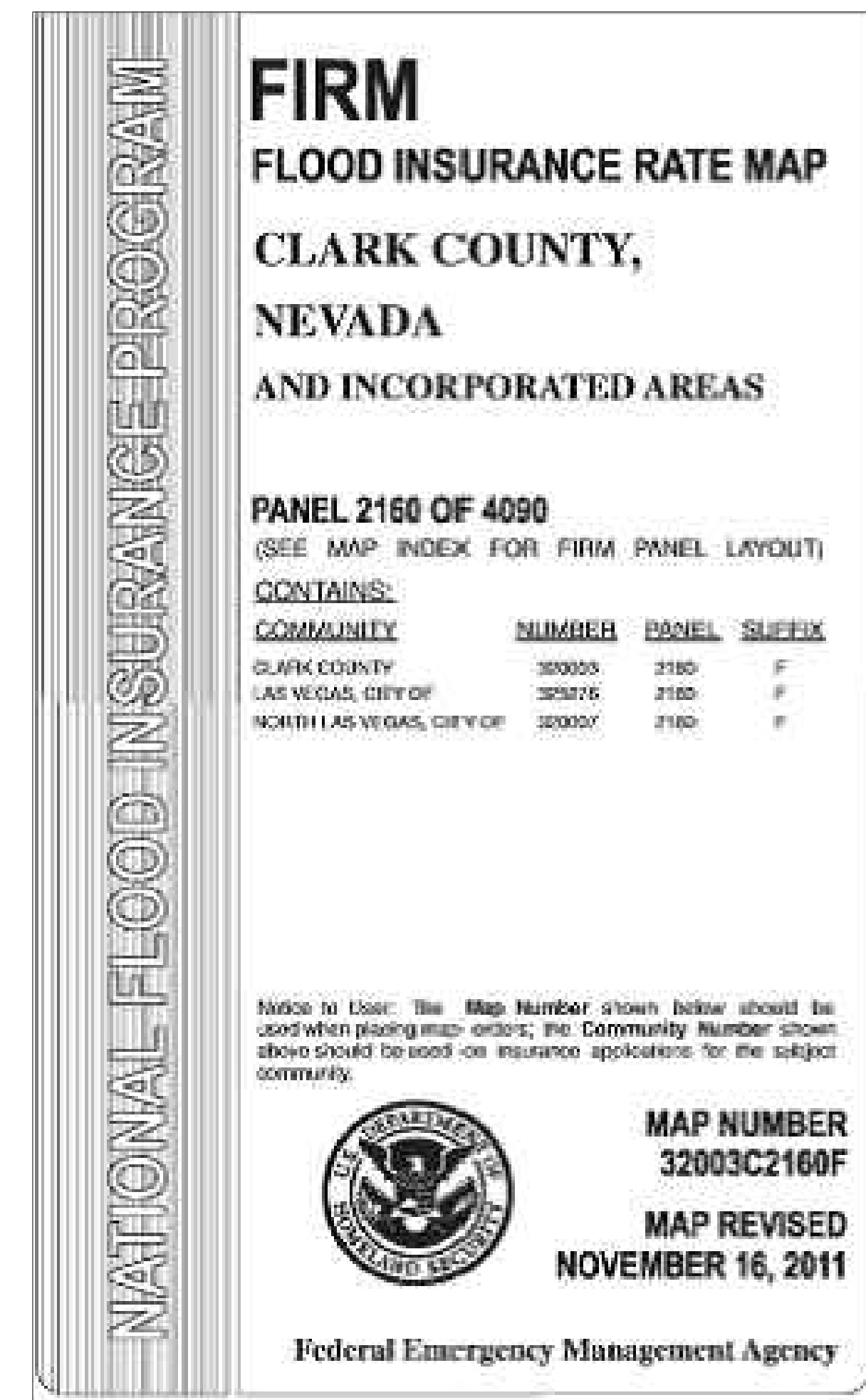
PROPOSED FLOODPLAIN AREA

HEC-RAS CROSS SECTION REFERENCE NUMBER (SEE TABLE 4-2 IN LOMR TEXT FOR STATION)

HEC-RAS CROSS SECTION

I CERTIFY THAT THE INFORMATION SHOWN ON THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE.

				SCALE	WARNING 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED <u>N. NATALE</u>		CITY OF NORTH LAS VEGAS	BROOKS CHANNEL FLOOD CONTROL IMPROVEMENTS LOMR	PROPOSED CONDITION 100-YEAR FLOOD PLAIN EXHIBIT 2	SHEET 4 Job Number
REV	DATE	BY	DESCRIPTION	DRAWN <u>S. WILLIAMSON</u>		CHECKED <u>J. PARKE</u>					



REV	DATE	BY	DESCRIPTION

1" = 1000'

WARNING

0 1/2 1



IF THIS BAR DOES
NOT MEASURE 1"
THEN DRAWING IS
NOT TO SCALE

CHECKED J PARKE



CITY OF NORTH LAS VEGAS

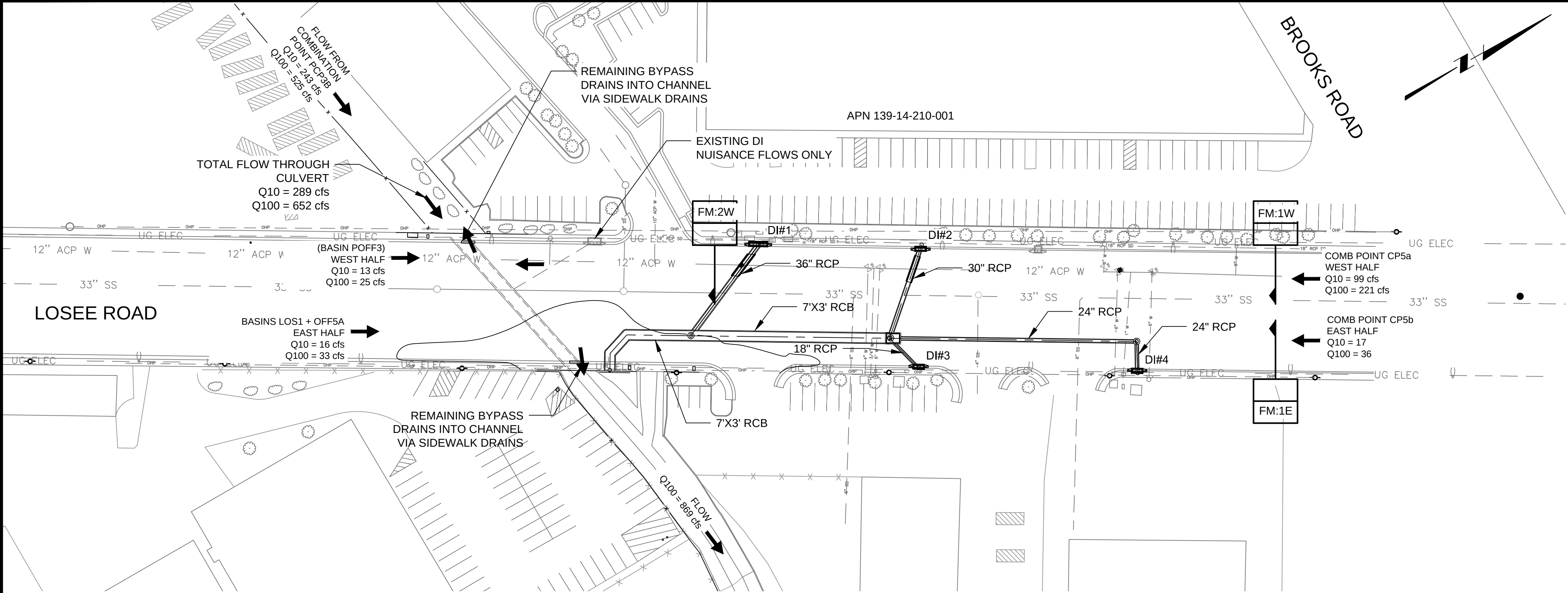
BROOKS CHANNEL FLOOD CONTROL IMPROVEMENTS

LOMR

ANNOTATED FIRM MAP

FIGURE

5



INLET SUMMARY TABLE

DROP INLET #	TYPE & DIMENSIONS	STREET FLOW (CFS)		INTERCEPTED FLOW (CFS)		BYPASS FLOW (CFS)	
		Q10	Q100	Q10	Q100	Q10	Q100
1	TYPE "CM" L=12.5', GRATE ≈12.5'	75	182	42	80	33	102
2	TYPE "CM" L=7.5', GRATE ≈5'	99	221	24	39	75	182
3	TYPE "CM" L=7.5', GRATE ≈7.5'	8	21	5	11	3	10
4	TYPE "CM" L=7.5', GRATE ≈7.5'	17	36	9	15	8	21
SIDEWALK DRAIN	DIMENSIONS	--	--	--	--	--	--
WEST	USDCCA DWG# 236, 4 TOTAL S/W DRAINS	41	127	41	127	0	0
EAST	USDCCA DWG# 236, 4 TOTAL S/W DRAINS	10	43	20	43	0	0

WSPG MODEL SUMMARY

WSPG MODEL	DESCRIPTION
"LOSSD100.OUT"	Q-100: MAIN STORM DRAIN REACH - UP TO DROP INLET #4 LATERAL
"DI1.OUT"	Q-100: DROP INLET #1 LATERAL REACH
"DI2.OUT"	Q-100: DROP INLET #2 LATERAL REACH
"DI3.OUT"	Q-100: DROP INLET #2 LATERAL REACH

STREET HYDRAULIC SECTION SUMMARY

SECTION	DESCRIPTION	Q (CFS)	DEPTH (FT)	VELOCITY (FT/S)	V X D
FM:1W-Q100	WEST HALF LOSEE ROAD	221	1.40	5.37	7.52
FM:1W-Q10	WEST HALF LOSEE ROAD	99	1.08	3.92	4.23
FM:1E-Q100	EAST HALF LOSEE ROAD	36	0.80	2.92	2.34
FM:1E-Q10	EAST HALF LOSEE ROAD	17	0.65	2.37	1.54
FM:2W-Q100	WEST HALF LOSEE ROAD	86	1.04	3.70	3.85
FM:2W-Q10	WEST HALF LOSEE ROAD	31	0.76	2.80	2.13

REVISIONS

NO.	DESCRIPTION	DATE	BY

SCALE: AS SHOWN

DESIGN:

DRAWN:

CHECKED:

APPROVED:

DATE:

LOSEE ROAD STORM DRAIN EXHIBIT

SHEET NO.

7

SHEET OF 46



W. North Las Vegas					SCALE	WARNING  0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED <u>R VALDEZ</u>		CITY OF NORTH LAS VEGAS	CENTRAL FREEWAY CHANNEL AT CHEYENNE CROSSING CENTRAL FREEWAY CHANNEL CHEYENNE CROSSING EXHIBIT	FIGURE 8
					1"=80'H, 1"=20'V						
	REV	DATE	BY	DESCRIPTION							

Appendix B

CLOMR Approval Letter



Federal Emergency Management Agency

Washington, D.C. 20472

May 13, 2016

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable John J. Lee
Mayor, City of North Las Vegas
2250 Las Vegas Boulevard North
North Las Vegas, NV 89030

IN REPLY REFER TO:

Case No.: 16-09-0140R
Community Name: City of North Las Vegas, NV
Community No.: 320007

Dear Mayor Lee:

We are providing our comments with the enclosed Conditional Letter of Map Revision (CLOMR) on a proposed project within your community that, if constructed as proposed, could revise effective Flood Insurance Study report, and Flood Insurance Rate Map for your community.

If you have any questions regarding the floodplain management regulations for your community, the National Flood Insurance Program (NFIP) in general, or technical questions regarding this CLOMR, please contact the Director, Mitigation Division of the Federal Emergency Management Agency (FEMA) Regional Office in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Sincerely,

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

List of Enclosures:

Conditional Letter of Map Revision Comment Document

cc: Mr. Dan Le, P.E., C.F.M.
City of North Las Vegas

Mr. Raul Valdez, P.E., C.F.M.
MWH Americas, Inc.



Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	City of North Las Vegas Clark County Nevada	CHANNELIZATION CULVERT	HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 320007		
IDENTIFIER	Brooks Channel Flood Control Project	APPROXIMATE LATITUDE & LONGITUDE: 36.212 , -115.133 SOURCE: GOOGLE EARTH DATUM: NAD 83	
AFFECTED MAP PANELS			
TYPE: FIRM* NO.: 32003C2160F DATE: November 16, 2011		* FIRM - Flood Insurance Rate Map	

FLOODING SOURCE AND REACH DESCRIPTION

Unnamed Zone A Channel (referred to hereafter as Brooks Channel) - from approximately 900 feet upstream of 5th Street to approximately 1,500 feet downstream of 5th Street (UPRR embankment).

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Brooks Channel	Channelization	from 160 feet upstream of Losee Road to approximately 600 feet downstream of Loose Road (UPRR embankment)
	Dual 9 x 3 RCB Culvert	At Loose Road

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Brooks Channel	Zone A	Zone A	Yes	Yes
	Zone A	Contained	None	None

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State law have been received. State, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional information about the NFIP is available on the FEMA website at <http://www.fema.gov/nfip>.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

To determine the changes in flood hazards that will be caused by the proposed project, we compared the hydraulic modeling reflecting the proposed project (referred to as the proposed conditions model) to the hydraulic modeling reflecting the existing conditions.

The table below shows the changes in the base flood water-surface elevations (WSELs).

Base Flood WSEL Comparison Table

Flooding Source: Unnamed Flooding Along Brooks Channel		Base Flood WSEL Change (feet)	Location of maximum change
Proposed vs. Existing	Maximum increase	None	
	Maximum decrease	11.2	approximately 440 feet downstream of Losee Road

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional information about the NFIP is available on the FEMA website at <http://www.fema.gov/nfip>.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

DATA REQUIRED FOR FOLLOW-UP LOMR

Upon completion of the project, your community must submit the data listed below and request that we make a final determination on revising the effective FIRM. If the project is built as proposed and the data below are received, a revision to the FIRM would be warranted.

- Form 1, entitled "Overview & Concurrence Form". Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1 must be included.
- Form 2, entitled "Riverine Hydrology & Hydraulics Form"
- Form 3, entitled "Riverine Structures Form"
- As-built plans, certified by a registered professional engineer, of all proposed project elements
- Hydraulic analyses, for as-built conditions, of the base (1-percent-annual-chance) flood, together with a topographic work map showing the revised floodplain boundary delineations. Please ensure that the revised information ties into the currently effective information at the downstream and upstream ends of the revised reach.
- An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised floodplain and floodway boundary delineations shown on the submitted work map and how they tie into the floodplain and floodway boundary delineations shown on the current effective FIRM at the downstream and upstream ends of the revised reach.
- Documentation of the notification to property owners who will be affected by any widening/shifting of the base floodplain and/or any BFE increases along Brooks Channel.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on the FEMA website at <http://www.fema.gov/nfip>.

A handwritten signature in black ink, appearing to read "Rick F. Sacibit".

Patrick "Rick" F. Sacibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

• FEMA's fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps may be accessed at <https://www.fema.gov/forms-documents-and-software/flood-map-related-fees>. The fee at the time of the map revision submittal must be received before we can begin processing the request. Payment of this fee can be made through a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). Please forward the payment, along with the revision application, to the following address:

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM. Because the flood hazard information (i.e., base flood elevations, base flood depths, SFHAs, zone designations, and/or regulatory floodways) will change as a result of the project, a 90-day appeal period will be initiated for the revision, during which community officials and interested persons may appeal the revised flood hazard information based on scientific or technical data.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional information about the NFIP is available on the FEMA website at <http://www.fema.gov/nfip>.

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Engineering Services Branch
Federal Insurance and Mitigation Administration



Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

COMMUNITY REMINDERS

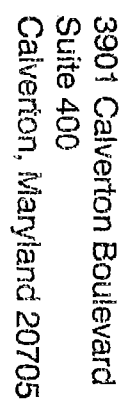
We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jeffrey D. Lusk
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

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Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration



U.S. Department of Homeland Security
500 C Street, SW
Washington, DC 20472 - _____

Mr. Raul Valdez, P.E., C.F.M
MWH Americas, Inc.
3010 West Charleston Boulevard
Las Vegas, NV 89102

FEMA LA-1

Appendix C

Hydraulic Analyses and Calculations

Appendix C-1

Existing Condition HEC-RAS Analysis

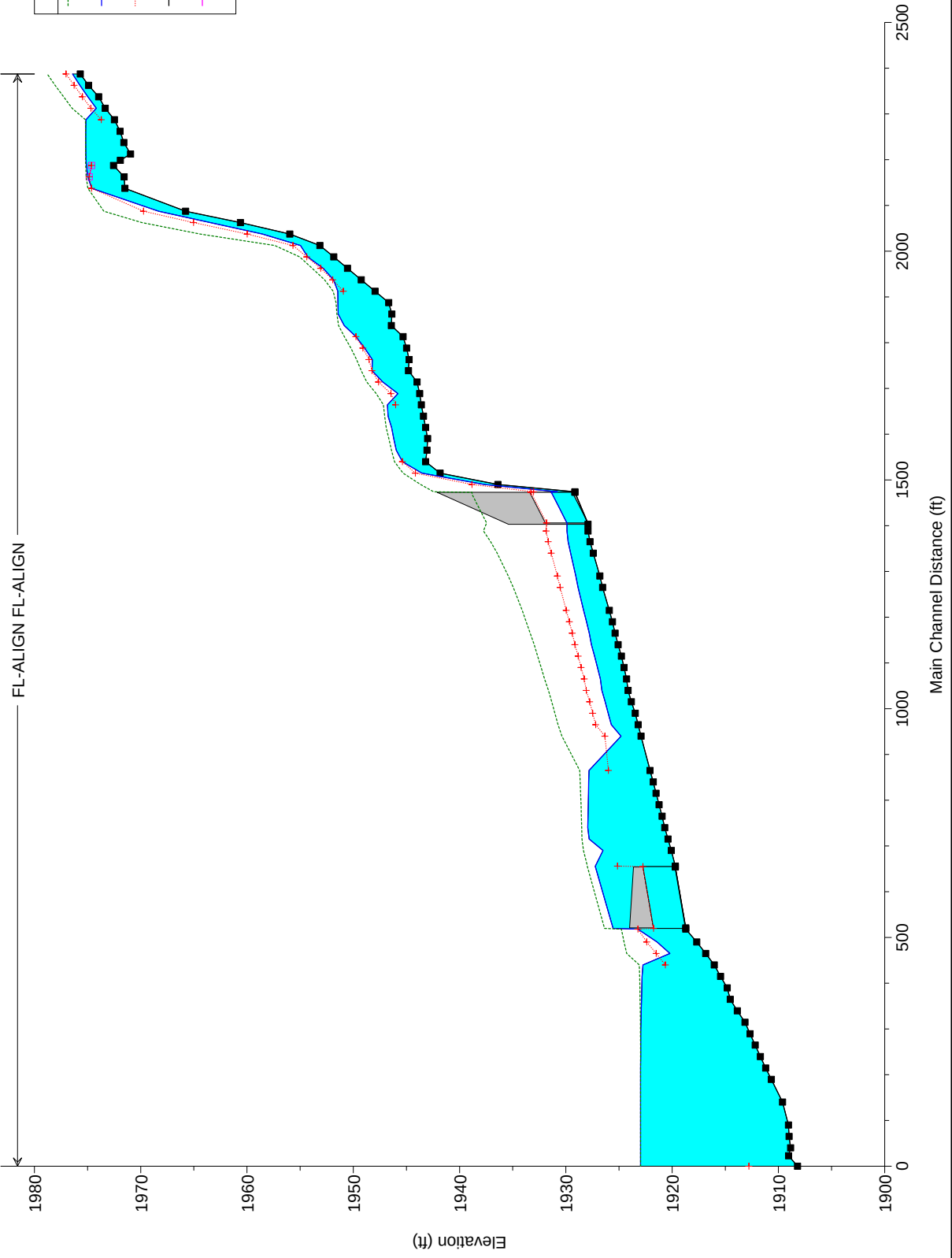
HEC-RAS Plan: Plan 01 River: FL-ALIGN Reach: FL-ALIGN Profile: PF 1

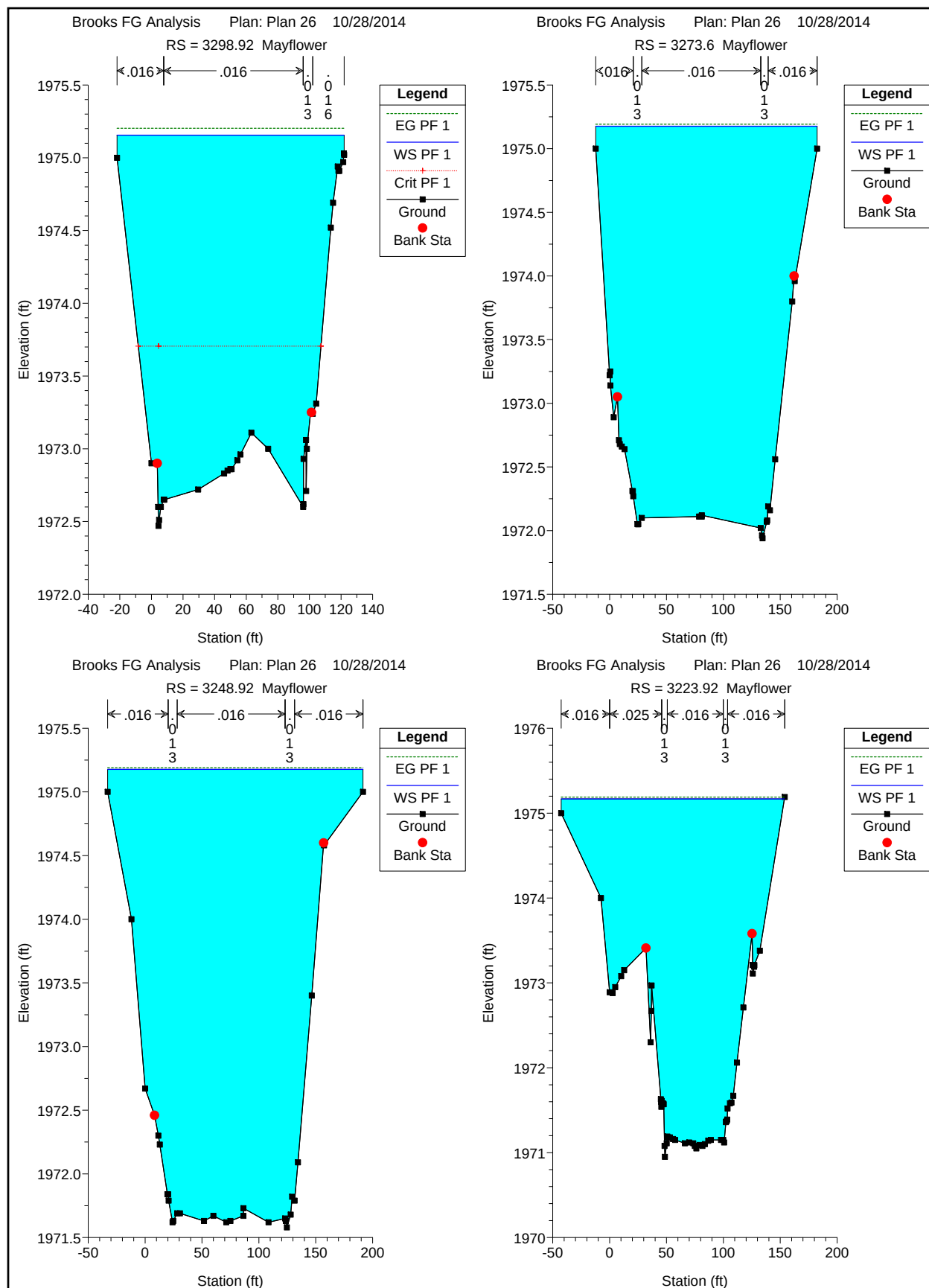
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FL-ALIGN	3398.92	PF 1	480.00	1975.69	1976.41	1977.03	1978.80	0.028585	12.44	38.93	59.32	2.66
FL-ALIGN	3373.92	PF 1	480.00	1974.90	1975.72	1976.27	1978.06	0.029391	12.63	41.15	85.14	2.71
FL-ALIGN	3348.92	PF 1	480.00	1973.95	1974.98	1975.49	1977.25	0.034080	12.63	42.16	91.01	2.79
FL-ALIGN	3323.92	PF 1	480.00	1973.34	1974.18	1974.69	1976.45	0.030062	12.16	40.07	68.65	2.72
FL-ALIGN	3298.92	PF 1	480.00	1972.47	1975.16	1973.71	1975.20	0.000125	1.83	281.40	143.74	0.21
FL-ALIGN	3273.6	PF 1	480.00	1971.94	1975.18		1975.19	0.000027	1.01	494.72	194.57	0.10
FL-ALIGN	3248.92	PF 1	480.00	1971.58	1975.18		1975.19	0.000019	0.93	550.02	224.41	0.09
FL-ALIGN	3223.92	PF 1	480.00	1970.95	1975.17		1975.19	0.000033	1.24	462.80	196.23	0.12
FL-ALIGN	3210.22	PF 1	480.00	1971.92	1975.14		1975.19	0.000458	1.51	296.36	214.14	0.19
FL-ALIGN	3198.92	PF 1	480.00	1972.55	1975.10	1974.63	1975.18	0.000941	1.44	234.77	216.72	0.23
FL-ALIGN	3173.92	PF 1	480.00	1971.56	1974.98	1974.84	1975.13	0.003499	2.92	155.91	151.31	0.46
FL-ALIGN	3148.92	PF 1	480.00	1971.49	1974.62	1974.62	1974.98	0.008281	5.37	106.68	164.78	0.73
FL-ALIGN	3098.95	PF 1	480.00	1965.77	1968.32	1969.74	1973.47	0.128374	18.21	26.36	19.38	2.75
FL-ALIGN	3073.97	PF 1	480.00	1960.62	1963.45	1965.02	1969.89	0.149362	20.36	23.58	16.05	2.96
FL-ALIGN	3048.96	PF 1	480.00	1955.97	1958.55	1959.97	1964.42	0.323881	19.44	24.70	19.36	3.03
FL-ALIGN	3023.98	PF 1	480.00	1953.14	1954.97	1955.68	1957.39	0.184945	12.48	38.46	39.63	2.23
FL-ALIGN	2998.98	PF 1	480.00	1951.84	1954.29	1954.37	1955.05	0.039488	7.01	68.43	52.55	1.08
FL-ALIGN	2973.99	PF 1	480.00	1950.54	1952.83	1953.07	1953.87	0.054517	8.16	58.83	45.82	1.27
FL-ALIGN	2948.99	PF 1	480.00	1949.25	1951.86	1951.93	1952.70	0.036745	7.35	65.27	44.11	1.07
FL-ALIGN	2923.99	PF 1	480.00	1947.95	1951.45	1950.94	1951.89	0.015012	5.33	90.14	50.40	0.70
FL-ALIGN	2898.97	PF 1	480.00	1946.67	1951.45		1951.62	0.004589	3.28	146.27	69.38	0.40
FL-ALIGN	2874.04	PF 1	480.00	1946.37	1951.42		1951.54	0.001882	2.51	174.46	93.22	0.26
FL-ALIGN	2849.1	PF 1	480.00	1946.42	1950.85		1951.38	0.013690	5.85	82.02	35.99	0.68
FL-ALIGN	2824.82	PF 1	480.00	1945.32	1949.75	1949.75	1950.84	0.032801	8.38	57.31	27.03	1.01
FL-ALIGN	2799.78	PF 1	480.00	1944.99	1948.93	1949.10	1950.22	0.018400	9.12	52.64	24.65	1.10
FL-ALIGN	2774.63	PF 1	480.00	1944.75	1948.21	1948.51	1949.70	0.022339	9.76	49.16	24.15	1.21
FL-ALIGN	2750.44	PF 1	480.00	1944.81	1948.23	1948.24	1949.25	0.015174	8.11	59.19	29.48	1.01
FL-ALIGN	2725.42	PF 1	480.00	1944.00	1947.23	1947.62	1948.73	0.025155	9.82	48.86	26.75	1.28
FL-ALIGN	2700.17	PF 1	480.00	1943.75	1945.80	1946.45	1947.84	0.044932	11.47	41.86	28.58	1.67
FL-ALIGN	2675.8	PF 1	480.00	1943.60	1946.78	1946.01	1947.17	0.004877	4.99	96.22	43.34	0.59
FL-ALIGN	2650.79	PF 1	480.00	1943.40	1946.73		1947.04	0.003645	4.49	106.94	45.35	0.52
FL-ALIGN	2626.19	PF 1	480.00	1943.20	1946.40		1946.90	0.006898	5.69	84.34	40.33	0.69
FL-ALIGN	2601.78	PF 1	480.00	1943.00	1946.20		1946.66	0.013973	5.46	87.88	44.58	0.69
FL-ALIGN	2576.59	PF 1	480.00	1943.06	1945.95		1946.41	0.007211	5.43	88.36	47.17	0.70
FL-ALIGN	2551.36	PF 1	480.00	1943.20	1945.38	1945.38	1946.12	0.016168	6.91	69.49	47.67	1.01
FL-ALIGN	2526.44	PF 1	480.00	1941.83	1943.55	1944.15	1945.32	0.061139	10.66	45.05	43.82	1.85
FL-ALIGN	2501.48	PF 1	480.00	1936.39	1937.68	1938.84	1943.67	0.040256	19.65	24.43	30.50	3.87
FL-ALIGN	2485.61	PF 1	521.00	1929.15	1930.78	1933.03	1942.44	0.041980	27.40	19.01	12.44	3.91
FL-ALIGN	2484.00		Culvert									
FL-ALIGN	2399.9	PF 1	525.00	1927.92	1929.90	1931.85	1937.76	0.023409	22.50	23.16	11.79	2.83
FL-ALIGN	2376.49	PF 1	525.00	1927.72	1929.79	1931.66	1937.08	0.020740	21.66	24.23	11.96	2.68
FL-ALIGN	2351.49	PF 1	525.00	1927.42	1929.55	1931.38	1936.47	0.018719	21.11	24.87	11.86	2.57
FL-ALIGN	2301.49	PF 1	525.00	1926.80	1929.06	1930.80	1935.42	0.016408	20.23	25.95	11.82	2.41
FL-ALIGN	2276.48	PF 1	525.00	1926.54	1928.85	1930.54	1934.94	0.015432	19.80	26.51	11.81	2.33
FL-ALIGN	2226.48	PF 1	525.00	1925.91	1928.33	1929.96	1934.10	0.014116	19.28	27.23	11.63	2.22
FL-ALIGN	2201.48	PF 1	525.00	1925.62	1928.06	1929.67	1933.73	0.013788	19.12	27.46	11.59	2.19
FL-ALIGN	2176.48	PF 1	525.00	1925.37	1927.80	1929.39	1933.36	0.013423	18.91	27.76	11.57	2.15
FL-ALIGN	2151.48	PF 1	525.00	1925.08	1927.59	1929.15	1932.97	0.012711	18.61	28.21	11.47	2.09
FL-ALIGN	2126.48	PF 1	525.00	1924.77	1927.29	1928.84	1932.66	0.012685	18.59	28.25	11.52	2.09
FL-ALIGN	2101.47	PF 1	525.00	1924.52	1927.03	1928.56	1932.33	0.012478	18.47	28.43	11.54	2.07
FL-ALIGN	2076.46	PF 1	525.00	1924.29	1926.75	1928.27	1932.01	0.012660	18.40	28.53	11.92	2.10
FL-ALIGN	2051.45	PF 1	525.00	1924.15	1926.61	1928.08	1931.63	0.011824	17.98	29.19	11.88	2.02
FL-ALIGN	2026.52	PF 1	525.00	1923.84	1926.31	1927.77	1931.33	0.011856	17.99	29.19	11.99	2.03
FL-ALIGN	2001.52	PF 1	525.00	1923.47	1926.01	1927.47	1931.03	0.011787	17.98	29.20	11.88	2.02
FL-ALIGN	1976.52	PF 1	525.00	1923.20	1925.73	1927.19	1930.74	0.011774	17.97	29.22	11.92	2.02
FL-ALIGN	1951.52	PF 1	525.00	1922.92	1924.81	1926.33	1930.36	0.014085	18.91	27.77	23.68	2.46
FL-ALIGN	1876.56	PF 1	525.00	1922.08	1927.82	1925.99	1928.70	0.000936	7.57	70.79	13.83	0.56
FL-ALIGN	1851.56	PF 1	525.00	1921.78	1927.86		1928.65	0.000798	7.16	75.23	14.30	0.51
FL-ALIGN	1826.56	PF 1	525.00	1921.52	1927.87		1928.61	0.001137	6.94	77.53	13.59	0.49
FL-ALIGN	1801.56	PF 1	525.00	1921.23	1927.89		1928.57	0.000648	6.63	81.11	13.32	0.45
FL-ALIGN	1776.56	PF 1	525.00	1920.94	1927.91		1928.54	0.000582	6.36	84.58	13.25	0.43
FL-ALIGN	1751.58	PF 1	525.00	1920.70	1927.94		1928.51	0.000522	6.10	87.73	13.20	0.40
FL-ALIGN	1726.57	PF 1	525.00	1920.39	1927.80		1928.49	0.000679	6.67	82.70	12.95	0.43
FL-ALIGN	1701.57	PF 1	652.00	1920.08	1926.51		1928.34	0.002459	10.94	62.84	11.46	0.77
FL-ALIGN	1667.4	PF 1	652.00	1919.70	1927.22	1925.15	1927.97	0.000771	7.30	100.32	18.95	0.47
FL-ALIGN	1660		Culvert									
FL-ALIGN	1529.8	PF 1	820.00	1918.72	1923.23	1923.23	1924.77	0.001908	9.97	82.26	26.80	1.00
FL-ALIGN	1501.53	PF 1	820.00	1917.68	1921.42	1922.40	1924.53	0.005062	14.16	57.91	23.56	1.59
FL-ALIGN	1476.5	PF 1	820.00	1916.84	1920.21	1921.50	1924.28	0.007241	16.19	50.64	22.03	1.88
FL-ALIGN	1451.37	PF 1	820.00	1916.04	1922.75	1920.63	1923.09	0.000274	4.99	199.31	92.88	0.41
FL-ALIGN	1426.37	PF 1	820.00	1915.44	1922.82		1923.05	0.000162	4.12	251.57	108.27	0.32
FL-ALIGN	1401.35	PF 1	820.00	1914.82	1922.86		1923.03	0.000104	3.61	288.20	101.88	0.26
FL-ALIGN	1376.2	PF 1	820.00	1914.53	1922.87		1923.02	0.000089	3.57	312.88	111.67	0.24
FL-ALIGN	1351.17	PF 1	820.00	1913.87	1922.92		1923.00	0.000043	2.64	427.79	129.23	0.17
FL-ALIGN	1326.16	PF 1	820.00	1913.15	1922.94		1922.99	0.000027	2.17	526.80	149.75	0.14

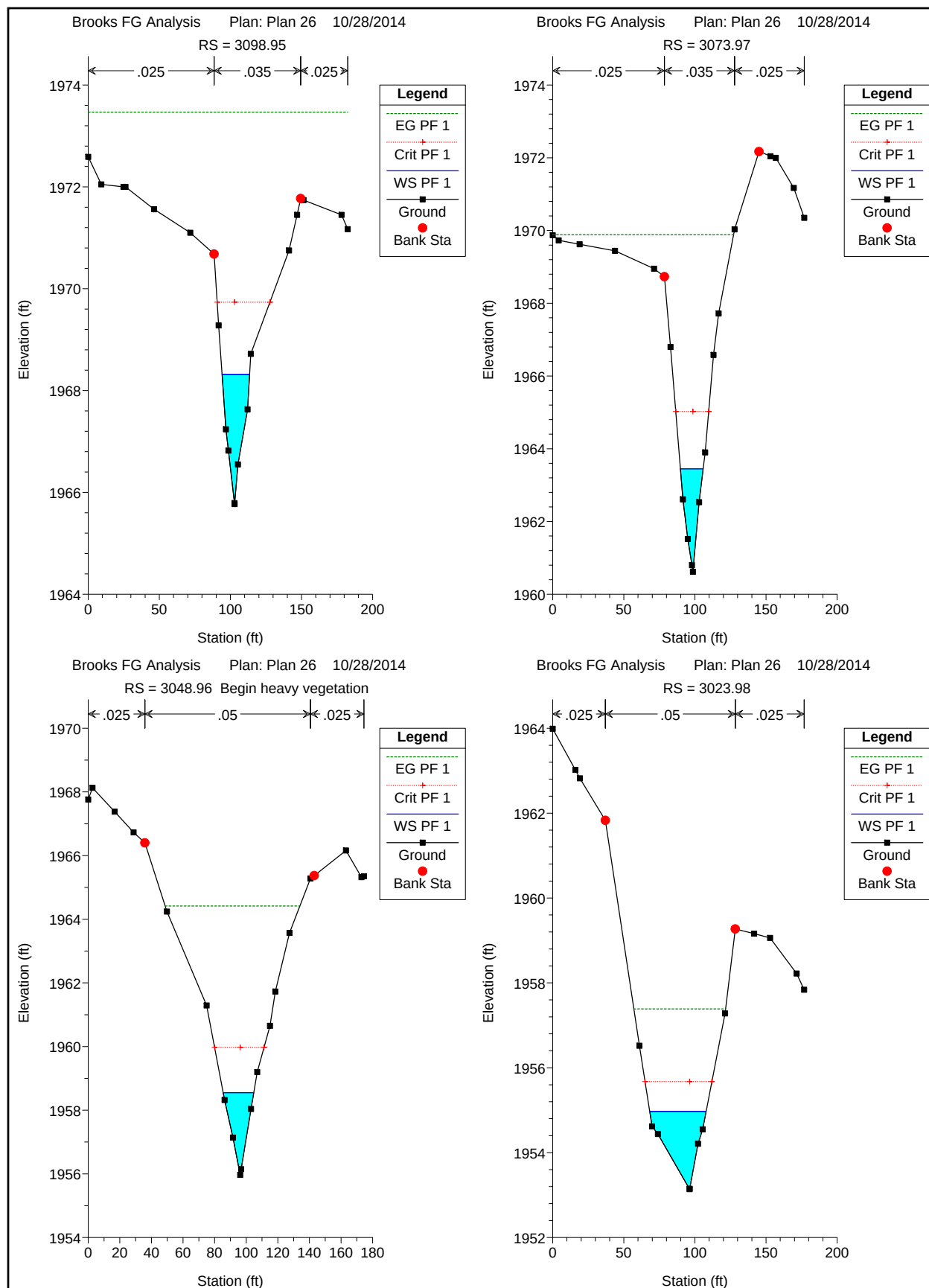
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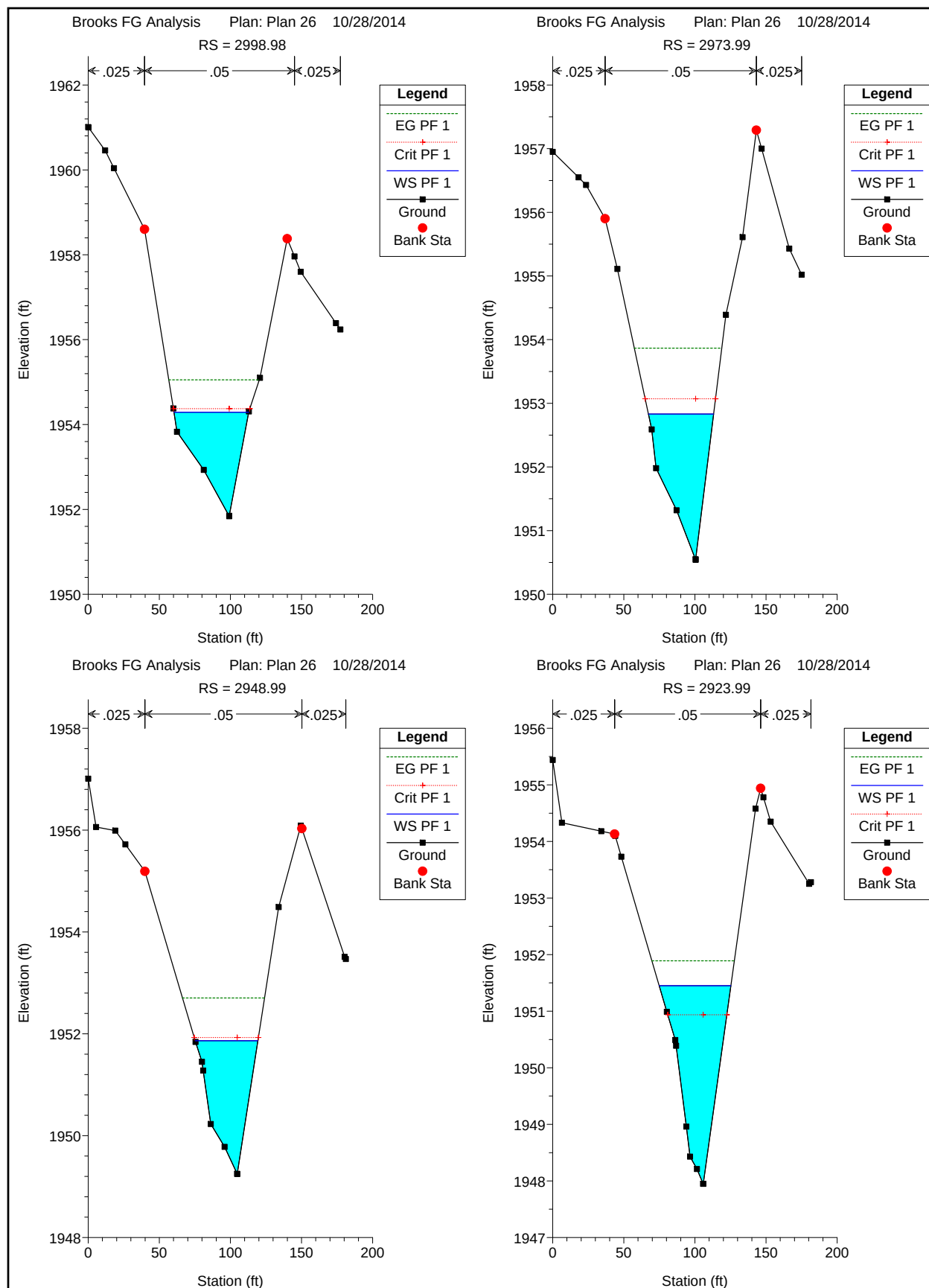
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FL-ALIGN	1301.14	PF 1	820.00	1912.67	1922.95		1922.98	0.000016	1.76	712.32	222.68	0.11
FL-ALIGN	1276.14	PF 1	820.00	1912.19	1922.96		1922.98	0.000009	1.36	911.23	241.54	0.08
FL-ALIGN	1251.15	PF 1	820.00	1911.70	1922.97		1922.98	0.000005	1.09	1121.74	263.09	0.06
FL-ALIGN	1226.18	PF 1	820.00	1911.20	1922.97		1922.98	0.000003	0.93	1320.40	290.16	0.05
FL-ALIGN	1201.34	PF 1	820.00	1910.67	1922.97		1922.98	0.000003	0.90	1439.65	338.52	0.05
FL-ALIGN	1151.6	PF 1	869.00	1909.61	1922.97		1922.97	0.000002	0.63	2077.55	474.63	0.04
FL-ALIGN	1101.71	PF 1	869.00	1909.06	1922.97		1922.97	0.000003	0.79	2341.58	449.50	0.05
FL-ALIGN	1076.62	PF 1	869.00	1909.00	1922.97		1922.97	0.000003	0.78	2298.58	413.95	0.05
FL-ALIGN	1051.67	PF 1	869.00	1908.86	1922.97		1922.97	0.000004	0.47	2764.91	718.70	0.03
FL-ALIGN	1034.38	PF 1	869.00	1909.04	1922.97		1922.97	0.000005	0.52	2601.32	657.52	0.03
FL-ALIGN	1011.5	PF 1	869.00	1908.20	1922.97	1912.78	1922.97	0.000003	0.47	3252.57	1031.58	0.02

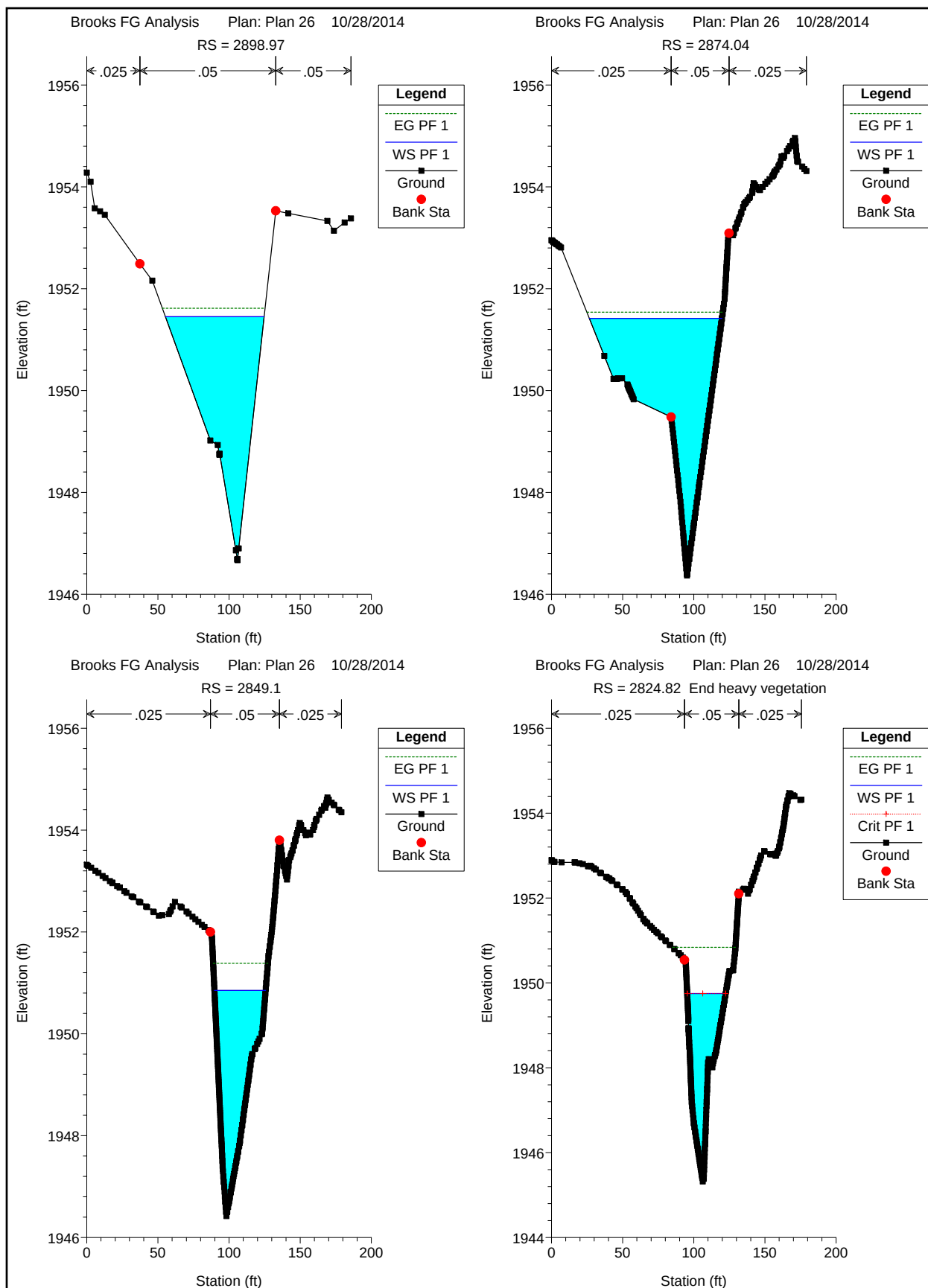
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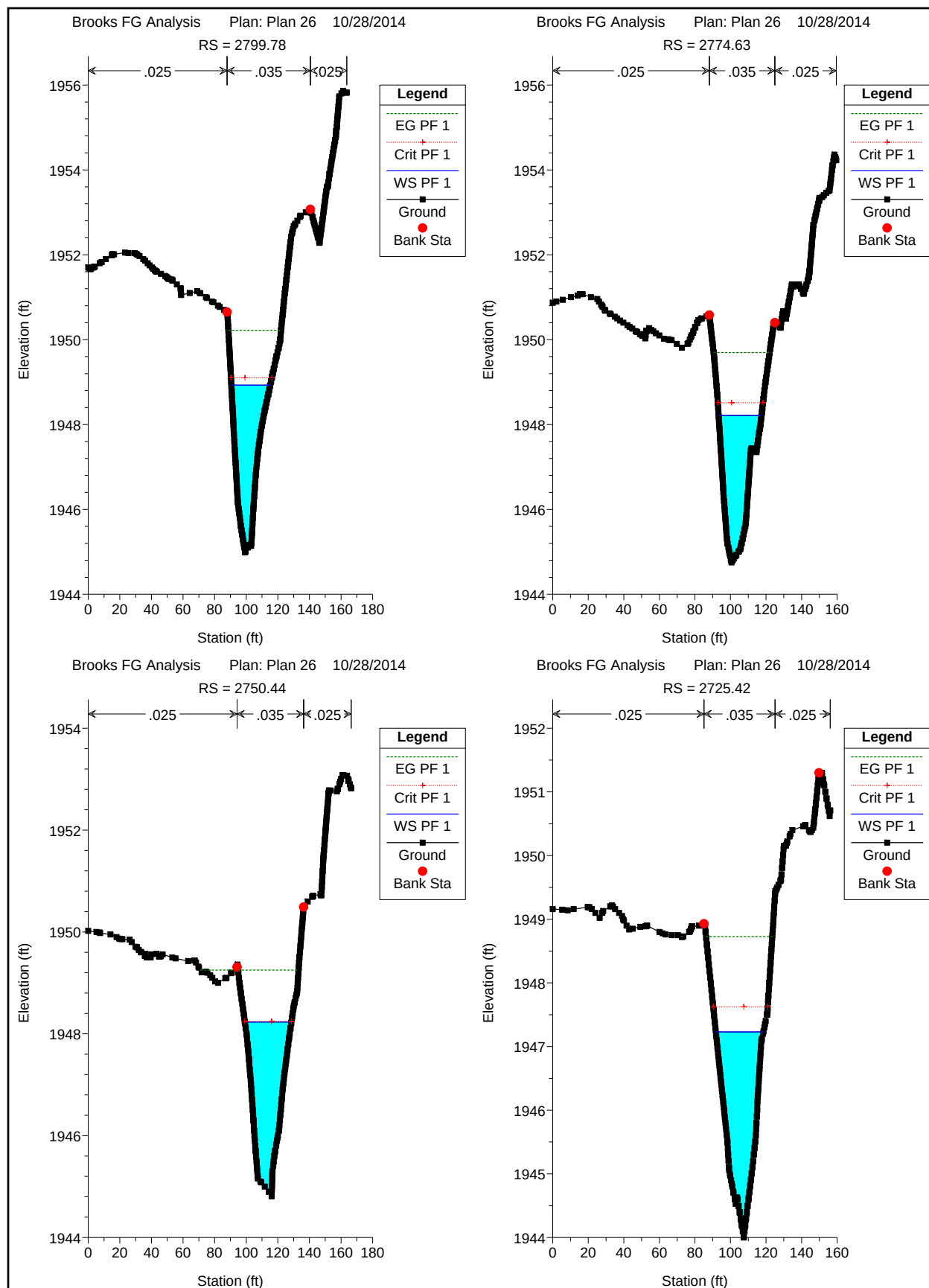


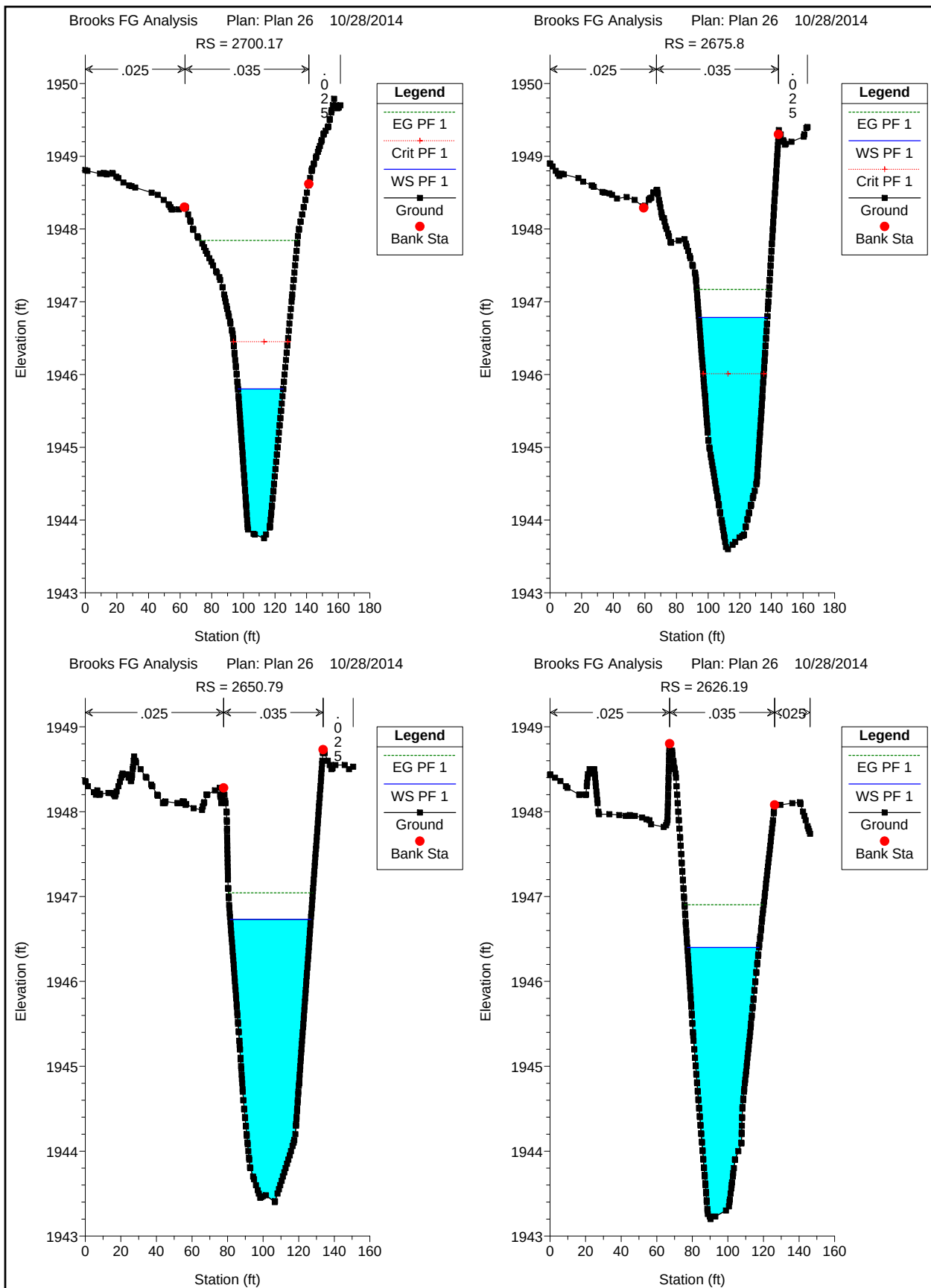


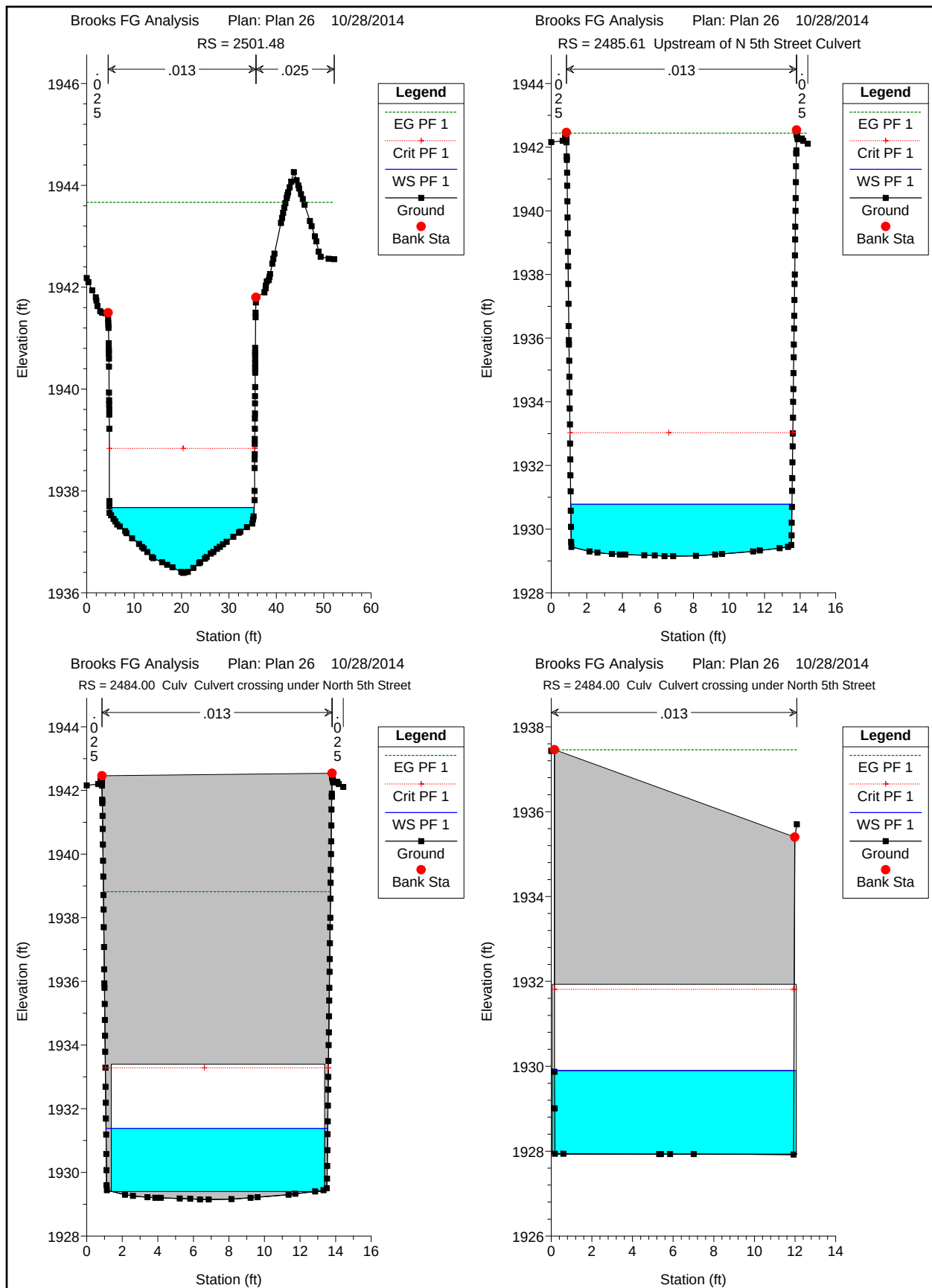


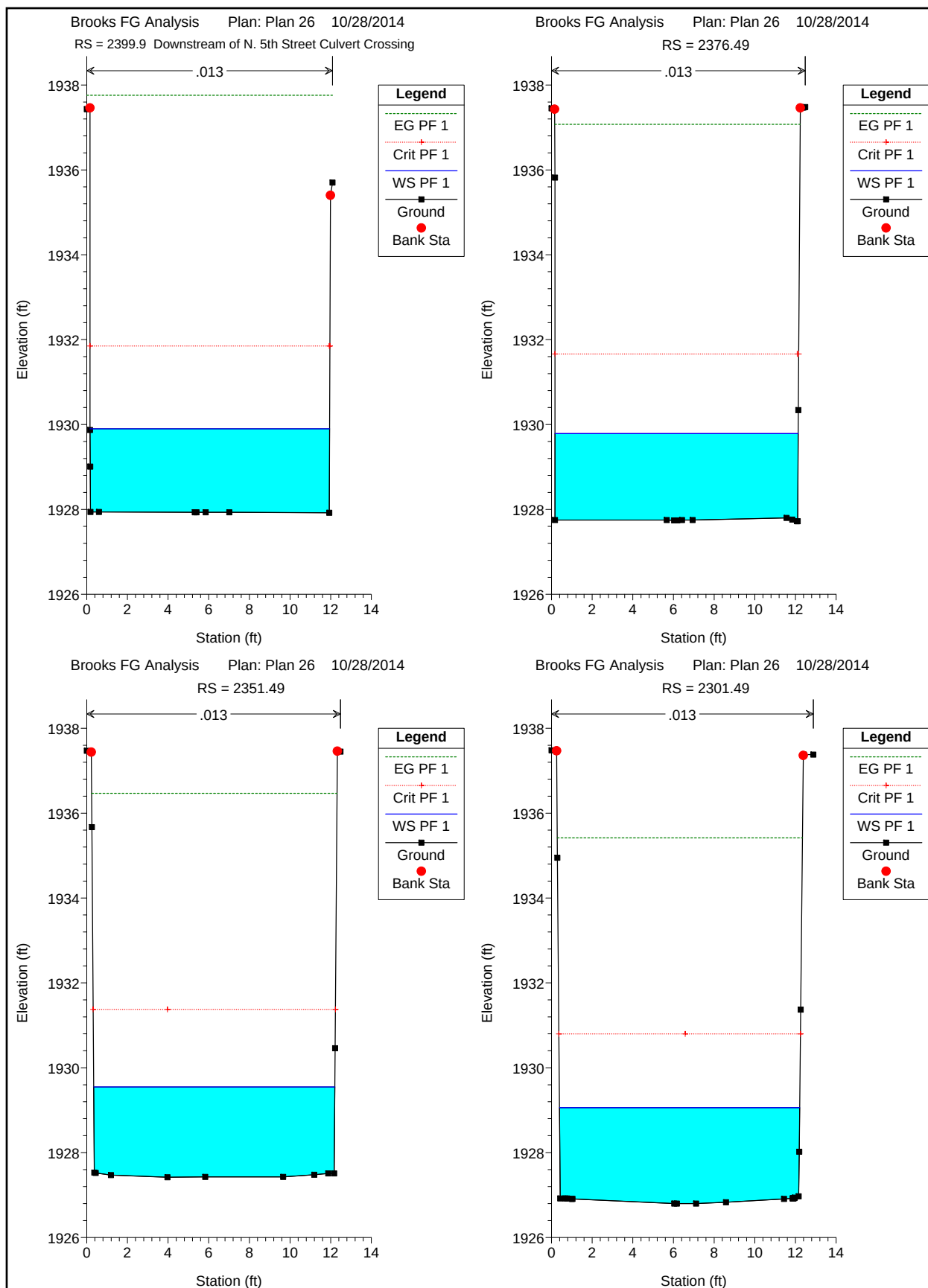


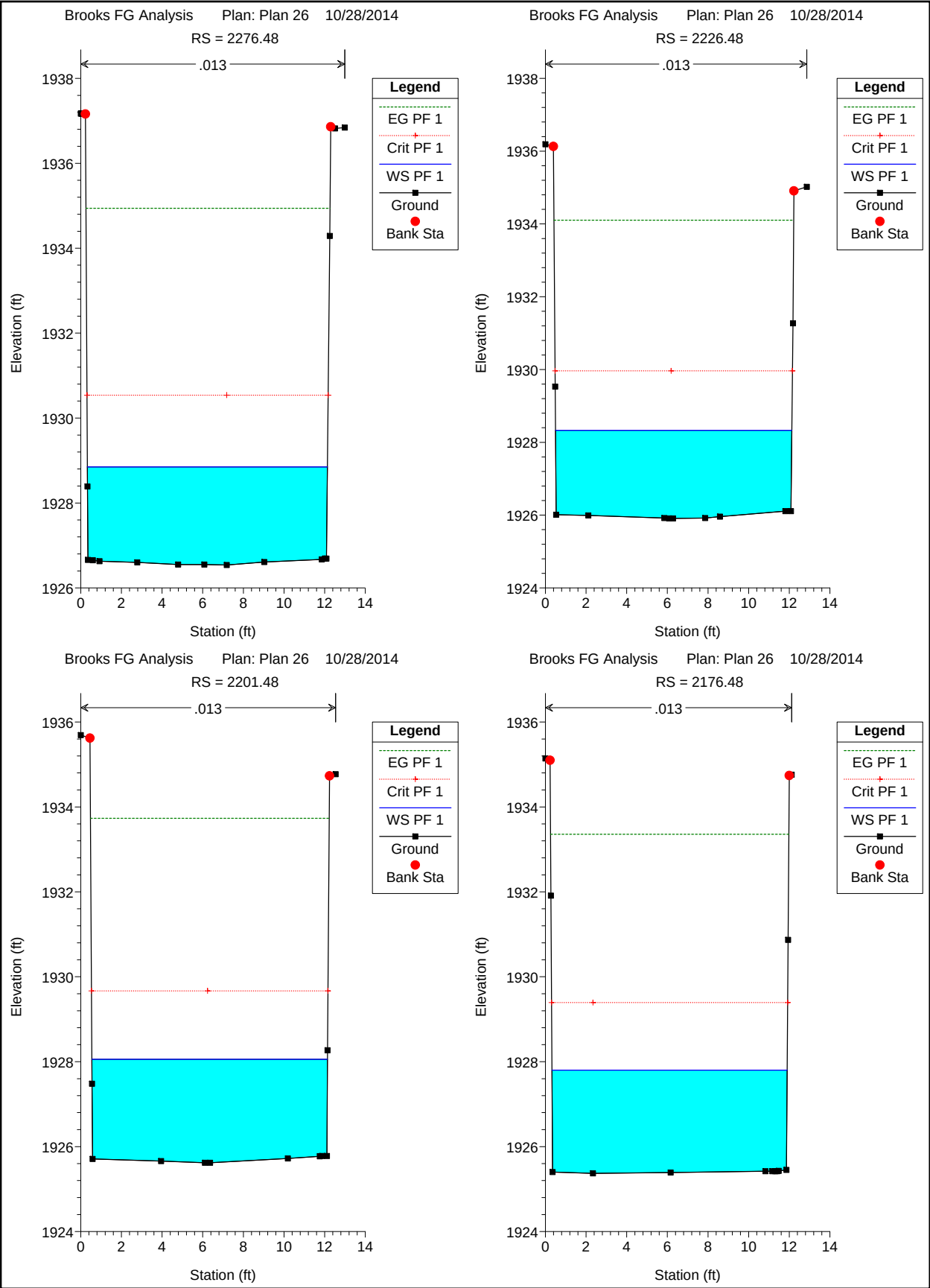


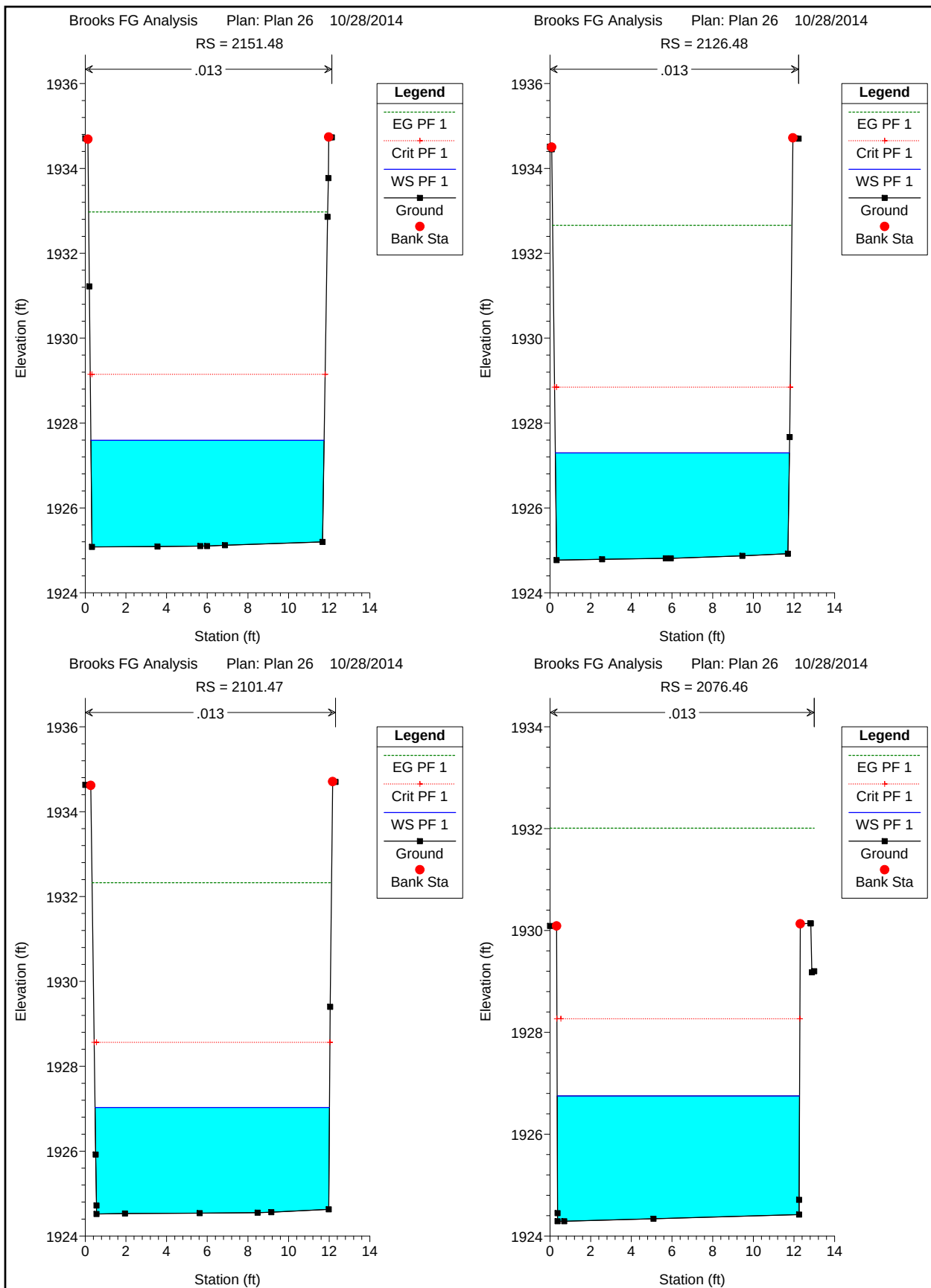


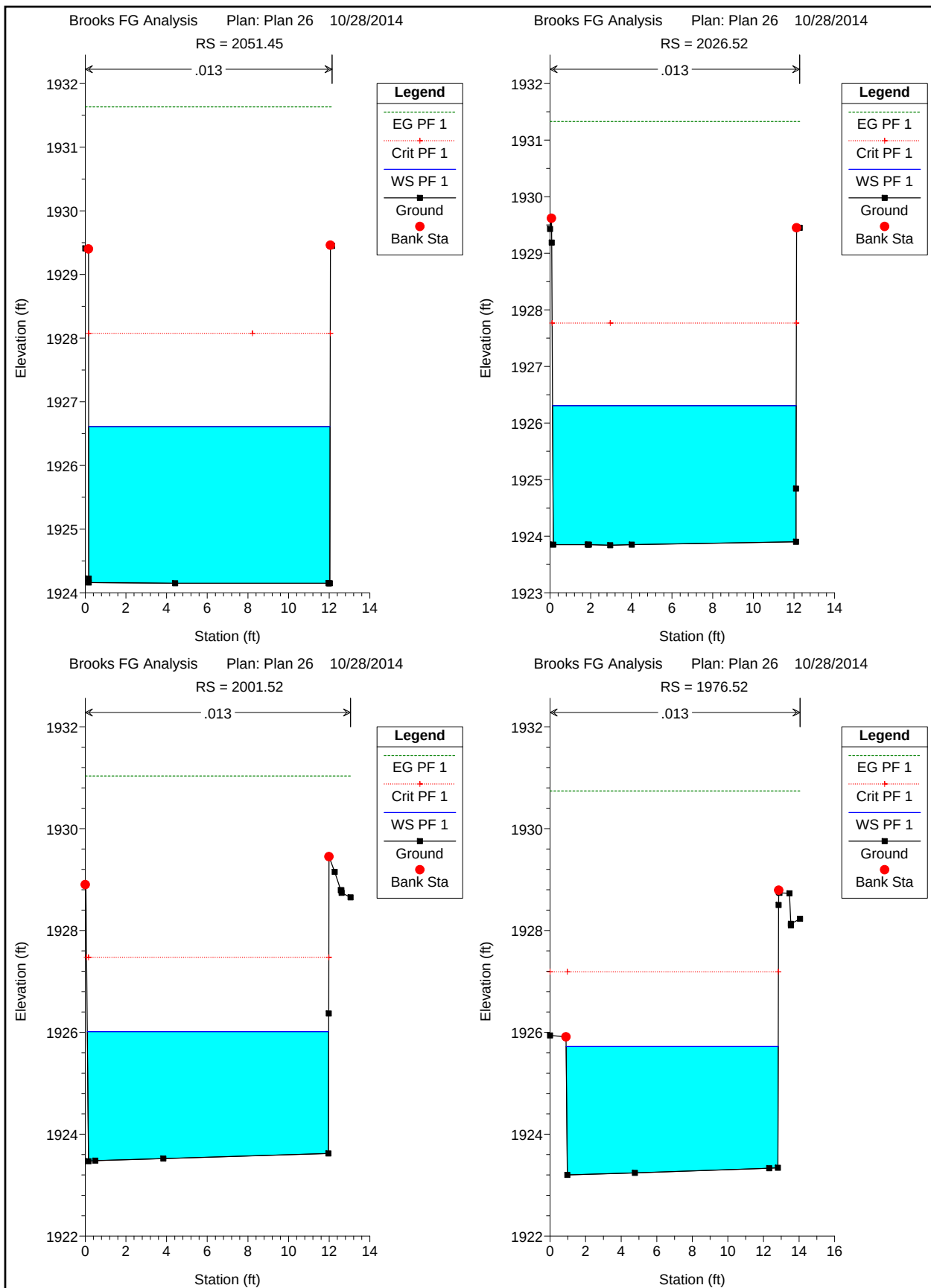


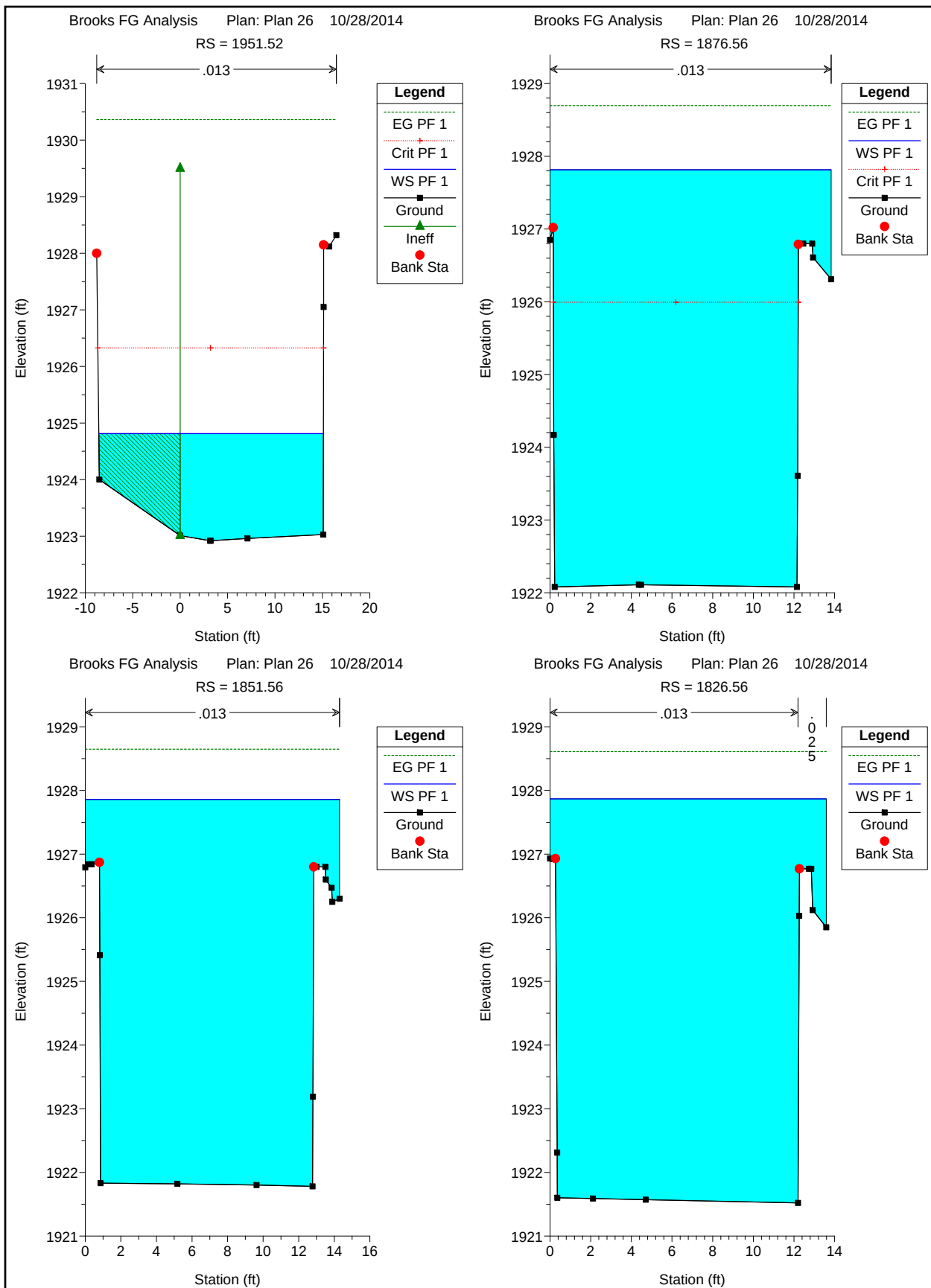


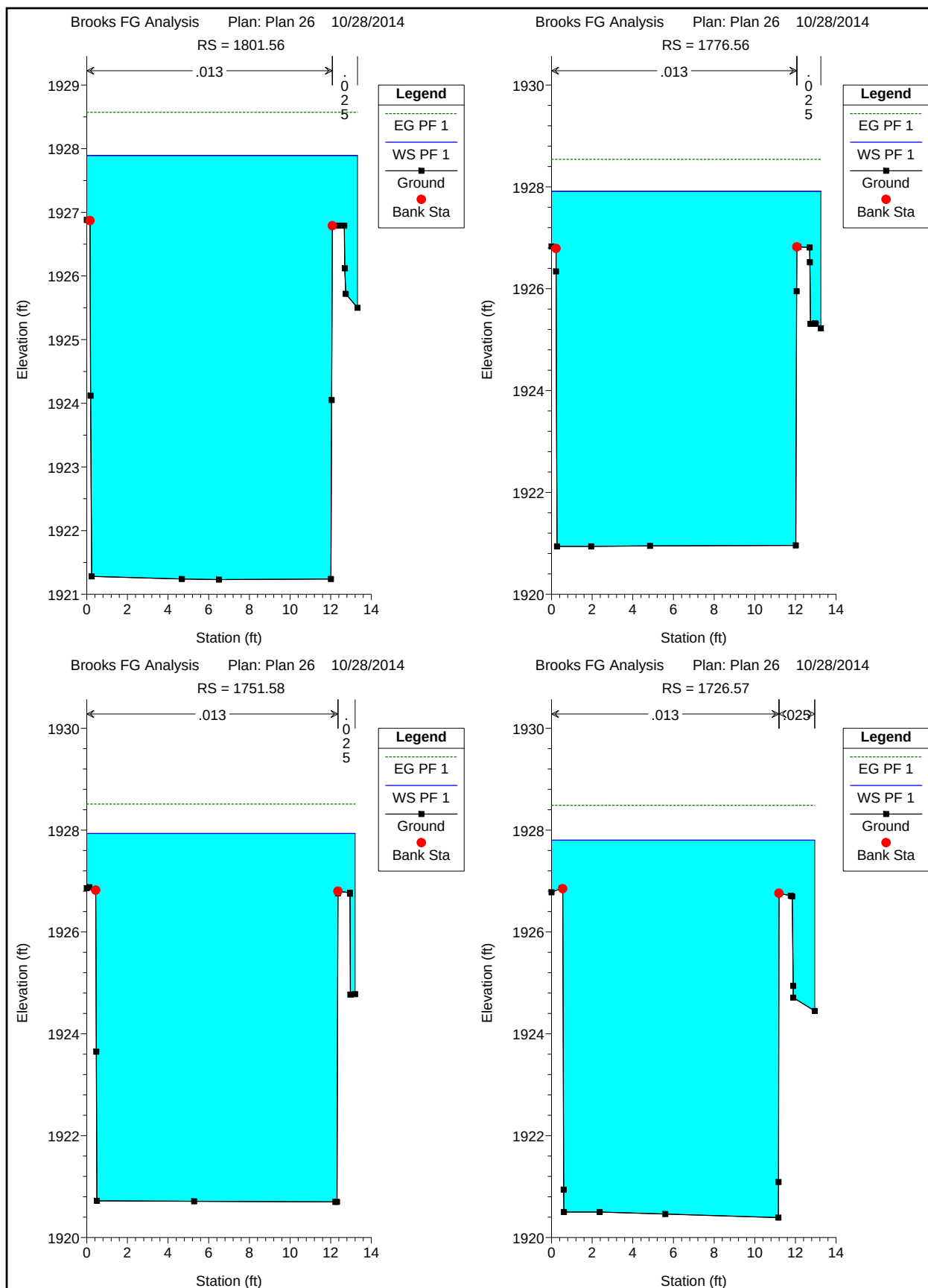


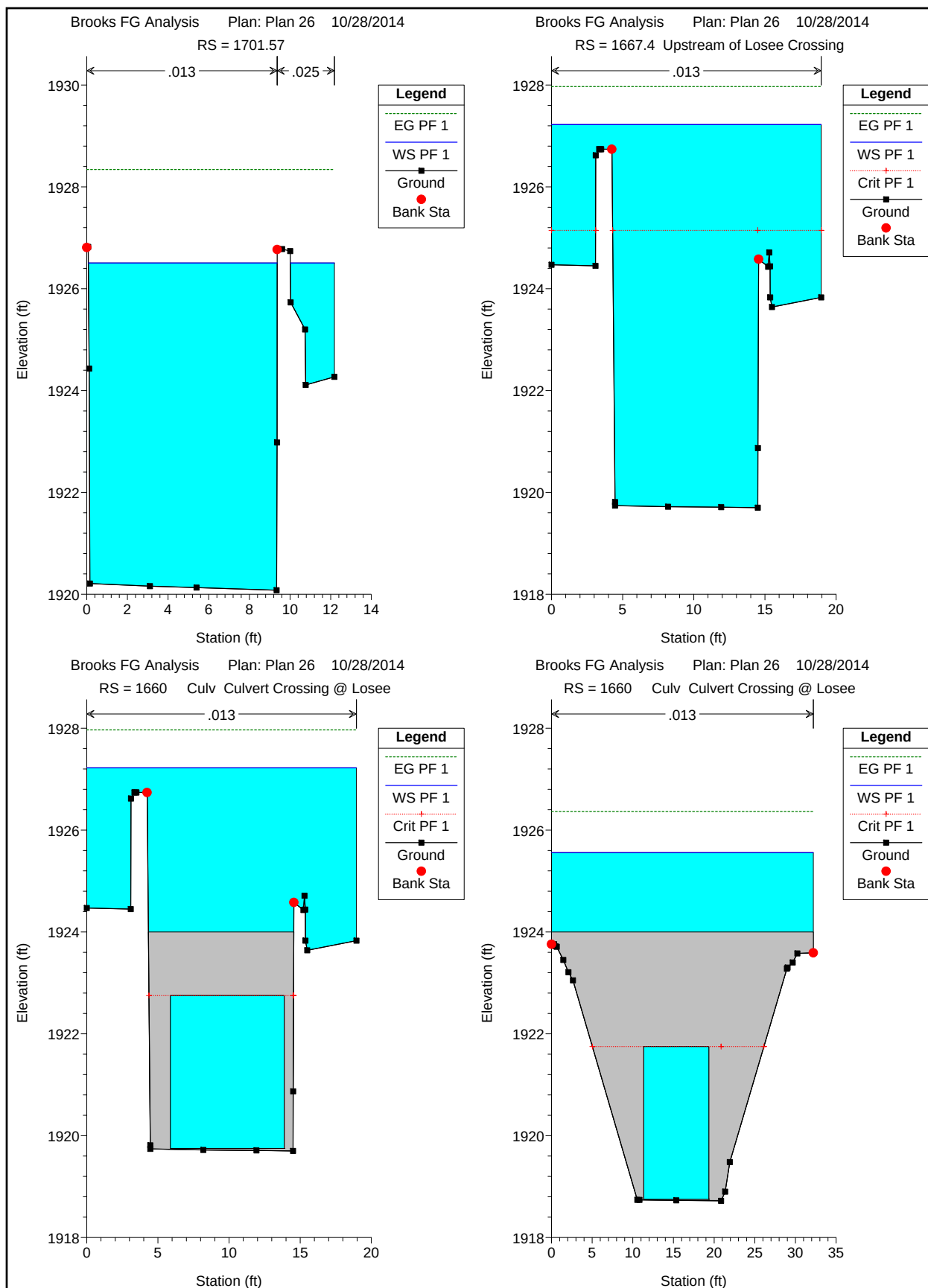


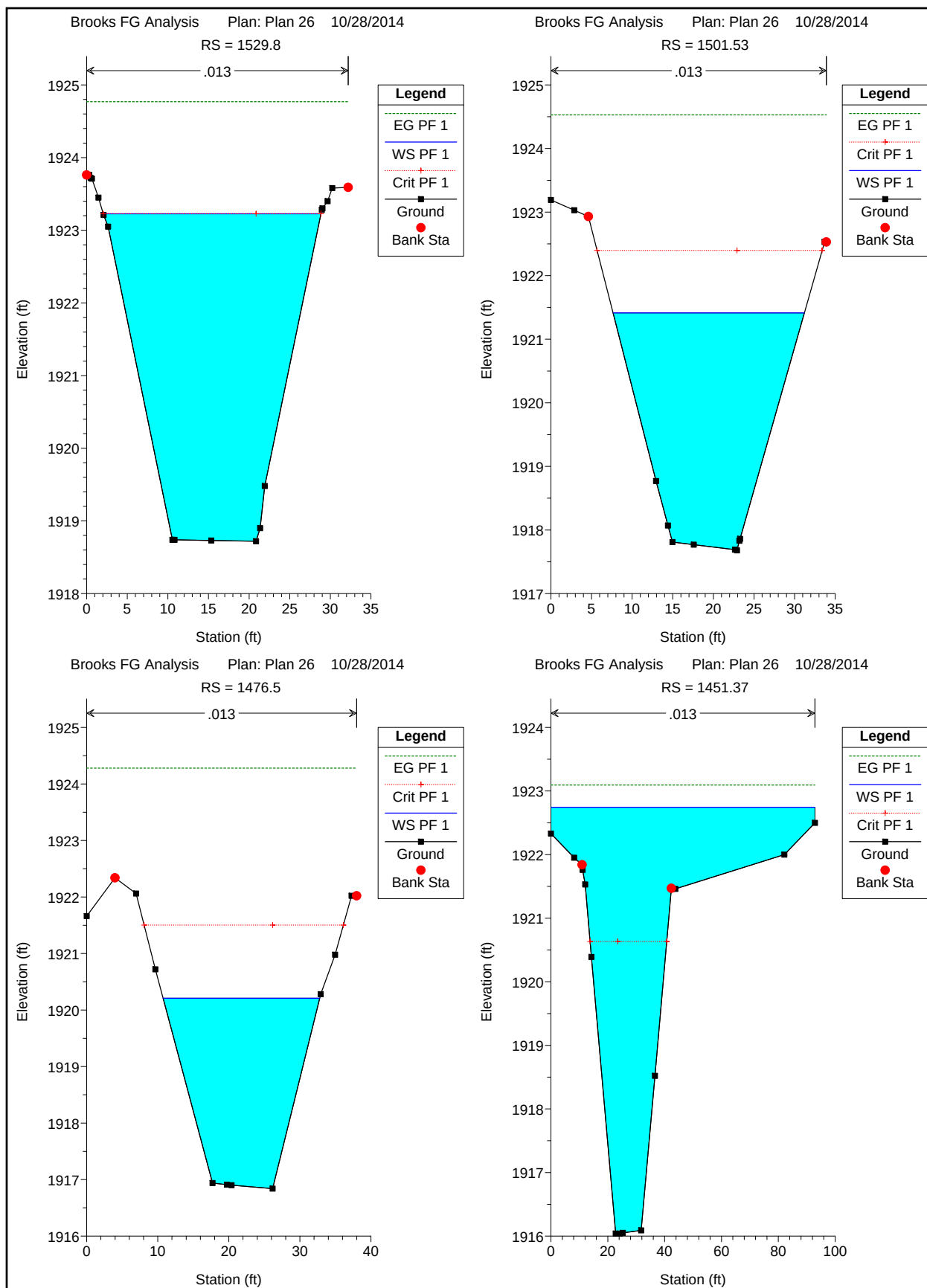


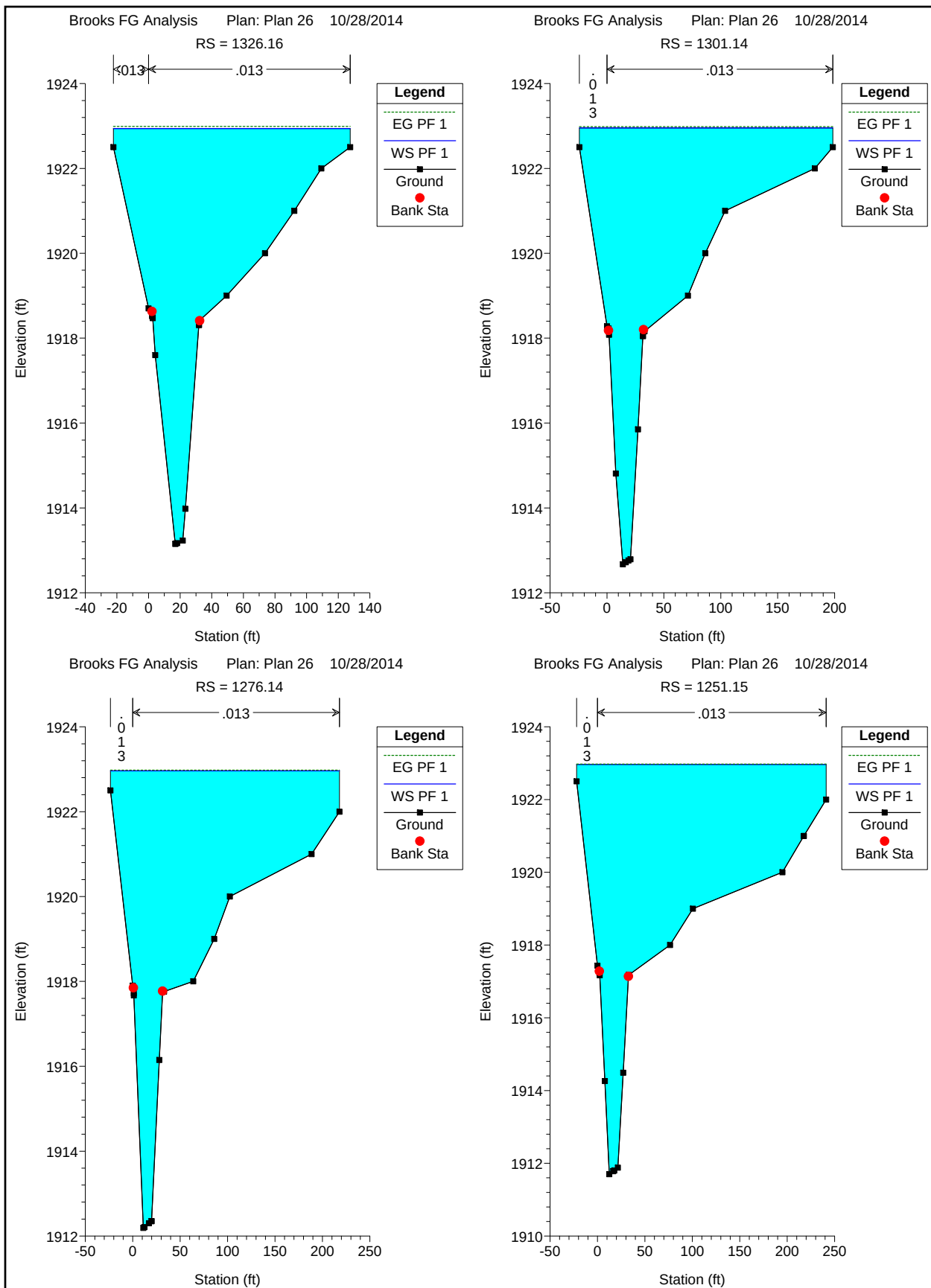


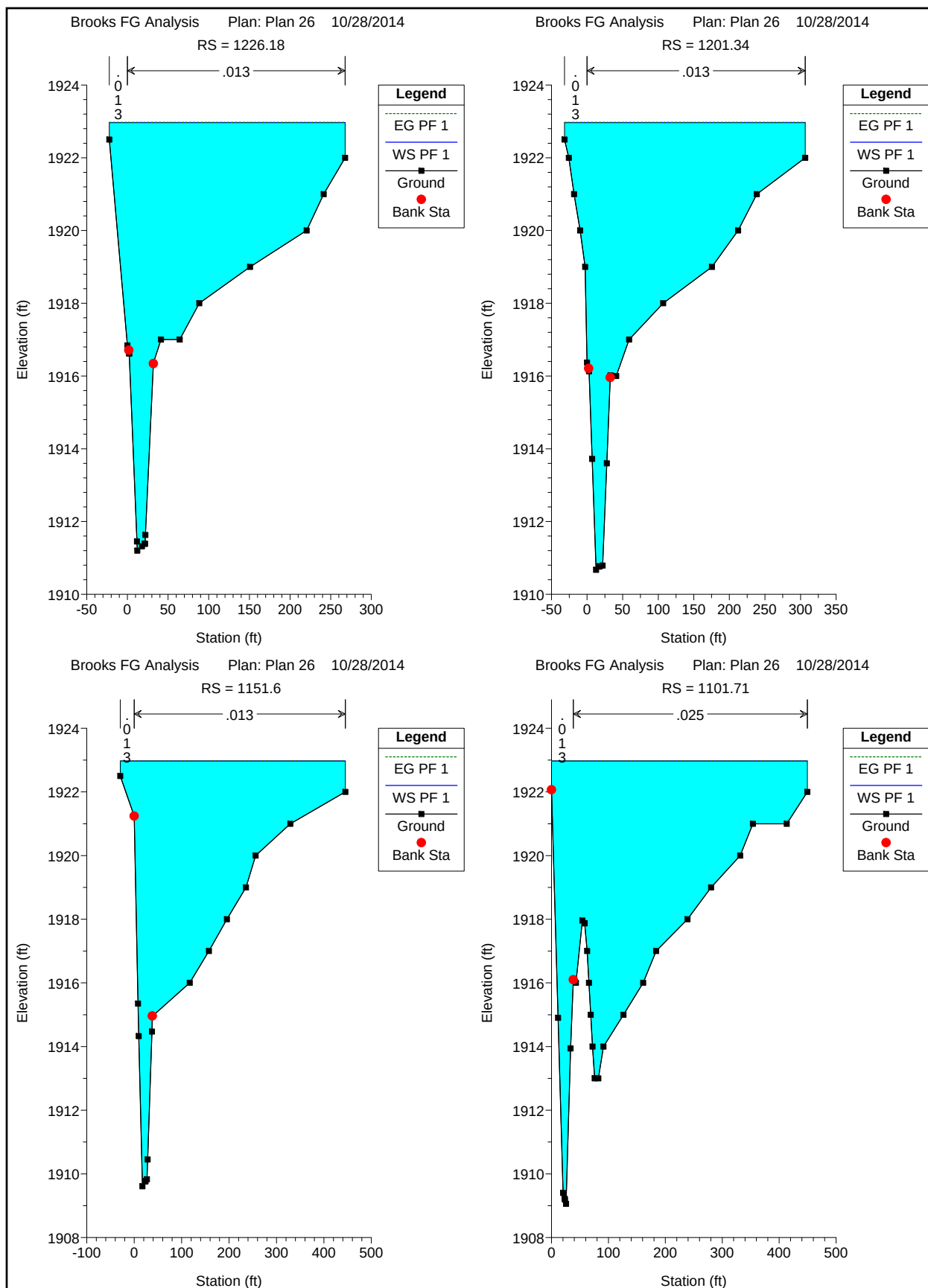


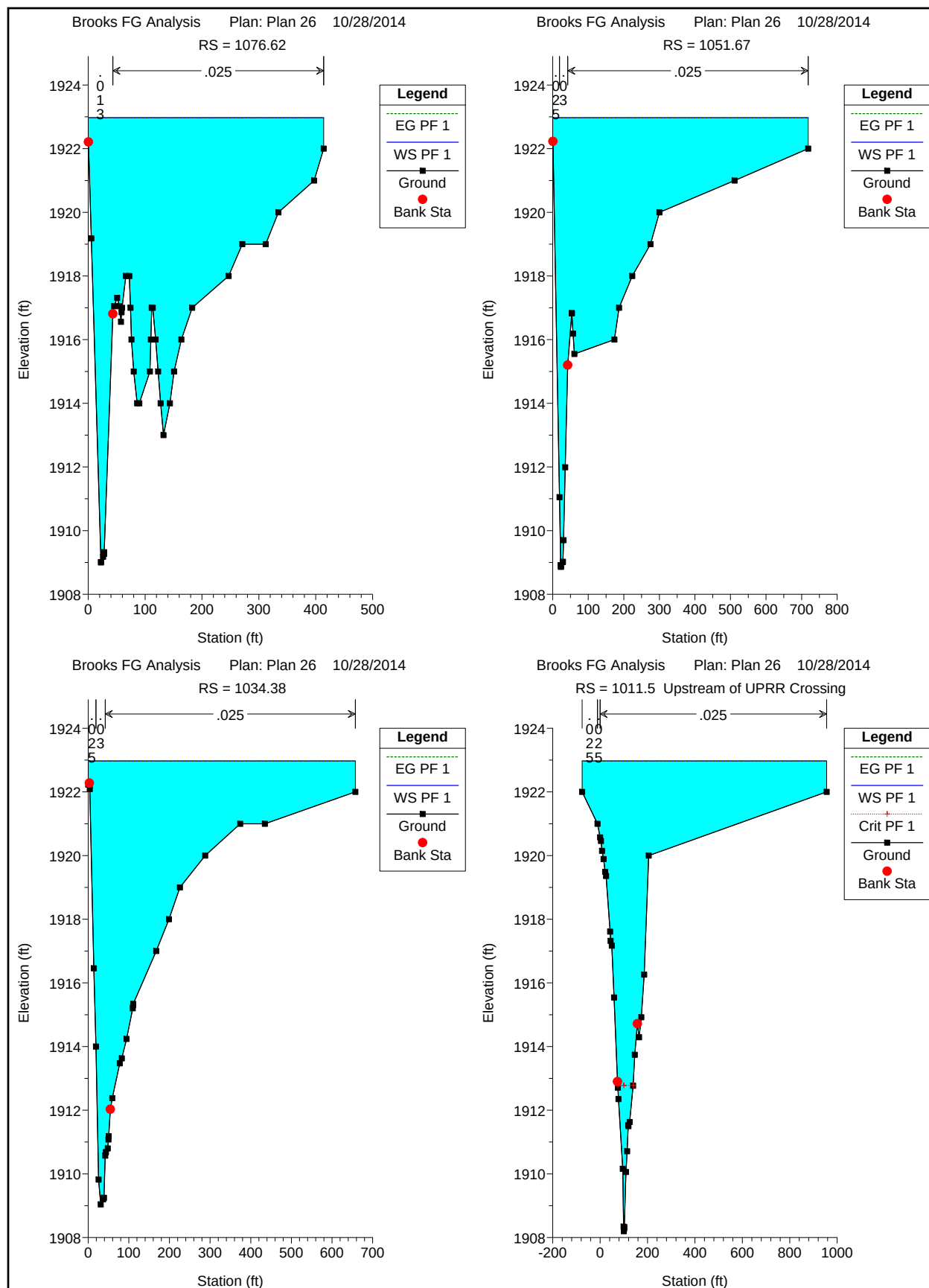












HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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X   X   XXXXXX   XXXX   XXXX   XX   XXXX
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PROJECT DATA

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 Project File : BrooksFGAnalysis.prj
 Run Date and Time: 10/28/2014 10:02:05 AM

Project in English units

PLAN DATA

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Geometry Title: EX TOPO
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Plan Summary Information:

Number of: Cross Sections = 84 Multiple Openings = 0
 Culverts = 2 Inline Structures = 0
 Bridges = 0 Lateral Structures = 0

Computational Information

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

Computation Options

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

FLOW DATA

Flow Title: Flow-EX COND
 Flow File : w:\North Las Vegas - City of\10500960 Brooks Flood Control Channel\06 Studies and Reports\6.5 Report Calculations\Hydraulics\Final
 Design Calcs\BRKS-HEC-RAS\BRKS-HEC-RAS\BrooksFGAnalysis.f04

Flow Data (cfs)

River	Reach	RS	PF 1
FL-ALIGN	FL-ALIGN	3398.92	480
FL-ALIGN	FL-ALIGN	2998.98	480
FL-ALIGN	FL-ALIGN	2485.61	521
FL-ALIGN	FL-ALIGN	2399.9	525
FL-ALIGN	FL-ALIGN	1701.57	652
FL-ALIGN	FL-ALIGN	1529.8	820
FL-ALIGN	FL-ALIGN	1151.6	869

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
FL-ALIGN	FL-ALIGN	PF 1	Normal S = 0.0285714	Known WS = 1922.97

GEOMETRY DATA

Geometry Title: EX TOPO
 Geometry File : w:\North Las Vegas - City of\10500960 Brooks Flood Control Channel\06 Studies and Reports\6.5 Report
 Calculations\Hydraulics\Final Design Calcs\BRKS-HEC-RAS\BRKS-HEC-RAS\BrooksFGAnalysis.g01

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3398.92

INPUT

Description: Mayflower
 Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-13.61	1978	0	1976.04	6800003	1976.04	1.09	1976.04	230003	1975.86
3.100002	1975.72	26.74	1975.69	27.83	1975.69	49.65	1975.7	51.53	1975.7
53.7	1975.88	56.57	1976.17	56.74	1976.18				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-13.61	.016	0	.0133	100002	.016	51.53	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .6800003 56.74 25.01 25 25.02 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 3373.92

INPUT

Description: Mayflower

Station	Elevation	Data	num=	19	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3.75	1977	0	1975.32	1.27	1975.331	740002	1975.332	529999	1975.31			
2.689999	1975.213	110001	1974.9	3.48	1974.934	509998	1975.01	10.74	1975.05			
27.86	1975.04	47.98	1975.04	51	1975.01	51.71	1975.1	52.7	1975.07			
53.18	1975.37	54.27	1975.38	57.5	1975.42	108.84	1976					

Manning's n	Values	num=	5	Sta	n Val	Sta	n Val	Sta	n Val
-3.75	.016	0	.0134	509998	.016	47.98	.013	57.5	.016

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1.27	53.18		25.03	25	25.05	.1	.3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 3348.92

INPUT

Description: Mayflower

Station	Elevation	Data	num=	23	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3.39	1976	0	1974.62	1.98	1974.63	2.16	1974.62	5	1974.57			
5.22	1974.43	5.53	1974.05	6.06	1974.09	6.97	1974.27	28.63	1974.41			
29	1974.41	30	1974.41	30.27	1974.42	32.04	1974.41	53.28	1974.25			
53.51	1974.25	54.94	1973.95	54.95	1973.95	55.58	1974.56	58.55	1974.56			
58.61	1974.56	60	1974.61	92.11	1975							

Manning's n	Values	num=	4	Sta	n Val	Sta	n Val	Sta	n Val
-3.39	.016	6.97	.016	53.28	.013	53.51	.016		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2.16	55.58		25.18	25	26.53	.1	.3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 3323.92

INPUT

Description: Mayflower

Station	Elevation	Data	num=	26	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-9.32	1975	0	1973.77	.08	1973.77	.21	1973.77	1.68	1973.75			
3.92	1973.77	4.23	1973.64	4.61	1973.66	4.65	1973.39	5.04	1973.34			
6.05	1973.43	11.79	1973.48	30.82	1973.59	31.35	1973.59	36.15	1973.66			
52.56	1973.52	57.03	1973.44	57.97	1973.34	58.71	1973.38	59.23	1973.34			
59.52	1973.49	62.73	1973.86	69.49	1974.63	70.03	1974.71	71.96	1974.72			
75.67	1974.77											

Manning's n	Values	num=	4	Sta	n Val	Sta	n Val	Sta	n Val
-9.32	.016	0	.013	6.05	.016	57.03	.013		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	.08	62.73		27.48	25	31.71	.1	.3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 3298.92

INPUT

Description: Mayflower

Station	Elevation	Data	num=	36	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-21.78	1975	0	1972.9	3.69	1972.9	4.23	1972.6	4.45	1972.47			
4.86	1972.51	5.98	1972.6	7.81	1972.65	8.17	1972.65	29.58	1972.72			
45.97	1972.83	48.21	1972.85	50	1972.86	50.77	1972.86	54.36	1972.92			
56.32	1972.96	63.24	1973.11	73.93	1973	96.04	1972.6	96.17	1972.62			
96.28	1972.93	97.84	1973.06	97.93	1972.71	98.41	1973	100.74	1973.25			
101.35	1973.25	102.05	1973.24	104.25	1973.31	113.55	1974.52	114.95	1974.69			
117.89	1974.94	118.33	1974.91	118.89	1974.91	121.38	1974.97	121.87	1975.03			
121.96	1975.02											

Manning's n	Values	num=	4	Sta	n Val	Sta	n Val	Sta	n Val
-21.78	.016	7.81	.016	96.04	.013	102.05	.016		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	3.69	101.35		28.27	25.32	26.5	.1	.3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 3273.6

INPUT

Description: Mayflower

Station	Elevation	Data	num=	34	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-12.17	1975	0	1973.22	.6	1973.25	.63	1973.14	3.6	1972.89			
6.93	1973.05	8.18	1972.71	8.92	1972.68	10.75	1972.66	13.09	1972.64			
20.05	1972.31	20.45	1972.31	20.8	1972.27	24.44	1972.05	25.07	1972.05			
25.17	1972.05	28.27	1972.1	78.62	1972.11	79.94	1972.11	80.69	1972.11			
80.95	1972.11	81.04	1972.12	132.93	1972.02	133.93	1971.96	134.46	1971.94			
138.17	1972.07	138.51	1972.08	139.43	1972.19	140.93	1972.16	145.61	1972.56			
160.51	1973.8	162.19	1974	162.74	1973.96	182.4	1975					

Manning's n	Values	num=	5	Sta	n Val	Sta	n Val	Sta	n Val
-12.17	.016	20.8	.013	28.27	.016	132.93	.013	139.43	.016

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	6.93	162.19		26	24.68	24.56	.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3248.92

INPUT

Description: Mayflower

Station	Elevation	Data	num=	31	Sta	Elev	Sta	Elev	Sta	Elev
-32.94	1975	-11.98	1974	0	1972.67	8.33	1972.46	11.62	1972.3	
12.89	1972.23	19.64	1971.84	20.2	1971.84	20.64	1971.79	24.08	1971.62	
24.75	1971.63	28.19	1971.69	30.58	1971.69	51.74	1971.63	60.02	1971.67	
71.31	1971.62	75.05	1971.63	86.38	1971.67	86.4	1971.73	108.46	1971.62	
123.04	1971.65	123.63	1971.63	124.58	1971.58	128.02	1971.68	129.24	1971.82	
131.45	1971.79	134.32	1972.09	146.48	1973.4	156.98	1974.6	157.29	1974.58	
191.47	1975									

Manning's	n	Values	num=	5	Sta	n	Val	Sta	n	Val	Sta	n	Val
-32.94	.016	20.2	.013	28.19	.016	123.04	.013	131.45	.016				

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	8.33	156.98	25.13	25	30.09		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3223.92

INPUT

Description: Mayflower

Station	Elevation	Data	num=	54	Sta	Elev	Sta	Elev	Sta	Elev
-42.58	1975	-7.6	1974	0	1972.89	2.64	1972.88	4.98	1972.95	
10.16	1973.08	12.81	1973.15	31.99	1973.41	36.1	1972.3	36.7	1972.67	
36.9	1972.97	45.08	1971.63	45.22	1971.6	45.45	1971.54	45.8	1971.61	
47.03	1971.58	47.6	1971.57	48.33	1971.08	48.58	1970.95	50.18	1971.11	
50.69	1971.18	50.79	1971.19	53.03	1971.18	55.74	1971.16	57.61	1971.15	
66.19	1971.11	69.97	1971.12	73.49	1971.11	74.86	1971.08	76.21	1971.05	
79.38	1971.09	81.57	1971.08	83.76	1971.1	86.76	1971.14	89.06	1971.15	
97.88	1971.15	99.96	1971.15	100.6	1971.12	102.25	1971.36	102.86	1971.37	
103.33	1971.39	103.65	1971.52	105.8	1971.58	107.13	1971.59	108.67	1971.67	
111.91	1972.06	117.59	1972.71	125.27	1973.58	125.78	1973.21	125.9	1973.11	
127.02	1973.19	127.28	1973.21	132.07	1973.38	153.91	1975.19			

Manning's	n	Values	num=	6	Sta	n	Val	Sta	n	Val	Sta	n	Val
-42.58	.016	0	.025	45.8	.013	50.69	.016	99.96	.013				

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	31.99	125.27	14.07	13.7	14.32		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3210.22

INPUT

Description: Begin Overflow

Station	Elevation	Data	num=	36	Sta	Elev	Sta	Elev	Sta	Elev
-64.08	1975	-9.73	1974	0	1973.31	13.09	1973.24	13.44	1973.24	
13.87	1973.24	14.66	1973.25	46.96	1973.66	50.19	1973.71	50.26	1973.78	
58.98	1973.84	67.54	1973.09	68.72	1972.76	69.12	1973.11	73.29	1973.09	
79.8	1971.92	82.62	1971.99	84.08	1972.04	87.65	1971.97	92.06	1972.9	
93.25	1972.93	97.84	1973.01	102.24	1973.1	105.43	1973.18	106.03	1973.26	
122.03	1973.82	126.66	1974.27	129.48	1974.59	132.16	1974.89	133.82	1975.08	
133.86	1975.05	134.44	1974.54	134.54	1974.55	135.74	1974.63	158.3	1975.44	
161.05	1975.66									

Manning's	n	Values	num=	4	Sta	n	Val	Sta	n	Val	Sta	n	Val
-64.08	.016	0	.025	58.98	.035	122.03	.016						

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	58.98	133.82	11.65	11.3	11.82		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3198.92

INPUT

Description:

Station	Elevation	Data	num=	30	Sta	Elev	Sta	Elev	Sta	Elev
-74.88	1975	0	1973.63	8.1	1973.59	15.04	1973.48	16.77	1973.46	
27.28	1973.46	49.92	1973.76	59.33	1973.89	59.55	1974.11	72.15	1974.19	
72.7	1974.62	72.83	1974.39	75.57	1974.41	81.28	1973.59	85.77	1972.75	
86.82	1972.55	88.33	1972.92	97.51	1974.8	105.11	1974.31	107.86	1974.27	
108.07	1974.23	109.94	1973.02	115.03	1973.34	135.02	1974.89	136.19	1974.92	
139.25	1975.01	159.54	1975.74	166.95	1976.02	167.79	1975.56	168.97	1975.49	

Manning's	n	Values	num=	4	Sta	n	Val	Sta	n	Val	Sta	n	Val
-74.88	.016	0	.025	72.7	.035	135.02	.025						

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	72.7	136.19	25.32	25	25.98		.1	.3

Left Levee	Station=	72.7	Elevation=	1974.62

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3173.92

INPUT

Description:

Station	Elevation	Data	num=	30	Sta	Elev	Sta	Elev	Sta	Elev
0	1974.32	18.53	1974.04	18.78	1974.03	23.09	1973.96	55.89	1973.97	

56.9	1973.97	78.31	1974.27	78.35	1974.3	78.81	1974.741	78.83	1974.77
79.12	1974.84	81.36	1974.57	84.72	1974.33	91.84	1972.15	92.88	1971.82
93.69	1971.56	93.93	1971.61	94.36	1971.63	105.51	1974.16	105.77	1974.16
115.22	1974.04	116.21	1973.84	117.23	1973.17	143.08	1974.79	144.14	1974.8
148.6	1974.85	168.7	1975.79	175	1976.03	175.03	1976.01	178.17	1975.82

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .025	79.12 .035	144.14 .025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
78.8	144.14	25.43	25		.1	.3
Left Levee	Station=	79.12	Elevation=	1974.84		

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3148.92

INPUT

Description:

Station Elevation Data	num=	26
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 1974.8 1 1974.8 11.31 1974.63 19.98 1974.63 20.37 1974.63		
74.31 1974.41 80.46 1974.5 80.91 1974.83 81.07 1974.98 84.32 1975.76		
85.50999 1975.61 92.57 1972.39 95.39 1971.4996 03999 1971.62 102.06 1972.88		
113.67 1973.42 115.4 1973.81 116.97 1973.83 118.45 1973.81 120.21 1973.45		
120.4 1973.33 125.04 1973.62 140.82 1973.78 173.95 1974.12 175.59 1974.2		
195.09 1974.5		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .025 84.32 .035 116.97 .025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
84.32	116.97	55.38	49.97		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3098.95

INPUT

Description:

Station Elevation Data	num=	21
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 1972.599 200012 1972.0524.82001 197226.23001 197246.29001 1971.56		
71.74001 1971.1 88.52 1970.6891.68001 1969.2896.85001 1967.2498.57001 1966.82		
102.82 1965.79 102.9 1965.77 105.28 1966.55 112.02 1967.63 114.36 1968.72		
141.22 1970.75 146.9 1971.45 149.45 1971.77 151.4 1971.74 178.18 1971.45		
182.49 1971.17		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .025 88.52 .035 149.45 .025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
88.52	149.45	20.29	24.98		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3073.97

INPUT

Description:

Station Elevation Data	num=	22
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 1969.874.190002 1969.73 18.92 1969.6243.78999 1969.44 71.29 1968.95		
78.58 1968.73 82.8 1966.8 91.51 1962.61 94.99 1961.52 97.89 1960.8		
98.59 1960.62 102.94 1962.53 107.22 1963.9 113.1 1966.58 116.65 1967.72		
127.92 1970.03 145.05 1972.17 145.14 1972.18 153.13 1972.04 156.84 1972		
169.54 1971.17 176.89 1970.35		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .025 78.58 .035 127.92 .025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
78.58	145.05	25	25.01		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3048.96

INPUT

Description: Begin heavy vegetation

Station Elevation Data	num=	21
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 1967.762.729996 1968.13 16.75 1967.3828.71001 1966.73 35.86 1966.4		
49.83 1964.24 74.92 1961.29 86.3 1958.32 91.55 1957.14 96.16 1955.97		
96.77 1956.15 103.04 1958.04 106.99 1959.2 115 1960.65 118.41 1961.73		
127.38 1963.57 140.65 1965.28 143.06 1965.37 163.14 1966.16 172.93 1965.32		
174.47 1965.35		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .025 35.86 .05 140.65 .025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
35.86	143.06	28.34	24.98		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 3023.98

INPUT

Description:

Station Elevation Data	num=	17
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 1963.99 15.92 1963.02 19.13 1962.82 37.04 1961.83 60.94 1956.52		

69.89	1954.62	73.99	1954.44	96.24	1953.14	96.3	1953.15	102.18	1954.21
105.46	1954.55	121.15	1957.28	128.42	1959.27	141.65	1959.16	152.84	1959.06
171.55	1958.22	176.84	1957.84						

Manning's n Values	num=	3			
Sta n Val Sta n Val					
0 .025 37.04	.05	128.42	.025		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
37.04	128.42	21.46	25	27.03		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2998.98

INPUT

Description:

Station Elevation Data	num=	17			
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev					
0 1961.01 .14 1961 11.93 1960.46 18.09 1960.04 39.61 1958.6					
59.87 1954.38 62.4 1953.83 81.23 1952.93 99.17 1951.84 99.2 1951.85					
112.96 1954.31 120.74 1955.1 139.95 1958.38 145.06 1957.96 149.42 1957.6					
174.19 1956.39 177.33 1956.24					

Manning's n Values	num=	3			
Sta n Val Sta n Val					
0 .025 39.61	.05	145.06	.025		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
39.61	139.95	28.33	24.99	23.13		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2973.99

INPUT

Description:

Station Elevation Data	num=	16			
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev					
0 1956.9518.21001 1956.55 23.47 1956.43 36.89 1955.945.45001 1955.11					
69.63 1952.59 72.7 1951.9887.14001 1951.32 100.48 1950.54 100.48 1950.55					
121.76 1954.39 133.54 1955.61 143.25 1957.29 146.88 1957 166.34 1955.43					
175.07 1955.02					

Manning's n Values	num=	3			
Sta n Val Sta n Val					
0 .025 36.89	.05	143.25	.025		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
36.89	143.25	23.9	25	25.86		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2948.99

INPUT

Description:

Station Elevation Data	num=	17			
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev					
0 1957.015.490005 1956.0619.01001 1955.99 26.09 1955.72 39.85 1955.19					
75.44 1951.84 79.95 1951.4580.81001 1951.28 86.18 1950.23 95.88 1949.78					
104.76 1949.25 104.78 1949.25 133.9 1954.49 149.52 1956.09 150.21 1956.03					
180.31 1953.51 181.19 1953.47					

Manning's n Values	num=	3			
Sta n Val Sta n Val					
0 .025 39.85	.05	150.21	.025		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
39.85	150.21	26.22	25	25.08		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2923.99

INPUT

Description:

Station Elevation Data	num=	21			
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev					
0 1955.44 6.48 1954.33 34.13 1954.18 43.59 1954.1343.71999 1954.12					
43.95 1954.1 48.28 1953.7380.23999 1950.9986.14999 1950.4986.74999 1950.39					
93.93999 1948.9696.59999 1948.43 101.42 1948.21 105.79 1947.95 105.84 1947.95					
142.63 1954.58 146.2 1954.94 148.14 1954.78 153.26 1954.35 180.31 1953.25					
181.54 1953.28					

Manning's n Values	num=	3			
Sta n Val Sta n Val					
0 .025 43.59	.05	146.2	.025		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
43.59	146.2	15.83	25.02	30.98		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2898.97

INPUT

Description:

Station Elevation Data	num=	29			
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev					
0 1954.28 2.7 1954.1 5.61 1953.58 9.42 1953.52 12.66 1953.45					
37.32 1952.49 46.03 1952.16 86.81 1949.02 92.01 1948.93 93.25 1948.74					
93.29 1948.7593.32001 1948.75 93.36 1948.76 104.78 1946.86 105.88 1946.68					
105.89 1946.68 105.9 1946.68 105.91 1946.68 105.92 1946.69 105.93 1946.69					
105.94 1946.69 105.96 1946.67 106.77 1946.9 132.79 1953.53 141.66 1953.48					
169.11 1953.33 173.73 1953.14 181.2 1953.3 185.66 1953.38					

Manning's n Values	num=	3			

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	37.32	132.79		17.15	24.93	30.48		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 2874.04

INPUT

Description:
Station Elevation Data num= 274

	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
	0	1952.95	1199951	1952.95	6300049	1952.941	179993	1952.921	779999	1952.91
2.429993	1952.93	1399999	1952.883	910004	1952.874	759995	1952.855	699997	1952.83	
6.740005	1952.81	37.08	1950.6843	539999	1950.2344	240001	1950.2345	803999	1950.23	
45.94	1950.23	46.98	1950.24	48.17	1950.24	49.56	1950.24	53.31	1950.12	
53.65	1950.1	54	1950.07	54.38	1950.05	54.78	1950.02	55.2	1950	
55.64	1949.97	56.11	1949.93	56.61	1949.9	57.14	1949.87	57.71	1949.83	
84.12	1949.48	84.43	1949.4	84.75	1949.32	85.07	1949.24	85.39	1949.16	
85.73	1949.07	86.06	1948.99	86.41	1948.9	86.76	1948.81	87.11	1948.7	
87.48	1948.62	87.84	1948.53	88.22	1948.43	88.6	1948.34	88.99	1948.24	
89.39	1948.14	89.79	1948.03	90.2	1947.93	90.61	1947.82	90.92	1947.72	
91.24	1947.62	91.56	1947.51	91.88	1947.41	92.2	1947.31	92.52	1947.2	
92.71	1947.14	92.84	1947.1	92.85	1947.1	93.16	1947	93.17	1947	
93.48	1946.9	93.49	1946.9	93.79	1946.81	93.81	1946.8	94.11	1946.71	
94.13	1946.7	94.43	1946.61	94.46	1946.6	94.75	1946.51	94.78	1946.5	
95.08	1946.41	95.1	1946.4	95.2	1946.37	95.36	1946.4	95.38	1946.4	
95.84	1946.5	95.87	1946.51	96.32	1946.6	96.78	1946.69	96.81	1946.7	
97.26	1946.8	97.29	1946.8	97.75	1946.9	97.77	1946.9	98.23	1947	
98.25	1947	98.71	1947.1	98.73	1947.1	99.2	1947.2	99.21	1947.2	
99.68	1947.3	99.7	1947.3	99.95	1947.35	100.16	1947.4	100.18	1947.4	
100.65	1947.5	100.66	1947.5	101.13	1947.6	101.14	1947.6	101.62	1947.7	
102.1	1947.8	102.11	1947.8	102.58	1947.9	102.59	1947.9	103.07	1948	
103.55	1948.1	103.8	1948.15	104.04	1948.2	104.53	1948.3	104.54	1948.3	
105.02	1948.4	105.03	1948.4	105.51	1948.5	105.53	1948.5	106	1948.6	
106.03	1948.61	106.49	1948.7	106.52	1948.71	106.98	1948.8	107.01	1948.81	
107.47	1948.9	107.51	1948.91	107.96	1949	108	1949.01	108.45	1949.1	
108.49	1949.11	108.94	1949.2	108.99	1949.21	109.42	1949.3	109.48	1949.31	
109.91	1949.4	109.97	1949.41	110.4	1949.5	110.47	1949.51	110.89	1949.6	
110.96	1949.61	111.38	1949.7	111.45	1949.71	111.87	1949.8	111.94	1949.81	
112.36	1949.9	112.43	1949.91	112.85	1950	112.93	1950.01	113.34	1950.1	
113.42	1950.12	113.83	1950.2	113.91	1950.22	114.32	1950.3	114.4	1950.32	
114.81	1950.4	114.89	1950.42	115.3	1950.5	115.38	1950.52	115.79	1950.6	
115.87	1950.62	116.28	1950.7	116.36	1950.72	116.77	1950.8	116.86	1950.82	
117.26	1950.9	117.35	1950.92	117.75	1951	117.84	1951.02	118.24	1951.1	
118.33	1951.12	118.73	1951.2</							

Manning's	n	Values		num=	3	
Sta	n	Val	Sta	n	Val	Sta
0	.025	84.12		.05	124.79	.025

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	84.12	124.79		39.68	24.94	17.95		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 2849.1

INPUT

Description:											
Station Elevation Data				num=		370					
	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
	0	1953.32	9499969	1953.33	139999	1953.266	0400009	1953.28	2200001	1953.16	
	11.13	1953.1	13	1953.06	16.23	1953	17.95	1952.9718	100001	1952.96	
21.	320001	1952.923	010001	1952.87	26.41	1952.827	900001	1952.77	31.5	1952.7	
32.	760001	1952.68	36.59	1952.637	400001	1952.58	37.59	1952.5841	680001	1952.5	
	42.37	1952.49	46.77	1952.447	100001	1952.3950	650001	1952.3252	990001	1952.33	
	57.73	1952.35	58.64	1952.4	59.13	1952.43	60.34	1952.5	61.94	1952.59	
	65.89	1952.5	66.72	1952.4870	100001	1952.4	71.58	1952.36	74.3	1952.3	
	76.29	1952.25	78.51	1952.2	80.9	1952.14	82.71	1952.1	85.44	1952.04	
	86.92	1952	87.68	1951.93	87.97	1951.9	88.02	1951.87	88.14	1951.8	
	88.19	1951.7788	310001	1951.7	88.36	1951.67	88.47	1951.6	88.53	1951.57	
	88.64	1951.5	88.69	1951.4788	810001	1951.4	88.86	1951.37	88.98	1951.3	
	89.03	1951.27	89.14	1951.2	89.2	1951.1789	310001	1951.1	89.36	1951.07	
	89.48	1951	89.53	1950.97	89.64	1950.9	89.7	1950.8789	810001	1950.8	
	89.87	1950.77	89.98	1950.7	90.04	1950.67	90.15	1950.6	90.2	1950.57	
90.	310001	1950.5	90.37	1950.46	90.48	1950.4	90.54	1950.36	90.65	1950.3	
	90.71	1950.26	90.82	1950.2	90.88	1950.16	90.98	1950.1	91.04	1950.06	
	91.15	1950	91.21	1949.96	91.32	1949.9	91.38	1949.86	91.48	1949.8	
	91.55	1949.76	91.65	1949.7	91.72	1949.66	91.82	1949.6	91.89	1949.56	
91.	990001	1949.5	92.05	1949.46	92.15	1949.4	92.22	1949.36	92.32	1949.3	
	92.39	1949.2692	490001	1949.292	560001	1949.16	92.65	1949.1	92.73	1949.06	
	92.82	1949	92.9	1948.9592	990001	1948.9	93.07	1948.85	93.16	1948.8	
93.	240001	1948.75	93.32	1948.7	93.41	1948.6593	490001	1948.6	93.58	1948.55	
	93.66	1948.5	93.75	1948.45	93.83	1948.493	920001	1948.3493	990001	1948.3	
	94.09	1948.24	94.16	1948.2	94.26	1948.14	94.33	1948.1	94.43	1948.04	
94.	490001	1948	94.61	1947.93	94.66	1947.9	94.78	1947.83	94.83	1947.8	
	94.95	1947.73	95	1947.7	95.13	1947.62	95.16	1947.695	310001	1947.51	
	95.33	1947.594	595.490001	1947.41	95.5	1947.4	95.59	1947.34	95.71	1947.3	
	95.98	1947.295	990001	1947.2	96.26	1947.1	96.27	1947.09	96.53	1947	
	96.55	1946.9996	810001	1946.9	97.05	1946.81	97.08</				

97.35001	1946.7	97.58	1946.62	97.63	1946.6	97.88	1946.51	97.9	1946.5
98.12	1946.42	98.65	1946.5	98.75	1946.51	99.3	1946.6	99.78	1946.67
99.95	1946.7	100.1	1946.72	100.41	1946.77	100.6	1946.8	101.04	1946.87
101.26	1946.9	101.67	1946.96	101.91	1947	102.18	1947.04	102.56	1947.1
102.87	1947.15	103.21	1947.2	103.55	1947.25	103.86	1947.3	104.24	1947.36
104.51	1947.4	104.94	1947.47	105.16	1947.5	105.64	1947.57	105.82	1947.6
106.35	1947.68	106.47	1947.7	107.07	1947.79	107.12	1947.8	107.5	1947.86
107.7	1947.9	107.71	1947.9	108.2	1948	108.23	1948.01	108.69	1948.1
108.75	1948.11	109.19	1948.2	109.26	1948.21	109.68	1948.3	109.77	1948.32
110.17	1948.4	110.28	1948.42	110.67	1948.5	110.79	1948.53	111.16	1948.6
111.3	1948.63	111.65	1948.7	111.81	1948.73	112.15	1948.8	112.32	1948.83
112.64	1948.9	112.82	1948.94	113.14	1949	113.47	1949.07	113.63	1949.1
113.99	1949.17	114.12	1949.2	114.51	1949.28	114.62	1949.3	115.04	1949.38
115.11	1949.4	115.57	1949.49	115.61	1949.5	115.96	1949.57	116.36	1949.6
116.42	1949.6	116.5	1949.6	118.09	1949.7	118.47	1949.72	119.75	1949.8
120.59	1949.85	121.41	1949.9	122.98	1949.99	123.07	1950	123.23	1950.01
123.5	1950.1	123.58	1950.13	123.79	1950.2	123.93	1950.25	124.09	1950.3
124.26	1950.36	124.39	1950.4	124.59	1950.47	124.68	1950.5	124.89	1950.57
124.98	1950.6	125.19	1950.67	125.28	1950.7	125.5	1950.77	125.57	1950.8
125.8	1950.88	125.87	1950.9	126.1	1950.98	126.17	1951	126.41	1951.08
126.47	1951.1	126.71	1951.18	126.76	1951.2	127.02	1951.29	127.06	1951.3
127.33	1951.39	127.36	1951.4	127.65	1951.5	127.73	1951.53	128.08	1951.6
128.13	1951.61	128.55	1951.7	128.66	1951.72	129.03	1951.8	129.19	1951.83
129.5	1951.9	129.7	1951.94	129.96	1952	130.13	1952.05	130.35	1952.1
130.54	1952.16	130.71	1952.2	130.92	1952.27	131.03	1952.3	131.13	1952.33
131.34	1952.4	131.42	1952.43	131.64	1952.5	131.72	1952.53	131.94	1952.6
132.01	1952.62	132.25	1952.7	132.3	1952.72	132.55	1952.8	132.59	1952.81
132.85	1952.9	132.87	1952.91	133.12	1952.99	133.15	1953	133.16	1953
133.44	1953.1	133.45	1953.1	133.72	1953.2	133.74	1953.21	134.01	1953.3
134.04	1953.31	134.29	1953.4	134.34	1953.42	134.58	1953.5	134.64	1953.52
134.86	1953.6	134.94	1953.63	135.15	1953.7	135.31	1953.76	135.43	1953.8
135.96	1953.75	136.22	1953.7	136.63	1953.62	136.72	1953.6	137.16	1953.51
137.22	1953.5	137.71	1953.4	137.72	1953.4	137.79	1953.39	138.48	1953.3
138.59	1953.29	139.29	1953.2	139.66	1953.15	140.1	1953.1	140.7	1953.03
140.99	1953.1	141.2	1953.15	141.38	1953.2	141.71	1953.28	141.77	1953.3
142.16	1953.4	142.2	1953.41	143.01	1953.47	143.36	1953.5	143.86	1953.54
144.63	1953.6	144.64	1953.6	145.51	1953.69	145.6	1953.7	146.4	1953.78
146.55	1953.8	146.77	1953.82	147.51	1953.9	147.92	1953.94	148.46	1954
149.21	1954.08	149.42	1954.1	149.79	1954.14	150.48	1954.1	150.63	1954.09
152.26	1954	153.41	1953.94	154.05	1953.9	154.42	1953.91	155.72	1953.95
156.88	1953.91	157.03	1953.92	159.07	1954	159.72	1954.06	160.09	1954.1
160.9	1954.18	161.3	1954.2	161.66	1954.22	163.29	1954.3	164.79	1954.38
165.27	1954.4	166.73	1954.47	167.22	1954.45	167.63	1954.44	168.09	1954.5
168.27	1954.53	168.8	1954.6	169.15	1954.64	170.09	1954.6	172.08	1954.54
173.57	1954.5	173.98	1954.49	177.05	1954.4	177.49	1954.39	178.94	1954.35

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .025 86.92 .05 135.43 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
86.92 135.43 38.99 24.28 10.13 .1 .3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 2824.82

INPUT

Description: End heavy vegetation

Station Elevation Data		num= 374		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
0	1952.89	3500061	1952.891	580002	1952.852	110001	1952.857	130005	1952.84		
16.21001	1952.8416	399999	1952.84	16.48	1952.8419	71001	1952.82	22	1952.8		
25.60001	1952.75	26.16	1952.75	27.23	1952.76	28.13	1952.74	29.87	1952.7		
31.13	1952.67	34.12	1952.6	34.77	1952.58	38.38	1952.538	78999	1952.49		
39.92999	1952.47	40.37	1952.4640	67999	1952.46	41.97	1952.42	42.78	1952.4		
45.73	1952.32	46.36	1952.3	49.71	1952.21	49.94	1952.2	49.95	1952.2		
52.02	1952.14	52.92	1952.1	53.03	1952.09	54.9	1952	55.23	1951.98		
56.88	1951.9	57.44	1951.87	58.85	1951.8	59.74	1951.76	60.83	1951.7		
62.09	1951.64	62.8	1951.6	64.53	1951.51	64.78	1951.5	65.72	1951.45		
66.89	1951.42	67.37	1951.4	69.34	1951.34	70.52	1951.3	71.99	1951.25		
73.67	1951.2	74.76	1951.17	76.82	1951.1	77.61	1951.07	79.97	1951		
80.52	1950.98	83.12	1950.9	83.48	1950.89	86.27	1950.8	86.46	1950.79		
89.42	1950.7	89.47	1950.7	90.85	1950.65	92.32	1950.6	93.5	1950.54		
94.3	1950.5	94.4	1950.44	94.42	1950.42	94.45	1950.4	94.54	1950.34		
94.59	1950.3	94.67	1950.24	94.73	1950.2	94.81	1950.14	94.87	1950.1		
94.95	1950.04	95.01	1950	95.09	1949.95	95.15	1949.9	95.22	1949.85		
95.29	1949.8	95.36	1949.75	95.43	1949.7	95.5	1949.65	95.57	1949.6		
95.64	1949.55	95.71	1949.5	95.78	1949.45	95.85	1949.4	95.92	1949.35		
95.99	1949.3	96.06	1949.25	96.13	1949.2	96.15	1949.14	96.17	1949.1		
96.31	1948.92	96.32	1948.93	96.33	1948.91	96.34	1948.9	96.4	1948.9		
96.45	1948.81	96.46	1948.81	96.47	1948.8	96.59	1948.71	96.6	1948.7		
96.61	1948.69	96.73	1948.6	96.74	1948.59	96.85	1948.5	96.86	1948.49		
97.14	1948.4	97.19	1948.35	97.25	1948.3	97.31	1948.25	97.37	1948.2		
97.42	1948.15	97.48	1948.1	97.54	1948.05	97.6	1948	97.66	1947.95		
97.71	1947.9	97.78	1947.85	97.83	1947.8	97.89	1947.74	97.94	1947.7		
98.01	1947.64	98.06	1947.6	98.13	1947.54	98.18	1947.5	98.26	1947.43		
98.29	1947.4	98.38	1947.32	98.41	1947.3	98.52	1947.2	98.54	1947.18		
98.79	1947.1	98.81	1947.09	99.1	1947	99.14	1946.99	99.41	1946.9		
99.69	1946.81	99.71	1946.8	100.01	1946.7	100.02	1946.7	100.09	1946.68		
100.44	1946.6	100.5	1946.59	100.9	1946.5	101.01	1946.48	101.36	1946.4		
101.5	1946.37	101.82	1946.3	101.98	1946.26	102.28	1946.2	102.46	1946.16		
102.74	1946.1	102.93	1946.06	103.2	1946	103.4	1945.96	103.66	1945.9		
103.87	1945.85	104.12	1945.8	104.34	1945.75	104.58	1945.7	104.8	1945.65		
105.04	1945.6	105.27	1945.55	105.49	1945.5	105.59	1945.48	105.75	1945.44		
105.95	1945.4	106.31	1945.32	106.92	1945.38	107	1945.39	107.01	1945.4		
107.12	1945.5	107.23	1945.6	107.24	1945.6	107.35	1945.7	107.46	1945.8		
107.57	1945.9	107.58	1945.9	107.69	1946	107.8	1946.1	107.91	1946.2		
107.92	1946.2	108.03	1946.3	108.14	1946.4	108.25	1946.5	108.26	1946.5		
108.37	1946.6	108.48	1946.7	108.59	1946.8	108.71	1946.9	108.82	1947		
108.93	1947.1	109.04	1947.2	109.05	1947.2	109.16	1947.3	109.27	1947.4		
109.36	1947.48	109.38	1947.5	109.5	1947.6	109.61	1947.7	109.72	1947.8		
109.83	1947.9	109.84	1947.91	109.94	1948	109.95	1948.01	110.05	1948.1		
110.07	1948.12	110.31	1948.11	110.45	1948.2	111.17	1948.2	111.37	1948.15		
111.67	1948.2	111.9	1948.17	112.43	1948.1	113.1	1948.01	113.48	1948.1		
113.73	1948.16	114.04	1948.2	114.7	1948.27	114.99	1948.3	115.52	1948.35		
115.74	1948.4	115.82	1948.42	116.23	1948.5	116.42	1948.54	116.73	1948.6		
116.97	1948.65	117.22	1948.7	117.51	1948.76	117.72	1948.8	118.03	1948.86		
118.21	1948.9	118.55	1948.97	118.71	1949	119.06	1949.07	119.2	1949.1		
119.56	1949.17	119.69	1949.2	120.07	1949.28	120.19	1949.3	120.57	1949.38		
120.68	1949.4	121.07	1949.48	121.18	1949.5	121.57	1949.58	121.67	1949.6		
121.79	1949.62	122.16	1949.7	122.3	1949.73	122.66	1949.8	122.82	1949.83		
123.15	1949.9	123.35	1949.94	123.65	1950	123.91	1950.05	124.14	1950.1		
124.5	1950.17	124.63	1950.2	124.98	1950.27	125.53	1950.28	127.54	1950.3		
127.58	1950.3	127.6	1950.3	127.93	1950.4	127.98	1950.41	128.27	1950.5		
128.56	1950.59	128.6	1950.6	128.92	1950.69	128.94	1950.7	129.1	1950.76		

129.2	1950.8	129.23	1950.82	129.39	1950.9	129.46	1950.94	129.58	1951
129.67	1951.05	129.77	1951.1	129.88	1951.16	129.96	1951.2	130.08	1951.26
130.15	1951.3	130.28	1951.37	130.34	1951.4	130.4	1951.43	130.53	1951.5
130.6	1951.54	130.72	1951.6	130.8	1951.64	130.91	1951.7	131	1951.75
131.1	1951.8	131.2	1951.85	131.29	1951.9	131.42	1951.97	131.48	1952
131.64	1952.09	131.67	1952.1	131.76	1952.15	134.55	1952.2	135.38	1952.22
135.64	1952.2	135.66	1952.2	135.74	1952.2	138.12	1952.1	138.96	1952.18
139.19	1952.2	139.31	1952.21	140.25	1952.3	140.34	1952.31	141.31	1952.4
141.35	1952.4	141.88	1952.45	142.33	1952.5	142.34	1952.5	143.29	1952.6
143.33	1952.6	144.26	1952.69	144.32	1952.7	144.38	1952.71	145.3	1952.8
145.45	1952.81	146.29	1952.9	146.77	1952.95	147.28	1953	149.5	1953.1
149.54	1953.1	149.68	1953.1	153.8	1953.03	154.74	1953.03	157.27	1953.04
157.42	1953	157.51	1953.02	157.51	1953	157.86	1953	158.6	1953.06
159.08	1953.1	159.92	1953.17	160.11	1953.2	160.15	1953.21	160.69	1953.3
160.83	1953.32	161.27	1953.4	161.47	1953.43	161.86	1953.5	162.09	1953.54
162.44	1953.6	162.7	1953.64	163.03	1953.7	163.26	1953.75	163.47	1953.8
163.72	1953.86	163.86	1953.9	164.15	1953.97	164.25	1954	164.6	1954.09
164.64	1954.1	164.85	1954.15	165.14	1954.19	165.19	1954.2	165.8	1954.28
165.91	1954.3	166.48	1954.38	166.64	1954.4	167.11	1954.47	168.01	1954.46
169.93	1954.42	170.8	1954.4	174.86	1954.31	175.64	1954.32		

Manning's n Values
Sta n Val Sta n Val
0 .025 93.5 .05 131.67 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
93.5 131.67 22.37 25.04 27.85 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN

RS: 2799.78

INPUT

Description:

Station Elevation Data		num=	429						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1951.7	7299957	1951.681	399994	1951.661	779999	1951.673	259995	1951.7
3.710007	1951.714	1300005	1951.727	399994	1951.8	8.5	1951.83	11.13	1951.9
14.89	1951.99	15.16	1952.15	46001	1952.0115	50999	1952.01	16.33	1952.01
23.37	1952.05	25.5	1952.0429	49001	1952.04	30.52	1952.02	31.14	1952
32.47	1951.9734	85001	1951.9	36.02	1951.86	37.61	1951.8	38.91	1951.75
40.37	1951.7	41.11	1951.67	42.21	1951.63	42.85	1951.61	43.08	1951.61
43.38	1951.6	46.07	1951.55	48.72	1951.5	49.55	1951.48	50.3	1951.45
50.73	1951.44	50.92	1951.43	52.78	1951.42	53.22	1951.4	53.27	1951.4
53.39	1951.39	56.06	1951.3	58.48	1951.21	58.51	1951.2	58.57	1951.17
58.69	1951.1	58.78	1951.05	64.23	1951.1	68.97	1951.14	70.68	1951.1
70.93	1951.09	74.49	1951	75.13	1950.98	78.3	1950.9	79.19	1950.88
82.11	1950.8	83.18	1950.77	85.92	1950.7	87.88	1950.65	88.14	1950.6
88.22	1950.54	88.29	1950.5	88.41	1950.42	88.44	1950.4	88.56	1950.32
88.59	1950.3	88.72	1950.21	88.74	1950.2	88.88	1950.11	88.89	1950.1
89.04	1950	89.07	1949.98	89.19	1949.9	89.21	1949.89	89.35	1949.8
89.37	1949.77	89.47	1949.7	89.53	1949.66	89.62	1949.6	89.69	1949.55
89.76	1949.5	89.84	1949.45	89.91	1949.4	89.99	1949.34	90.05	1949.3
90.14	1949.23	90.19	1949.2	90.29	1949.13	90.34	1949.1	90.44	1949.03
90.48	1949	90.59	1948.92	90.62	1948.9	90.66	1948.88	90.77	1948.8
90.8	1948.78	90.91	1948.7	90.94	1948.68	91.06	1948.6	91.08	1948.58
91.2	1948.5	91.23	1948.48	91.34	1948.4	91.37	1948.38	91.49	1948.3
91.51	1948.28	91.63	1948.2	91.65	1948.19	91.77	1948.1	91.79	1948.09
91.92	1948	91.93	1947.99	92.06	1947.9	92.07	1947.89	92.21	1947.8
92.21	1947.79	92.35	1947.7	92.49	1947.6	92.5	1947.59	92.65	1947.5
92.8	1947.4	92.81	1947.4	92.96	1947.3	92.97	1947.29	93.11	1947.2
93.12	1947.19	93.26	1947.1	93.28	1947.09	93.41	1947	93.44	1946.98
93.57	1946.9	93.59	1946.88	93.72	1946.8	93.75	1946.78	93.87	1946.7
93.91	1946.68	94.03	1946.6	94.06	1946.58	94.18	1946.5	94.22	1946.47
94.33	1946.4	94.37	1946.37	94.49	1946.3	94.6	1946.22	94.64	1946.17
94.7	1946.16	94.91	1946.1	95.14	1946.03	95.26	1946	95.55	1945.92
95.61	1945.9	95.92	1945.81	95.96	1945.8	96.29	1945.71	96.31	1945.7
96.58	1945.62	96.66	1945.6	96.67	1945.6	97.04	1945.51	97.09	1945.5
97.42	1945.42	97.51	1945.4	97.59	1945.38	97.93	1945.3	98.07	1945.26
98.34	1945.2	98.59	1945.14	98.76	1945.1	99.16	1945	99.18	1945
99.21	1944.99	99.32	1945	99.55	1945.01	100.99	1945.1	101.58	1945.14
102.03	1945.16	102.65	1945.15	103.13	1945.14	103.23	1945.2	103.26	1945.22
103.39	1945.3	103.46	1945.35	103.54	1945.4	103.7	1945.45	103.74	1945.5
103.79	1945.57	103.85	1945.6	103.92	1945.66	103.95	1945.66	103.98	1945.7
104.13	1945.79	104.15	1945.8	104.31	1945.9	104.48	1946	104.49	1946
104.54	1946.03	104.67	1946.1	104.68	1946.11	104.85	1946.2	104.88	1946.21
105.04	1946.3	105.07	1946.32	105.22	1946.4	105.36	1946.47	105.42	1946.5
105.46	1946.52	105.62	1946.6	105.75	1946.68	105.79	1946.7	105.84	1946.73
106	1946.8	106.03	1946.81	106.24	1946.9	106.3	1946.92	106.49	1947
106.7	1947.08	106.76	1947.1	106.99	1947.18	107.04	1947.2	107.29	1947.29
107.31	1947.3	107.46	1947.36	107.62	1947.4	107.65	1947.41	107.99	1947.5
108.05	1947.52	108.36	1947.6	108.45	1947.62	108.73	1947.7	108.84	1947.73
109.1	1947.8	109.22	1947.83	109.48	1947.9	109.85	1947.96	109.98	1948
110.37	1948.07	110.49	1948.1	110.9	1948.17	111.01	1948.2	111.44	1948.27
111.56	1948.3	111.72	1948.33	112.14	1948.4	112.3	1948.43	112.72	1948.5
112.88	1948.53	113.3	1948.6	113.45	1948.63	113.88	1948.7	114.03	1948.72
114.46	1948.8	114.6	1948.82	115.04	1948.9	115.17	1948.92	115.62	1949
115.75	1949.02	116.2	1949.1	116.32	1949.12	116.78	1949.2	116.88	1949.22
117.36	1949.3	117.45	1949.31	117.94	1949.4	118	1949.41	118.52	1949.5
118.55	1949.51	118.94	1949.57	119.13	1949.6	119.21	1949.61	119.81	1949.7
120.39	1949.79	120.49	1949.8	120.56	1949.81	121.03	1949.9	121.41	1949.97
121.47	1950	121.49	1950.01	121.72	1950.1	121.78	1950.13	121.99	1950.2
122.05	1950.23	122.25	1950.3	122.31	1950.33	122.51	1950.4	122.73	1950.48
122.79	1950.5	123.01	1950.58	123.06	1950.6	123.29	1950.68	123.33	1950.7
123.57	1950.79	123.61	1950.8	123.86	1950.89	123.88	1950.9	124.14	1951
124.15	1951	124.4	1951.09	124.43	1951.1	124.73	1951.2	124.74	1951.2
125.03	1951.3	125.05	1951.31	125.33	1951.4	125.36	1951.41	125.63	1951.5
125.67	1951.51	125.94	1951.6	125.98	1951.62	126.24	1951.7	126.3	1951.72
126.54	1951.8	126.62	1951.83	126.84	1951.9	126.94	1951.93	127.14	1952
127.27	1952.04	127.44	1952.1	127.61	1952.16	127.74	1952.2	127.96	1952.27
128.04	1952.3	128.33	1952.39	128.34	1952.4	128.4	1952.42	128.94	1952.5
129.18	1952.54	129.59	1952.6	130.03	1952.67	130.61	1952.7	131.1	1952.73
132.35	1952.8	133.91	1952.89	134.08	1952.9	134.17	1952.91	134.45	1952.92
137.75	1953	140.61	1953.07	141.11	1953	141.23	1952.98	141.84	1952.9
142.09	1952.87	142.58	1952.8	142.92	1952.75	143.31	1952.7	143.72	1952.64
144.04	1952.6	144.37	1952.55	144.77	1952.5	145.2	1952.44	145.5	1952.4
146.16	1952.31	146.23	1952.3	146.35	1952.28	146.41	1952.3	146.46	1952.31
146.77	1952.4	146.95	1952.45	147.13	1952.5	147.36	1952.57	147.48	1952.6
147.58	1952.63	147.84	1952.7	147.95	1952.73	148.19	1952.8	148.31	1952.83
148.55	1952.9	148.67	1952.93	148.91	1953	149.04	1953.04	149.26	1953.1
149.41	1953.14	149.62	1953.2	149.79	1953.25	149.98	1953.3	150.03	1953.32
150.18	1953.36	150.33	1953.4	150.59	1953.47	150.69	1953.5	150.98	1953.58
151.12	1953.59	151.28	1953.6	151.67	1953.62	151.71	1953.63	151.93	1953.7
151.97	1953.71	152.3	1953.8	152.63	1953.89	152.69	1953.9	152.72	1953.91
153.14	1954	153.3	1954.04	153.59	1954.1	153.81	1954.15	154.03	1954.2
154.3	1954.26	154.48	1954.3	154.77	1954.36	154.93	1954.4	155.24	1954.47

155.38	1954.5	155.7	1954.57	155.83	1954.6	156.16	1954.67	156.28	1954.7
156.61	1954.77	156.73	1954.8	156.83	1954.82	156.85	1954.9	156.92	1954.92
157.32	1955	157.38	1955.03	157.42	1955.1	157.58	1955.17	157.66	1955.2
157.83	1955.27	157.89	1955.3	158.08	1955.38	158.13	1955.4	158.33	1955.48
158.37	1955.5	158.58	1955.59	158.61	1955.6	158.84	1955.7	158.91	1955.73
160.22	1955.8	161.35	1955.86	163.48	1955.82	163.61	1955.82		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.025	87.88	.035
		140.61	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	87.88	140.61		23.04	25.15		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN

RS: 2774.63

INPUT

Description:

Station	Elevation	Data	num=	416	Elev	Sta	Elev	Sta	Elev
0	1950.872	.0800002	1950.95	.649994	1950.9410	.25999	195113	.98999	1951.04
15.31999	1951.07	16.81	1951.07	21.52	195125	.03999	1950.96	26.02	1950.9
27.20999	1950.83	27.66	1950.8	28.08	1950.77	29.31	1950.7	29.38	1950.7
29.56999	1950.68	32.03	1950.6232	.64999	1950.6	34.96	1950.54	36.23	1950.5
37.89	1950.45	39.74	1950.442	.07999	1950.34	43.28	1950.3	44.74	1950.26
46.6	1950.2	46.98	1950.19	47.41	1950.18	49.03	1950.13	49.31	1950.13
50.25999	1950.1	50.39	1950.1	50.42	1950.1	50.43	1950.1	50.49	1950.09
52.03	1950.03	52.31	1950.1	52.71	1950.2	52.72	1950.252	.75999	1950.21
52.91	1950.21	54.27	1950.27	55.37	1950.23	56.54	1950.2	58.12	1950.15
59.99	1950.162	.64999	1950.02	64.92	1950.01	65.24	1950	65.63	1949.99
66.63	1949.99	66.87	1949.9969	.82999	1949.972	.68999	1949.81	75.87	1949.9
76.29	1949.92	77.1	1950	77.78	1950.06	78.16	1950.178	.89999	1950.17
79.22	1950.2	80.05	1950.28	80.28	1950.3	81.23	1950.39	81.34	1950.4
82.00999	1950.46	83.32	1950.49	83.92	1950.586	.39999	1950.55	88.11	1950.58
88.32999	1950.5	88.43	1950.46	88.6	1950.488	.75999	1950.34	88.87	1950.3
89.06	1950.23	89.14	1950.289	.32999	1950.13	89.41	1950.1	89.61	1950.03
89.68	1950	89.89	1949.92	89.95	1949.9	90.17	1949.82	90.22	1949.8
90.45	1949.71	90.49	1949.7	90.74	1949.6190	.75999	1949.6	90.89	1949.55
90.99	1949.5	91	1949.591	.18999	1949.4	91.21	1949.39	91.38	1949.3
91.42	1949.2891	.57999	1949.2	91.62	1949.18	91.78	1949.191	.93999	1949.02
91.98	194992	.14999	1948.91	92.17	1948.9	92.36	1948.81	92.37	1948.8
92.56	1948.71	92.57	1948.7	92.73	1948.6	92.88	1948.5	92.89	1948.49
93.04	1948.4	93.06	1948.39	93.2	1948.3	93.22	1948.29	93.35	1948.2
93.38	1948.1893	.50999	1948.1	93.53	1948.08	93.66	194893	.68999	1947.98
93.82	1947.9	93.85	1947.88	93.97	1947.894	.00999	1947.77	94.12	1947.7
94.16	1947.67	94.27	1947.6	94.32	1947.57	94.43	1947.5	94.47	1947.47
94.57999	1947.4	94.62	1947.37	94.73	1947.3	94.78	1947.26	94.88	1947.2
94.93	1947.16	95.03	1947.195	.07999	1947.06	95.17	194795	.25999	1946.94
95.32	1946.9	95.41	1946.83	95.46	1946.8	95.56	1946.73	95.6	1946.7
95.71	1946.62	95.74	1946.6	95.86	1946.52	95.88	1946.596	.00999	1946.41
96.03	1946.4	96.17	1946.396	.17999	1946.29	96.35	1946.2	96.37	1946.19
96.53999	1946.196	.56999	1946.08	96.72	194696	.75999	1945.9896	.89999	1945.9
96.96	1945.87	97.09	1945.897	.14999	1945.77	97.27	1945.7	97.34	1945.66
97.46	1945.6	97.53	1945.56	97.64	1945.597	.75999	1945.4497	.81999	1945.4
97.97	1945.3298	.00999	1945.3	98.14	1945.2398	.28999	1945.2	98.35	1945.19
98.8	1945.199	.06999	1945.05	99.3	194599	.53999	1944.95	99.8	1944.9
100.18	1944.82	100.3	1944.8	100.55	1944.75	101.33	1944.8	102.07	1944.85
102.93	1944.9	103.33	1944.93	104.53	1945	104.7	1945.01	105.5	1945.06
105.71	1945.1	105.73	1945.1	105.88	1945.13	106.24	1945.2	106.31	1945.21
106.77	1945.3	106.88	1945.32	107.3	1945.4	107.43	1945.42	107.83	1945.5
108.04	1945.54	108.37	1945.6	108.57	1945.66	108.64	1945.7	108.75	1945.77
108.81	1945.8	108.92	1945.87	108.98	1945.9	109.09	1945.97	109.14	1946
109.25	1946.07	109.31	1946.1	109.42	1946.17	109.48	1946.2	109.59	1946.27
109.64	1946.3	109.75	1946.37	109.81	1946.4	109.92	1946.47	109.98	1946.5
110.08	1946.57	110.14	1946.6	110.25	1946.67	110.31	1946.7	110.42	1946.77
110.47	1946.8	110.54	1946.84	110.64	1946.9	110.71	1946.94	110.81	1947
110.88	1947.05	110.97	1947.1	111.06	1947.15	111.14	1947.2	111.24	1947.26
111.31	1947.3	111.45	1947.39	111.55	1947.4	111.72	1947.42	111.94	1947.44
113.09	1947.4	114.61	1947.35	114.78	1947.4	115.1	1947.5	115.12	1947.51
115.42	1947.6	115.44	1947.61	115.74	1947.7	116.08	1947.79	116.11	1947.8
116.53	1947.9	116.54	1947.9	116.55	1947.9	116.73	1947.94	116.89	1948
116.97	1948.03	117.17	1948.1	117.33	1948.16	117.44	1948.2	117.64	1948.27
117.72	1948.3	117.94	1948.38	117.99	1948.4	118.23	1948.49	118.27	1948.5
118.52	1948.59	118.55	1948.6	118.81	1948.7	118.82	1948.7	119.09	1948.8
119.1	1948.8	119.37	1948.9	119.7	1949	119.71	1949	120.02	1949.09
120.05	1949.1	120.35	1949.19	120.39	1949.2	120.68	1949.29	120.73	1949.3
121.01	1949.38	121.07	1949.4	121.35	1949.48	121.41	1949.5	121.68	1949.58
121.75	1949.6	122.01	1949.68	122.09	1949.7	122.35	1949.78	122.43	1949.8
122.68	1949.88	122.77	1949.9	123.02	1949.97	123.1	1950	123.35	1950.07
123.44	1950.1	123.56	1950.13	123.78	1950.2	123.95	1950.25	124.12	1950.3
124.42	1950.39	124.99	1950.4	125.93	1950.36	127.68	1950.3	128.16	1950.28
128.22	1950.3	128.25	1950.31	128.59	1950.4	128.86	1950.48	128.95	1950.5
129.28	1950.59	129.32	1950.6	129.58	1950.67	130.26	1950.6	131.11	1950.51
131.21	1950.5	131.23	1950.5	131.25	1950.5	131.26	1950.5	131.66	1950.6
131.86	1950.65	132.07	1950.7	132.34	1950.77	132.48	1950.8	132.79	1950.88
132.89	1950.9	133.21	1950.98	133.3	1951	133.44	1951.03	133.71	1951.1
133.89	1951.14	134.12	1951.2	134.41	1951.27	134.54	1951.3	135.06	1951.3
135.36	1951.25	138.34	1951.3	138.82	1951.26	139.6	1951.2	140.69	1951.11
140.85	1951.1	141.15	1951.08	141.33	1951.1	141.46	1951.12	142.06	1951.2
142.53	1951.26	142.8	1951.3	143.4	1951.38	143.53	1951.4	144.04	1951.47
144.05	1951.47	144.14	1951.5	144.16	1951.51	144.37	1951.57	144.43	1951.6
144.47	1951.62	144.56	1951.66	144.64	1951.7	144.73	1951.74	144.84	1951.8
144.95	1951.85	145.05	1951.9	145.17	1951.96	145.25	1952	145.38	1952.06
145.46	1952.1	145.59	1952.16	145.66	1952.2	145.74	1952.24	145.87	1952.3
145.96	1952.35	146.07	1952.4	146.19	1952.46	146.27	1952.5	146.43	1952.58
146.48	1952.6	146.68	1952.7	146.69	1952.7	146.7	1952.7	147.22	1952.8
147.39	1952.83	147.75	1952.9	148.04	1952.95	148.28	1953	148.65	1953.07
148.8	1953.1	149.24	1953.18	149.33	1953.2	149.84	1953.27	149.87	1953.27
149.92	1953.3	149.99	1953.34	151.62	1953.36	152.49	1953.4	153.82	1953.46
155.13	1953.5	155.78	1953.52	156	1953.6	156.13	1953.65	156.28	1953.7
156.48	1953.77	156.55	1953.8	156.79	1953.89	156.83	1953.9	157.09	1954
157.1	1954	157.27	1954.06	157.43	1954.1	157.48	1954.11	157.84	1954.2
158.08	1954.26	158.26	1954.3	158.51	1954.36	158.99	1954.3	159.31	1954.26
159.56	1954.23								

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.025	88.11	.035
		124.99	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	88.11	124.99		36.1	24.19		.1	.3

CROSS SECTION

RS: 2750.44

INPUT

Description:

[illegible]

Manning's	n Values		num=	3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.025	94.24	.035	136.35	.025

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	94.24	136.35		30.61	25.02	22.4		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN

RS: 2725.42

INPUT

Description:

[illegible]

103.48	1944.6	103.75	1944.63	103.93	1944.6	103.94	1944.6	104.53	1944.5
104.56	1944.49	105.12	1944.4	105.18	1944.39	105.71	1944.3	105.79	1944.28
106.29	1944.2	106.4	1944.18	106.87	1944.1	107.4	1944.01	107.46	1944
107.51	1944.01	107.92	1944.1	108.24	1944.17	108.25	1944.18	108.36	1944.2
108.71	1944.28	108.8	1944.3	109.16	1944.38	109.24	1944.4	109.62	1944.49
109.68	1944.5	110.07	1944.59	110.12	1944.6	110.24	1944.62	110.58	1944.7
110.67	1944.72	111.02	1944.8	111.1	1944.82	111.46	1944.9	111.52	1944.91
111.9	1945	111.94	1945.01	112.34	1945.1	112.39	1945.11	112.74	1945.2
112.75	1945.2	113.13	1945.3	113.15	1945.31	113.52	1945.4	113.55	1945.41
113.91	1945.5	113.94	1945.51	114.21	1945.6	114.24	1945.61	114.42	1945.7
114.6	1945.78	114.64	1945.8	114.83	1945.9	114.85	1945.91	115.03	1946
115.05	1946.01	115.1	1946.1	115.19	1946.14	115.32	1946.2	115.42	1946.24
115.55	1946.3	115.65	1946.34	115.77	1946.4	115.88	1946.45	116	1946.5
116.12	1946.55	116.23	1946.6	116.36	1946.65	116.46	1946.7	116.6	1946.76
116.69	1946.8	116.8	1946.85	116.92	1946.9	117.08	1946.96	117.16	1947
117.35	1947.08	117.52	1947.1	117.66	1947.12	118.29	1947.2	118.58	1947.24
119.05	1947.3	119.41	1947.35	119.81	1947.4	120.54	1947.5	120.58	1947.5
120.64	1947.52	120.9	1947.56	120.96	1947.6	121.15	1947.7	121.17	1947.71
121.35	1947.79	121.37	1947.8	121.58	1947.89	121.61	1947.9	121.81	1947.99
121.84	1948	122.04	1948.08	122.07	1948.1	122.27	1948.18	122.31	1948.2
122.5	1948.28	122.54	1948.3	122.58	1948.32	122.78	1948.4	122.82	1948.42
123.01	1948.5	123.07	1948.53	123.24	1948.6	123.31	1948.63	123.48	1948.7
123.56	1948.74	123.71	1948.8	123.81	1948.84	123.94	1948.9	124.06	1948.95
124.18	1949	124.31	1949.06	124.41	1949.1	124.57	1949.17	124.64	1949.2
124.83	1949.28	124.88	1949.3	125.1	1949.39	125.11	1949.4	125.2	1949.44
125.89	1949.47	126.35	1949.5	127.03	1949.54	128.14	1949.6	128.24	1949.61
128.46	1949.62	128.7	1949.7	128.71	1949.7	129	1949.8	129.02	1949.81
129.3	1949.9	129.33	1949.91	129.59	1950	129.63	1950.01	129.88	1950.1
130.03	1950.15	130.04	1950.15	131.19	1950.16	131.25	1950.16	131.27	1950.16
131.73	1950.2	131.98	1950.22	133.26	1950.3	133.81	1950.34	134.78	1950.4
140.82	1950.46	141.99	1950.47	142.08	1950.48	142.09	1950.48	142.1	1950.48
142.18	1950.47	144.09	1950.4	144.58	1950.38	145.1	1950.37	145.82	1950.4
146.63	1950.44	146.86	1950.5	146.99	1950.53	147.23	1950.6	147.46	1950.66
147.61	1950.7	147.73	1950.73	147.98	1950.8	148.1	1950.83	148.35	1950.9
148.47	1950.93	148.72	1951	148.83	1951.03	149.09	1951.1	149.2	1951.13
149.46	1951.2	149.57	1951.23	149.83	1951.3	150.21	1951.26	150.28	1951.3
151.45	1951.3	151.5	1951.29	152.11	1951.2	152.12	1951.2	152.64	1951.12
152.76	1951.1	153.39	1951	153.4	1951	154.02	1950.9	154.06	1950.89
154.66	1950.8	154.78	1950.78	155.29	1950.7	155.79	1950.62	156.07	1950.7
156.12	1950.71								

Manning's n Values num= 3
Sta n Val Sta n Val
0 .025 85.12 .035 125.11 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
85.12 149.83 21.47 25.25 27.5 .1 .3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN

RS: 2700.17

INPUT

Description:

Station Elevation Data		num=	234						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1948.811.389999	1948.89	380005	1948.76	11.75	1948.7712.85001	1948.76		
13.25	1948.7613.68001	1948.75	17.17	1948.7717.43001	1948.7619.65001	1948.72			
20.99001	1948.724.09001	1948.6427.76001	1948.6	29.28	1948.5931.60001	1948.57			
42.02	1948.545.86001	1948.4749.61001	1948.4	52.77	1948.3452.92001	1948.33			
53.86001	1948.3	54.59	1948.2755.24001	1948.27	59.16	1948.27	62.73	1948.3	
63.10001	1948.31	63.45	1948.3	63.65	1948.2965.04001	1948.266.35001	1948.12		
66.62	1948.168.17001	1948	68.2	194868.31001	1947.99	70.91	1947.9		
71.44	1947.88	74.01	1947.8	75.13	1947.75	76.23	1947.777.10001	1947.66	
78.50001	1947.6	79.76	1947.5580.82001	1947.582.71001	1947.42	83.27	1947.4		
84.79001	1947.3485.35001	1947.386.81001	1947.286.82001	1947.287.82001	1947.287.82001	1947.1			
88.31001	1947.0588.81001	1947	89.38	1946.9489.81001	1946.9	90.45	1946.84		
90.8	1946.8	91.55	1946.73	91.8	1946.7	92.7	1946.6192.79001	1946.6	
93.22	1946.56	93.48	1946.5	93.51	1946.49	93.94	1946.493.99001	1946.39	
94.39001	1946.3	94.48	1946.28	94.84	1946.2	95.22	1946.12	95.3	1946.1
95.7	1946.0195.75001	1946	96.19	1945.996.21001	1945.996.49001	1945.84			
96.61001	1945.896.64001	1945.7996.93001	1945.7	97.02	1945.6797.25001	1945.6			
97.38	1945.5697.57001	1945.5	97.73	1945.45	97.89	1945.498.07001	1945.34		
98.21001	1945.3	98.41	1945.2498.53001	1945.298.74001	1945.1398.85001	1945.1			
99.07001	1945.0399.17001	194599.40001	1944.9399.49001	1944.9	99.73	1944.83			
99.81001	1944.8	100.06	1944.72	100.13	1944.7	100.38	1944.62	100.45	1944.6
100.71	1944.52	100.77	1944.5	101.03	1944.42	101.09	1944.4	101.36	1944.32
101.42	1944.3	101.68	1944.22	101.74	1944.2	101.8	1944.18	102.06	1944.1
102.16	1944.07	102.38	1944	102.58	1943.94	102.7	1943.9	102.96	1943.87
106.4	1943.81	107.28	1943.8	113.07	1943.75	114.35	1943.8	116.62	1943.9
116.64	1943.9	116.67	1943.9	116.73	1943.9	116.76	1943.91	116.87	1943.92
117.22	1944	117.51	1944.07	117.66	1944.1	118.03	1944.18	118.11	1944.2
118.5	1944.29	118.55	1944.3	118.95	1944.39	118.99	1944.4	119.4	1944.49
119.43	1944.5	119.85	1944.6	119.87	1944.6	120.3	1944.7	120.32	1944.7
120.74	1944.8	120.76	1944.8	121.19	1944.9	121.2	1944.9	121.63	1945
121.64	1945	122.07	1945.1	122.08	1945.1	122.52	1945.2	122.96	1945.3
122.97	1945.3	123.4	1945.4	123.41	1945.4	123.84	1945.5	123.85	1945.5
124.29	1945.6	124.73	1945.7	125.17	1945.8	125.18	1945.8	125.61	1945.9
125.62	1945.9	126.06	1946	126.5	1946.1	126.94	1946.2	127.38	1946.3
127.39	1946.3	127.82	1946.4	127.83	1946.4	128.27	1946.5	128.71	1946.6
129.15	1946.7	129.59	1946.8	130.04	1946.9	130.48	1947	130.75	1947.06
130.92	1947.1	131.37	1947.2	131.81	1947.3	131.82	1947.3	132.26	1947.4
132.71	1947.5	133.15	1947.6	133.16	1947.6	133.6	1947.7	133.61	1947.7
134.04	1947.8	134.09	1947.81	134.49	1947.9	135.13	1947.99	135.2	1948
136.16	1948.1	136.2	1948.1	137.19	1948.2	137.2	1948.2	138.19	1948.3
138.2	1948.3	139.19	1948.4	139.2	1948.4	140.2	1948.5	141.2	1948.6
141.37	1948.62	142.2	1948.7	143.2	1948.8	143.22	1948.8	143.34	1948.81
143.39	1948.82	143.49	1948.83	144.5	1948.89	144.65	1948.9	145.83	1948.98
146.18	1949	147.12	1949.06	147.71	1949.1	148.39	1949.14	149.24	1949.2
149.61	1949.22	150.77	1949.3	150.79	1949.3	150.85	1949.31	152.05	1949.35
153.42	1949.4	153.55	1949.4	153.74	1949.41	154.6	1949.5	154.71	1949.51
155.57	1949.6	155.83	1949.63	156.55	1949.7	157.39	1949.79	158.8	1949.7
159.01	1949.69	159.53	1949.66	160.35	1949.67	161.38	1949.7		

Manning's n Values num= 3
Sta n Val Sta n Val
0 .02563.10001 .035 141.37 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
62.73 141.37 16.35 24.37 29.93 .1 .3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN

RS: 2675.8

INPUT

Description:

Station	Elevation	Data	num=	272						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	1948.9	.03	1948.91	570007	1948.863	650009	1948.84	930008	1948.76	
5.860001	1948.737	290009	1948.768	740005	1948.7517	960001	1948.720	960001	1948.65	
26.41	1948.626	540001	1948.627	640001	1948.5833	180001	1948.51	34.38	1948.5	
37.500001	1948.49	39.2	1948.4742	390001	1948.4248	430001	1948.4453	510001	1948.4	
58.63	1948.3158	800001	1948.359	120001	1948.29	59.27	1948.2959	500001	1948.3	
60.170001	1948.3262	460001	1948.463	140001	1948.4264	080001	1948.4365	310001	1948.5	
65.400001	1948.565	530001	1948.567	330001	1948.5367	730001	1948.5468	060001	1948.5	
68.240001	1948.48	68.91	1948.469	350001	1948.35	69.77	1948.3	70.34	1948.23	
70.620001	1948.271	010001	1948.1672	030001	1948.1572	420001	1948.173	010001	1948.04	
73.710001	194874.680001	1947.9475	230001	1947.976	240001	1947.8276	300001	1947.82		
76.52	1947.8176	610001	1947.82	81.41	1947.8485	120001	1947.8685	920001	1947.8	
86.460001	1947.76	87.34	1947.788	350001	1947.6388	760001	1947.690	000001	1947.51	
90.180001	1947.590	350001	1947.4991	600001	1947.4	91.66	1947.491	890001	1947.38	
92.150001	1947.3492	300001	1947.392	360001	1947.2892	650001	1947.292	780001	1947.16	
93.010001	1947.193	170001	1947.0593	360001	194793	530001	1946.9593	720001	1946.9	
93.900001	1946.8594	070001	1946.894	260001	1946.7594	420001	1946.794	620001	1946.65	
94.780001	1946.694	970001	1946.54	95.13	1946.595	330001	1946.4495	490001	1946.4	
95.690001	1946.34	95.84	1946.396	050001	1946.24	96.2	1946.296	400001	1946.14	
96.550001	1946.196	760001	1946.04	96.91	194697	110001	1945.9497	260001	1945.9	
97.470001	1945.8497	620001	1945.897	820001	1945.7497	970001	1945.798	180001	1945.64	
98.330001	1945.698	530001	1945.5498	680001	1945.598	840001	1945.4599	030001	1945.4	
99.230001	1945.3499	390001	1945.399	640001	1945.2399	740001	1945.2	100.09	1945.1	
100.1	1945.1	100.14	1945.09	100.81	1945	100.96	1944.98	101.56	1944.9	
101.83	1944.86	102.31	1944.8	102.67	1944.75	103.08	1944.7	103.46	1944.65	
103.81	1944.6	104.24	1944.54	104.56	1944.5	105.03	1944.44	105.31	1944.4	
105.83	1944.33	106.07	1944.3	106.65	1944.22	106.82	1944.2	107.49	1944.11	
107.57	1944.1	107.65	1944.09	108.45	1944	108.81	1943.96	109.22	1943.9	
109.57	1943.86	109.99	1943.8	110.16	1943.78	110.33	1943.76	110.75	1943.7	
111.27	1943.63	112.52	1943.6	115.5	1943.66	117.17	1943.7	119.85	1943.76	
121.55	1943.78	122.55	1943.79	122.67	1943.8	122.7	1943.8	123.75	1943.9	
123.88	1943.91	124.84	1944	124.91	1944.01	125.77	1944.09	125.9	1944.1	
125.93	1944.1	126.93	1944.19	127.08	1944.2	127.22	1944.21	128.23	1944.3	
128.59	1944.33	129.5	1944.4	130.45	1944.49	130.55	1944.5	130.83	1944.53	
131.06	1944.6	131.11	1944.62	131.34	1944.7	131.53	1944.76	131.64	1944.8	
131.83	1944.86	131.93	1944.9	132.12	1944.97	132.22	1945	132.42	1945.07	
132.52	1945.1	132.72	1945.17	132.81	1945.2	133.02	1945.27	133.11	1945.3	
133.32	1945.37	133.4	1945.4	133.61	1945.47	133.7	1945.5	133.91	1945.57	
133.99	1945.6	134.21	1945.67	134.29	1945.7	134.51	1945.78	134.58	1945.8	
134.81	1945.88	134.88	1945.9	135.11	1945.98	135.17	1946	135.41	1946.08	
135.47	1946.1	135.71	1946.18	135.76	1946.2	136.01	1946.28	136.05	1946.3	
136.31	1946.39	136.35	1946.4	136.61	1946.49	136.64	1946.5	136.91	1946.59	
136.94	1946.6	137.21	1946.69	137.23	1946.7	137.52	1946.8	137.53	1946.8	
137.82	1946.9	137.93	1946.94	138.1	1947	138.11	1947	138.38	1947.1	
138.39	1947.1	138.65	1947.19	138.67	1947.2	138.93	1947.29	138.95	1947.3	
139.2	1947.39	139.23	1947.4	139.48	1947.49	139.5	1947.5	139.75	1947.59	
139.78	1947.6	140.03	1947.69	140.06	1947.7	140.3	1947.79	140.34	1947.8	
140.58	1947.88	140.62	1947.9	140.86	1947.98	140.9	1948	141.13	1948.08	
141.18	1948.1	141.41	1948.18	141.46	1948.2	141.69	1948.28	141.74	1948.3	
141.96	1948.38	142.02	1948.4	142.24	1948.48	142.3	1948.5	142.52	1948.58	
142.58	1948.6	142.8	1948.68	142.86	1948.7	143.07	1948.78	143.14	1948.8	
143.35	1948.88	143.42	1948.9	143.49	1948.93	143.7	1949	143.79	1949.03	
143.98	1949.1	144.11	1949.15	144.26	1949.2	144.45	1949.27	144.52	1949.3	
144.71	1949.36	145.92	1949.3	147.48	1949.22	147.91	1949.2	148.67	1949.16	
149.14	1949.17	152.75	1949.2	160.47	1949.27	160.85	1949.3	162.11	1949.39	
162.79	1949.4	162.82	1949.4							

Manning's n Values num= 3
 Sta n Val Sta n Val
 0 .02567.330001 .035 144.52 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 59.27 144.52 25.2 25.01 25.01 .1 .3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 2650.79

INPUT

Description:

Station	Elevation	Data	num=	294						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	1948.36	.21	1948.35	1.49	1948.3	4.8	1948.23	5.96	1948.2	
6.8	1948.25	7.74	1948.2	8.05	1948.21	8.09	1948.2	8.4	1948.21	
12.98	1948.22	13.66	1948.22	15.4	1948.22	15.93	1948.21	16.15	1948.2	
16.7	1948.18	17.06	1948.2	17.64	1948.24	18.63	1948.3	19.44	1948.35	
20.2	1948.4	20.62	1948.43	20.96	1948.45	22.08	1948.44	23.15	1948.44	
24.32	1948.4	25.61	1948.36	25.77	1948.36	26.15	1948.4	26.32	1948.43	
26.67	1948.5	26.85	1948.53	27.2	1948.6	27.44	1948.65	28.18	1948.6	
28.54	1948.58	31.08	1948.5	33.97	1948.41	34.39	1948.4	37.08	1948.32	
37.62	1948.3	37.65	1948.3	40.49	1948.2	40.74	1948.19	40.75	1948.19	
40.9	1948.19	43.62	1948.1	44.54	1948.11	44.78	1948.1	45.12	1948.12	
51.81	1948.1	52.12	1948.1	54.79	1948.12	55.23	1948.1	55.48	1948.12	
55.52	1948.1	56.42	1948.08	56.76	1948.09	60.91	1948.04	65.66	1948.02	
66.05	1948.06	66.7	1948.1	66.84	1948.11	68.2	1948.2	68.27	1948.2	
68.28	1948.2	68.42	1948.2	68.61	1948.2	72.88	1948.25	75.56	1948.28	
75.85	1948.2	75.93	1948.18	76.14	1948.17	76.48	1948.1	77	1948.17	
77.19	1948.2	77.78	1948.28	78.26	1948.2	78.65	1948.13	78.84	1948.1	
79.42	1948	79.43	1948	79.47	1947.99	79.56	1947.9	79.57	1947.88	
79.65	1947.8	79.68	1947.77	79.75	1947.7	79.79	1947.66	79.84	1947.6	
79.89	1947.55	79.94	1947.5	79.99	1947.45	80.03	1947.4	80.08	1947.35	
80.13	1947.3	80.19	1947.24	80.22	1947.2	80.31	1947.1	80.32	1947.1	
80.32	1947.09	80.58	1947	80.64	1946.98	80.87	1946.9	81	1946.87	
81.23	1946.8	81.36	1946.76	81.59	1946.7	81.73	1946.66	81.95	1946.6	
82.1	1946.56	82.31	1946.5	82.47	1946.46	82.67	1946.4	82.84	1946.35	
83.03	1946.3	83.21	1946.25	83.39	1946.2	83.58	1946.15	83.75	1946.1	
83.95	1946.04	84.11	1946	84.32	1945.94	84.47	1945.9	84.7	1945.84	
84.83	1945.8	85.08	1945.73	85.19	1945.7	85.46	1945.63	85.55	1945.6	
85.84	1945.52	85.91	1945.5	86.22	1945.41	86.27	1945.4	86.61	1945.3	
86.63	1945.3	86.8	1945.25	86.96	1945.2	86.98	1945.2	87.27	1945.1	
87.32	1945.08	87.58	1945	87.68	1944.97	87.9	1944.9	88.04	1944.85	
88.21	1944.8	88.42	1944.73	88.52	1944.7	88.82	1944.6	88.83	1944.6	
89.32	1944.5	89.33	1944.49	89.78	1944.4	89.83	1944.39	90.26	1944.3	
90.33	1944.29	90.74	1944.2	90.82	1944.18	91.21	1944.1	91.31	1944.08	
91.69	1944	92.09	1943.92	92.17	1943.9	92.61	1943.81	92.72	1943.8	
92.77	1943.8	94.34	1943.7	94.89	1943.67	95.96	1943.6	96.93	1943.54	
97.57	1943.5	98.35	1943.45	99	1943.46	99.9	1943.47	101.57	1943.48	
106.54	1943.4	106.68	1943.41	108.1	1943.5	108.87	1943.55	109.61	1943.6	
110.39	1943.65	111.12	1943.7	111.9	1943.75	112.63	1943.8	113.42	1943.85	
114.15	1943.9	114.95	1943.95	115.66	1944	116.5	1944.06	117.17	1944.1	
117.49	1944.13	118.14	1944.2	118.44	1944.3	118.45	1944.3	118.51	1944.32	
118.73	1944.38	118.79	1944.4	119.05	1944.47	119.13	1944.5	119.38	1944.57	

119.48	1944.6	119.71	1944.67	119.82	1944.7	120.05	1944.77	120.17	1944.8
120.39	1944.87	120.51	1944.9	120.74	1944.96	120.86	1945	121.08	1945.06
121.2	1945.1	121.42	1945.16	121.55	1945.2	121.77	1945.26	121.89	1945.3
122.11	1945.36	122.24	1945.4	122.45	1945.46	122.58	1945.5	122.8	1945.56
122.93	1945.6	123.14	1945.66	123.27	1945.7	123.49	1945.76	123.62	1945.8
123.83	1945.86	123.96	1945.9	124.18	1945.96	124.31	1946	124.52	1946.06
124.65	1946.1	124.86	1946.16	125	1946.2	125.21	1946.26	125.34	1946.3
125.55	1946.36	125.69	1946.4	125.9	1946.46	126.03	1946.5	126.24	1946.56
126.38	1946.6	126.59	1946.66	126.72	1946.7	126.93	1946.76	127.07	1946.8
127.28	1946.86	127.41	1946.9	127.62	1946.96	127.76	1947	127.97	1947.06
128.1	1947.1	128.31	1947.16	128.45	1947.2	128.65	1947.26	128.79	1947.3
129	1947.36	129.14	1947.4	129.34	1947.46	129.48	1947.5	129.69	1947.56
129.83	1947.6	130.03	1947.66	130.17	1947.7	130.38	1947.76	130.51	1947.8
130.72	1947.86	130.86	1947.9	131.07	1947.96	131.2	1948	131.41	1948.06
131.55	1948.1	131.76	1948.16	131.89	1948.2	132.1	1948.26	132.24	1948.3
132.45	1948.36	132.58	1948.4	132.75	1948.45	132.93	1948.5	133.14	1948.56
133.27	1948.6	133.57	1948.69	133.62	1948.7	133.73	1948.73	134.38	1948.7
134.6	1948.69	136.37	1948.6	137.45	1948.55	138.37	1948.5	139	1948.51
140.66	1948.55	145.87	1948.55	148.27	1948.5	150.6	1948.53		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .025 77.78 .035 133.73 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 77.78 133.73 21.98 24.6 26.83 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2626.19

INPUT									
Description:									
Station Elevation Data num= 286									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1948.43.1599884	1948.442.809998	1948.45.799988	1948.368.909988	1948.3				
9.769989	1948.28	16.39	1948.216.48999	1948.2	16.62	1948.220.01999	1948.2		
20.09	1948.220.10999	1948.220.12999	1948.2	20.62	1948.320.80999	1948.34			
21.13999	1948.421.32999	1948.4422.21999	1948.4522.23999	1948.522.64999	1948.45				
23.69999	1948.4623.88999	1948.524.87999	1948.5	25.16	1948.44	25.34	1948.4		
25.62	1948.34	25.8	1948.3	26.09	1948.2426.25999	1948.2	26.55	1948.14	
26.70999	1948.127.16999	194827.53999	1947.9733.39999	1947.9738.95999	1947.96				
42.53999	1947.9543.78999	1947.9544.87999	1947.9646.14999	1947.9547.70999	1947.95				
51.8	1947.9354.18999	1947.91	55.91	1947.956.84999	1947.8563.92999	1947.82			
65.28999	1947.8465.75999	1947.8766.03999	1947.9	66.09	1947.94	66.16	1948		
66.23	1948.0666.26999	1948.166.34999	1948.1766.38999	1948.266.46999	1948.27				
66.50999	1948.3	66.59	1948.3766.62999	1948.466.70999	1948.4766.73999	1948.5			
66.77999	1948.5366.85999	1948.666.92999	1948.66	66.98	1948.767.05999	1948.77			
67.24	1948.868.57999	1948.7268.70999	1948.7	68.87	1948.67	69.34	1948.6		
69.48	1948.58	69.87	1948.5270.06999	1948.570.59999	1948.45	70.8	1948.4		
71.12	1948.371.12999	1948.371.44999	1948.271.45999	1948.271.77999	1948.1				
71.78999	1948.172.10999	1948	72.12	194872.43999	1947.972.44999	1947.9			
72.76999	1947.872.77999	1947.873.10999	1947.773.14999	1947.6973.41999	1947.6				
73.42999	1947.673.73999	1947.573.74999	1947.5	74.05	1947.474.06999	1947.39			
74.37	1947.374.39999	1947.2974.67999	1947.274.71999	1947.1974.99999	1947.1				
75.03999	1947.0975.30999	1947	75.37	1946.9875.62999	1946.975.68999	1946.88			
75.93999	1946.876.01999	1946.7876.24999	1946.7	76.34	1946.6776.56999	1946.6			
76.66999	1946.5776.87999	1946.576.99999	1946.4677.19999	1946.477.31999	1946.36				
77.50999	1946.377.64999	1946.2677.82999	1946.2	77.98	1946.1578.13999	1946.1			
78.30999	1946.0578.45999	194678.64999	1945.9478.76999	1945.9	78.98	1945.83			
79.09	1945.879.31999	1945.7379.39999	1945.779.64999	1945.6279.71999	1945.6				
79.98999	1945.5180.02999	1945.580.32999	1945.480.34999	1945.480.48999	1945.36				
80.69999	1945.381.07999	1945.2	81.09	1945.281.46999	1945.181.48999	1945.1			
81.85999	1945.0181.87999	194582.23999	1944.9182.26999	1944.982.62999	1944.81				
82.65999	1944.883.01999	1944.7183.04999	1944.783.39999	1944.6183.43999	1944.6				
83.78999	1944.5183.82999	1944.584.17999	1944.4184.21999	1944.484.56999	1944.31				
84.60999	1944.384.95999	1944.2185.00999	1944.2	85.34	1944.1185.39999	1944.1			
85.73	1944.0185.78999	1944	86.12	1943.9186.17999	1943.986.50999	1943.81			
86.56999	1943.886.89999	1943.7286.95999	1943.787.28999	1943.6287.34999	1943.6				
87.67999	1943.5287.73999	1943.588.06999	1943.4288.12999	1943.488.45999	1943.32				
88.52999	1943.388.67999	1943.26	89.81	1943.2390.15999	1943.2290.24999	1943.2			
92.95	1943.23	98.92	1943.3	100.58	1943.35	100.89	1943.4	101.09	1943.43
101.51	1943.5	101.91	1943.56	102.13	1943.6	102.31	1943.63	102.76	1943.7
103	1943.74	103.38	1943.8	103.99	1943.9	104	1943.9	104.03	1943.9
105.84	1944	107.58	1944.09	107.59	1944.1	107.74	1944.2	107.77	1944.22
107.88	1944.3	108.01	1944.39	108.03	1944.4	108.17	1944.5	108.2	1944.52
108.61	1944.6	108.68	1944.62	109.09	1944.7	109.23	1944.73	109.58	1944.8
109.75	1944.84	110.07	1944.9	110.27	1944.94	110.55	1945	110.77	1945.04
111.04	1945.1	111.28	1945.15	111.53	1945.2	111.78	1945.25	112.04	1945.3
112.29	1945.35	112.54	1945.4	112.8	1945.46	112.99	1945.5	113.32	1945.57
113.48	1945.6	113.84	1945.68	113.96	1945.7	114.37	1945.78	114.45	1945.8
114.89	1945.89	114.94	1945.9	115.38	1945.99	115.43	1946	115.95	1946.1
116	1946.11	116.47	1946.2	116.56	1946.22	117	1946.3	117.11	1946.32
117.52	1946.4	117.66	1946.43	118.04	1946.5	118.2	1946.53	118.56	1946.6
118.74	1946.63	119.09	1946.7	119.28	1946.74	119.61	1946.8	119.82	1946.84
120.13	1946.9	120.35	1946.94	120.66	1947	120.89	1947.04	121.18	1947.1
121.42	1947.15	121.7	1947.2	121.95	1947.25	122.22	1947.3	122.48	1947.35
122.75	1947.4	123.01	1947.45	123.27	1947.5	123.54	1947.55	123.79	1947.6
124.07	1947.65	124.32	1947.7	124.59	1947.75	124.84	1947.8	125.17	1947.86
125.36	1947.9	125.78	1947.98	125.88	1948	126.29	1948.08	129.52	1948.08
136.2	1948.1	140.57	1948.11	140.72	1948.1	140.84	1948.09	142.23	1948
143	1947.95	143.74	1947.9	144.77	1947.83	145.25	1947.8	145.7	1947.77
146.18	1947.74								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .025 67.24 .035 126.29 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 67.24 126.29 19.32 24.41 28.81 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2601.78

INPUT									
Description:									
Station Elevation Data num= 280									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1948.01.6100006	19483.910004	1947.954.110001	1947.945.410004	1947.9				
6.419998	1947.87	8.51001	1947.89.840012	1947.7611.60001	1947.7	13.7	1947.67		
13.96001	1947.6715.32001	1947.67	19.87	1947.64	23.09	1947.625.42001	1947.57		
26.58	1947.5732.47001	1947.5	35.7	1947.45	35.76	1947.4536.47001	1947.43		
38.77	1947.4738.79001	1947.48	39.02	1947.4841.56001	1947.5	42.76	1947.51		

48.69	1947.5251.03001	1947.5251.92001	1947.553.85001	1947.4656.46001	1947.4
58.83	1947.3559.64001	1947.33	59.84	1947.460.06001	1947.48
60.39001	1947.5960.42001	1947.6	60.7	1947.760.90001	1947.77
60.99001	1947.861.24001	1947.9	61.26	1947.9161.50001	1948.01
61.76	1948.161.81001	1948.12	62.02	1948.262.07001	1948.2262.28001
62.34	1948.3262.54001	1948.462.60001	1948.43	62.8	1948.5
63.06001	1948.6	63.13	1948.6363.32001	1948.763.40001	1948.73
63.77	1948.8764.31001	1948.83	64.53	1948.9	64.95
65.14001	1948.76	65.27	1948.7	65.37	1948.6665.49001
65.71001	1948.565.81001	1948.4665.93001	1948.466.04001	1948.3566.15001	1948.3
66.26	1948.25	66.38	1948.266.49001	1948.1566.60001	1948.1
66.78001	1948	66.87	1947.96	67.02	1947.9
67.39001	1947.7567.50001	1947.7	67.62	1947.6567.72001	1947.667.82001
67.94	1947.5	68.01	1947.45	68.12	1947.4
68.33	1947.2468.40001	1947.2	68.48	1947.1468.53001	1947.1
68.67001	1947	68.77	1946.9368.81001	1946.9	68.91
69.06001	1946.72	69.09	1946.769.21001	1946.6169.22001	1946.669.35001
69.36001	1946.569.43001	1946.4569.54001	1946.4	69.55	1946.4
69.8	1946.2970.00001	1946.270.04001	1946.18	70.23	1946.170.28001
70.46001	1946	70.52	1945.97	70.69	1945.9
71.00001	1945.7771.15001	1945.7	71.23	1945.66	71.38
71.61001	1945.5	71.7	1945.46	71.84	1945.4
72.21001	1945.24	72.3	1945.2	72.51	1945.11
73.74001	194574.32001	1944.9574.89001	1944.9	75.8	1944.82
76.37001	1944.77	76.94	1944.7	77.55	1944.62
78.51001	1944.5	78.97	1944.4479.07001	1944.4	79.13
79.47	1944.2479.56001	1944.279.76001	1944.12	79.8	1944.180.04001
80.05	194480.17001	1943.9580.32001	1943.9	80.61	1943.8
80.91	1943.781.17001	1943.6181.21001	1943.681.24001	1943.5981.51001	1943.5
82.21001	1943.41	82.3	1943.483.18001	1943.3584.32001	1943.3984.64001
85.33	1943.4285.53001	1943.4	85.61	1943.3986.46001	1943.3
87.39001	1943.287.90001	1943.1488.31001	1943.1	88.7	1943.0689.24001
90.40001	1943	91.16	1943.0791.43001	1943.191.67001	1943.1292.46001
92.69	1943.2293.48001	1943.3	94.45	1943.3994.51001	1943.4
95.43001	1943.595.46001	1943.596.26001	1943.59	96.33	1943.697.10001
97.21001	1943.7	97.95	1943.78	98.09	1943.898.81001
99.67001	1943.98	99.84	1944	100.53	1944.08
101.6	1944.2	102.27	1944.28	102.47	1944.3
103.71	1944.43	104.49	1944.5	104.77	1944.53
106.6	1944.7	106.91	1944.73	107.66	1944.8
109.11	1944.94	109.64	1945	110.12	1945.04
111.6	1945.19	111.64	1945.2	111.7	1945.21
112.14	1945.4	112.24	1945.45	112.39	1945.49
112.72	1945.6	112.99	1945.69	113.04	1945.7
113.6	1945.88	113.66	1945.9	113.91	1945.98
114.29	1946.1	114.54	1946.18	114.6	1946.2
115.16	1946.38	115.23	1946.4	115.47	1946.48
115.85	1946.6	116.09	1946.68	116.17	1946.7
116.72	1946.88	116.79	1946.9	117.03	1946.98
117.42	1947.1	117.66	1947.18	117.73	1947.2
121.17	1947.38	122.81	1947.37	125.71	1947.37

Manning's n Values num= 3
Sta n Val Sta n Val
0 .025 64.53 .05 121.17 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
64.53 121.17 24.17 25.19 26.43 .1 .3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 2576.59

INPUT

Description:

Station Elevation Data		num= 277									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1947.141.360001	1947.13	070007	1947.05	4.51001	1947.070007	1946.92				
7.650009	1946.97.979996	1946.8710.04001	1946.9	10.11	1946.92	11.03	1946.9				
12.04001	1946.9513.01001	1947	14.38	1947.08	14.72	1947.115.01001	1947.13				
17.60001	1947.13	18.39	1947.13	19.7	1947.14	22.05	1947.1622.06001	1947.16			
22.59	1947.12	23.13	1947.2	23.34	1947.23	23.84	1947.324.10001	1947.34			
24.54	1947.424.85001	1947.4525.24001	1947.5	25.61	1947.55	25.93	1947.6				
26.36	1947.66	26.62	1947.7	32.94	1947.79	33.19	1947.79	33.3	1947.79		
33.88	1947.77	34.18	1947.8	35	1947.87	35.28	1947.9	35.3	1947.9		
36.2	1948	36.28	1948.01	37.12	1948.1	37.28	1948.12	38.04	1948.2		
38.31001	1948.23	38.55	1948.26	38.96	1948.3	39.41	1948.35	39.87	1948.4		
40.63	1948.48	40.79	1948.541.10001	1948.53	41.46	1948.5	41.87	1948.46			
42.51	1948.4	43.48	1948.31	47.05	1948.3	48.79	1948.3	48.84	1948.3		
48.86	1948.3	50.15	1948.4	50.53	1948.43	51.45	1948.5	52.12	1948.55		
52.75	1948.6	55.68	1948.69	55.73	1948.7	58.22	1948.79	58.26	1948.79		
58.27	1948.79	59.71	1948.8	63.26	1948.7	63.51	1948.69	64.11	1948.68		
64.35001	1948.6	64.43	1948.57	64.65	1948.5	64.78	1948.46	64.96	1948.4		
65.12	1948.35	65.26	1948.3	65.44	1948.24	65.57	1948.2	65.76	1948.14		
65.87	1948.1	66.08	1948.03	66.18	1948	66.39	1947.93	66.48	1947.9		
66.7	1947.83	66.79	1947.8	67.01	1947.73	67.09	1947.767.17001	1947.67			
67.4	1947.6	67.48	1947.57	67.7	1947.5	67.79	1947.47	68	1947.4		
68.10001	1947.3768.31001	1947.3	68.41	1947.27	68.61	1947.2	68.72	1947.16			
68.91	1947.1	69.03	1947.06	69.21	1947	69.34	1946.96	69.47	1946.9		
69.60001	1946.86	69.69	1946.8	69.79	1946.76	69.88	1946.7	69.97	1946.64		
70.05	1946.6	70.14	1946.54	70.22	1946.570.31001	1946.44	70.39	1946.4			
70.48	1946.34	70.55	1946.3	70.65	1946.24	70.72	1946.2	70.82	1946.14		
70.89	1946.170.99001	1946.0471.06001	1946								
71.32	1945.84	71.39	1945.871.49001	1945.74	71.55	1945.7	71.66	1945.63			
71.72	1945.6	71.82	1945.53	71.88	1945.571.99001	1945.43	72.05	1945.4			
72.16	1945.33	72.21	1945.3	72.32	1945.23	72.4	1945.2	72.51	1945.13		
72.60001	1945.1	72.71	1945.03	72.8	1945	73.03	1944.91	73.07	1944.9		
73.18	1944.86	73.59	1944.8	73.8	1944.77	74.25	1944.7	74.61	1944.65		
74.91	1944.6	75.34	1944.54	75.57	1944.5	75.84	1944.46	76.23	1944.4		
76.58	1944.35	76.9	1944.3	77.37	1944.2377.56001	1944.2	78.14	1944.11			
78.32	1944.1	78.54	1944.09	79.79	1944	80.27	1943.9780.56001	1943.9			
80.64	1943.88	80.98	1943.8	81.36	1943.71	81.41	1943.7	81.7	1943.63		
82.03	1943.6	82.17	1943.59	83.03	1943.583.43001	1943.46	84.03	1943.4			
84.58	1943.35	85.04	1943.3	85.42	1943.26	86.04	1943.2	86.76	1943.13		
87.04	1943.187.68001	1943.06	88.03	1943.06	89.47	1943.191.32001	1943.13				
92.64	1943.2	93.2	1943.23	94.41	1943.3	95.64	1943.3796.18001	1943.4			
97.84	1943.49	97.92	1943.5	97.98	1943.5	99.25	1943.6	99.88	1943.65		
100.59	1943.7	101.49	1943.77	101.89	1943.8	102.72	1943.88	102.92	1943.9		
103.6	1943.98	103.79	1944	104.48	1944.08	104.66	1944.1	104.82	1944.12		
105.53	1944.2	105.72	1944.22	106.41	1944.3	106.61	1944.32	107.28	1944.4		
107.51	1944.43	108.16	1944.5	108.41	1944.53	109.03	1944.6	109.31	1944.63		
109.91	1944.7	110.48	1944.77	110.75	1944.77	110.98	1944.8	111.19	1944.82		
111.91	1944.9	112.14	1944.93	112.84	1945	113.08	1945.03	113.77	1945.1		
114.17	1945.14	114.71	1945.2	115.45	1945.28	115.65	1945.3	115.93	1945.33		
116.2	1945.4	116.31	1945.43	116.58	1945.5	116.82	1945.56	116.97	1945.6		
117.12	1945.64	117.35	1945.7	117.49	1945.74	117.73	1945.8	117.86	1945.83		

118.12	1945.9	118.22	1945.93	118.5	1946	118.57	1946.02	118.88	1946.1
118.9	1946.1	118.95	1946.12	119.55	1946.18	119.7	1946.2	120.3	1946.27
120.6	1946.3	121.09	1946.35	121.51	1946.4	121.96	1946.45	122.41	1946.5
123.01	1946.57	123.32	1946.6	124.08	1946.68	124.31	1946.7	124.35	1946.7
124.83	1946.73	125.73	1946.77	126.51	1946.77	127.18	1946.8	128.08	1946.81
131.75	1946.88	133	1946.9	133.98	1946.92	138.6	1947	139.97	1947.02
144.2	1947.1	144.94	1947.11						

Manning's	n Values	num=	3
Sta	n Val	Sta	n Val
0	.025	59.71	.035
			124.83
			.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	59.71	124.83		36.89	25.23		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 2551.36

INPUT

Description:

Station	Elevation	Data	num=	361					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1947.19	.41	1947.12	.54	1947.1	.58	1947.09	.86	1947
1.049	1946.94	1.16	1946.9	1.45	1946.81	1.471	1946.81.529999	1946.78	
2.23999	1946.78	4.48999	1946.754	8.30002	1946.84	8.39996	1946.81	4.87999	1946.8
5.080002	1946.786	7.89993	1946.78	11.9995	1946.638	7.99988	1946.69	7.29996	1946.55
10.47	1946.5211	14.999	1946.611	6.8999	1946.6711	8.1999	1946.7	11.89	1946.72
12.22	1946.812	4.0999	1946.85	12.61	1946.912	8.7999	1946.9713	0.0999	1947
13.33	1947.0813	4.0999	1947.1	13.48	1947.1213	7.9999	1947.213	9.2999	1947.23
14.2	1947.3	14.45	1947.35	14.59	1947.4	14.75	1947.4614	8.1999	1947.49
14.86	1947.49	14.87	1947.514	8.7999	1947.5	15.17	1947.615	1.8999	1947.61
15.45999	1947.715	5.0999	1947.7115	7.5999	1947.8	15.83	1947.82	16.06	1947.9
16.17	1947.9416	3.4999	194816	5.1999	1948.0616	6.4999	1948.116	8.9999	1948.19
16.93999	1948.217	0.4999	1948.2317	2.3999	1948.2	17.75	1948.11	17.81	1948.1
17.84999	1948.0917	8.7999	1948.1	17.92	1948.1118	2.8999	1948.2	18.47	1948.25
18.59	1948.21	18.62	1948.2	18.87	1948.12	18.95	1948.1	19.17	1948.03
19.27999	194819	4.6999	1947.9419	6.0999	1947.919	7.8999	1947.8519	9.2999	1947.8
20.09999	1947.7520	2.5999	1947.7	20.42	1947.65	20.59	1947.6	20.74	1947.55
20.92	1947.521	1.7999	1947.4221	2.4999	1947.421	3.1999	1947.38	21.48	1947.4
21.60999	1947.4522	0.3999	1947.45	22.2	1947.422	4.2999	1947.3322	5.2999	1947.3
22.81999	1947.2123	8.2999	1947.2724	2.4999	1947.29	24.42	1947.324	9.5999	1947.32
25.06999	1947.425	10.999	1947.43	25.2	1947.525	2.7999	1947.55	25.34	1947.6
25.42999	1947.67	25.48	1947.725	5.6999	1947.7725	6.0999	1947.825	7.1999	1947.88
25.74999	1947.9	25.87	1947.99	25.88	1948	25.95	1948.0526	0.0999	1948
26.02	1947.99	26.12	1947.926	1.4999	1947.88	26.23	1947.8	26.27	1947.77
26.34999	1947.726	3.8999	1947.6626	4.5999	1947.626	5.0999	1947.5526	5.6999	1947.5
26.63999	1947.4426	6.7999	1947.426	7.8999	1947.3	26.8	1947.2927	6.3999	1947.2
28.34	1947.128	7.7999	1947.04	29.16	1947.04	29.55	1947.0530	6.4999	1947.1
30.73	1947.1430	8.4999	1947.230	9.6999	1947.26	31.05	1947.331	1.7999	1947.37
31.24	1947.431	3.8999	1947.4731	4.3999	1947.531	5.9999	1947.5831	6.3999	1947.6
31.81999	1947.69	31.84	1947.731	9.6999	1947.7732	2.4999	1947.832	3.4999	1947.81
33.12	1947.9	33.62	1947.9633	9.9999	194834	5.7999	1948.0735	2.5999	1948.01
35.38999	194836	2.5999	1947.9336	5.7999	1947.9	37.24	1947.8437	7.4999	1947.8
38.2	1947.7638	8.9999	1947.739	1.4999	1947.68	40.02	1947.640	0.7999	1947.6
40.31999	1947.57	40.81	1947.5	41.23	1947.44	42.77	1947.43	46.67	1947.42
46.99	1947.447	7.0999	1947.36	48.95	1947.349	2.8999	1947.28	50.17	1947.2
50.56999	1947.1651	2.1999	1947.1	52.92	1947.07	53.31	1947	53.67	1946.91
53.71999	1946.9	53.95	1946.84	54.34	1946.85	55.06	1946.86	55.38	1946.85
56.07999	1946.83	57.05	1946.8359	0.6999	1946.8159	2.7999	1946.8	61.73	1946.71
61.84	1946.762	5.7999	1946.6463	0.6999	1946.6763	1.7999	1946.6863	2.8999	1946.7
63.38999	1946.72	63.87	1946.864	2.5999	1946.87	64.45	1946.964	4.9999	1946.91
64.92999	1946.91	64.95	1946.9	64.98	1946.89	65.17	1946.865	2.0999	1946.78
65.38999	1946.765	4.2999	1946.6865	6.0999	1946.6	65.66	1946.5865	8.2999	1946.5
65.88999	1946.47	66.05	1946.4	66.12	1946.37	66.27	1946.366	3.5999	1946.26
66.49	1946.266	5.9999	1946.1566	7.0999	1946.166	8.5999	1946.0366	9.2999	1946
67.13	1945.967	1.3999	1945.9	67.17	1945.89	67.48	1945.867	5.3999	1945.78
67.84	1945.767	9.5999	1945.6768	1.8999	1945.6	68.48	1945.55	68.84	1945.5
69.09999	1945.4769	5.7999	1945.4	69.67	1945.3969	8.9999	1945.3670	0.3999	1945.31
70.07999	1945.370	3.1999	1945.2270	3.8999	1945.2	70.62	1945.13	70.7	1945.1
70.92	1945.03	71.02	1945	71.3	1944.93	71.42	1944.9	71.8	1944.81
71.85999	1944.8	72.24	1944.7172	3.1999	1944.772	3.2999	1944.7	72.92	1944.6
72.99	1944.5973	5.0999	1944.5	73.63	1944.4874	0.9999	1944.474	2.4999	1944.37
74.67999	1944.375	1.4999	1944.2275	2.4999	1944.2	75.48	1944.1677	7.1999	1944.1
79.84	1944.04	80.34	194480	4.5999	1943.99	81.48	1943.9	81.77	1943.87
82.62	1943.8	83.05	1943.7684	3.7999	1943.786	0.3999	1943.6286	5.0999	1943.6
86.7	1943.59	88.03	1943.53	88.64	1943.53	89.41	1943.53	89.75	1943.53
89.95	1943.51	90	1943.590	6.7999	1943.4290	8.4999	1943.490	9.8999	1943.38
91.7	1943.3	92.28	1943.2393	3.2999	1943.297	0.3999	1943.2797	5.1999	1943.3
98.8	1943.3998	9.2999	1943.4	99.28	1943.42	101.56	1943.5	102.92	1943.55
103.54	1943.6	103.77	1943.62	104.67	1943.7	105.74	1943.79	105.8	1943.8
105.93	1943.81	109.77	1943.9	110.26	1943.96	110.47	1944	110.57	1944.02
110.98	1944.1	111.16	1944.14	111.48	1944.2	111.71	1944.24	111.99	1944.3
112.23	1944.35	112.5	1944.4	112.75	1944.45	113	1944.5	113.26	1944.55
113.51	1944.6	113.78	1944.65	114.01	1944.7	114.29	1944.75	114.52	1944.8
114.8	1944.85	115.03	1944.9	115.31	1944.96	115.53	1945	115.82	1945.06
116.04	1945.1	116.32	1945.16	116.54	1945.2	116.83	1945.26	117.05	1945.3
117.34	1945.36	117.56	1945.4	117.88	1945.46	118.33	1945.5	118.66	1945.52
120.71	1945.6	121.77	1945.64	122.49	1945.7	122.62	1945.71	123.67	1945.8
123.94	1945.82	124.85	1945.9	125.2	1945.93	126.03	1946	126.44	1946.03
127.21	1946.1	128.06	1946.17	128.39	1946.2	129.53	1946.3	129.57	1946.3
129.68	1946.31	131.28	1946.4	131.79	1946.43	132.75	1946.48	133.04	1946.5
133.85	1946.55	134.81	1946.6	135.79	1946.66	136.58	1946.7	137.68	1946.76
138.34	1946.8	139.07	1946.84	140.11	1946.9	141.01	1946.95	141.87	1947
143.06	1947.07	143.64	1947.1	145.31	1947.19	145.41	1947.2	145.63	1947.21
147.01	1947.24								

Manning's	n Values	num=	3
Sta	n Val	Sta	n Val
0	.02564	9.2999	.035
			118.33
			.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	64.45	117.88		19.09	24.92		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 2526.44

INPUT

Description:

Station	Elevation	Data	num=	269					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1944.511	6.10001	1944.572	5.20004	1944.64	0.99991	1944.655	4.90005	1944.7
6.529999	1944.738	4.59991	1944.88	7.70004	1944.819	4.90005	1944.8312	5.3999	1944.86

15.39999	1944.9	22.92	1944.98	23.23	1944.97	24.88	1944.92	25.42	1944.92
25.86	1944.91	26.17	1944.91	26.45	1944.93	26.56	1944.93	32.37	1944.9
34.6	1944.8935	43999	1944.88	35.47	1944.88	35.7	1944.88	36.21	1944.9
38.15	1944.99	38.35	1945	38.43	194538	50999	1945	39.58	1944.95
42.7	1944.94	44.58	1944.94	45.8	1945	47.21	1945.07	47.82	1945.1
48.1	1945.11	48.99	1945.14	49.83	1945.150	75999	1945.19	50.91	1945.2
51.00999	1945.21	51.29	1945.22	52.03	1945.26	52.91	1945.24	53.71	1945.22
54.59	1945.3	55.4	1945.37	55.71	1945.3	55.92	1945.23	55.99	1945.2
56.08	1945.17	56.28	1945.1	56.38	1945.07	56.57	1945	56.67	1944.96
56.85	1944.9	56.98	1944.85	57.14	1944.8	57.32	1944.74	57.42	1944.7
57.65	1944.62	57.97	1944.7	58.04	1944.72	58.16	1944.758	58.18999	1944.7
58.83	1944.6	59.03	1944.57	59.5	1944.5	59.91	1944.44	60.18	1944.4
60.54	1944.35	60.85	1944.3	61.16	1944.26	61.53	1944.2	61.75	1944.17
62.2	1944.1	62.29	1944.09	62.49	1944.06	62.6	1944	62.79	1943.9
62.8	1943.89	62.99	1943.8	63.17	1943.7	63.18	1943.7	63.25	1943.67
63.63	1943.63	64.04	1943.6	64.66	1943.55	65.24	1943.5	65.74	1943.45
66.39	1943.4	67.07	1943.3467	50999	1943.3	68.32	1943.22	68.59	1943.2
69.52	1943.11	69.67	1943.1	70.68	1943	70.73	1943	71.35	1942.94
71.78	1942.91	71.84	1942.971	93999	1942.89	73.06	1942.8	73.72	1942.75
74.27	1942.7	74.68	1942.67	75.74	1942.62	75.96	1942.61	76.11	1942.6
76.18999	1942.59	77.47	1942.5	78.23	1942.45	78.86	1942.4	79.91	1942.33
80.28	1942.3	81.89	1942.21	82	1942.2	82.1	1942.19	82.56	1942.17
83.42	1942.16	84.98	1942.15	85.49	1942.16	86.27	1942.1	86.82	1942.07
88.00999	1942.09	88.57	1942.1	91.1	1942.14	91.35	1942.1	91.41	1942.09
91.98	1942	92.28	1941.95	92.61	1941.9	93.03	1941.83	93.56	1941.9
93.92999	1941.95	94.37	1942	95.02	1942.0895	17999	1942.1	95.98	1942.2
95.99	1942.2	96	1942.2	96.05	1942.2	96.07	1942.21	96.3	1942.2
97.47	1942.15	98.39	1942.17	99.82	1942.2	100.87	1942.22	101.29	1942.25
101.52	1942.3	101.53	1942.3	102.06	1942.4	102.29	1942.44	102.61	1942.5
102.62	1942.5	103.17	1942.6	103.19	1942.6	103.72	1942.7	103.77	1942.71
104.28	1942.8	104.34	1942.81	104.84	1942.9	104.93	1942.92	105.39	1943
105.52	1943.02	105.95	1943.1	106.12	1943.13	106.5	1943.2	106.74	1943.24
107.06	1943.3	107.38	1943.36	107.62	1943.4	108.06	1943.48	108.17	1943.5
108.49	1943.56	108.73	1943.6	108.75	1943.6	109.3	1943.7	109.42	1943.72
109.87	1943.8	110.33	1943.79	110.48	1943.78	111.32	1943.77	112.16	1943.8
112.68	1943.72	112.85	1943.7	113.03	1943.67	113.38	1943.7	113.53	1943.71
114.7	1943.8	114.82	1943.81	115.15	1943.82	116.19	1943.84	117.63	1943.81
118.23	1943.83	118.81	1943.85	118.92	1943.85	119.87	1943.9	120.41	1943.94
121.73	1944	121.96	1944.02	122.87	1944.1	122.97	1944.11	123.09	1944.12
123.18	1944.1	123.22	1944.09	123.62	1944	123.81	1943.96	123.83	1943.94
123.85	1943.9	124.44	1943.85	127.65	1943.86	128.84	1943.8	129.55	1943.76
129.63	1943.76	130.38	1943.8	131.44	1943.86	132.51	1943.86	133.26	1943.86
133.96	1943.8	134.34	1943.76	134.91	1943.7	135.77	1943.6	138.34	1943.6
138.52	1943.6	140.51	1943.7	142.29	1943.79	142.53	1943.8	143.05	1943.85
143.64	1943.9	143.85	1943.92	144.1	1944	144.18	1944.03	144.42	1944.1
144.55	1944.14	144.73	1944.2	144.9	1944.25	145.05	1944.3	145.22	1944.35
145.36	1944.4	145.56	1944.46	145.68	1944.5	145.91	1944.57	145.99	1944.6
146.27	1944.69	146.31	1944.7	146.55	1944.78	146.82	1944.79	147.15	1944.8
148.18	1944.84	149.6	1944.89	149.61	1944.9	149.72	1945	149.73	1945.01
149.82	1945.1	149.85	1945.12	149.93	1945.2	149.96	1945.23	150.03	1945.3
150.07	1945.34	150.14	1945.4	150.18	1945.44	150.24	1945.5	150.31	1945.56
150.35	1945.6	150.62	1945.56	150.77	1945.5	150.92	1945.44		

Manning's n Values
 Sta n Val Sta n Val
 0 .025 55.4 .035 122.97 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 55.4 122.87 44.23 24.96 30.79 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2501.48

INPUT									
Description:									
Station Elevation Data num= 128									
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
0 1942.18	.36	1942.1	1.15	1941.94	1.9	1941.8	2.03	1941.74	
2.25	1941.63	2.83	1941.53	3.22	1941.5	3.92	1941.49	4.52	1941.5
4.530003	1941.374	560001	1941.34	580002	1941.25	4.59	1941.24	650002	1940.9
4.66	1940.84	670002	1940.75	4.68	1940.7	4.69	1940.6	4.7	1940.44
4.71	1939.934	720001	1939.78	4.73	1939.74	740002	1939.6	4.75	1939.5
4.77	1939.224	780003	1937.74	780003	1937.84	810001	1937.575	150002	1937.52
5.66	1937.456	030003	1937.46	440002	1937.34	6.98	1937.38	110001	1937.21
8.400002	1937.17	9.57	1937.07	11.04	1936.96	11.65	1936.9	12.04	1936.87
12.77	1936.8	13.78	1936.7	14.02	1936.68	15.9	1936.6	16.96	1936.55
18.08	1936.5	19.96	1936.41	20.32	1936.39	20.69	1936.4	21.34	1936.41
22.5	1936.49	23.71	1936.58	23.95	1936.6	24.95	1936.67	25.31	1936.7
26.19	1936.77	26.7	1936.8	27.46	1936.86	28.1	1936.9	28.74	1936.95
29.53	1937	30.93	1937.1	32.12	1937.18	32.39	1937.2	33.8	1937.29
34.92	1937.36	35.08	1937.44	35.19	1937.5	35.39	1937.82	35.4	1938
35.42	1938.45	35.43	1938.62	35.44	1938.72	35.45	1938.92	35.46	1939.02
35.47	1939.22	35.48	1939.42	35.49	1939.52	35.5	1939.72	35.51	1939.86
35.52	1940.04	35.53	1940.81	35.53	1940.71	35.53	1940.51	35.54	1940.32
35.54	1940.42	35.54	1940.58	35.54	1940.68	35.55	1940.4	35.63	1941.41
35.64	1941.5	35.68	1941.7	35.7	1941.8	37.49	1941.9	37.74	1941.98
37.78	1942.03	37.98	1942.11	38.41	1942.14	38.55	1942.2	38.68	1942.26
39.14	1942.46	39.37	1942.56	39.6	1942.66	40.98	1943.26	41.21	1943.36
41.44	1943.46	41.67	1943.56	41.9	1943.65	42.18	1943.75	42.31	1943.8
42.48	1943.86	42.81	1943.96	43.14	1944.07	43.7	1944.26	44.26	1944.1
44.62	1944	44.81	1943.94	45.2	1943.83	45.58	1943.73	45.96	1943.62
47.08	1943.3	47.44	1943.2	48.14	1943	48.42	1942.9	48.92	1942.7
49.35	1942.6	51.03	1942.56	52.2	1942.55				

Manning's n Values
 Sta n Val Sta n Val
 0 .025 4.52 .013 35.7 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 4.52 35.7 20.64 15.87 22.6 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2485.61

INPUT									
Description: Upstream of N 5th Street Culvert									
Station Elevation Data num= 96									
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
0 1942.16	.64	1942.2	.78	1942.31	.83	1942.4	.86	1942.46	
.86	1942.4	.86	1942.38	.86	1942.3	.86	1942.27	.86	1942.2
.86	1942.15	.87	1941.71	.88	1941.6	.88	1941.67	.89	1941.2
.9	1940.79	.91	1940.3	.92	1939.79	.93	1939.29	.94	1938.71

.95 1938.26	.96 1937.7	.97 1937.08	.98 1936.38	.99 1935.94
1 1935.8	1.01 1935.29	1.02 1934.79	1.03 1934.29	1.04 1933.79
1.05 1933.29	1.06 1932.69	1.07 1932.19	1.08 1931.69	1.09 1931.19
1.1 1930.58	1.11 1930.07	1.12 1929.6	1.13 1929.44	2.15 1929.3
2.6 1929.26	3.42 1929.22	3.86 1929.2	4.17 1929.2	5.23 1929.18
5.82 1929.17	6.37 1929.15	6.86 1929.15	8.14 1929.16	9.22 1929.2
9.61 1929.22	11.36 1929.3	11.73 1929.33	12.85 1929.4	13.32 1929.44
13.5 1929.5	13.52 1929.8	13.53 1930.2	13.54 1930.7	13.55 1931.2
13.56 1931.6	13.57 1932.1	13.58 1932.6	13.59 1933	13.6 1933.5
13.61 1934	13.62 1934.4	13.63 1934.9	13.64 1935.4	13.65 1935.8
13.66 1936.3	13.67 1936.7	13.68 1937.2	13.69 1937.7	13.7 1938
13.71 1938.6	13.72 1939.1	13.73 1939.5	13.74 1940	13.75 1940.4
13.76 1940.9	13.77 1941.4	13.78 1941.81	13.79 1941.9	13.79 1941.8
13.8 1942.4	13.8 1942.41	13.8 1942.5	13.8 1942.54	13.81 1942.48
13.83 1942.36	13.85 1942.3	13.86 1942.25	14.1 1942.27	14.18 1942.2
14.43 1942.11				

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .025	.86 .013	13.8 .025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
.86	13.8	85.04 85.71	86.5		.1	.3

CULVERT

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 2484.00

INPUT

Description: Culvert crossing under North 5th Street

Distance from Upstream XS =	1
Deck/Roadway Width =	70
Weir Coefficient =	2.6
Upstream Deck/Roadway Coordinates	
num=	2
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord
.86 1942.46 1929.1	13.8 1942.54 1929.1

Upstream Bridge Cross Section Data	num=	96
Station Elevation Data	Sta Elev	Sta Elev
0 1942.16	.64 1942.2	.78 1942.31
.86 1942.4	.86 1942.38	.86 1942.27
.86 1942.15	.87 1941.71	.88 1941.6
.9 1940.79	.91 1940.3	.92 1939.79
.95 1938.26	.96 1937.7	.97 1937.08
1 1935.8	1.01 1935.29	1.02 1934.79
1.05 1933.29	1.06 1932.69	1.07 1932.19
1.1 1930.58	1.11 1930.07	1.12 1929.6
2.6 1929.26	3.42 1929.22	3.86 1929.2
5.82 1929.17	6.37 1929.15	6.86 1929.15
9.61 1929.22	11.36 1929.3	11.73 1929.33
13.5 1929.5	13.52 1929.8	13.53 1930.2
13.56 1931.6	13.57 1932.1	13.58 1932.6
13.61 1934	13.62 1934.4	13.63 1934.9
13.66 1936.3	13.67 1936.7	13.68 1937.2
13.71 1938.6	13.72 1939.1	13.73 1939.5
13.76 1940.9	13.77 1941.4	13.78 1941.81
13.8 1942.4	13.8 1942.41	13.8 1942.5
13.83 1942.36	13.85 1942.3	13.86 1942.25
14.43 1942.11		

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .025	.86 .013	13.8 .025

Bank Sta: Left	Right	Coeff	Contr.	Expan.
.86	13.8		.1	.3

Downstream Deck/Roadway Coordinates

num=	2
Sta Hi Cord Lo Cord	Sta Hi Cord Lo Cord
.16 1937.46 1927.94	11.99 1935.4 1927.92

Downstream Bridge Cross Section Data	num=	13
Station Elevation Data	Sta Elev	Sta Elev
0 1937.43	.16 1937.46	.16 1929.87
.61927.939	5.31 1927.93	5.4 1927.93
11.93 1927.92	11.99 1935.4	12.09 1935.7

Manning's n Values	num=	1
Sta n Val	Sta n Val	Sta n Val
0 .013		

Bank Sta: Left	Right	Coeff	Contr.	Expan.
.16	11.99		.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	=	.98
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	4	12
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
1	67	.013	.013
Upstream Elevation = 1929.4			
Centerline Station = 7.38			
Downstream Elevation = 1927.93			
Centerline Station = 6.06			

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 2399.9

INPUT

Description: Downstream of N. 5th Street Culvert Crossing

Station	Elevation	Data	num=	13	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1937.43	.16	1937.46	.16	1929.87	.17	1929.01	.18	1927.94			
.61	1927.939	5.31	1927.93	5.4	1927.93	5.85	1927.93	7.01	1927.93			
11.93	1927.92	11.99	1935.4	12.09	1935.7							

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	.16	11.99		23.41 23.41	23.41		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 2376.49

INPUT

Description:

Station	Elevation	Data	num=	18	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1937.45	.15	1937.43	.17	1935.82	.17	1927.75	5.67	1927.75			
6.03	1927.74	6.19	1927.74	6.42	1927.75	6.94	1927.75	11.56	1927.8			
11.84	1927.76	12.07	1927.72	12.11	1927.72	12.14	1930.34	12.24	1937.46			
12.35	1937.47	12.4	1937.47	12.48	1937.48							

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	.15	12.24		25 25	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 2351.49

INPUT

Description:

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1937.47	.22	1937.44	.25	1935.67	.37	1927.53	.44	1927.52			
1.19	1927.47	3.97	1927.42	5.83	1927.43	9.66	1927.43	11.19	1927.48			
11.88	1927.51	12.17	1927.51	12.22	1930.46	12.33	1937.46	12.48	1937.45			

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	.22	12.33		50 50	50		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 2301.49

INPUT

Description:

Station	Elevation	Data	num=	26	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1937.48	.25	1937.47	.25	1937.45	.29	1934.95	.43	1926.92			
.68	1926.92	.77	1926.92	.99	1926.91	1.03	1926.91	6.04	1926.8			
6.17	1926.8	7.11	1926.8	8.58	1926.83	11.44	1926.91	11.86	1926.92			
11.87	1926.92	11.88	1926.92	11.9	1926.92	11.95	1926.93	11.97	1926.94			
12.16	1926.97	12.19	1928.02	12.26	1931.37	12.39	1937.36	12.42	1937.38			
12.88	1937.38											

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	.25	12.39		25 25.01	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 2276.48

INPUT

Description:

Station	Elevation	Data	num=	20	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1937.17	.059	1937.17	.06	1937.17	.23	1937.16	.33	1928.39			
.35	1926.66	.59	1926.65	.92	1926.63	2.78	1926.6	4.79	1926.55			
6.08	1926.55	7.18	1926.54	9.03	1926.61	11.86	1926.67	12.02	1926.69			
12.09	1926.69	12.25	1934.29	12.3	1936.86	12.51	1936.82	12.99	1936.84			

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	.23	12.3		50.02 50	49.99		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 2226.48

INPUT

Description:

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1936.19	.39	1936.13	.48	1929.53	.53	1926.01	2.11	1925.99			
5.85	1925.92	6.09	1925.91	6.28	1925.91	7.86	1925.92	8.59	1925.96			
11.81	1926.11	12.08	1926.11	12.18	1931.27	12.23	1934.91	12.86	1935.02			

Manning's n Values num= 1
 Sta n Val
 0 .013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .39 12.23 25 25 25 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2201.48

INPUT

Description:

Station	Elevation	Data	num=	14	Sta	Elev	Sta	Elev	Sta	Elev
0	1935.69	.45	1935.62	.55	1927.48	.58	1925.71	3.95	1925.66	
6.11	1925.62	6.36	1925.62	10.19	1925.72	11.76	1925.77	11.87	1925.78	
12.11	1925.78	12.14	1928.27	12.24	1934.73	12.54	1934.77			

Manning's n Values num= 1
 Sta n Val
 0 .013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .45 12.24 25 25 25 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2176.48

INPUT

Description:

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev
0	1935.14	.23	1935.1	.27	1931.91	.35	1925.4	2.34	1925.37	
6.16	1925.39	10.83	1925.42	11.16	1925.42	11.31	1925.42	11.4	1925.42	
11.48	1925.43	11.86	1925.45	11.94	1930.87	12	1934.74	12.12	1934.76	

Manning's n Values num= 1
 Sta n Val
 0 .013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .23 12 25 25 25 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2151.48

INPUT

Description:

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev
0	1934.71	.13	1934.69	.2	1931.22	.33	1925.08	3.55	1925.09	
5.66	1925.1	5.99	1925.1	6.87	1925.12	11.67	1925.2	11.92	1932.86	
11.96	1933.77	11.98	1934.74	12	1934.74	12.03	1934.73	12.13	1934.73	

Manning's n Values num= 1
 Sta n Val
 0 .013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .13 11.98 25.18 25 24.82 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2126.48

INPUT

Description:

Station	Elevation	Data	num=	14	Sta	Elev	Sta	Elev	Sta	Elev
0	1934.51	.003	1934.51	.08	1934.5	.08	1934.45	3199997	1924.77	
2.559999	1924.79	5.69	1924.81	5.94	1924.819	459999	1924.87	11.7	1924.92	
11.79	1927.67	11.95	1934.72	12.09	1934.71	12.23	1934.7			

Manning's n Values num= 1
 Sta n Val
 0 .013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .08 11.95 25.01 25.01 25.01 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2101.47

INPUT

Description:

Station	Elevation	Data	num=	14	Sta	Elev	Sta	Elev	Sta	Elev
0	1934.63	.22	1934.62	.27	1934.62	.51	1925.92	.55	1924.72	
.55	1924.52	1.95	1924.53	5.63	1924.54	8.48	1924.55	9.15	1924.56	
11.98	1924.63	12.05	1929.4	12.17	1934.71	12.31	1934.7			

Manning's n Values num= 1
 Sta n Val
 0 .013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 .27 12.17 25 25.01 25.01 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 2076.46

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1930.09	.32	1930.09	.37	1924.45	.37	1924.29	.7	1924.29
5.09	1924.34	12.25	1924.42	12.25	1924.71	12.31	1930.13	12.81	1930.14
12.83	1930.14	12.88	1929.18	13	1929.2				

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
.32 12.31 25 25.01 25.01 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 2051.45

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1929.41	.16	1929.4	.17	1924.22	.17	1924.16	4.42	1924.15
11.97	1924.15	11.98	1924.15	12.03	1924.15	12.06	1929.45	12.06	1929.46
12.14	1929.45								

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
.16 12.06 24.83 24.93 25.12 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 2026.52

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1929.43	.07	1929.62	.08	1929.19	.16	1923.85	1.85	1923.85
1.91	1923.85	2.96	1923.84	4.02	1923.85	12.1	1923.9	12.1	1924.84
12.13	1929.45	12.24	1929.45	12.28	1929.45				

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
.07 12.13 25 25 25.02 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 2001.52

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1928.9	.03	1928.9	.16	1923.47	.49	1923.48	3.84	1923.52
11.96	1923.62	11.98	1926.37	11.99	1929.45	12.27	1929.15	12.57	1928.79
12.6	1928.79	12.61	1928.74	13.05	1928.65				

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 11.99 25.02 25 25 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 1976.52

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1925.94	.9	1925.91	.97	1923.2	4.77	1923.24	12.32	1923.33
12.81	1923.34	12.85	1928.5	12.86	1928.76	12.86	1928.79	12.89	1928.79
12.9	1928.74	13.46	1928.73	13.54	1928.1	13.54	1928.13	14.06	1928.23

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
.9 12.86 25.12 25 25 .1 .3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN RS: 1951.52

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-8.8	1928	-8.52	1924	0	1923.01	3.15	1922.92	3.22	1922.92
7.1	1922.96	15.09	1923.03	15.12	1927.05	15.13	1928.15	15.26	1928.14
15.71	1928.12	16.47	1928.32						

Manning's n Values num= 1

Sta	n Val
-8.8	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
-8.8	15.13	75.59	74.96	75.08		.1	.3
Ineffective Flow	num=	1					
Sta L Sta R	Elev	Permanent					
-8.8	0	1929.5	F				

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1876.56

INPUT

Description:

Station	Elevation	Data	num=	13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.85	.16	1927.02	.18	1924.17	.23	1922.08	4.37	1922.11
4.48	1922.11	12.15	1922.08	12.18	1923.61	12.22	1926.79	12.46	1926.8
12.9	1926.8	12.94	1926.61	13.83	1926.31				

Manning's n	Values	num=	1
Sta	n Val		
0	.013		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
.16	12.22	25	25	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1851.56

INPUT

Description:

Station	Elevation	Data	num=	17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.79	.19	1926.84	.36	1926.84	.8	1926.87	.82	1925.41
.86	1921.83	5.18	1921.82	9.63	1921.8	12.78	1921.78	12.8	1923.19
12.85	1926.8	13	1926.8	13.5	1926.8	13.52	1926.6	13.85	1926.47
13.89	1926.25	14.3	1926.3						

Manning's n	Values	num=	1
Sta	n Val		
0	.013		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
.8	12.85	25.01	25	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1826.56

INPUT

Description:

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.93	.18	1926.92	.27	1926.93	.35	1922.31	.36	1921.6
2.11	1921.59	4.71	1921.57	12.2	1921.52	12.26	1926.03	12.27	1926.77
12.74	1926.77	12.85	1926.77	12.92	1926.12	13.59	1925.85		

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
0	.013	12.2	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
.27	12.27	25	25	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1801.56

INPUT

Description:

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.88	.16	1926.87	.19	1924.12	.24	1921.28	4.68	1921.24
6.5	1921.23	12.01	1921.24	12.05	1924.05	12.08	1926.79	12.38	1926.79
12.67	1926.79	12.69	1926.12	12.74	1925.72	13.32	1925.5		

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
0	.013	12.08	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
.16	12.08	25	25	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1776.56

INPUT

Description:

Station	Elevation	Data	num=	16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.83	.22	1926.79	.22	1926.34	.27	1920.94	1.95	1920.94
4.85	1920.95	12.02	1920.96	12.06	1925.95	12.07	1926.82	12.15	1926.82
12.7	1926.81	12.71	1926.52	12.74	1925.31	12.97	1925.32	13	1925.31
13.25	1925.22								

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
0	.013	12.07	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
.22	12.07	24.9	24.98	25.08		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1751.58

INPUT

Description:

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.86	.13	1926.88	.44	1926.82	.47	1923.65	.5	1920.72			
5.28	1920.71	12.23	1920.7	12.31	1920.7	12.36	1926.76	12.36	1926.8			
12.95	1926.77	12.95	1926.75	12.97	1924.77	12.99	1924.77	13.2	1924.78			

Manning's n Values

num= 2

Sta	n Val	Sta	n Val
0	.013	12.36	.025

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	.44	12.36	25	25.01	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 1726.57

REACH: FL-ALIGN

INPUT

Description:

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.78	.51	1926.86	.55	1926.85	.6	1920.94	.61	1920.5			
2.37	1920.5	5.6	1920.46	11.16	1920.39	11.17	1921.09	11.19	1926.76			
11.77	1926.71	11.84	1926.7	11.89	1924.94	11.89	1924.71	12.95	1924.45			

Manning's n Values

num= 2

Sta	n Val	Sta	n Val
0	.013	11.19	.025

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	.55	11.19	25.01	25	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 1701.57

REACH: FL-ALIGN

INPUT

Description:

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1926.81	.071	1926.82	.12	1924.43	.15	1920.21	3.11	1920.16			
5.4	1920.13	9.34	1920.08	9.36	1922.98	9.37	1926.77	9.61	1926.78			
10.01	1926.74	10.03	1925.73	10.74	1925.2	10.77	1924.11	12.18	1924.27			

Manning's n Values

num= 2

Sta	n Val	Sta	n Val
0	.013	9.37	.025

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	0	9.37	39.81	34.17	29.44		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

RS: 1667.4

REACH: FL-ALIGN

INPUT

Description: Upstream of Losee Crossing

Station	Elevation	Data	num=	21	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1924.47	3.09	1924.45	3.11	1926.62	3.35	1926.74	3.46	1926.74			
3.49	1926.74	4.24	1926.74	4.25	1926.74	4.46	1919.81	4.46	1919.74			
8.19	1919.72	11.93	1919.71	14.5	1919.7	14.51	1920.87	14.56	1924.58			
15.23	1924.43	15.3	1924.71	15.36	1924.44	15.37	1923.83	15.49	1923.64			
18.95	1923.83											

Manning's n Values

num= 1

Sta	n Val
0	.013

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	4.24	14.56	142.41	137.6	131.13		.1	.3

CULVERT

RIVER: FL-ALIGN

RS: 1660

REACH: FL-ALIGN

INPUT

Description: Culvert Crossing @ Losee

Distance from Upstream XS = 2

Deck/Roadway Width = 133

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num=	2	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
		4.24	1924	1919.5	14.56	1924	1919.7				

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	21	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1924.47	3.09	1924.45	3.11	1926.62	3.35	1926.74	3.46	1926.74			
3.49	1926.74	4.24	1926.74	4.25	1926.74	4.46	1919.81	4.46	1919.74			
8.19	1919.72	11.93	1919.71	14.5	1919.7	14.51	1920.87	14.56	1924.58			
15.23	1924.43	15.3	1924.71	15.36	1924.44	15.37	1923.83	15.49	1923.64			
18.95	1923.83											

Manning's n Values

num= 1

Sta	n Val
0	.013

Bank	Sta: Left	Right	Coeff	Contr.	Expan.
	4.24	14.56	.1		.3

Downstream Deck/Roadway Coordinates

num=	2	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
		0	1924	1918.74	32.2	1924	1918.72				

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	18	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1923.76	3200016	1923.76	4900017	1923.72	6400013	1923.71	11.450001	1923.45			
2.08	1923.212	640001	1923.05	10.56	1918.74	10.81	1918.74	15.34	1918.73			
20.86	1918.72	21.36	1918.9	21.92	1919.48	28.94	1923.28	29.03	1923.3			
29.67	1923.4	30.24	1923.58	32.2	1923.59							

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
0	32.2	.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 = .98
 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 3 8

FHWA Chart # 58- Rectangular concrete

FHWA Scale # 1 - Side tapered; Less favorable edges

Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth	Blocked	Entrance Loss Coef	Exit Loss Coef
1	135	.013	.013	0		.5	1

Upstream Elevation = 1919.75
 Centerline Station = 9.88

Downstream Elevation = 1918.75
 Centerline Station = 15.34

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1529.8

INPUT

Description:

Station	Elevation	Data	num=	18	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1923.76	3200016	1923.76	4900017	1923.72	6400013	1923.71	11.450001	1923.45			
2.08	1923.212	640001	1923.05	10.56	1918.74	10.81	1918.74	15.34	1918.73			
20.86	1918.72	21.36	1918.9	21.92	1919.48	28.94	1923.28	29.03	1923.3			
29.67	1923.4	30.24	1923.58	32.2	1923.59							

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Lengths	Left Channel	Right	Coeff	Contr.	Expan.
0	32.2	18.7	28.27	39.36	.1		.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1501.53

INPUT

Description:

Station	Elevation	Data	num=	13	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1923.19	2.88	1923.03	4.61	1922.93	12.94	1918.77	14.41	1918.07			
14.96	1917.81	17.59	1917.77	22.66	1917.69	22.91	1917.68	23.2	1917.83			
23.29	1917.86	33.69	1922.53	33.91	1922.53							

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Lengths	Left Channel	Right	Coeff	Contr.	Expan.
4.61	33.91	25.78	25.03	25.01	.1		.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1476.5

INPUT

Description:

Station	Elevation	Data	num=	12	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1921.66	3.98	1922.34	6.95	1922.06	9.67	1920.72	17.7	1916.94			
19.73	1916.91	20.39	1916.9	26.17	1916.84	32.93	1920.28	34.96	1920.98			
37.27	1922.02	37.99	1922.02									

Manning's n Values num= 1

Sta	n Val
0	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Lengths	Left Channel	Right	Coeff	Contr.	Expan.
3.98	37.99	26.88	25.13	24.27	.1		.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1451.37

INPUT

Description:

Station	Elevation	Data	num=	17	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1922.33	8.18	1921.95	10.97	1921.84	11.13	1921.76	12.05	1921.53			
14.24	1920.39	22.8	1916.04	24.2	1916.04	25.3	1916.05	31.76	1916.09			
36.6	1918.52	42.39	1921.47	42.44	1921.46	42.69	1921.46	43.77	1921.46			
82.1	1922	92.88	1922.5									

Manning's n Values num= 1

Sta	n Val
0	.013

0 .013

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	10.97	42.39		25.89	25	25.01		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1426.37

INPUT

Description:
 Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-18.84	1922.5	-10.35	1922	0	1922.13	3.88	1921.98	4.34	1921.75
5.21	1920.96	9.76	1918.7	15.89	1915.51	18.52	1915.46	19.46	1915.44
24.55	1915.44	31.38	1918.91	35.52	1920.89	36.28	1920.89	36.4	1920.88
53.3	1921	75.49	1922	89.43	1922.5				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
-18.84	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	3.88	35.52		25.38	25.02	25.08		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1401.35

INPUT

Description:
 Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-16.78	1922.5	0	1920.43	.01	1920.43	.03	1920.47	.81	1920.34
1.06	1920.28	1.7	1919.87	11.59	1914.97	12.4	1914.97	14.87	1914.92
19.94	1914.82	20.97	1915.41	22.67	1916.15	31.28	1920.27	31.99	1920.27
51.65	1921	70.5	1922	85.1	1922.5				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
-16.78	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	0	31.28		27.16	25.15	22.91		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1376.2

INPUT

Description:
 Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-22.69	1922.5	0	1919.93	.14	1919.91	2.35	1919.39	7.99	1915.76
10.32	1914.6	13.98	1914.58	16.44	1914.56	18.24	1914.53	25.15	1918.46
27.63	1919.55	28.33	1919.52	28.93	1919.51	29.47	1919.56	29.56	1919.58
29.59	1919.59	35.39	1920	52.69	1921	69.87	1922	88.98	1922.5

Manning's n Values num= 2

Sta	n Val	Sta	n Val
-22.69	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	2.35	27.63		25.55	25.03	24.62		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1351.17

INPUT

Description:
 Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-23.36	1922.5	0	1919.22	1.63	1919.18	1.92	1919.19	2.18	1919.17
6.98	1916.54	8.35	1916.22	11.82	1913.98	15.55	1913.96	16.43	1913.93
18.59	1913.87	20.66	1913.91	25.72	1916.43	29.75	1918.81	30.04	1918.83
30.67	1918.8	31.29	1918.96	31.34	1918.92	31.88	1918.97	36.89	1919
54.98	1920	73.17	1921	93.23	1922	105.87	1922.5		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
-23.36	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	2.18	29.75		25.06	25.01	24.96		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1326.16

INPUT

Description:
 Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-22.19	1922.5	0	1918.7	2.2	1918.52	2.21	1918.63	2.6	1918.49
2.67	1918.47	4.24	1917.6	16.89	1913.15	17.31	1913.16	18.11	1913.17
21.65	1913.23	23.28	1913.98	31.83	1918.31	31.96	1918.31	32.34	1918.41
32.37	1918.42	49.4	1919	73.69	1920	92.22	1921	109.33	1922
127.56	1922.5								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
-22.19	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	2.21	32.34		27.06	25.02	23.19		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1301.14

INPUT

Description:

Station	Elevation	Data	num=	23							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-24.25	1922.5	0	1918.28	1.38	1918.18	1.38	1918.23	1.57	1918.16		
1.82	1918.08	7.79	1914.81	13.96	1912.67	16.56	1912.72	18.91	1912.76		
20.7	1912.79	27.28	1915.85	31.58	1918.05	31.65	1918.05	32.22	1918.2		
32.46	1918.19	32.51	1918.16	33.07	1918.16	71.15	1919	86.37	1920		
103.83	1921	182.58	1922	198.43	1922.5						

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
-24.25	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1.38	32.22	25	25	25		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1276.14

INPUT

Description:

Station	Elevation	Data	num=	22							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-23.54	1922.5	0	1917.9	.7	1917.85	1.1	1917.72	1.19	1917.67		
11.15	1912.19	12.42	1912.21	17.1	1912.3	19.83	1912.35	19.85	1912.35		
28.02	1916.15	31.49	1917.76	31.52	1917.77	31.95	1917.76	31.96	1917.76		
32.01	1917.76	32.99	1917.76	63.81	1918	85.9	1919	102.39	1920		
188.54	1921	218	1922								

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
-23.54	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	.7	31.52	25.88	24.99	24.17		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1251.15

INPUT

Description:

Station	Elevation	Data	num=	19							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-22.03	1922.5	0	1917.43	1.97	1917.28	2.16	1917.22	2.4	1917.17		
7.73	1914.26	12.39	1911.7	16.55	1911.78	17.74	1911.8	21.48	1911.88		
27.1	1914.49	32.61	1917.14	32.82	1917.13	33.05	1917.18	76.45	1918		
100.69	1919	194.94	1920	217.57	1921	241.06	1922				

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
-22.03	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1.97	32.61	25.55	24.97	24.47		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1226.18

INPUT

Description:

Station	Elevation	Data	num=	20							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-22.35	1922.5	0	1916.84	1.72	1916.71	2.16	1916.62	2.17	1916.62		
11.73	1911.45	12.18	1911.2	17.92	1911.32	21.25	1911.39	21.65	1911.39		
22.15	1911.63	31.96	1916.34	32.02	1916.37	41.24	1917	64.26	1917		
88.32	1918	150.82	1919	220.35	1920	241.33	1921	267.81	1922		

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
-22.35	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1.72	31.96	26.31	24.84	23.7		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1201.34

INPUT

Description:

Station	Elevation	Data	num=	26							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-31.82	1922.5	-25.79	1922	-18.26	1921	-9.72	1920	-2.69	1919		
0	1916.37	2.33	1916.21	2.53	1916.17	2.71	1916.13	7.17	1913.72		
12.57	1910.67	16.88	1910.76	17.85	1910.77	21.82	1910.79	27.7	1913.6		
32.58	1915.96	32.82	1916.01	33.17	1916.01	33.56	1916.01	40.91	1916		
58.99	1917	106.99	1918	175.49	1919	212.27	1920	238.69	1921		
306.7	1922										

Manning's n	Values	num=	2
Sta	n Val	Sta	n Val
-31.82	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2.33	32.58	52.63	49.74	48.01		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
 REACH: FL-ALIGN RS: 1151.6

INPUT

Description:

Station	Elevation	Data	num=	21	Sta	Elev	Sta	Elev	Sta	Elev
-29.51	1922.5	0	1921.24	8.04	1915.35	9.5	1914.33	17.35	1909.61	
23.41	1909.76	23.97	1909.77	26.84	1909.83	28.49	1910.45	37.45	1914.47	
38.26	1914.96	38.45	1914.96	38.48	1914.96	38.88	1914.96	117.11	1916	
157.58	1917	195.53	1918	235.56	1919	256.07	1920	329.12	1921	
445.12	1922									

Manning's n Values

Sta	n Val	Sta	n Val
-29.51	.013	0	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
0	38.26		51.5	49.89	51.66		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 1101.71

INPUT

Description:

Station	Elevation	Data	num=	28	Sta	Elev	Sta	Elev	Sta	Elev
0	1922.07	11.49	1914.9	20.36	1909.4	23.12	1909.22	23.61	1909.19	
25.58	1909.06	33.59	1913.94	38.23	1916.1	43.02	1916	54.27	1917.96	
58	1917.88	58.29	1917.87	62.65	1917	65.78	1916	68.88	1915	
72.06	1914	75.78	1913	82.38	1913	91.32	1914	126.42	1915	
161.02	1916	183.84	1917	238.9	1918	280.42	1919	331.42	1920	
353.87	1921	413.24	1921	449.5	1922					

Manning's n Values

Sta	n Val	Sta	n Val
0	.013	38.23	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
0	38.23		24.1	25.09	26.33		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 1076.62

INPUT

Description:

Station	Elevation	Data	num=	40	Sta	Elev	Sta	Elev	Sta	Elev
0	1922.21	.47	1922.21	5.46	1919.18	22.42	1909	22.46	1909.01	
26.12	1909.18	27.99	1909.27	28.09	1909.32	43.24	1916.81	45.7	1917.05	
50.79	1917.31	55.03	1917.05	57.6	1916.56	58.71	1916.86	59.42	1917	
66.19	1918	72.3	1918	74.23	1917	76.05	1916	80.05	1915	
86.02	1914	89.84	1914	108.396	1915	110.08	1916	111.69	1917	
113.58	1917	118.43	1916	122.82	1915	127.34	1914	132.33	1913	
143.64	1914	151.02	1915	163.8	1916	182.77	1917	246.91	1918	
271.02	1919	312.02	1919	334.46	1920	397.13	1921	413.95	1922	

Manning's n Values

Sta	n Val	Sta	n Val
0	.013	43.24	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
.47	43.24		25.83	24.95	24.9		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 1051.67

INPUT

Description:

Station	Elevation	Data	num=	23	Sta	Elev	Sta	Elev	Sta	Elev
0	1922.22	.76	1922.23	19.2	1911.05	22.52	1908.91	22.87	1908.86	
23.36	1908.87	28.18	1909.01	28.79	1909.02	30.49	1909.7	35.24	1911.99	
42.12	1915.2	53.56	1916.83	53.62	1916.83	53.71	1916.83	57.29	1916.19	
60.88	1915.55	173.53	1916	186.56	1917	223.85	1918	275.11	1919	
300.19	1920	511.7	1921	718.7	1922					

Manning's n Values

Sta	n Val	Sta	n Val
0	.025	19.2	.03
		42.12	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
.76	42.12		2419.14	17.29	42.27		.1	.3

CROSS SECTION

RIVER: FL-ALIGN

REACH: FL-ALIGN RS: 1034.38

INPUT

Description:

Station	Elevation	Data	num=	30	Sta	Elev	Sta	Elev	Sta	Elev
0	1922.23	2.86	1922.28	3.68	1922.09	13.72	1916.46	19.07	1914	
25.57	1909.82	30.65	1909.04	36.66	1909.2	37.7	1909.23	38.59	1909.25	
41.91	1910.57	43.54	1910.68	47.95	1910.8	49.77	1911.08	50.43	1911.18	
54.65	1912.03	59.26	1912.38	77.72	1913.47	82.67	1913.63	94.44	1914.24	
109.54	1915.2	110.47	1915.3	110.8	1915.34	167.5	1917	198.66	1918	
225.62	1919	287.77	1920	374.11	1921	434.63	1921	657.52	1922	

Manning's n Values

Sta	n Val	Sta	n Val
0	.025	19.07	.03
		41.91	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
2.86	54.65		32.88	22.88	10.46		.1	.3

CROSS SECTION

RIVER: FL-ALIGN
REACH: FL-ALIGN

RS: 1011.5

INPUT

Description: Upstream of UPRR Crossing

Station	Elevation	Data	num=	34	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-75.7	1922	-10.87	1921	0	1920.57	3.42	1920.46	7.945	1920.15			
14.41	1919.89	20.89	1919.49	25.06	1919.36	42.32	1917.61	44.18	1917.32			
49.42	1917.17	58.82	1915.54	73.29	1912.9	73.67	1912.9	74.81	1912.71			
77.33	1912.35	95.44	1910.16	99.21	1908.34	99.92	1908.2	101.72	1908.28			
101.95	1908.33	109.22	1910.06	113.93	1910.71	118.45	1911.52	119.63	1911.5			
124.39	1911.63	139.24	1912.77	146.4	1913.74	157.18	1914.72	164.55	1914.29			
173.88	1914.92	185.7	1916.26	205.27	1920	955.88	1922					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-75.7	.025	-10.87	.025	0	.025

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
73.29	157.18	.1	.3	

SUMMARY OF MANNING'S N VALUES

River:FL-ALIGN

Reach	River Sta.	n1	n2	n3	n4	n5	n6
FL-ALIGN	3398.92	.016	.013	.016	.013		
FL-ALIGN	3373.92	.016	.013	.016	.013	.016	
FL-ALIGN	3348.92	.016	.016	.016	.013		
FL-ALIGN	3323.92	.016	.013	.016	.013		
FL-ALIGN	3298.92	.016	.016	.016	.013		
FL-ALIGN	3273.6	.016	.013	.016	.013	.016	
FL-ALIGN	3248.92	.016	.013	.016	.013	.016	
FL-ALIGN	3223.92	.016	.025	.013	.016	.013	.016
FL-ALIGN	3210.22	.016	.025	.035	.016		
FL-ALIGN	3198.92	.016	.025	.035	.025		
FL-ALIGN	3173.92	.025	.035	.025			
FL-ALIGN	3148.92	.025	.035	.025			
FL-ALIGN	3098.95	.025	.035	.025			
FL-ALIGN	3073.97	.025	.035	.025			
FL-ALIGN	3048.96	.025	.05	.025			
FL-ALIGN	3023.98	.025	.05	.025			
FL-ALIGN	2998.98	.025	.05	.025			
FL-ALIGN	2973.99	.025	.05	.025			
FL-ALIGN	2948.99	.025	.05	.025			
FL-ALIGN	2923.99	.025	.05	.025			
FL-ALIGN	2898.97	.025	.05	.05			
FL-ALIGN	2874.04	.025	.05	.025			
FL-ALIGN	2849.1	.025	.05	.025			
FL-ALIGN	2824.82	.025	.05	.025			
FL-ALIGN	2799.78	.025	.035	.025			
FL-ALIGN	2774.63	.025	.035	.025			
FL-ALIGN	2750.44	.025	.035	.025			
FL-ALIGN	2725.42	.025	.035	.025			
FL-ALIGN	2700.17	.025	.035	.025			
FL-ALIGN	2675.8	.025	.035	.025			
FL-ALIGN	2650.79	.025	.035	.025			
FL-ALIGN	2626.19	.025	.035	.025			
FL-ALIGN	2601.78	.025	.05	.025			
FL-ALIGN	2576.59	.025	.035	.025			
FL-ALIGN	2551.36	.025	.035	.025			
FL-ALIGN	2526.44	.025	.035	.025			
FL-ALIGN	2501.48	.025	.013	.025			
FL-ALIGN	2485.61	.025	.013	.025			
FL-ALIGN	2484.00	Culvert					
FL-ALIGN	2399.9	.013					
FL-ALIGN	2376.49	.013					
FL-ALIGN	2351.49	.013					
FL-ALIGN	2301.49	.013					
FL-ALIGN	2276.48	.013					
FL-ALIGN	2226.48	.013					
FL-ALIGN	2201.48	.013					
FL-ALIGN	2176.48	.013					
FL-ALIGN	2151.48	.013					
FL-ALIGN	2126.48	.013					
FL-ALIGN	2101.47	.013					
FL-ALIGN	2076.46	.013					
FL-ALIGN	2051.45	.013					
FL-ALIGN	2026.52	.013					
FL-ALIGN	2001.52	.013					
FL-ALIGN	1976.52	.013					
FL-ALIGN	1951.52	.013					
FL-ALIGN	1876.56	.013					
FL-ALIGN	1851.56	.013					
FL-ALIGN	1826.56	.013	.025				
FL-ALIGN	1801.56	.013	.025				
FL-ALIGN	1776.56	.013	.025				
FL-ALIGN	1751.58	.013	.025				
FL-ALIGN	1726.57	.013	.025				
FL-ALIGN	1701.57	.013	.025				
FL-ALIGN	1667.4	.013					
FL-ALIGN	1660	Culvert					
FL-ALIGN	1529.8	.013					
FL-ALIGN	1501.53	.013					
FL-ALIGN	1476.5	.013					
FL-ALIGN	1451.37	.013					
FL-ALIGN	1426.37	.013	.013				
FL-ALIGN	1401.35	.013	.013				
FL-ALIGN	1376.2	.013	.013				
FL-ALIGN	1351.17	.013	.013				
FL-ALIGN	1326.16	.013	.013				
FL-ALIGN	1301.14	.013	.013				
FL-ALIGN	1276.14	.013	.013				
FL-ALIGN	1251.15	.013	.013				
FL-ALIGN	1226.18	.013	.013				
FL-ALIGN	1201.34	.013	.013				
FL-ALIGN	1151.6	.013	.013				
FL-ALIGN	1101.71	.013	.025				
FL-ALIGN	1076.62	.013	.025				
FL-ALIGN	1051.67	.025	.03	.025			
FL-ALIGN	1034.38	.025	.03	.025			
FL-ALIGN	1011.5	.025	.025	.025			

SUMMARY OF REACH LENGTHS

River: FL-ALIGN

Reach	River Sta.	Left	Channel	Right
FL-ALIGN	3398.92	25.01	25	25.02
FL-ALIGN	3373.92	25.03	25	25.05
FL-ALIGN	3348.92	25.18	25	26.53
FL-ALIGN	3323.92	27.48	25	31.71
FL-ALIGN	3298.92	28.27	25.32	26.5
FL-ALIGN	3273.6	26	24.68	24.56
FL-ALIGN	3248.92	25.13	25	30.09
FL-ALIGN	3223.92	14.07	13.7	14.32
FL-ALIGN	3210.22	11.65	11.3	11.82
FL-ALIGN	3198.92	25.32	25	25.98
FL-ALIGN	3173.92	25.43	25	25.55
FL-ALIGN	3148.92	55.38	49.97	47.04
FL-ALIGN	3098.95	20.29	24.98	28.02
FL-ALIGN	3073.97	25	25.01	25.07
FL-ALIGN	3048.96	28.34	24.98	23.09
FL-ALIGN	3023.98	21.46	25	27.03
FL-ALIGN	2998.98	28.33	24.99	23.13
FL-ALIGN	2973.99	23.9	25	25.86
FL-ALIGN	2948.99	26.22	25	25.08
FL-ALIGN	2923.99	15.83	25.02	30.98
FL-ALIGN	2898.97	17.15	24.93	30.48
FL-ALIGN	2874.04	39.68	24.94	17.95
FL-ALIGN	2849.1	38.99	24.28	10.13
FL-ALIGN	2824.82	22.37	25.04	27.85
FL-ALIGN	2799.78	23.04	25.15	28.16
FL-ALIGN	2774.63	36.1	24.19	18.16
FL-ALIGN	2750.44	30.61	25.02	22.4
FL-ALIGN	2725.42	21.47	25.25	27.5
FL-ALIGN	2700.17	16.35	24.37	29.93
FL-ALIGN	2675.8	25.2	25.01	25.01
FL-ALIGN	2650.79	21.98	24.6	26.83
FL-ALIGN	2626.19	19.32	24.41	28.81
FL-ALIGN	2601.78	24.17	25.19	26.43
FL-ALIGN	2576.59	36.89	25.23	18.12
FL-ALIGN	2551.36	19.09	24.92	30.78
FL-ALIGN	2526.44	44.23	24.96	30.79
FL-ALIGN	2501.48	20.64	15.87	22.6
FL-ALIGN	2485.61	85.04	85.71	86.5
FL-ALIGN	2484.00	Culvert		
FL-ALIGN	2399.9	23.41	23.41	23.41
FL-ALIGN	2376.49	25	25	25
FL-ALIGN	2351.49	50	50	50
FL-ALIGN	2301.49	25	25.01	25
FL-ALIGN	2276.48	50.02	50	49.99
FL-ALIGN	2226.48	25	25	25
FL-ALIGN	2201.48	25	25	25
FL-ALIGN	2176.48	25	25	25
FL-ALIGN	2151.48	25.18	25	24.82
FL-ALIGN	2126.48	25.01	25.01	25.01
FL-ALIGN	2101.47	25	25.01	25.01
FL-ALIGN	2076.46	25	25.01	25.01
FL-ALIGN	2051.45	24.83	24.93	25.12
FL-ALIGN	2026.52	25	25	25.02
FL-ALIGN	2001.52	25.02	25	25
FL-ALIGN	1976.52	25.12	25	25
FL-ALIGN	1951.52	75.59	74.96	75.08
FL-ALIGN	1876.56	25	25	25
FL-ALIGN	1851.56	25.01	25	25
FL-ALIGN	1826.56	25	25	25
FL-ALIGN	1801.56	25	25	25
FL-ALIGN	1776.56	24.9	24.98	25.08
FL-ALIGN	1751.58	25	25.01	25
FL-ALIGN	1726.57	25.01	25	25
FL-ALIGN	1701.57	39.81	34.17	29.44
FL-ALIGN	1667.4	142.41	137.6	131.13
FL-ALIGN	1660	Culvert		
FL-ALIGN	1529.8	18.7	28.27	39.36
FL-ALIGN	1501.53	25.78	25.03	25.01
FL-ALIGN	1476.5	26.88	25.13	24.27
FL-ALIGN	1451.37	25.89	25	25.01
FL-ALIGN	1426.37	25.38	25.02	25.08
FL-ALIGN	1401.35	27.16	25.15	22.91
FL-ALIGN	1376.2	25.55	25.03	24.62
FL-ALIGN	1351.17	25.06	25.01	24.96
FL-ALIGN	1326.16	27.06	25.02	23.19
FL-ALIGN	1301.14	25	25	25
FL-ALIGN	1276.14	25.88	24.99	24.17
FL-ALIGN	1251.15	25.55	24.97	24.47
FL-ALIGN	1226.18	26.31	24.84	23.7
FL-ALIGN	1201.34	52.63	49.74	48.01
FL-ALIGN	1151.6	51.5	49.89	51.66
FL-ALIGN	1101.71	24.1	25.09	26.33
FL-ALIGN	1076.62	25.83	24.95	24.9
FL-ALIGN	1051.67	2419.14	17.29	42.27
FL-ALIGN	1034.38	32.88	22.88	10.46
FL-ALIGN	1011.5			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: FL-ALIGN

Reach	River Sta.	Contr.	Expan.
FL-ALIGN	3398.92	.1	.3
FL-ALIGN	3373.92	.1	.3
FL-ALIGN	3348.92	.1	.3
FL-ALIGN	3323.92	.1	.3
FL-ALIGN	3298.92	.1	.3
FL-ALIGN	3273.6	.1	.3
FL-ALIGN	3248.92	.1	.3
FL-ALIGN	3223.92	.1	.3
FL-ALIGN	3210.22	.1	.3
FL-ALIGN	3198.92	.1	.3
FL-ALIGN	3173.92	.1	.3
FL-ALIGN	3148.92	.1	.3
FL-ALIGN	3098.95	.1	.3
FL-ALIGN	3073.97	.1	.3

FL-ALIGN	3048.96	.1	.3
FL-ALIGN	3023.98	.1	.3
FL-ALIGN	2998.98	.1	.3
FL-ALIGN	2973.99	.1	.3
FL-ALIGN	2948.99	.1	.3
FL-ALIGN	2923.99	.1	.3
FL-ALIGN	2898.97	.1	.3
FL-ALIGN	2874.04	.1	.3
FL-ALIGN	2849.1	.1	.3
FL-ALIGN	2824.82	.1	.3
FL-ALIGN	2799.78	.1	.3
FL-ALIGN	2774.63	.1	.3
FL-ALIGN	2750.44	.1	.3
FL-ALIGN	2725.42	.1	.3
FL-ALIGN	2700.17	.1	.3
FL-ALIGN	2675.8	.1	.3
FL-ALIGN	2650.79	.1	.3
FL-ALIGN	2626.19	.1	.3
FL-ALIGN	2601.78	.1	.3
FL-ALIGN	2576.59	.1	.3
FL-ALIGN	2551.36	.1	.3
FL-ALIGN	2526.44	.1	.3
FL-ALIGN	2501.48	.1	.3
FL-ALIGN	2485.61	.1	.3
FL-ALIGN	2484.00	Culvert	
FL-ALIGN	2399.9	.1	.3
FL-ALIGN	2376.49	.1	.3
FL-ALIGN	2351.49	.1	.3
FL-ALIGN	2301.49	.1	.3
FL-ALIGN	2276.48	.1	.3
FL-ALIGN	2226.48	.1	.3
FL-ALIGN	2201.48	.1	.3
FL-ALIGN	2176.48	.1	.3
FL-ALIGN	2151.48	.1	.3
FL-ALIGN	2126.48	.1	.3
FL-ALIGN	2101.47	.1	.3
FL-ALIGN	2076.46	.1	.3
FL-ALIGN	2051.45	.1	.3
FL-ALIGN	2026.52	.1	.3
FL-ALIGN	2001.52	.1	.3
FL-ALIGN	1976.52	.1	.3
FL-ALIGN	1951.52	.1	.3
FL-ALIGN	1876.56	.1	.3
FL-ALIGN	1851.56	.1	.3
FL-ALIGN	1826.56	.1	.3
FL-ALIGN	1801.56	.1	.3
FL-ALIGN	1776.56	.1	.3
FL-ALIGN	1751.58	.1	.3
FL-ALIGN	1726.57	.1	.3
FL-ALIGN	1701.57	.1	.3
FL-ALIGN	1667.4	.1	.3
FL-ALIGN	1660	Culvert	
FL-ALIGN	1529.8	.1	.3
FL-ALIGN	1501.53	.1	.3
FL-ALIGN	1476.5	.1	.3
FL-ALIGN	1451.37	.1	.3
FL-ALIGN	1426.37	.1	.3
FL-ALIGN	1401.35	.1	.3
FL-ALIGN	1376.2	.1	.3
FL-ALIGN	1351.17	.1	.3
FL-ALIGN	1326.16	.1	.3
FL-ALIGN	1301.14	.1	.3
FL-ALIGN	1276.14	.1	.3
FL-ALIGN	1251.15	.1	.3
FL-ALIGN	1226.18	.1	.3
FL-ALIGN	1201.34	.1	.3
FL-ALIGN	1151.6	.1	.3
FL-ALIGN	1101.71	.1	.3
FL-ALIGN	1076.62	.1	.3
FL-ALIGN	1051.67	.1	.3
FL-ALIGN	1034.38	.1	.3
FL-ALIGN	1011.5	.1	.3

Appendix C-2

Existing Condition HY8 Analysis for Downstream Tail Water Elevation at UPRR Embankment

HY-8 Culvert Analysis Report

EXISTING UPRR CULVERT -
SCENARIO #1

Table 1 - Summary of Culvert Flows at Crossing: EX 8'x4' RCB Crossing-SECNARIO

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1912.88	5.00	5.00	0.00	1
1913.07	91.40	91.40	0.00	1
1913.60	177.80	177.80	0.00	1
1914.48	264.2	264.20	0.00	1
1915.70	350.60	350.60	0.00	1
1917.26	437.00	437.00	0.00	1
1919.71	523.40	523.40	0.00	1
1922.50	609.80	594.78	14.87	13
1922.70	696.20	599.67	96.16	7
1922.85	782.60	603.07	178.75	5
1922.97	869.00	605.94	262.80	5
1922.41	592.73	592.73	0.00	Overtopping

Rating Curve Plot for Crossing: EX 8'x4' RCB Crossing-SECNARIO-1

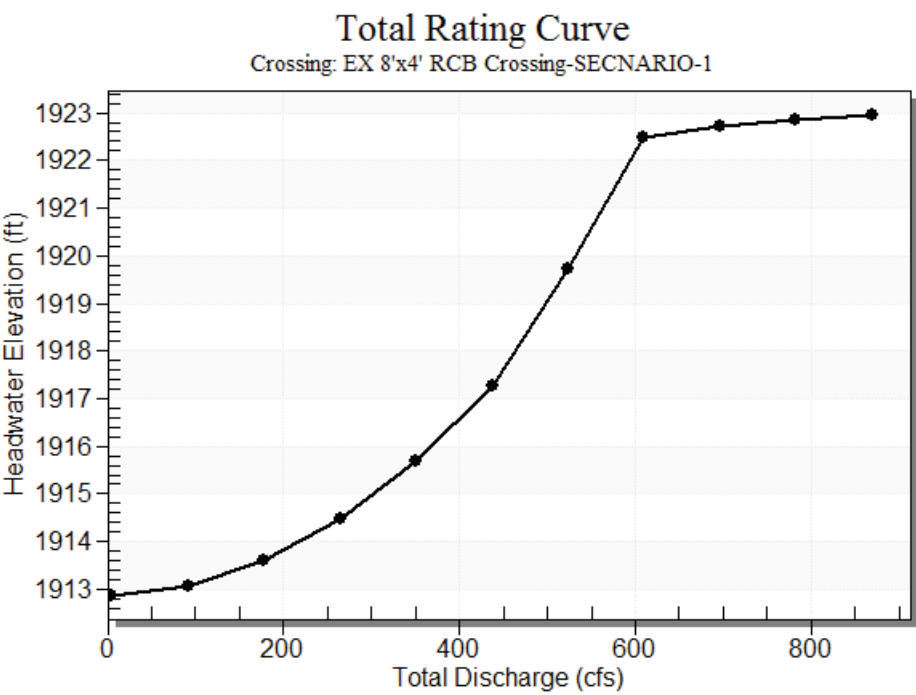
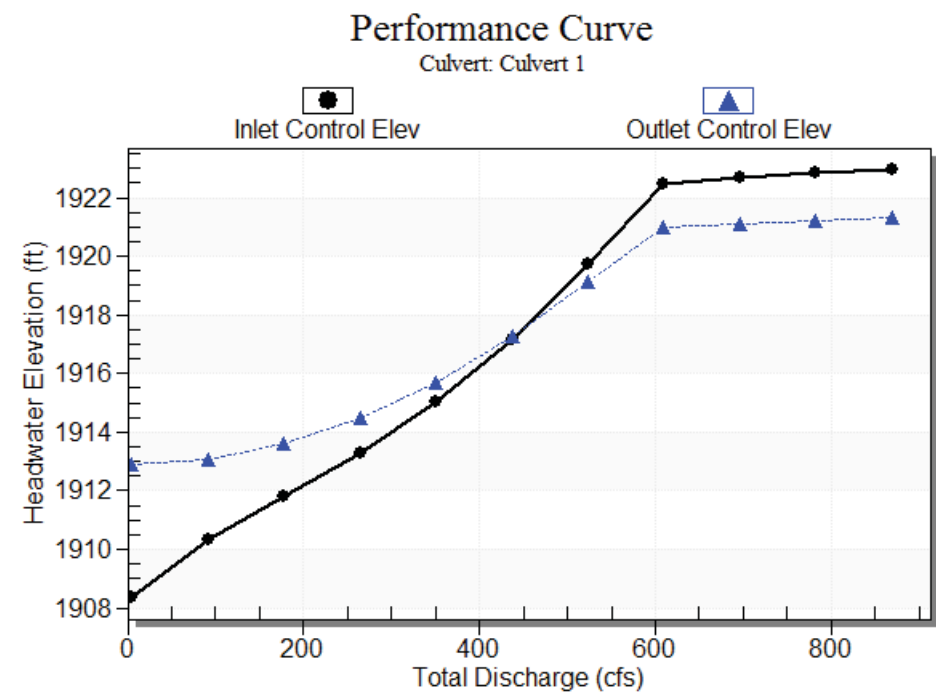


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5.00	5.00	1912.88	10.355	4.879	4-FFf	0.055	0.230	4.000	8.380	0.156	0.000
91.40	91.40	1913.07	2.345	5.070	4-FFf	0.706	1.598	4.000	8.380	2.856	0.000
177.80	177.80	1913.60	3.825	5.603	4-FFf	1.097	2.490	4.000	8.380	5.556	0.000
264.20	264.20	1914.48	5.299	6.479	4-FFf	1.430	3.242	4.000	8.380	8.256	0.000
350.60	350.60	1915.70	7.027	7.697	4-FFf	1.735	3.916	4.000	8.380	10.956	0.000
437.00	437.00	1917.26	9.148	9.257	4-FFf	2.023	4.000	4.000	8.380	13.656	0.000
523.40	523.40	1919.71	11.713	11.159	4-FFf	2.292	4.000	3.000	8.380	21.808	0.000
609.80	594.78	1922.50	14.495	12.989	4-FFf	2.509	4.000	3.230	8.380	23.018	0.000
696.20	599.67	1922.70	14.702	13.123	4-FFf	2.524	4.000	3.247	8.380	23.085	0.000
782.60	603.07	1922.85	14.846	13.217	4-FFf	2.534	4.000	3.257	8.380	23.145	0.000
869.00	605.94	1922.97	14.969	13.297	4- FFf	2.543	4.000	3.266	8.380	23.191	0.000

Inlet Elevation (invert): 1908.00 ft, Outlet Elevation (invert): 1904.50 ft
Culvert Length: 109.66 ft, Culvert Slope: 0.0319

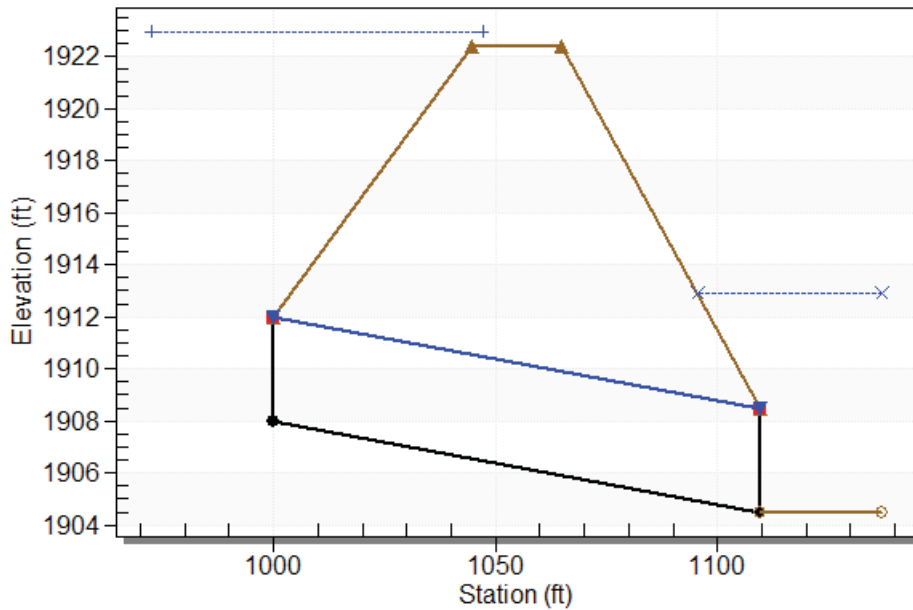
Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1

Crossing - EX 8'x4' RCB Crossing-SECNARIO-1, Design Discharge - 869.0 cfs

Culvert - Culvert 1, Culvert Discharge - 605.9 cfs



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 1000.00 ft

Inlet Elevation: 1908.00 ft

Outlet Station: 1109.60 ft

Outlet Elevation: 1904.50 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: 1:1 Bevel (45° flare) Wingwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: EX 8'x4' RCB Crossing-SECNARIO-1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
5.00	1912.88	8.38
91.40	1912.88	8.38
177.80	1912.88	8.38
264.20	1912.88	8.38
350.60	1912.88	8.38
437.00	1912.88	8.38
523.40	1912.88	8.38
609.80	1912.88	8.38
696.20	1912.88	8.38
782.60	1912.88	8.38
869.00	1912.88	8.38

Tailwater Channel Data - EX 8'x4' RCB Crossing-SECNARIO-1

Tailwater Channel Option: Enter Constant Tailwater Elevation Constant

Tailwater Elevation: 1912.88 ft

Roadway Data for Crossing: EX 8'x4' RCB Crossing-SECNARIO-1

Roadway Profile Shape: Constant Roadway Elevation Crest

Length: 232.00 ft

Crest Elevation: 1922.41 ft

Roadway Surface: Gravel

Roadway Top Width: 20.00 ft

HY-8 Culvert Analysis Report

EXISTING UPRR CULVERT -
SCENARIO #2

Table 1 - Summary of Culvert Flows at Crossing: EX 8'x4' RCB Crossing

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1916.82	5.00	5.00	0.00	1
1916.90	59.60	59.60	0.00	1
1917.12	114.20	114.20	0.00	1
1917.47	168.80	168.80	0.00	1
1917.96	223.40	223.40	0.00	1
1918.59	278.00	278.00	0.00	1
1919.35	332.60	332.60	0.00	1
1920.26	387.20	387.20	0.00	1
1921.29	441.80	441.80	0.00	1
1922.43	496.40	494.59	1.28	24
1922.60	551.00	502.00	48.46	7
1922.41	493.84	493.84	0.00	Overtopping

Rating Curve Plot for Crossing: EX 8'x4' RCB Crossing-SECNARIO-2

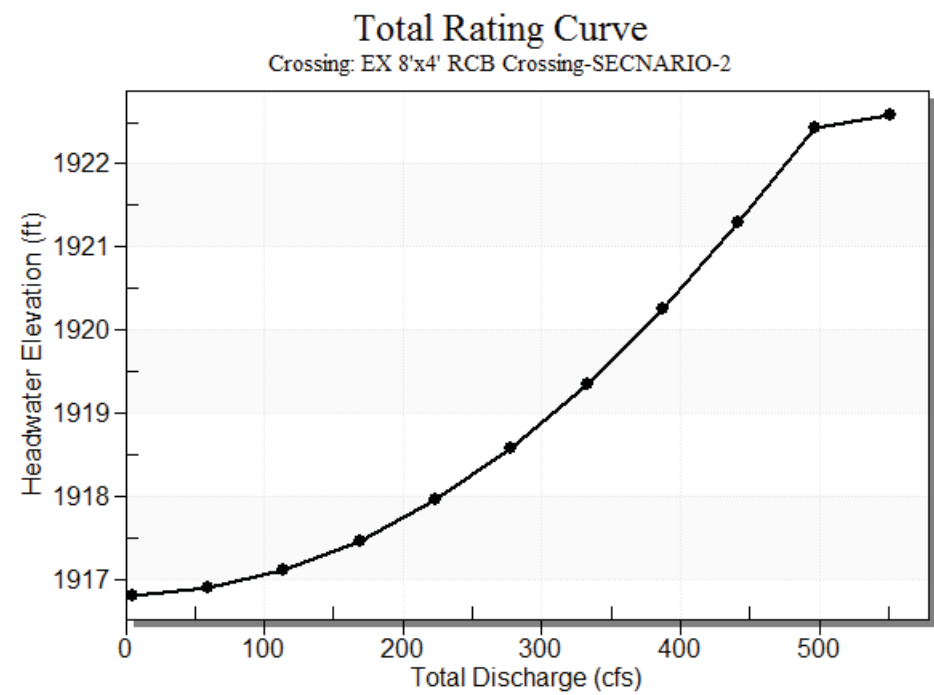
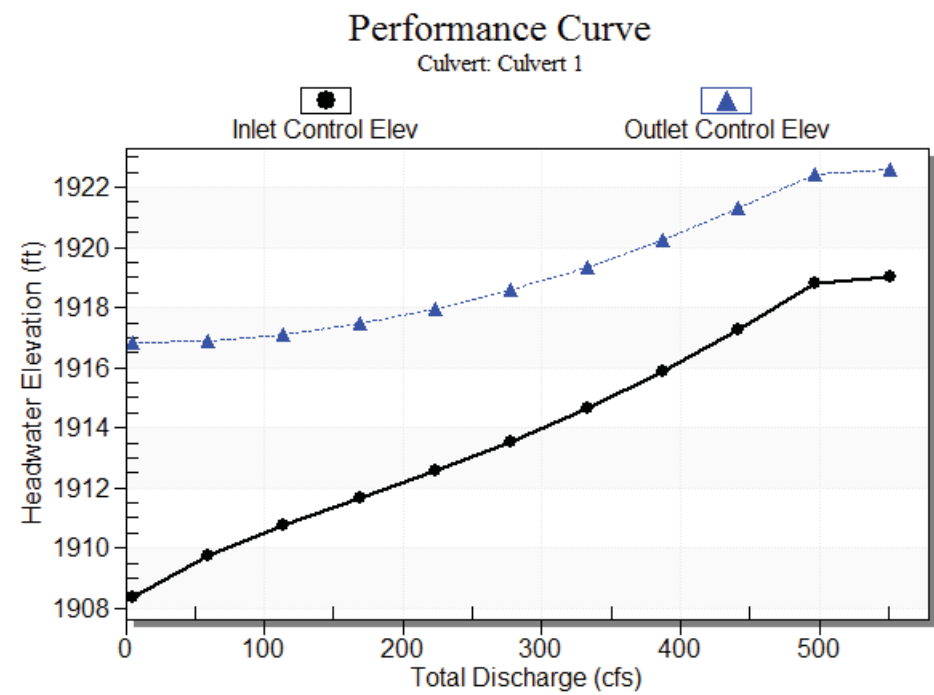


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5.00	5.00	1916.82	0.355	8.819	4-FFf	0.055	0.230	4.000	12.320	0.156	0.000
59.60	59.60	1916.90	1.740	8.900	4-FFf	0.530	1.202	4.000	12.320	1.863	0.000
114.20	114.20	1917.12	2.757	9.117	4-FFf	0.825	1.854	4.000	12.320	3.569	0.000
168.80	168.80	1917.47	3.677	9.472	4-FFf	1.059	2.405	4.000	12.320	5.275	0.000
223.40	223.40	1917.96	4.584	9.963	4-FFf	1.280	2.899	4.000	12.320	6.981	0.000
278.00	278.00	1918.59	5.553	10.590	4-FFf	1.481	3.354	4.000	12.320	8.688	0.000
332.60	332.60	1919.35	6.638	11.355	4-FFf	1.675	3.780	4.000	12.320	10.394	0.000
387.20	387.20	1920.26	7.873	12.256	4-FFf	1.857	4.000	4.000	12.320	12.100	0.000
441.80	441.80	1921.29	9.279	13.294	4-FFf	2.038	4.000	4.000	12.320	13.806	0.000
496.40	494.59	1922.43	10.808	14.427	4-FFf	2.202	4.000	4.000	12.320	15.456	0.000
551.00	502.00	1922.60	11.036	14.596	4- FFf	2.225	4.000	4.000	12.320	15.687	0.000

Inlet Elevation (invert): 1908.00 ft, Outlet Elevation (invert): 1904.50 ft
Culvert Length: 109.66 ft, Culvert Slope: 0.0319

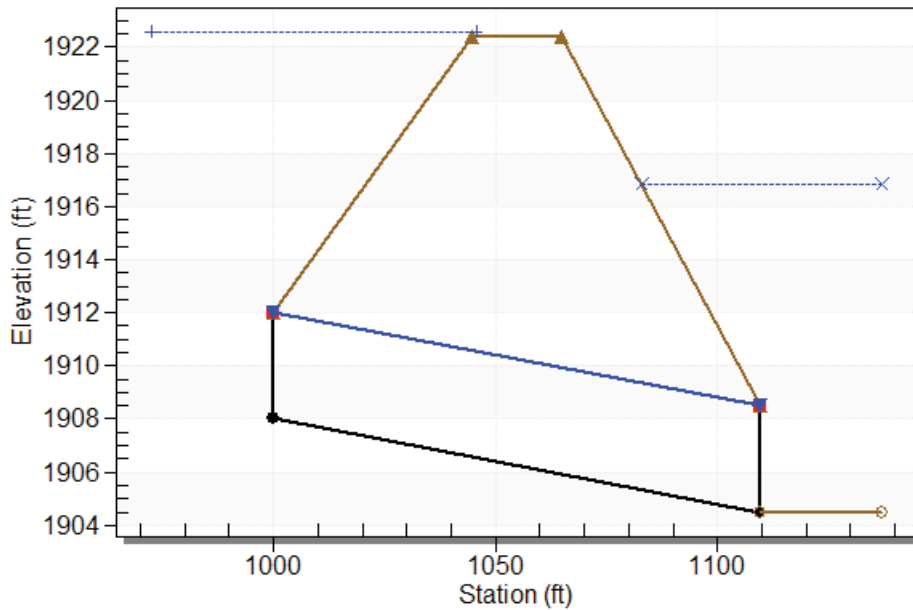
Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1

Crossing - EX 8'x4' RCB Crossing-SECENARIO-2, Design Discharge - 551.0 cfs

Culvert - Culvert 1, Culvert Discharge - 502.0 cfs



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 1000.00 ft

Inlet Elevation: 1908.00 ft

Outlet Station: 1109.60 ft

Outlet Elevation: 1904.50 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: 1:1 Bevel (45° flare) Wingwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: EX 8'x4' RCB Crossing-SECNARIO-2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
5.00	1916.82	12.32
59.60	1916.82	12.32
114.20	1916.82	12.32
168.80	1916.82	12.32
223.40	1916.82	12.32
278.00	1916.82	12.32
332.60	1916.82	12.32
387.20	1916.82	12.32
441.80	1916.82	12.32
496.40	1916.82	12.32
551.00	1916.82	12.32

Tailwater Channel Data - EX 8'x4' RCB Crossing-SECNARIO-2

Tailwater Channel Option: Enter Constant Tailwater Elevation Constant

Tailwater Elevation: 1916.82 ft

Roadway Data for Crossing: EX 8'x4' RCB Crossing-SECNARIO-2

Roadway Profile Shape: Constant Roadway Elevation Crest

Length: 232.00 ft

Crest Elevation: 1922.41 ft

Roadway Surface: Gravel

Roadway Top Width: 20.00 ft

Appendix C-3

As-Built Condition HEC-RAS Analysis

HEC-RAS Plan: 25 River: FL-ALIGN Reach: FL-ALIGN Profile: 100-YEAR

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
FL-ALIGN	3398.92	100-YEAR	480.00	1975.69	1976.41	1977.04	1978.82	0.028579	12.47	38.60	56.74	2.66
FL-ALIGN	3373.92	100-YEAR	480.00	1974.90	1975.76	1976.37	1978.13	0.026563	12.46	39.12	57.50	2.60
FL-ALIGN	3348.92	100-YEAR	480.00	1973.95	1975.01	1975.62	1977.42	0.029561	12.56	38.70	60.00	2.70
FL-ALIGN	3323.92	100-YEAR	480.00	1973.34	1974.16	1974.80	1976.62	0.033599	12.61	38.30	65.39	2.86
FL-ALIGN	3298.92	100-YEAR	480.00	1972.47	1975.18	1973.71	1975.24	0.000137	1.96	258.49	121.96	0.23
FL-ALIGN	3273.6	100-YEAR	480.00	1971.94	1975.21		1975.23	0.000031	1.03	473.45	162.74	0.11
FL-ALIGN	3248.92	100-YEAR	480.00	1971.58	1975.21		1975.23	0.000023	0.97	505.66	157.29	0.10
FL-ALIGN	3223.92	100-YEAR	480.00	1970.95	1975.20		1975.22	0.000039	1.29	431.18	153.91	0.12
FL-ALIGN	3210.22	100-YEAR	480.00	1971.92	1975.16		1975.22	0.000686	1.81	248.89	150.44	0.23
FL-ALIGN	3198.92	100-YEAR	480.00	1972.55	1975.05	1974.63	1975.20	0.002208	2.14	168.88	140.49	0.36
FL-ALIGN	3173.92	100-YEAR	480.00	1971.56	1974.98	1974.84	1975.13	0.003499	2.92	155.91	151.31	0.46
FL-ALIGN	3148.92	100-YEAR	480.00	1971.49	1974.62	1974.62	1974.98	0.008270	5.36	106.74	164.87	0.73
FL-ALIGN	3098.95	100-YEAR	480.00	1965.77	1968.32	1969.74	1973.47	0.128208	18.20	26.37	19.38	2.75
FL-ALIGN	3073.97	100-YEAR	480.00	1960.62	1963.45	1965.02	1969.89	0.149295	20.35	23.58	16.05	2.96
FL-ALIGN	3048.96	100-YEAR	480.00	1955.97	1958.55	1959.98	1964.42	0.323880	19.44	24.70	19.36	3.03
FL-ALIGN	3023.98	100-YEAR	480.00	1953.14	1954.97	1955.68	1957.39	0.185014	12.48	38.45	39.62	2.23
FL-ALIGN	2998.98	100-YEAR	480.00	1951.84	1954.29	1954.37	1955.05	0.039521	7.02	68.41	52.54	1.08
FL-ALIGN	2973.99	100-YEAR	480.00	1950.54	1952.83	1953.07	1953.87	0.054460	8.16	58.85	45.83	1.27
FL-ALIGN	2948.99	100-YEAR	480.00	1949.25	1951.86	1951.93	1952.70	0.036785	7.36	65.25	44.10	1.07
FL-ALIGN	2923.99	100-YEAR	480.00	1947.95	1951.45	1950.94	1951.89	0.015010	5.32	90.14	50.40	0.70
FL-ALIGN	2898.97	100-YEAR	480.00	1946.67	1951.45		1951.62	0.004587	3.28	146.29	69.38	0.40
FL-ALIGN	2874.04	100-YEAR	480.00	1946.37	1951.42		1951.54	0.001881	2.51	174.51	93.23	0.26
FL-ALIGN	2849.1	100-YEAR	480.00	1946.42	1950.85		1951.38	0.013686	5.85	82.03	35.99	0.68
FL-ALIGN	2824.82	100-YEAR	480.00	1945.32	1949.75	1949.75	1950.84	0.032775	8.37	57.33	27.04	1.01
FL-ALIGN	2799.78	100-YEAR	480.00	1944.99	1948.93	1949.10	1950.22	0.018403	9.12	52.64	24.65	1.10
FL-ALIGN	2774.63	100-YEAR	480.00	1944.75	1948.21	1948.50	1949.70	0.022362	9.77	49.14	24.15	1.21
FL-ALIGN	2750.44	100-YEAR	480.00	1944.81	1948.23	1948.23	1949.25	0.015185	8.11	59.18	29.47	1.01
FL-ALIGN	2725.42	100-YEAR	480.00	1944.00	1947.23	1947.63	1948.73	0.025054	9.81	48.94	26.78	1.28
FL-ALIGN	2700.17	100-YEAR	480.00	1943.75	1945.80	1946.45	1947.85	0.044900	11.47	41.87	28.59	1.67
FL-ALIGN	2675.8	100-YEAR	480.00	1943.60	1946.78	1946.01	1947.17	0.004878	4.99	96.21	43.34	0.59
FL-ALIGN	2650.79	100-YEAR	480.00	1943.40	1946.73		1947.04	0.003644	4.49	106.95	45.35	0.52
FL-ALIGN	2626.19	100-YEAR	480.00	1943.20	1946.40		1946.90	0.006901	5.69	84.33	40.32	0.69
FL-ALIGN	2601.78	100-YEAR	480.00	1943.00	1946.20		1946.66	0.013976	5.46	87.88	44.58	0.69
FL-ALIGN	2576.59	100-YEAR	480.00	1943.06	1945.95		1946.41	0.007209	5.43	88.37	47.17	0.70
FL-ALIGN	2551.36	100-YEAR	480.00	1943.20	1945.38	1945.38	1946.12	0.016157	6.91	69.51	47.67	1.01
FL-ALIGN	2526.44	100-YEAR	480.00	1941.83	1943.55	1944.15	1945.32	0.061099	10.65	45.06	43.82	1.85
FL-ALIGN	2501.48	100-YEAR	480.00	1936.39	1937.68	1938.84	1943.67	0.040216	19.64	24.44	30.50	3.87
FL-ALIGN	2485.61	100-YEAR	521.00	1929.15	1930.78	1933.03	1942.44	0.041939	27.39	19.02	12.44	3.91
FL-ALIGN	2484.00			Culvert								
FL-ALIGN	2399.9	100-YEAR	525.00	1927.92	1929.86	1931.85	1938.03	0.024788	22.93	22.72	11.79	2.91
FL-ALIGN	2376.49	100-YEAR	525.00	1927.72	1929.75	1931.66	1937.31	0.021866	22.05	23.81	11.96	2.76
FL-ALIGN	2351.49	100-YEAR	525.00	1927.42	1929.52	1931.38	1936.66	0.019601	21.44	24.49	11.86	2.63
FL-ALIGN	2301.49	100-YEAR	525.00	1926.80	1929.03	1930.80	1935.55	0.017010	20.48	25.63	11.82	2.45
FL-ALIGN	2276.48	100-YEAR	525.00	1926.54	1928.82	1930.54	1935.05	0.015935	20.02	26.22	11.81	2.37
FL-ALIGN	2226.48	100-YEAR	525.00	1925.91	1928.31	1929.96	1934.18	0.014464	19.44	27.00	11.63	2.25
FL-ALIGN	2201.48	100-YEAR	525.00	1925.62	1928.04	1929.67	1933.80	0.014094	19.26	27.26	11.59	2.21
FL-ALIGN	2176.48	100-YEAR	525.00	1925.37	1927.79	1929.39	1933.40	0.013614	19.00	27.62	11.57	2.17
FL-ALIGN	2151.48	100-YEAR	525.00	1925.08	1927.58	1929.15	1933.01	0.012868	18.69	28.09	11.47	2.11
FL-ALIGN	2126.48	100-YEAR	525.00	1924.77	1927.29	1928.85	1932.70	0.012827	18.66	28.14	11.52	2.10
FL-ALIGN	2101.47	100-YEAR	525.00	1924.52	1927.02	1928.57	1932.36	0.012595	18.53	28.34	11.54	2.08
FL-ALIGN	2076.46	100-YEAR	525.00	1924.29	1926.75	1928.27	1932.03	0.012754	18.45	28.46	11.92	2.10
FL-ALIGN	2051.45	100-YEAR	525.00	1924.15	1926.61	1928.08	1931.66	0.011910	18.03	29.12	11.88	2.03
FL-ALIGN	2026.52	100-YEAR	525.00	1923.84	1926.30	1927.77	1931.36	0.011974	18.05	29.09	11.99	2.04
FL-ALIGN	2001.52	100-YEAR	525.00	1923.47	1926.01	1927.47	1931.06	0.011895	18.04	29.11	11.88	2.03
FL-ALIGN	1976.52	100-YEAR	525.00	1923.20	1925.72	1927.20	1930.76	0.011861	18.02	29.14	11.92	2.03
FL-ALIGN	1951.52	100-YEAR	525.00	1922.92	1924.81	1926.33	1930.38	0.014133	18.93	27.74	23.68	2.46
FL-ALIGN	1876.56	100-YEAR	525.00	1922.08	1924.67	1925.99	1929.18	0.010115	17.03	30.83	12.02	1.87
FL-ALIGN	1851.56	100-YEAR	525.00	1921.78	1924.38	1925.72	1928.92	0.010213	17.09	30.72	11.98	1.88
FL-ALIGN	1826.56	100-YEAR	525.00	1921.52	1924.19	1925.48	1928.59	0.013238	16.83	31.19	11.92	1.83
FL-ALIGN	1801.56	100-YEAR	525.00	1921.23	1923.88	1925.18	1928.31	0.009747	16.88	31.11	11.85	1.84
FL-ALIGN	1776.56	100-YEAR	525.00	1920.94	1923.57	1924.89	1928.05	0.009954	16.98	30.92	11.75	1.85
FL-ALIGN	1751.58	100-YEAR	525.00	1920.70	1922.98	1924.36	1927.76	0.011682	17.54	29.94	13.15	2.05
FL-ALIGN	1726.57	100-YEAR	525.00	1920.44	1922.47	1923.87	1927.42	0.013204	17.85	29.41	14.50	2.21
FL-ALIGN	1701.57	100-YEAR	652.00	1920.14	1922.55	1923.85	1926.99	0.009624	16.91	38.56	16.00	1.92
FL-ALIGN	1667.4	100-YEAR	652.00	1919.72	1921.79	1924.21	1926.55	0.014741	17.51	37.24	18.00	2.15
FL-ALIGN	1530.0	100-YEAR	652.00	1918.74	1921.19	1921.72	1924.59	0.009073	14.80	44.05	18.00	1.67
FL-ALIGN	1529.8	100-YEAR	820.00	1918.75	1919.87	1921.01	1924.46	0.020714	17.18	47.74	42.50	2.86
FL-ALIGN	1515.66*	100-YEAR	820.00	1917.84	1919.59	1920.82	1923.96	0.011975	16.77	48.89	28.00	2.24
FL-ALIGN	1501.53	100-YEAR	820.00	1916.92	1919.65	1920.55	1923.57	0.007105	15.89	51.61	31.91	1.70
FL-ALIGN	1476.5	100-YEAR	820.00	1916.11	1918.67	1920.04	1923.29	0.009014	17.25	47.52	18.59	1.90
FL-ALIGN	1462.50	100-YEAR	820.00	1915.69	1918.26	1919.69	1923.15	0.009589	17.75	46.20	18.00	1.95
FL-ALIGN	1451.37	100-YEAR	820.00	1915.20	1917.69	1919.20	1922.89	0.010504	18.29	44.83	18.00	2.04
FL-ALIGN	1426.37	100-YEAR	820.00	1914.66	1917.08	1918.66	1922.59	0.011460	18.82	43.57	18.00	2.13
FL-ALIGN	1401.35	100-YEAR	820.00	1914.13	1916.50	1918.13	1922.26	0.012306	19.26	42.57	18.00	2.21
FL-ALIGN	1376.2	100-YEAR	820.00	1913.60	1915.92	1917.60	1921.92	0.013064	19.64	41.74	18.00	2.27
FL-ALIGN	1351.17	100-YEAR	820.00	1913.07	1915.35	1917.07	1921.56	0.013775	19.99	41.03	18.00	2.33
FL-ALIGN	1326.16	100-YEAR	820.00	1912.53	1914.77	1916.53	1921.18	0.014467	20.31	40.37	18.00	2.39
FL-ALIGN	1301.14	100-YEAR	820.00	1912.00	1914.21	1916.00	1920.80	0.015068	20.58	39.84	18.00	2.44
FL-ALIGN	1276.14	100-YEAR	820.00	1911.47	1913.66	1915.47	1920.40	0.015622	20.82	39.38	18.00	2.48

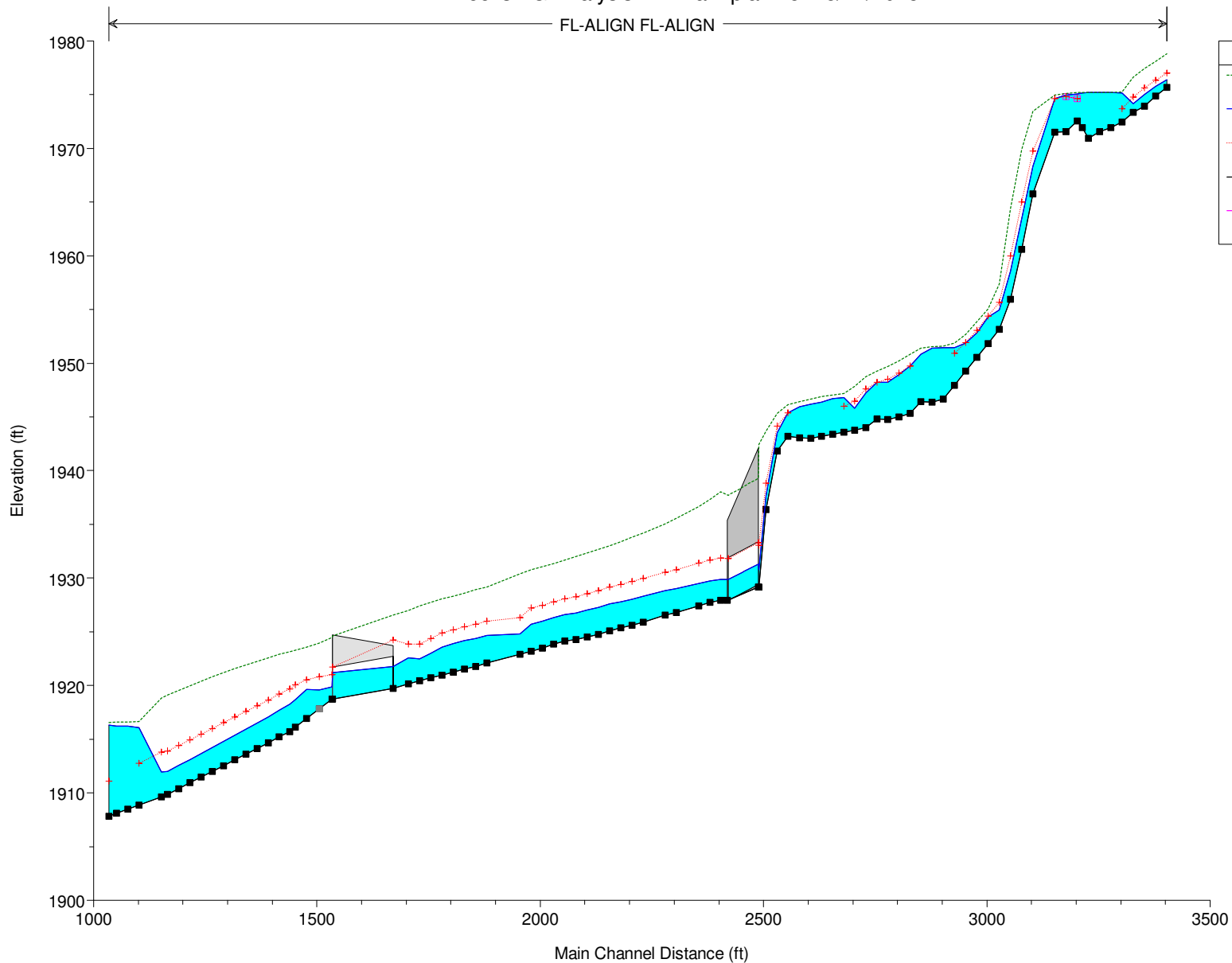
HEC-RAS Plan: 25 River: FL-ALIGN Reach: FL-ALIGN Profile: 100-YEAR (Continued)

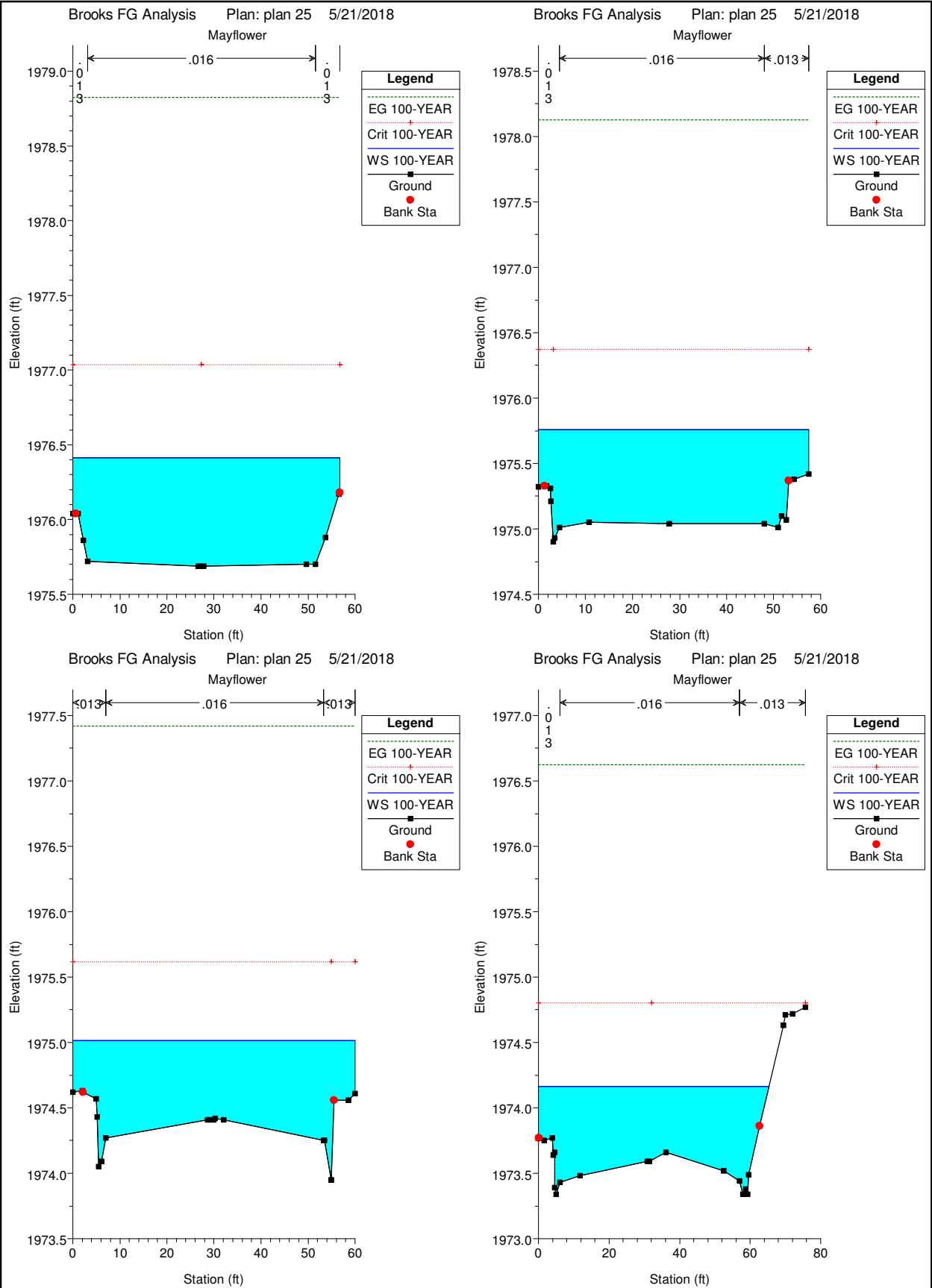
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
FL-ALIGN	1251.15	100-YEAR	820.00	1910.94	1913.11	1914.94	1919.99	0.016131	21.04	38.97	18.00	2.52
FL-ALIGN	1226.18	100-YEAR	820.00	1910.40	1912.55	1914.40	1919.56	0.016598	21.24	38.61	18.00	2.56
FL-ALIGN	1201.34	100-YEAR	820.00	1909.88	1912.01	1913.88	1919.13	0.016985	21.40	38.32	18.00	2.59
FL-ALIGN	1151.6	100-YEAR	869.00	1909.65	1911.94	1913.81	1918.83	0.015192	21.06	41.27	18.00	2.45
FL-ALIGN	1101.71	100-YEAR	869.00	1908.87	1916.10	1912.74	1916.66	0.000409	6.01	144.53	20.00	0.39
FL-ALIGN	1076.62	100-YEAR	869.00	1908.48	1916.20		1916.60	0.000268	5.12	169.59	21.98	0.33
FL-ALIGN	1051.67	100-YEAR	869.00	1908.09	1916.23		1916.58	0.000219	4.76	182.64	22.44	0.29
FL-ALIGN	1034.38	100-YEAR	869.00	1907.82	1916.30	1911.09	1916.55	0.000138	3.98	218.36	25.75	0.24

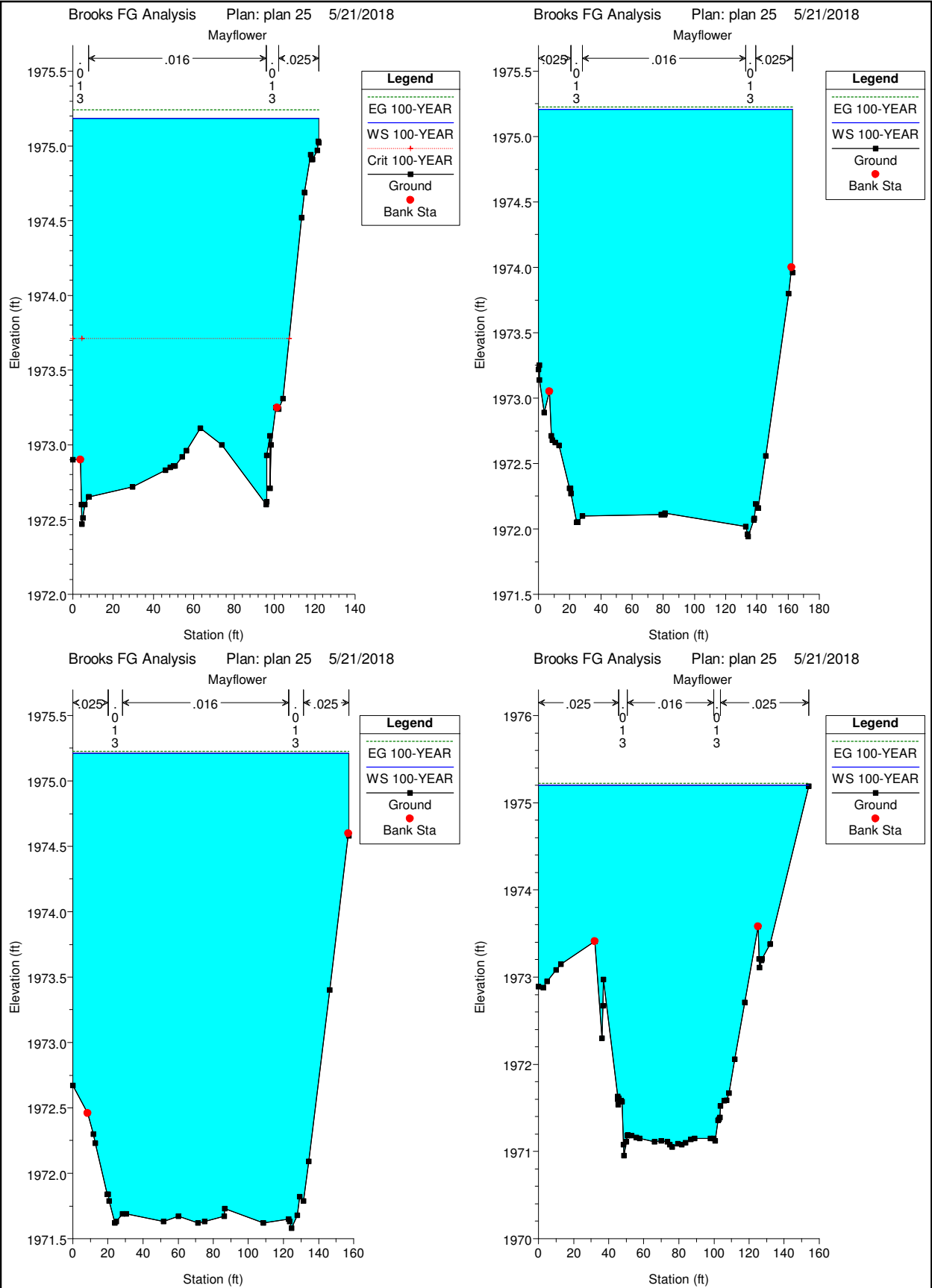
Brooks FG Analysis Plan: plan 25 5/21/2018

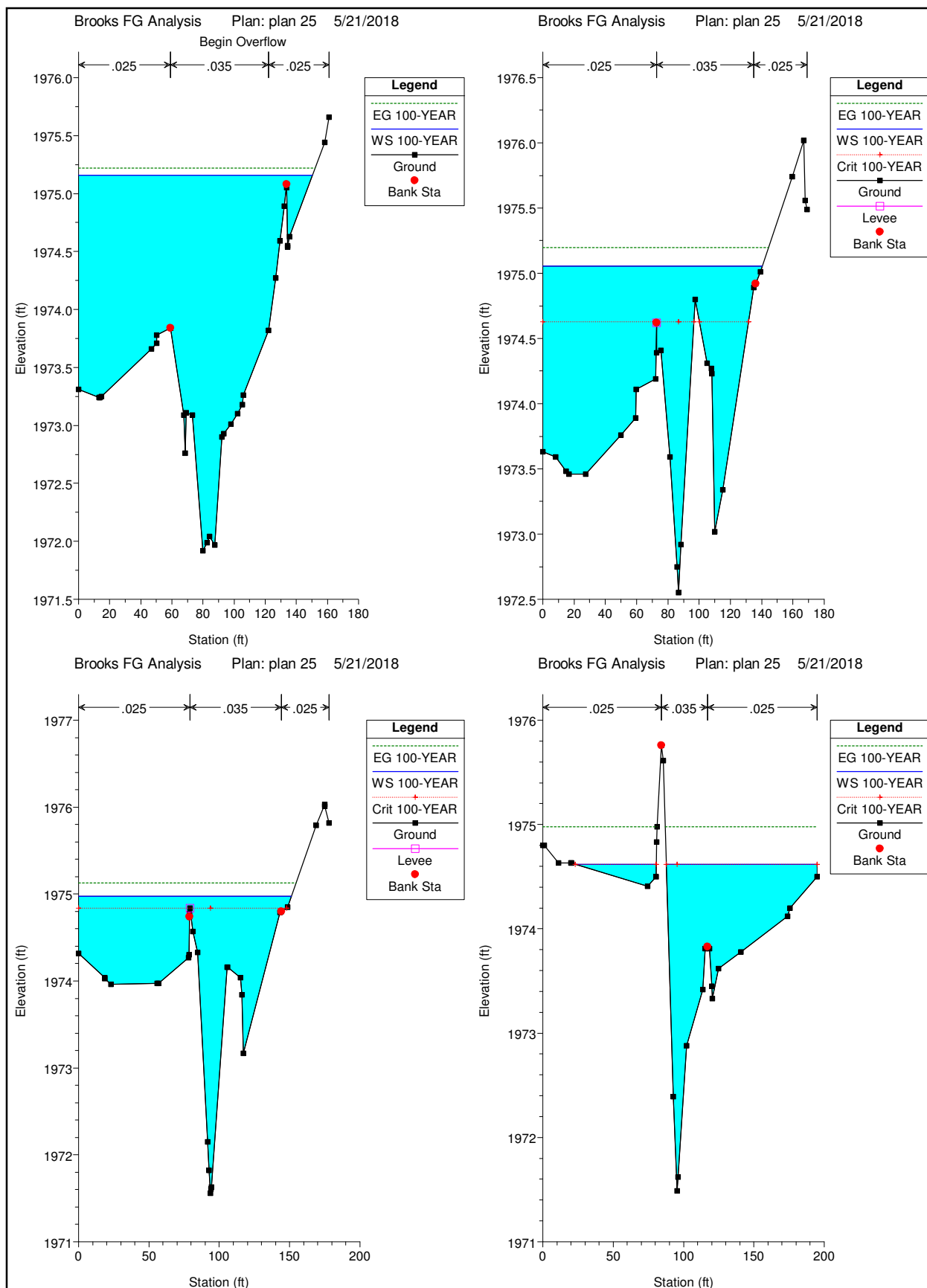
FL-ALIGN FL-ALIGN

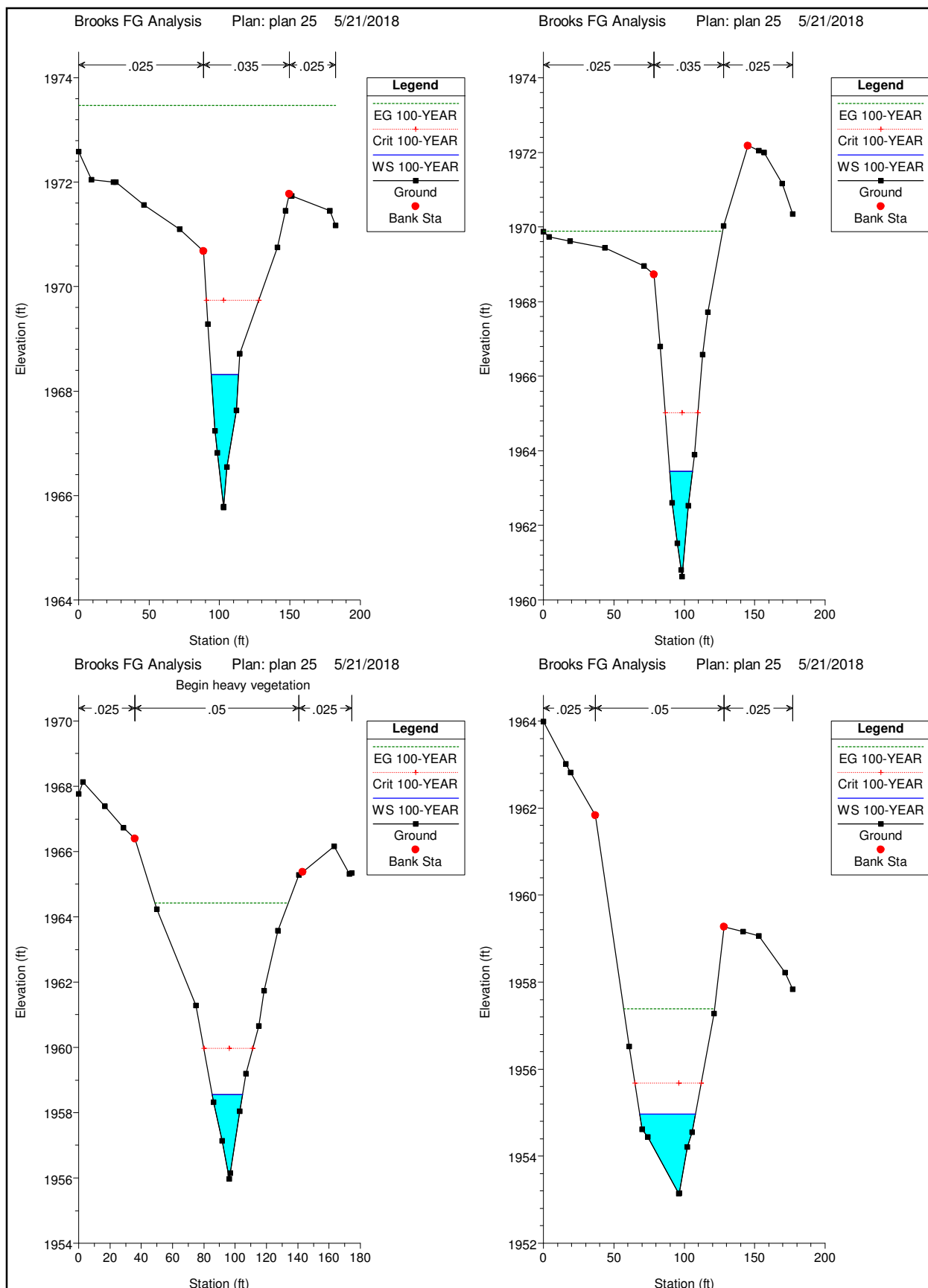
Legend	
EG 100-YEAR	
WS 100-YEAR	
Crit 100-YEAR	
Ground	
Left Levee	

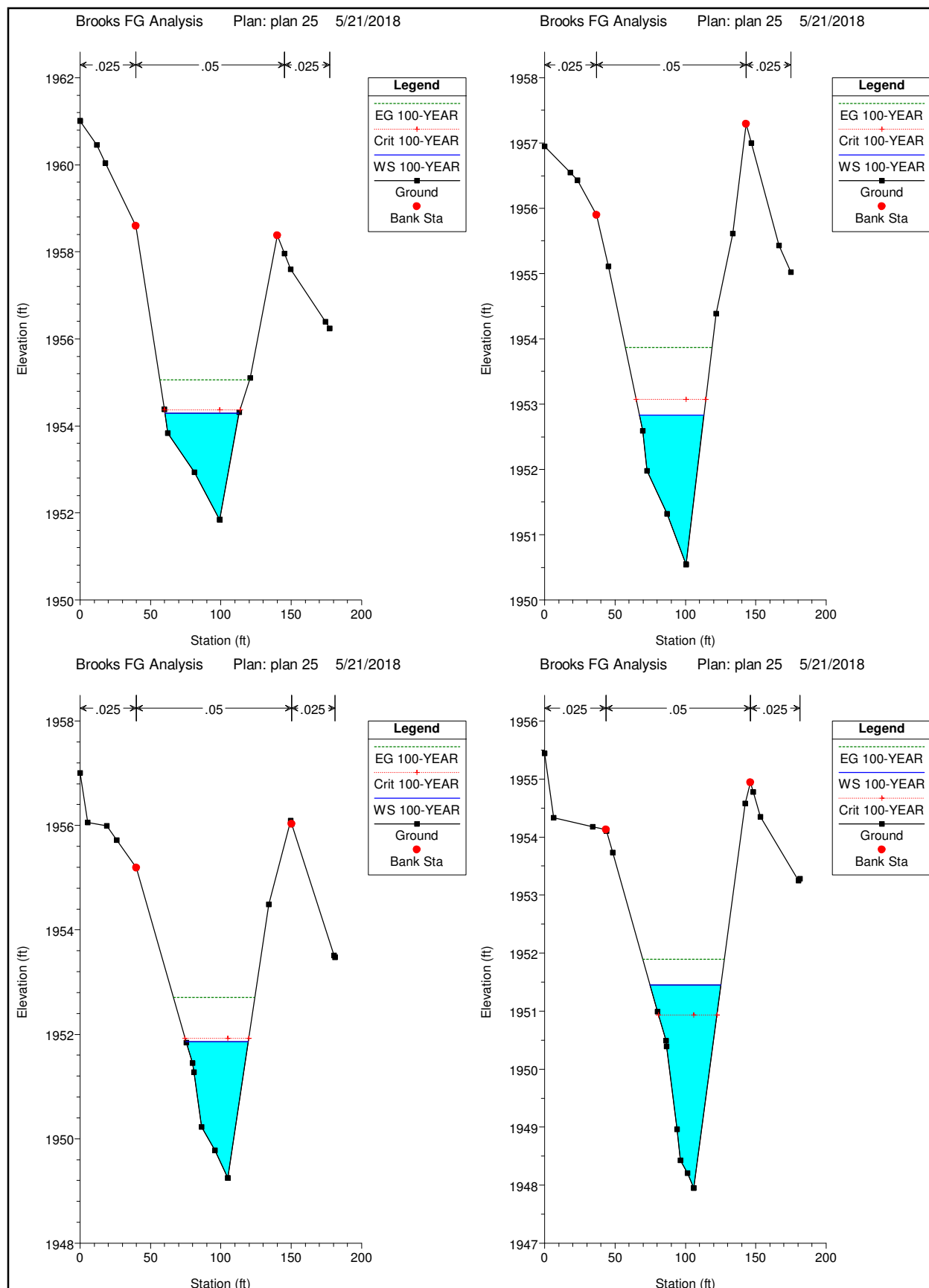


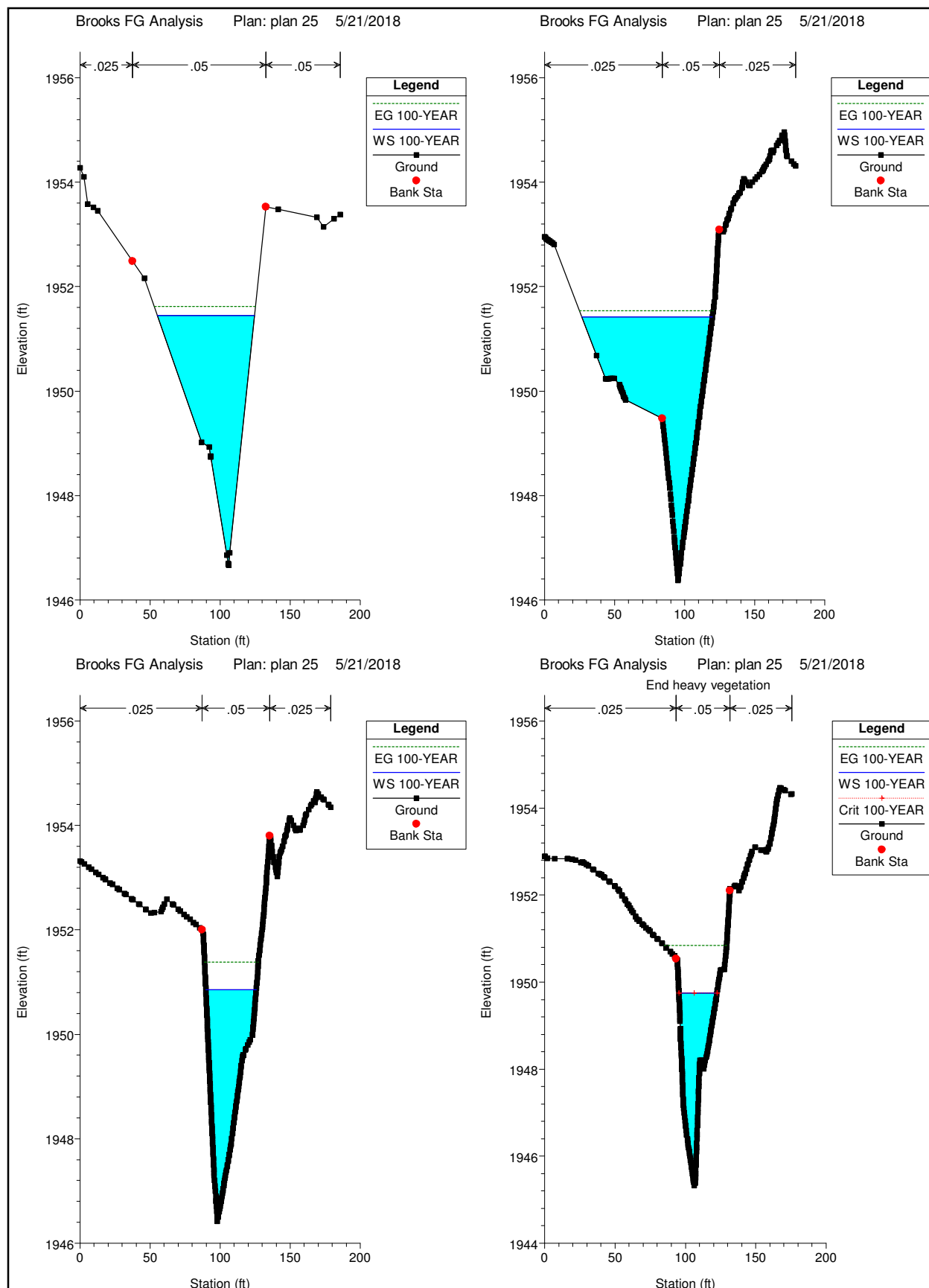


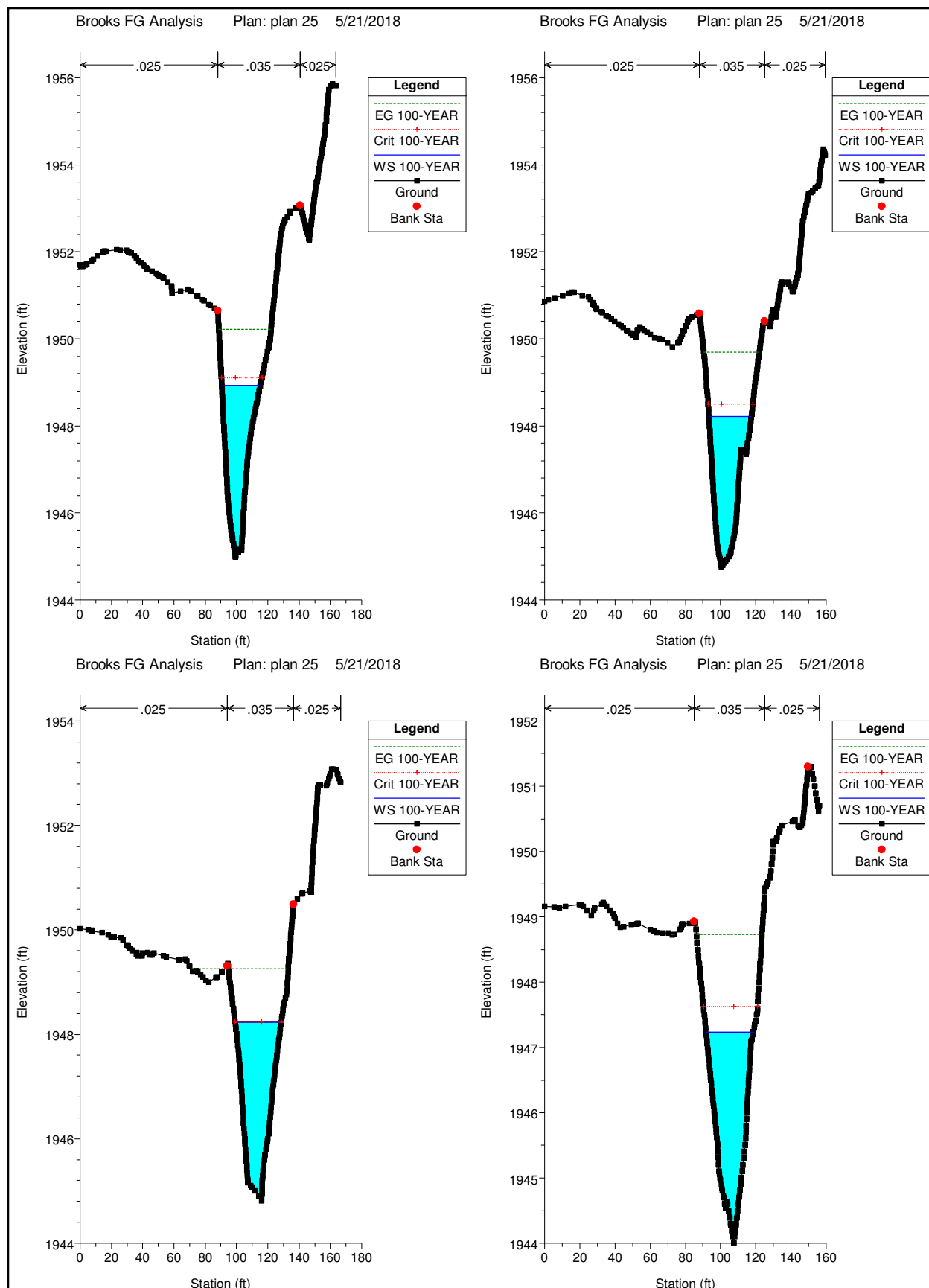


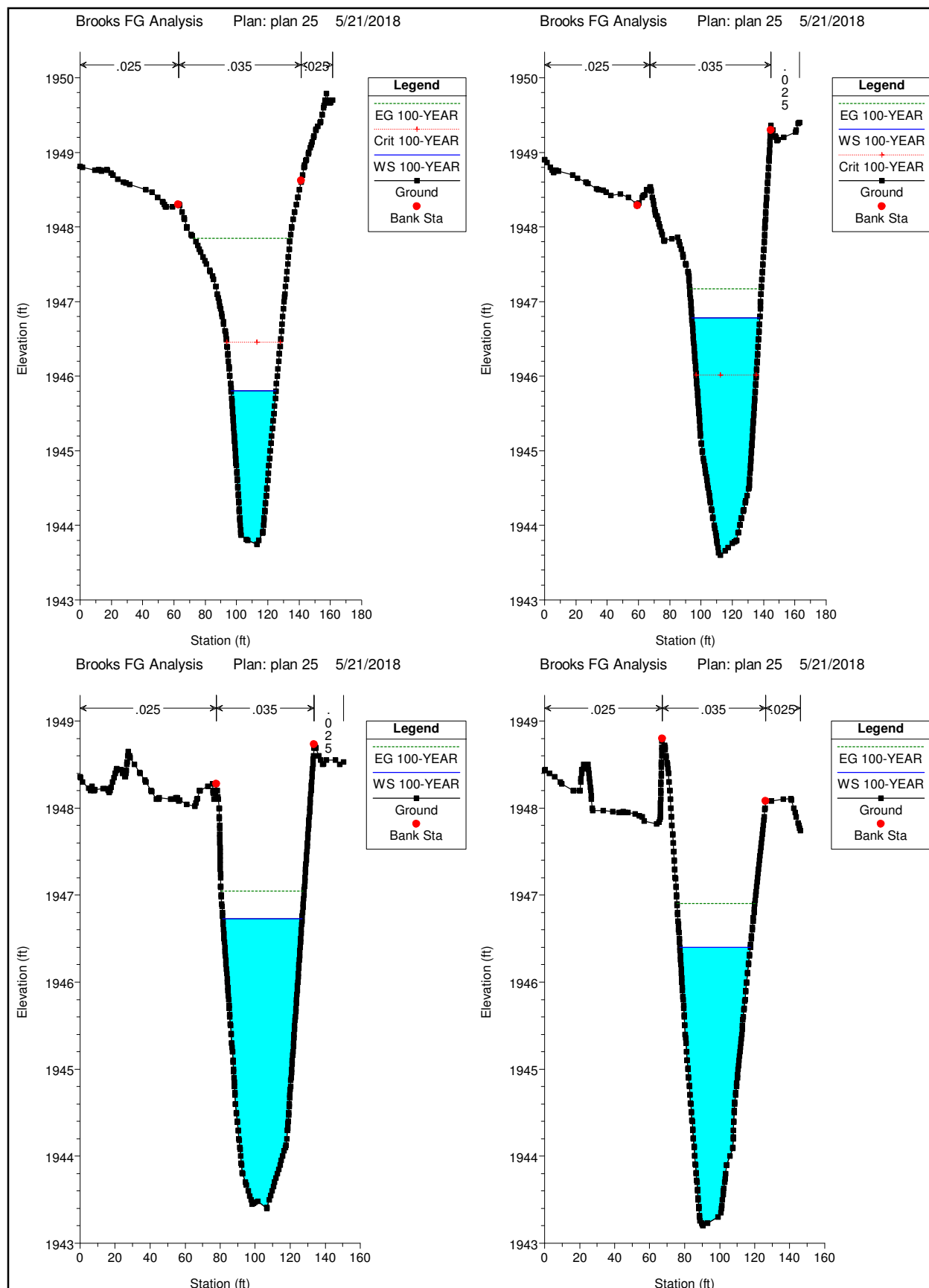


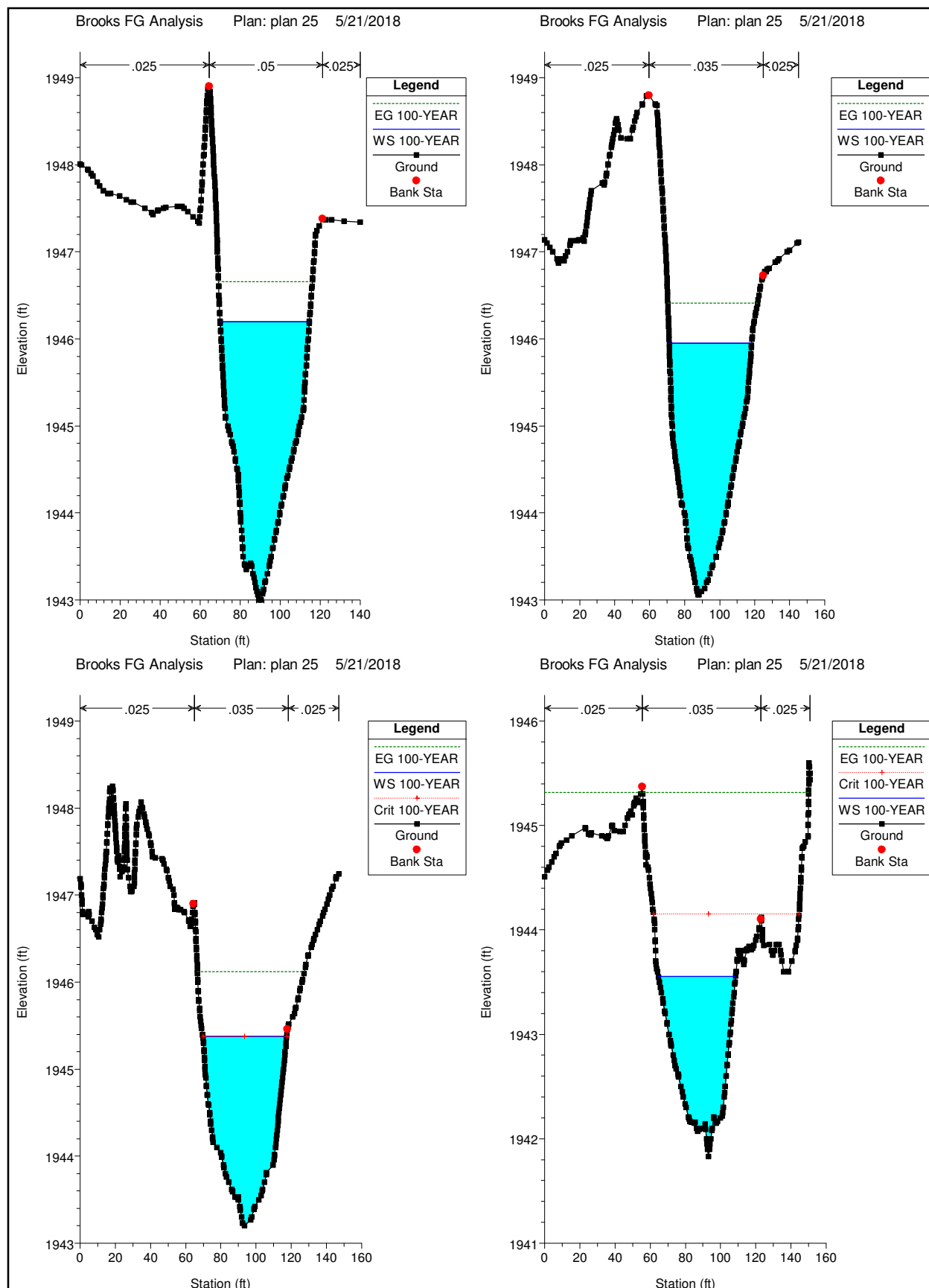


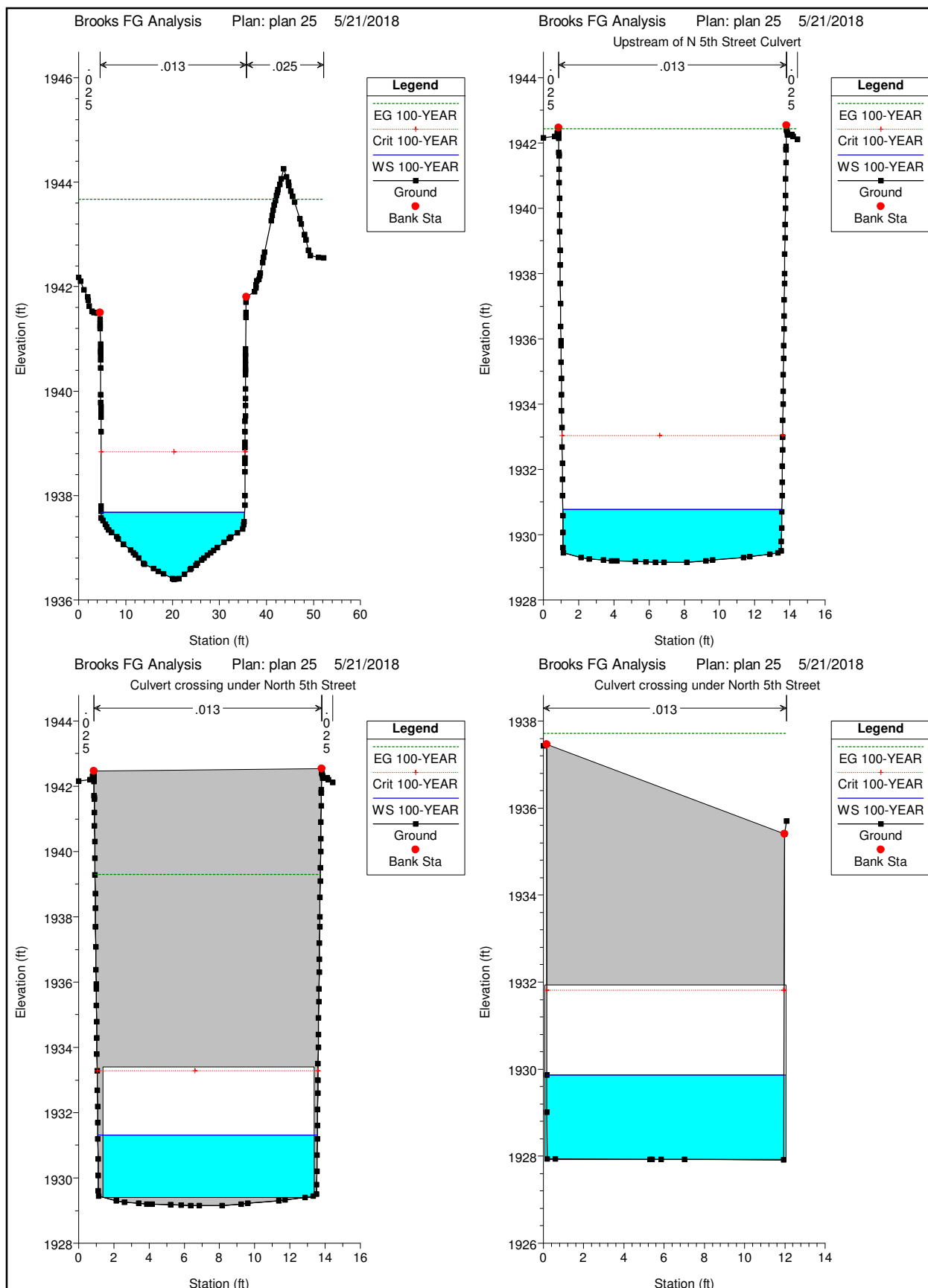


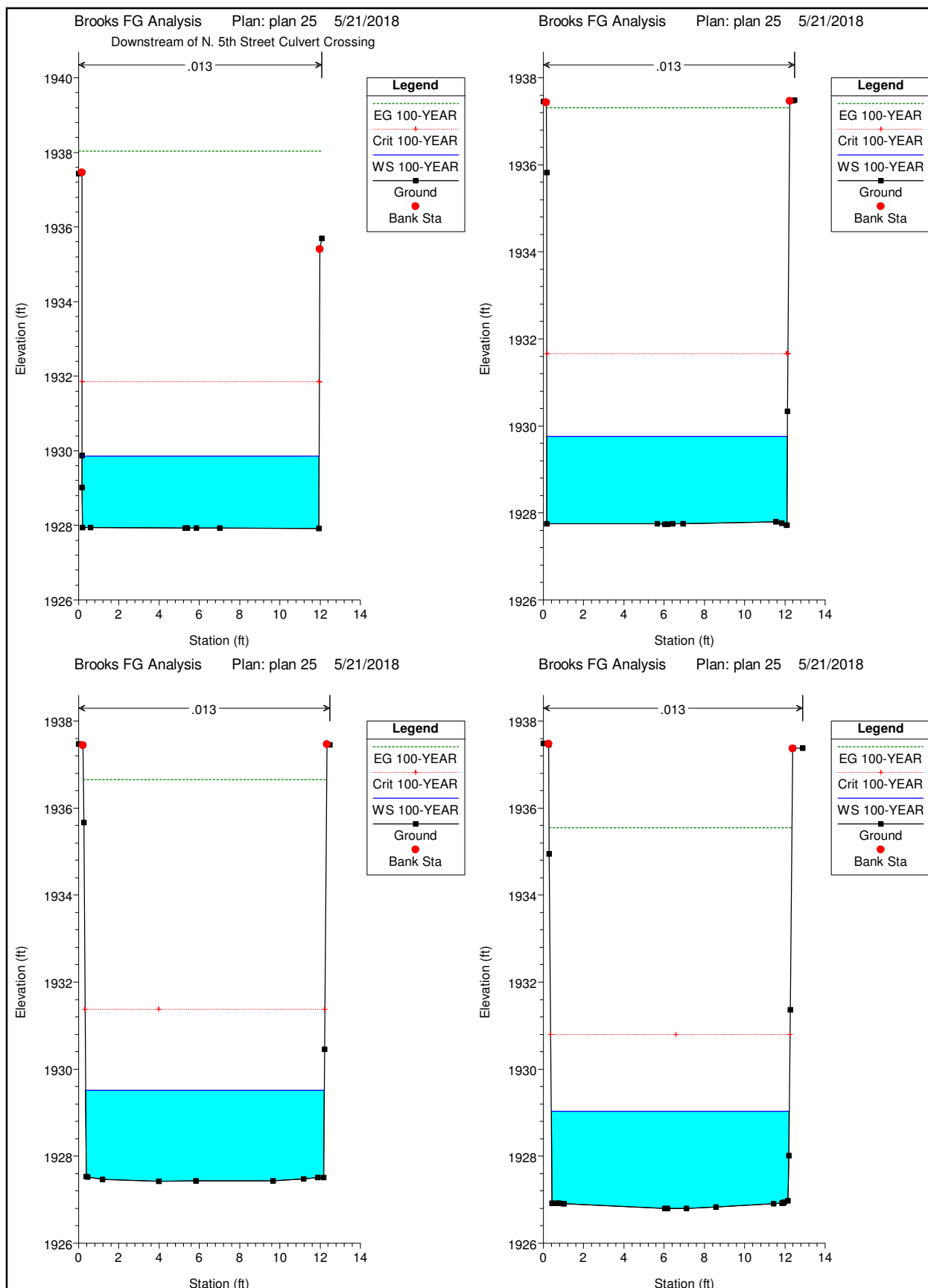


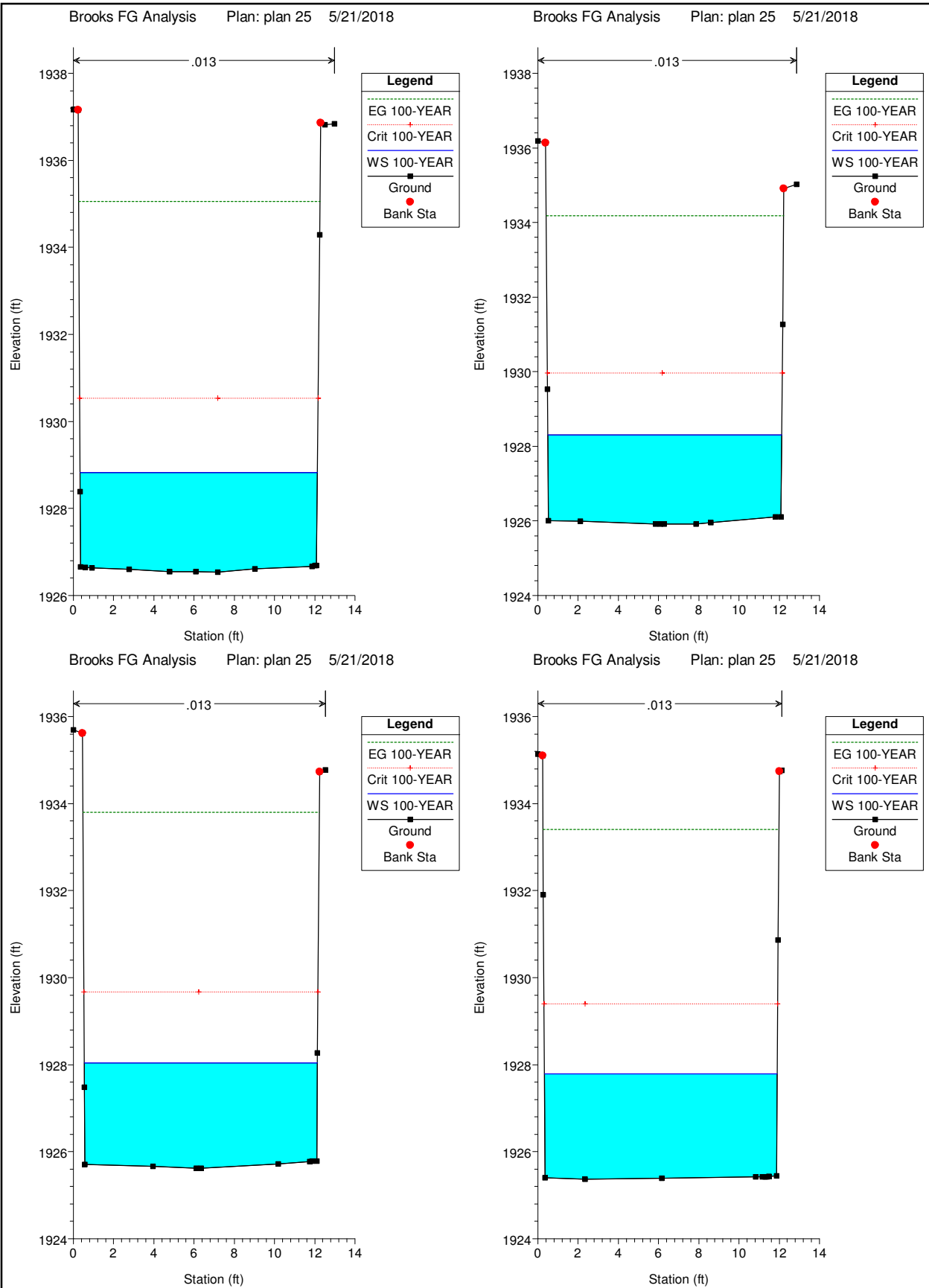


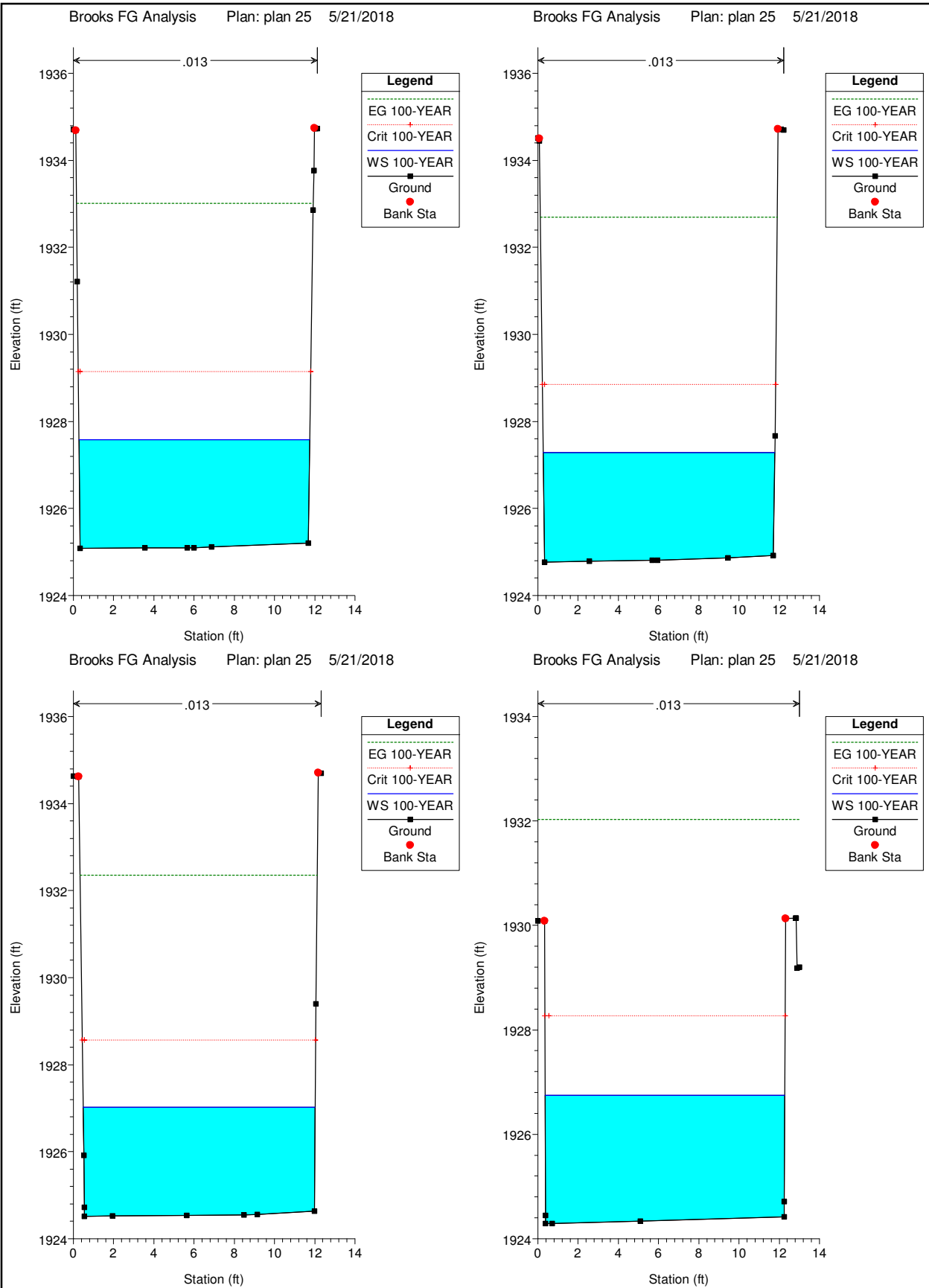


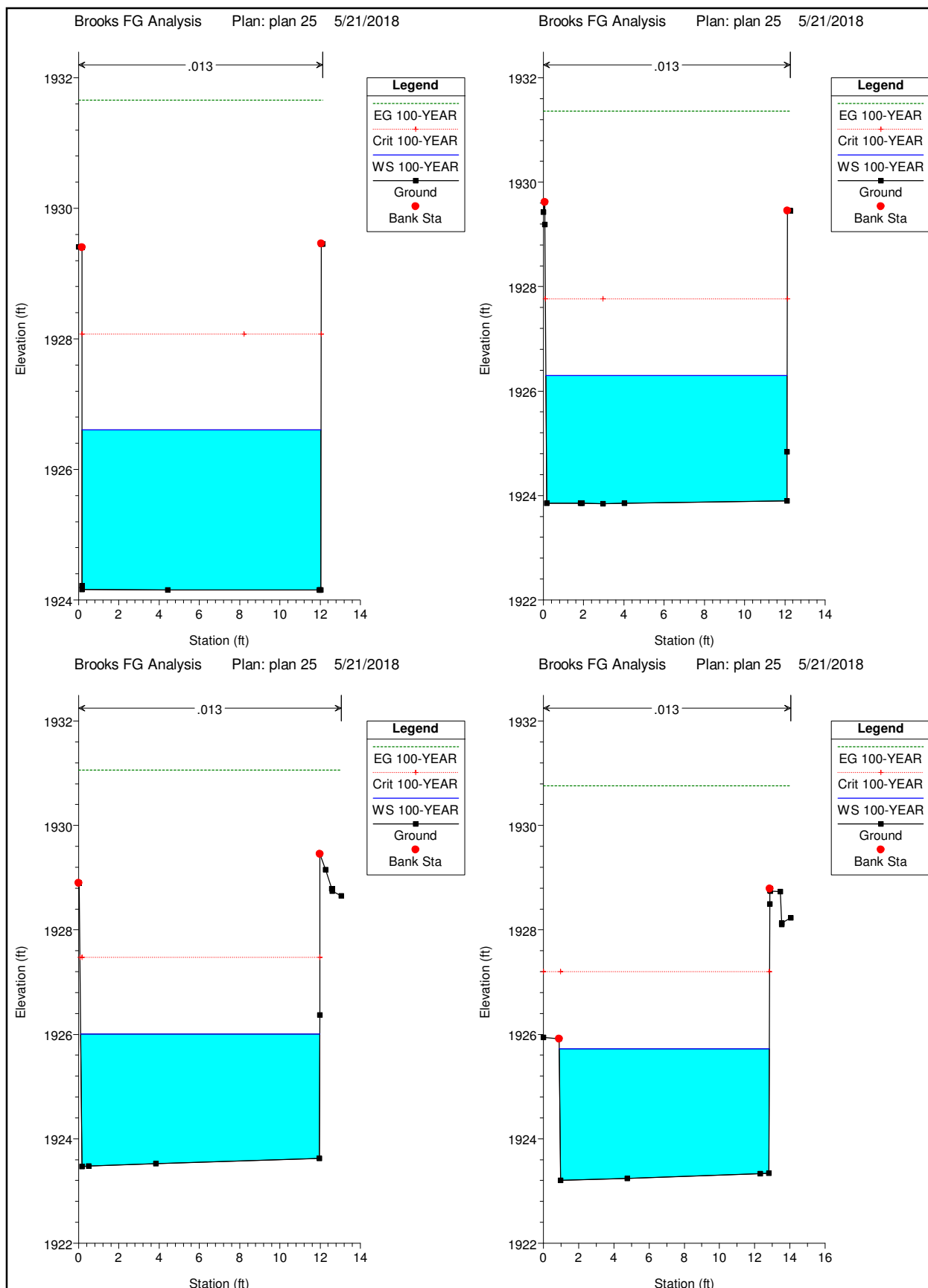


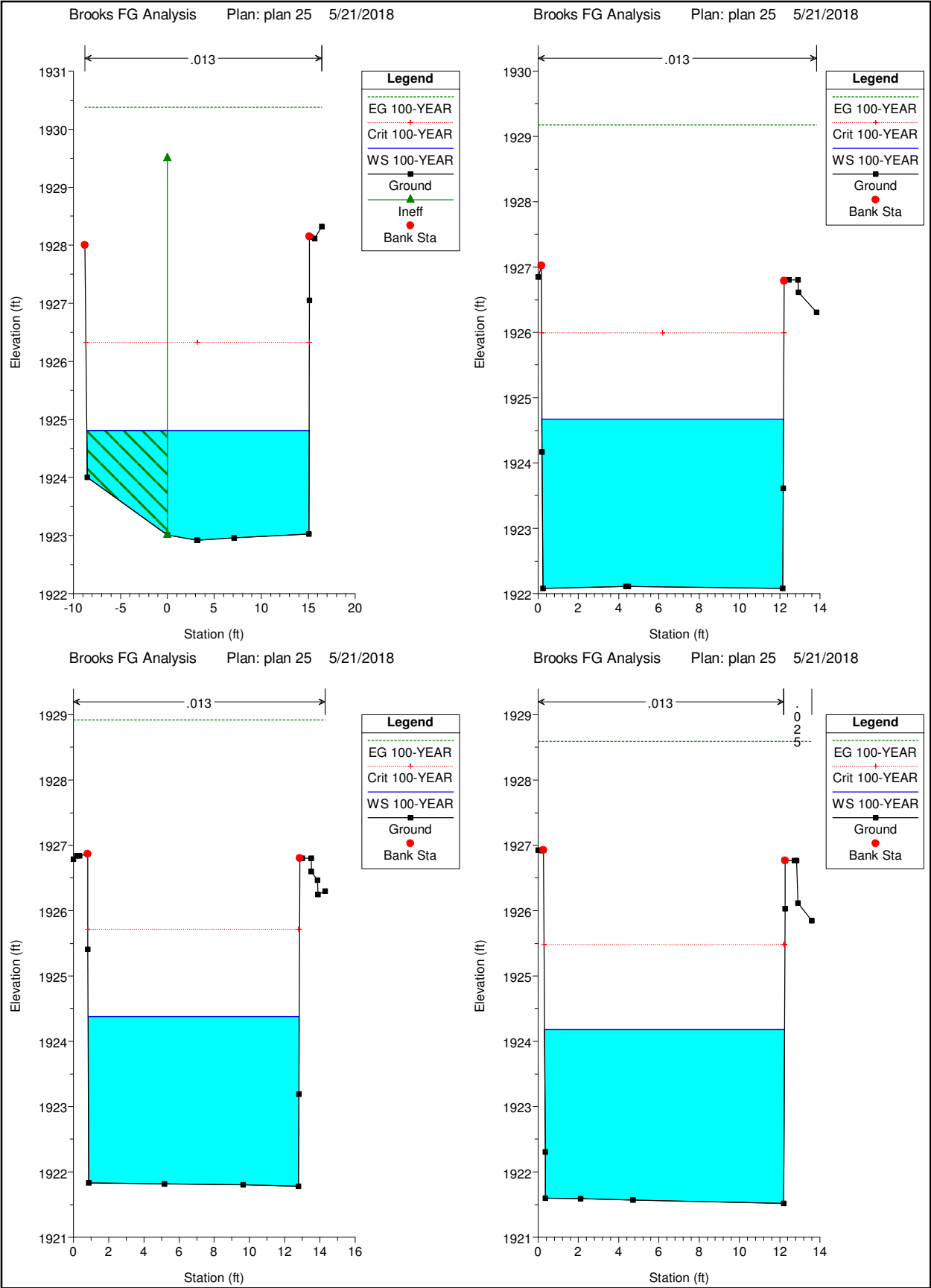


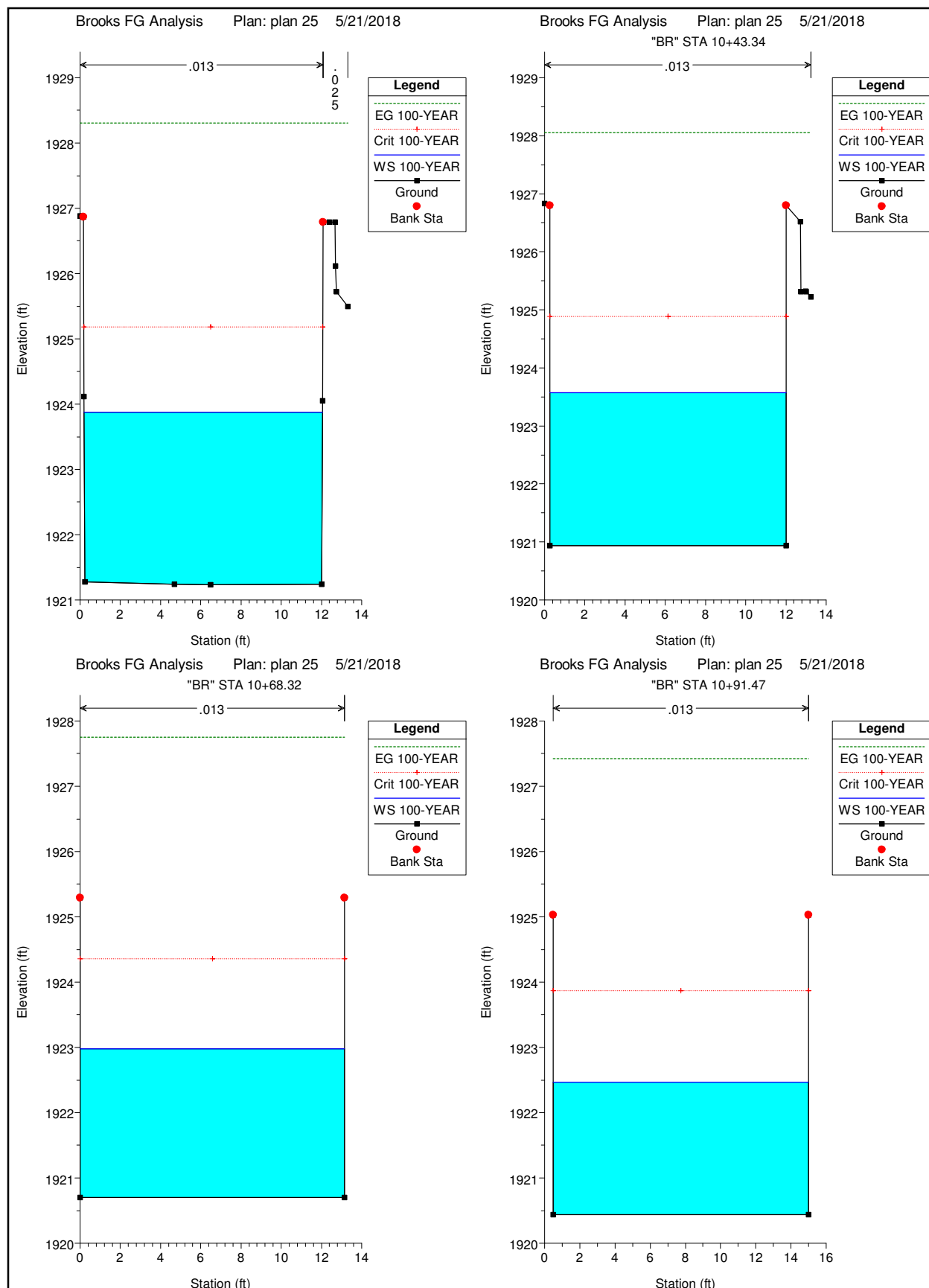


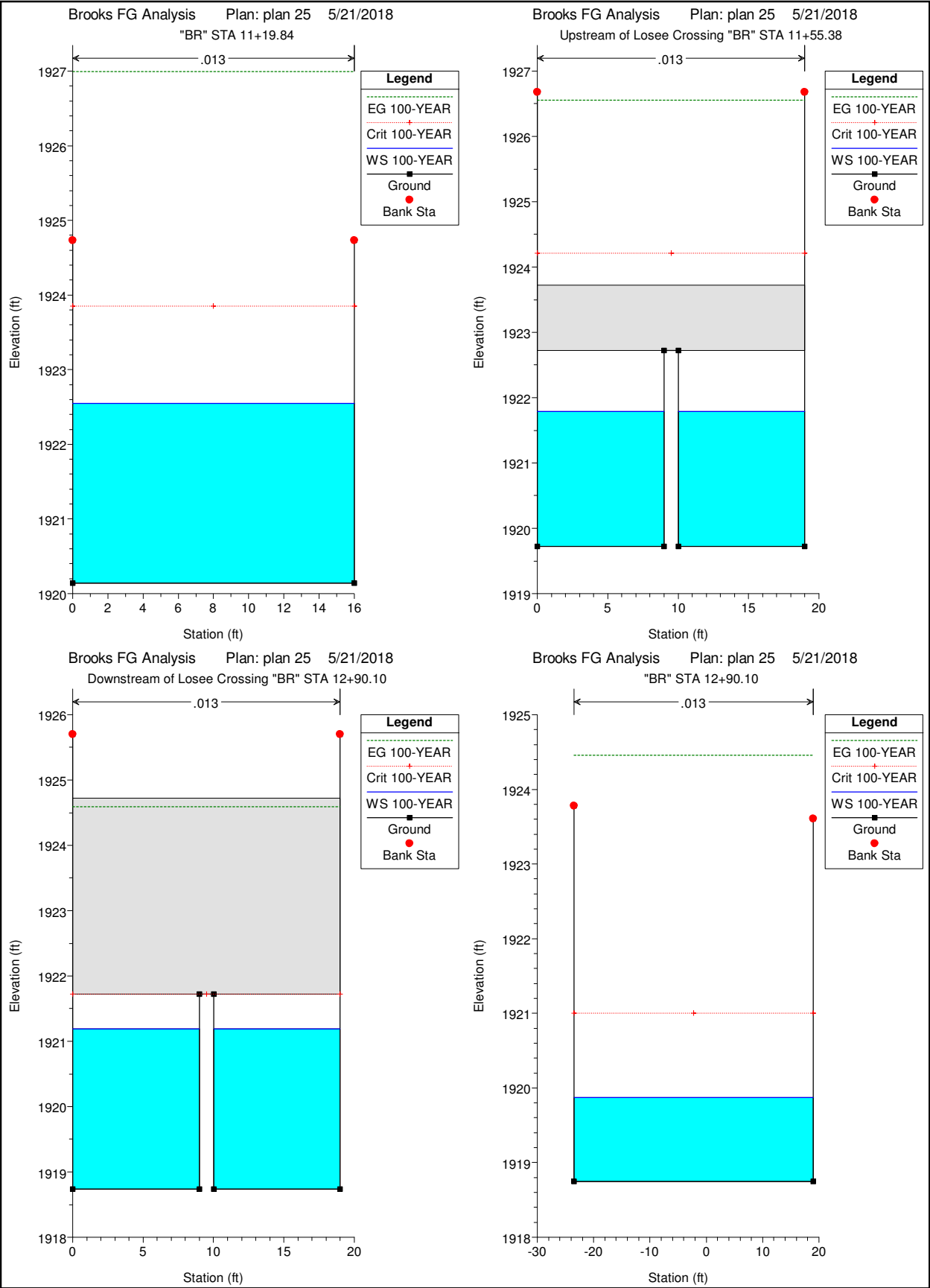


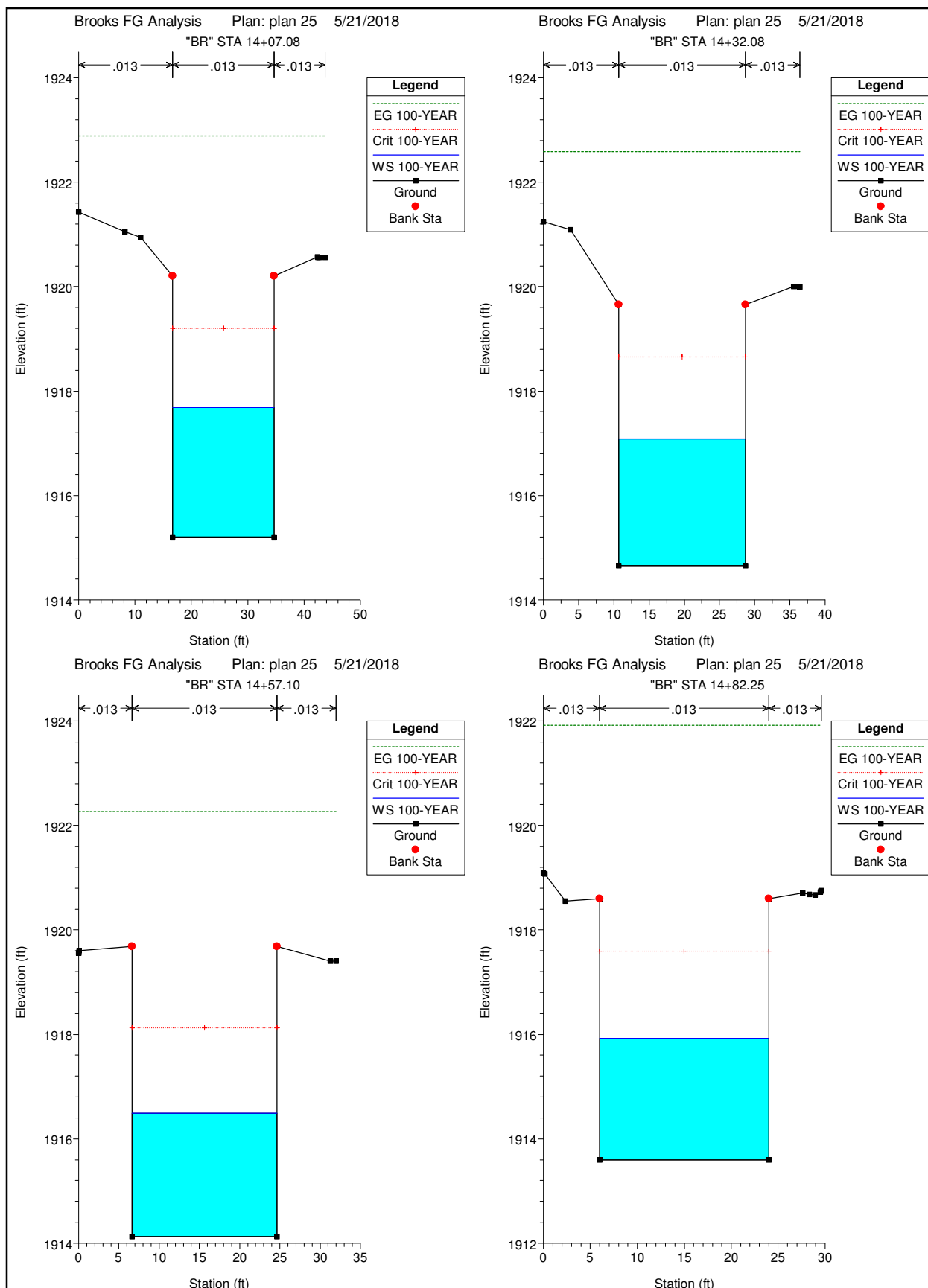


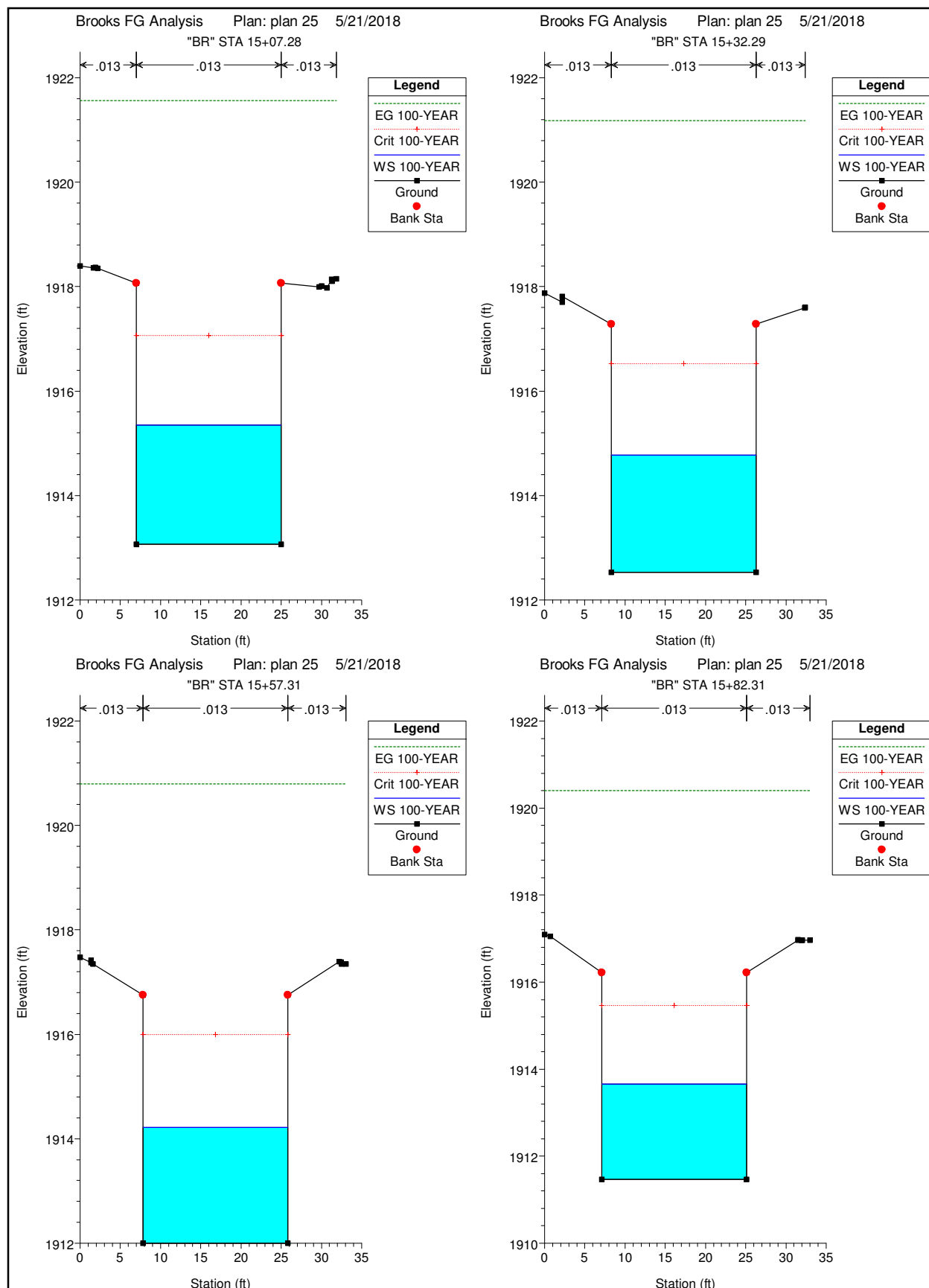


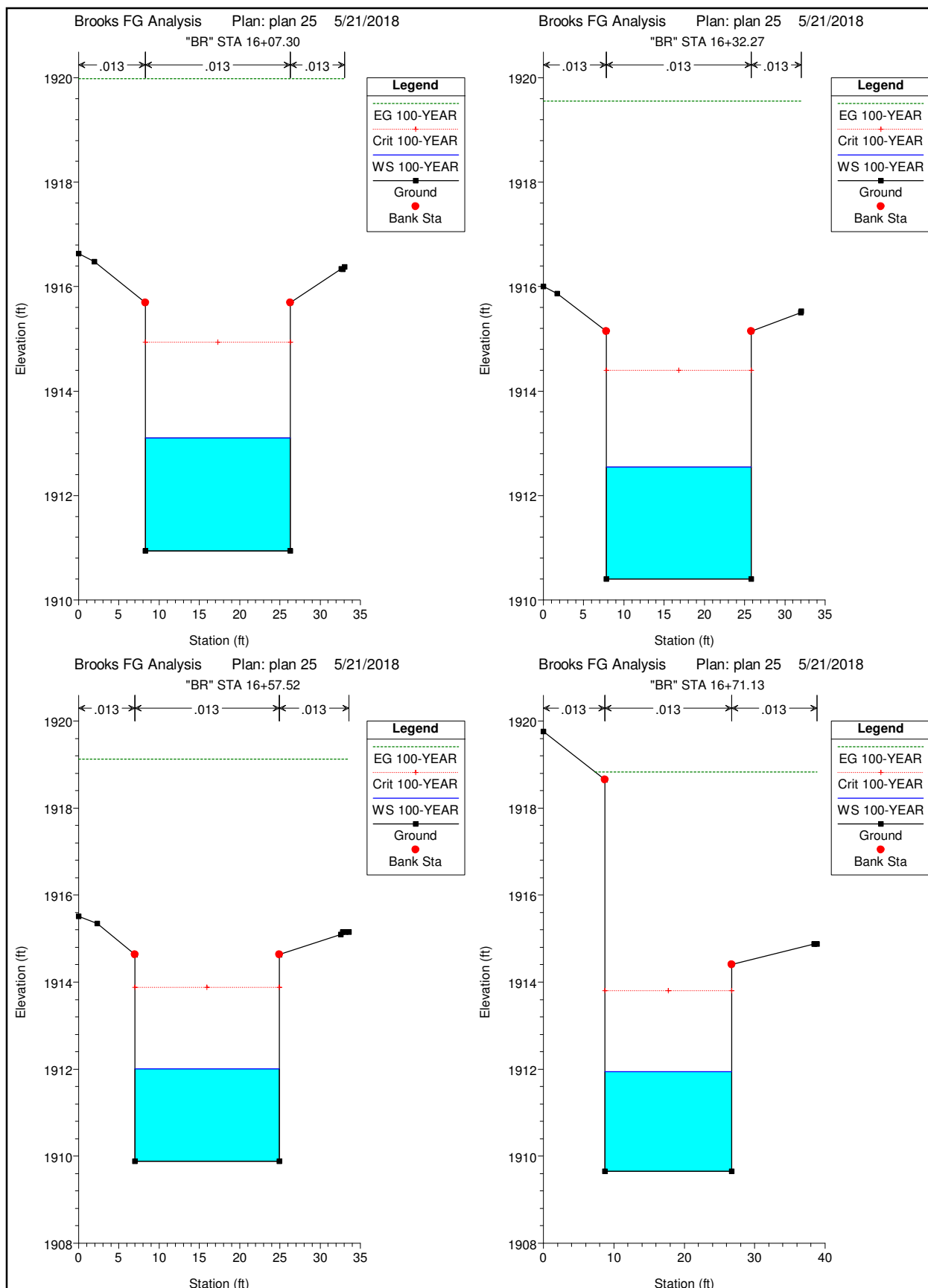


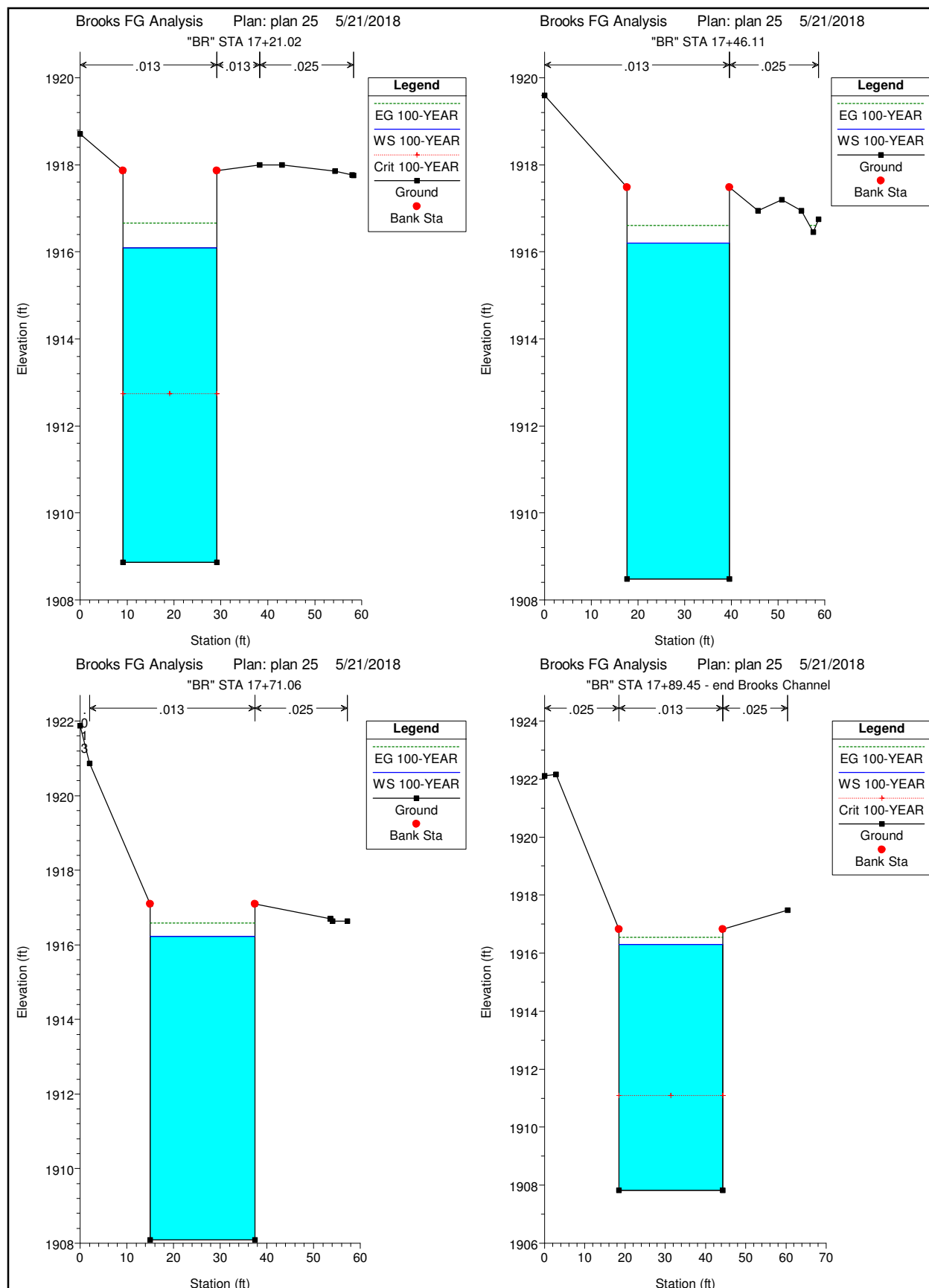












Plan: 25 FL-ALIGN FL-ALIGN RS: 3398.92 Profile: 100-YEAR

E.G. Elev (ft)	1978.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.41	Wt. n-Val.	0.013	0.016	
W.S. Elev (ft)	1976.41	Reach Len. (ft)	25.01	25.00	25.02
Crit W.S. (ft)	1977.04	Flow Area (sq ft)	0.25	38.34	
E.G. Slope (ft/ft)	0.028579	Area (sq ft)	0.25	38.34	
Q Total (cfs)	480.00	Flow (cfs)	1.91	478.09	
Top Width (ft)	56.74	Top Width (ft)	0.68	56.06	
Vel Total (ft/s)	12.44	Avg. Vel. (ft/s)	7.49	12.47	
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.37	0.68	
Conv. Total (cfs)	2839.3	Conv. (cfs)	11.3	2828.1	
Length Wtd. (ft)	25.00	Wetted Per. (ft)	1.05	56.34	
Min Ch El (ft)	1975.69	Shear (lb/sq ft)	0.43	1.21	
Alpha	1.00	Stream Power (lb/ft s)	3.23	15.14	
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.23	3.41	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.22	1.56	0.11

Plan: 25 FL-ALIGN FL-ALIGN RS: 3373.92 Profile: 100-YEAR

E.G. Elev (ft)	1978.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.37	Wt. n-Val.	0.013	0.015	0.013
W.S. Elev (ft)	1975.76	Reach Len. (ft)	25.03	25.00	25.05
Crit W.S. (ft)	1976.37	Flow Area (sq ft)	0.55	36.99	1.58
E.G. Slope (ft/ft)	0.026563	Area (sq ft)	0.55	36.99	1.58
Q Total (cfs)	480.00	Flow (cfs)	4.85	460.79	14.36
Top Width (ft)	57.50	Top Width (ft)	1.27	51.91	4.32
Vel Total (ft/s)	12.27	Avg. Vel. (ft/s)	8.77	12.46	9.07
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)	0.44	0.71	0.37
Conv. Total (cfs)	2945.1	Conv. (cfs)	29.8	2827.2	88.1
Length Wtd. (ft)	25.00	Wetted Per. (ft)	1.71	52.14	4.66
Min Ch El (ft)	1974.90	Shear (lb/sq ft)	0.54	1.18	0.56
Alpha	1.01	Stream Power (lb/ft s)	4.70	14.66	5.11
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.23	3.39	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	1.53	0.11

Plan: 25 FL-ALIGN FL-ALIGN RS: 3348.92 Profile: 100-YEAR

E.G. Elev (ft)	1977.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.41	Wt. n-Val.	0.013	0.016	0.013
W.S. Elev (ft)	1975.01	Reach Len. (ft)	25.18	25.00	26.53
Crit W.S. (ft)	1975.62	Flow Area (sq ft)	0.84	35.90	1.97
E.G. Slope (ft/ft)	0.029561	Area (sq ft)	0.84	35.90	1.97
Q Total (cfs)	480.00	Flow (cfs)	7.84	450.89	21.27
Top Width (ft)	60.00	Top Width (ft)	2.16	53.42	4.42
Vel Total (ft/s)	12.40	Avg. Vel. (ft/s)	9.35	12.56	10.81
Max Chl Dpth (ft)	1.06	Hydr. Depth (ft)	0.39	0.67	0.45
Conv. Total (cfs)	2791.8	Conv. (cfs)	45.6	2622.5	123.7
Length Wtd. (ft)	25.04	Wetted Per. (ft)	2.55	53.94	4.82
Min Ch El (ft)	1973.95	Shear (lb/sq ft)	0.61	1.23	0.75
Alpha	1.01	Stream Power (lb/ft s)	5.67	15.43	8.14
Frctn Loss (ft)	0.79	Cum Volume (acre-ft)	0.23	3.37	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.22	1.50	0.11

Plan: 25 FL-ALIGN FL-ALIGN RS: 3323.92 Profile: 100-YEAR

E.G. Elev (ft)	1976.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.46	Wt. n-Val.	0.013	0.015	0.013
W.S. Elev (ft)	1974.16	Reach Len. (ft)	27.48	25.00	31.71
Crit W.S. (ft)	1974.80	Flow Area (sq ft)	0.03	37.87	0.40
E.G. Slope (ft/ft)	0.033599	Area (sq ft)	0.03	37.87	0.40
Q Total (cfs)	480.00	Flow (cfs)	0.11	477.51	2.38
Top Width (ft)	65.39	Top Width (ft)	0.08	62.65	2.66
Vel Total (ft/s)	12.53	Avg. Vel. (ft/s)	3.44	12.61	5.93
Max Chl Dpth (ft)	0.82	Hydr. Depth (ft)	0.39	0.60	0.15
Conv. Total (cfs)	2618.7	Conv. (cfs)	0.6	2605.1	13.0
Length Wtd. (ft)	25.27	Wetted Per. (ft)	0.47	62.99	2.67
Min Ch El (ft)	1973.34	Shear (lb/sq ft)	0.14	1.26	0.32
Alpha	1.01	Stream Power (lb/ft s)	0.48	15.90	1.87
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.23	3.35	0.08
C & E Loss (ft)	0.12	Cum SA (acres)	0.22	1.47	0.11

Plan: 25 FL-ALIGN FL-ALIGN RS: 3298.92 Profile: 100-YEAR

E.G. Elev (ft)	1975.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.013	0.016	0.023
W.S. Elev (ft)	1975.18	Reach Len. (ft)	28.27	25.32	26.50
Crit W.S. (ft)	1973.71	Flow Area (sq ft)	8.42	229.87	20.20
E.G. Slope (ft/ft)	0.000137	Area (sq ft)	8.42	229.87	20.20
Q Total (cfs)	480.00	Flow (cfs)	14.19	450.45	15.37
Top Width (ft)	121.96	Top Width (ft)	3.69	97.66	20.61
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)	1.68	1.96	0.76
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)	2.28	2.35	0.98
Conv. Total (cfs)	40953.4	Conv. (cfs)	1210.5	38432.0	1310.9
Length Wtd. (ft)	25.40	Wetted Per. (ft)	5.97	98.38	20.88
Min Ch El (ft)	1972.47	Shear (lb/sq ft)	0.01	0.02	0.01
Alpha	1.07	Stream Power (lb/ft s)	0.02	0.04	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.23	3.27	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.22	1.42	0.10

Plan: 25 FL-ALIGN FL-ALIGN RS: 3273.6 Profile: 100-YEAR

E.G. Elev (ft)	1975.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.025	0.017	0.025
W.S. Elev (ft)	1975.21	Reach Len. (ft)	26.00	24.68	24.56
Crit W.S. (ft)		Flow Area (sq ft)	15.22	457.56	0.68
E.G. Slope (ft/ft)	0.000031	Area (sq ft)	15.22	457.56	0.68
Q Total (cfs)	480.00	Flow (cfs)	7.15	472.73	0.12
Top Width (ft)	162.74	Top Width (ft)	6.93	155.26	0.55
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)	0.47	1.03	0.17
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)	2.20	2.95	1.23
Conv. Total (cfs)	86074.9	Conv. (cfs)	1282.5	84771.4	20.9
Length Wtd. (ft)	24.70	Wetted Per. (ft)	9.02	155.42	1.80
Min Ch El (ft)	1971.94	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.22	3.07	0.06
C & E Loss (ft)	0.00	Cum SA (acres)	0.21	1.35	0.09

Plan: 25 FL-ALIGN FL-ALIGN RS: 3248.92 Profile: 100-YEAR

E.G. Elev (ft)	1975.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.025	0.016	0.025
W.S. Elev (ft)	1975.21	Reach Len. (ft)	25.13	25.00	30.09
Crit W.S. (ft)		Flow Area (sq ft)	22.04	483.43	0.19
E.G. Slope (ft/ft)	0.000023	Area (sq ft)	22.04	483.43	0.19
Q Total (cfs)	480.00	Flow (cfs)	10.09	469.89	0.02
Top Width (ft)	157.29	Top Width (ft)	8.33	148.65	0.31
Vel Total (ft/s)	0.95	Avg. Vel. (ft/s)	0.46	0.97	0.10
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)	2.65	3.25	0.62
Conv. Total (cfs)	99819.1	Conv. (cfs)	2097.6	97717.5	4.0
Length Wtd. (ft)	25.08	Wetted Per. (ft)	10.87	148.88	0.94
Min Ch El (ft)	1971.58	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.21	2.81	0.06
C & E Loss (ft)	0.00	Cum SA (acres)	0.21	1.26	0.09

Plan: 25 FL-ALIGN FL-ALIGN RS: 3223.92 Profile: 100-YEAR

E.G. Elev (ft)	1975.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.025	0.017	0.025
W.S. Elev (ft)	1975.20	Reach Len. (ft)	14.07	13.70	14.32
Crit W.S. (ft)		Flow Area (sq ft)	65.11	332.99	33.08
E.G. Slope (ft/ft)	0.000039	Area (sq ft)	65.11	332.99	33.08
Q Total (cfs)	480.00	Flow (cfs)	37.25	429.24	13.51
Top Width (ft)	153.91	Top Width (ft)	31.99	93.28	28.64
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)	0.57	1.29	0.41
Max Chl Dpth (ft)	4.25	Hydr. Depth (ft)	2.04	3.57	1.15
Conv. Total (cfs)	76450.5	Conv. (cfs)	5933.0	68365.6	2151.9
Length Wtd. (ft)	13.81	Wetted Per. (ft)	34.30	94.17	28.89
Min Ch El (ft)	1970.95	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.22	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.19	2.57	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	1.19	0.08

Plan: 25 FL-ALIGN FL-ALIGN RS: 3210.22 Profile: 100-YEAR

E.G. Elev (ft)	1975.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.025	0.035	0.025
W.S. Elev (ft)	1975.16	Reach Len. (ft)	11.65	11.30	11.82
Crit W.S. (ft)		Flow Area (sq ft)	99.26	144.80	4.83
E.G. Slope (ft/ft)	0.000686	Area (sq ft)	99.26	144.80	4.83
Q Total (cfs)	480.00	Flow (cfs)	214.04	262.68	3.28
Top Width (ft)	150.44	Top Width (ft)	58.98	74.84	16.62
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)	2.16	1.81	0.68
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)	1.68	1.93	0.29
Conv. Total (cfs)	18330.3	Conv. (cfs)	8173.9	10031.3	125.1
Length Wtd. (ft)	11.50	Wetted Per. (ft)	60.86	75.34	16.83
Min Ch El (ft)	1971.92	Shear (lb/sq ft)	0.07	0.08	0.01
Alpha	1.04	Stream Power (lb/ft s)	0.15	0.15	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.16	2.50	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.18	1.17	0.07

Plan: 25 FL-ALIGN FL-ALIGN RS: 3198.92 Profile: 100-YEAR

E.G. Elev (ft)	1975.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.025	0.035	0.025
W.S. Elev (ft)	1975.05	Reach Len. (ft)	25.32	25.00	25.98
Crit W.S. (ft)	1974.63	Flow Area (sq ft)	98.00	70.57	0.30
E.G. Slope (ft/ft)	0.002208	Area (sq ft)	98.00	70.57	0.30
Q Total (cfs)	480.00	Flow (cfs)	328.97	150.89	0.14
Top Width (ft)	140.49	Top Width (ft)	72.70	63.49	4.30
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)	3.36	2.14	0.47
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)	1.35	1.11	0.07
Conv. Total (cfs)	10215.9	Conv. (cfs)	7001.4	3211.4	3.0
Length Wtd. (ft)	25.19	Wetted Per. (ft)	74.37	64.46	4.30
Min Ch El (ft)	1972.55	Shear (lb/sq ft)	0.18	0.15	0.01
Alpha	1.13	Stream Power (lb/ft s)	0.61	0.32	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.13	2.47	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	1.15	0.07

Plan: 25 FL-ALIGN FL-ALIGN RS: 3173.92 Profile: 100-YEAR

E.G. Elev (ft)	1975.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.025	0.035	0.025
W.S. Elev (ft)	1974.98	Reach Len. (ft)	25.43	25.00	25.55
Crit W.S. (ft)	1974.84	Flow Area (sq ft)	72.02	83.04	0.85
E.G. Slope (ft/ft)	0.003499	Area (sq ft)	72.02	83.04	0.85
Q Total (cfs)	480.00	Flow (cfs)	236.80	242.48	0.72
Top Width (ft)	151.31	Top Width (ft)	78.80	65.34	7.17
Vel Total (ft/s)	3.08	Avg. Vel. (ft/s)	3.29	2.92	0.85
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)	0.91	1.27	0.12
Conv. Total (cfs)	8114.3	Conv. (cfs)	4003.0	4099.1	12.2
Length Wtd. (ft)	25.23	Wetted Per. (ft)	79.65	66.36	7.18
Min Ch El (ft)	1971.56	Shear (lb/sq ft)	0.20	0.27	0.03
Alpha	1.02	Stream Power (lb/ft s)	0.65	0.80	0.02
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.08	2.43	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.12	1.11	0.07

Plan: 25 FL-ALIGN FL-ALIGN RS: 3148.92 Profile: 100-YEAR

E.G. Elev (ft)	1974.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.025	0.035	0.025
W.S. Elev (ft)	1974.62	Reach Len. (ft)	55.38	49.97	47.04
Crit W.S. (ft)	1974.62	Flow Area (sq ft)	6.35	49.29	51.10
E.G. Slope (ft/ft)	0.008270	Area (sq ft)	6.35	49.29	51.10
Q Total (cfs)	480.00	Flow (cfs)	7.90	264.32	207.77
Top Width (ft)	164.87	Top Width (ft)	57.47	29.29	78.12
Vel Total (ft/s)	4.50	Avg. Vel. (ft/s)	1.24	5.36	4.07
Max Chl Dpth (ft)	3.13	Hydr. Depth (ft)	0.11	1.68	0.65
Conv. Total (cfs)	5278.3	Conv. (cfs)	86.9	2906.6	2284.8
Length Wtd. (ft)	49.38	Wetted Per. (ft)	57.51	30.11	78.33
Min Ch El (ft)	1971.49	Shear (lb/sq ft)	0.06	0.85	0.34
Alpha	1.14	Stream Power (lb/ft s)	0.07	4.53	1.37
Frctn Loss (ft)	1.03	Cum Volume (acre-ft)	0.06	2.39	0.03
C & E Loss (ft)	0.48	Cum SA (acres)	0.08	1.08	0.04

Plan: 25 FL-ALIGN FL-ALIGN RS: 3098.95 Profile: 100-YEAR

E.G. Elev (ft)	1973.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	1968.32	Reach Len. (ft)	20.29	24.98	28.02
Crit W.S. (ft)	1969.74	Flow Area (sq ft)		26.37	
E.G. Slope (ft/ft)	0.128208	Area (sq ft)		26.37	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	19.38	Top Width (ft)		19.38	
Vel Total (ft/s)	18.20	Avg. Vel. (ft/s)		18.20	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		1.36	
Conv. Total (cfs)	1340.6	Conv. (cfs)		1340.6	
Length Wtd. (ft)	24.98	Wetted Per. (ft)		20.12	
Min Ch El (ft)	1965.77	Shear (lb/sq ft)		10.49	
Alpha	1.00	Stream Power (lb/ft s)		190.92	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)	0.06	2.34	
C & E Loss (ft)	0.13	Cum SA (acres)	0.05	1.06	

Plan: 25 FL-ALIGN FL-ALIGN RS: 3073.97 Profile: 100-YEAR

E.G. Elev (ft)	1969.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.44	Wt. n-Val.		0.035	
W.S. Elev (ft)	1963.45	Reach Len. (ft)	25.00	25.01	25.07
Crit W.S. (ft)	1965.02	Flow Area (sq ft)		23.58	
E.G. Slope (ft/ft)	0.149295	Area (sq ft)		23.58	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	16.05	Top Width (ft)		16.05	
Vel Total (ft/s)	20.35	Avg. Vel. (ft/s)		20.35	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		1.47	
Conv. Total (cfs)	1242.3	Conv. (cfs)		1242.3	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		17.06	
Min Ch El (ft)	1960.62	Shear (lb/sq ft)		12.88	
Alpha	1.00	Stream Power (lb/ft s)		262.23	
Frctn Loss (ft)	5.30	Cum Volume (acre-ft)	0.06	2.33	
C & E Loss (ft)	0.17	Cum SA (acres)	0.05	1.05	

Plan: 25 FL-ALIGN FL-ALIGN RS: 3048.96 Profile: 100-YEAR

E.G. Elev (ft)	1964.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.87	Wt. n-Val.		0.050	
W.S. Elev (ft)	1958.55	Reach Len. (ft)	28.34	24.98	23.09
Crit W.S. (ft)	1959.98	Flow Area (sq ft)		24.70	
E.G. Slope (ft/ft)	0.323880	Area (sq ft)		24.70	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	19.36	Top Width (ft)		19.36	
Vel Total (ft/s)	19.44	Avg. Vel. (ft/s)		19.44	
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	843.4	Conv. (cfs)		843.4	
Length Wtd. (ft)	24.98	Wetted Per. (ft)		20.05	
Min Ch El (ft)	1955.97	Shear (lb/sq ft)		24.91	
Alpha	1.00	Stream Power (lb/ft s)		484.17	
Frctn Loss (ft)	6.00	Cum Volume (acre-ft)	0.06	2.32	
C & E Loss (ft)	1.03	Cum SA (acres)	0.05	1.04	

Plan: 25 FL-ALIGN FL-ALIGN RS: 3023.98 Profile: 100-YEAR

E.G. Elev (ft)	1957.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.42	Wt. n-Val.		0.050	
W.S. Elev (ft)	1954.97	Reach Len. (ft)	21.46	25.00	27.03
Crit W.S. (ft)	1955.68	Flow Area (sq ft)		38.45	
E.G. Slope (ft/ft)	0.185014	Area (sq ft)		38.45	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	39.62	Top Width (ft)		39.62	
Vel Total (ft/s)	12.48	Avg. Vel. (ft/s)		12.48	
Max Chl Dpth (ft)	1.83	Hydr. Depth (ft)		0.97	
Conv. Total (cfs)	1115.9	Conv. (cfs)		1115.9	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		39.85	
Min Ch El (ft)	1953.14	Shear (lb/sq ft)		11.15	
Alpha	1.00	Stream Power (lb/ft s)		139.12	
Frctn Loss (ft)	1.85	Cum Volume (acre-ft)	0.06	2.30	
C & E Loss (ft)	0.50	Cum SA (acres)	0.05	1.02	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2998.98 Profile: 100-YEAR

E.G. Elev (ft)	1955.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.050	
W.S. Elev (ft)	1954.29	Reach Len. (ft)	28.33	24.99	23.13
Crit W.S. (ft)	1954.37	Flow Area (sq ft)		68.41	
E.G. Slope (ft/ft)	0.039521	Area (sq ft)		68.41	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	52.54	Top Width (ft)		52.54	
Vel Total (ft/s)	7.02	Avg. Vel. (ft/s)		7.02	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	2414.5	Conv. (cfs)		2414.5	
Length Wtd. (ft)	24.99	Wetted Per. (ft)		52.86	
Min Ch El (ft)	1951.84	Shear (lb/sq ft)		3.19	
Alpha	1.00	Stream Power (lb/ft s)		22.40	
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)	0.06	2.27	
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	0.99	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2973.99 Profile: 100-YEAR

E.G. Elev (ft)	1953.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.050	
W.S. Elev (ft)	1952.83	Reach Len. (ft)	23.90	25.00	25.86
Crit W.S. (ft)	1953.07	Flow Area (sq ft)		58.85	
E.G. Slope (ft/ft)	0.054460	Area (sq ft)		58.85	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	45.83	Top Width (ft)		45.83	
Vel Total (ft/s)	8.16	Avg. Vel. (ft/s)		8.16	
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	2056.8	Conv. (cfs)		2056.8	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		46.15	
Min Ch El (ft)	1950.54	Shear (lb/sq ft)		4.34	
Alpha	1.00	Stream Power (lb/ft s)		35.36	
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)	0.06	2.23	
C & E Loss (ft)	0.06	Cum SA (acres)	0.05	0.96	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2948.99 Profile: 100-YEAR

E.G. Elev (ft)	1952.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.050	
W.S. Elev (ft)	1951.86	Reach Len. (ft)	26.22	25.00	25.08
Crit W.S. (ft)	1951.93	Flow Area (sq ft)		65.25	
E.G. Slope (ft/ft)	0.036785	Area (sq ft)		65.25	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	44.10	Top Width (ft)		44.10	
Vel Total (ft/s)	7.36	Avg. Vel. (ft/s)		7.36	
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	2502.7	Conv. (cfs)		2502.7	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		44.50	
Min Ch El (ft)	1949.25	Shear (lb/sq ft)		3.37	
Alpha	1.00	Stream Power (lb/ft s)		24.77	
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)	0.06	2.20	
C & E Loss (ft)	0.10	Cum SA (acres)	0.05	0.94	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2923.99 Profile: 100-YEAR

E.G. Elev (ft)	1951.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.050	
W.S. Elev (ft)	1951.45	Reach Len. (ft)	15.83	25.02	30.98
Crit W.S. (ft)	1950.94	Flow Area (sq ft)		90.14	
E.G. Slope (ft/ft)	0.015010	Area (sq ft)		90.14	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	50.40	Top Width (ft)		50.40	
Vel Total (ft/s)	5.32	Avg. Vel. (ft/s)		5.32	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	3917.9	Conv. (cfs)		3917.9	
Length Wtd. (ft)	25.02	Wetted Per. (ft)		50.97	
Min Ch El (ft)	1947.95	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)		8.82	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.06	2.15	
C & E Loss (ft)	0.08	Cum SA (acres)	0.05	0.91	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2898.97 Profile: 100-YEAR

E.G. Elev (ft)	1951.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.050	
W.S. Elev (ft)	1951.45	Reach Len. (ft)	17.15	24.93	30.48
Crit W.S. (ft)		Flow Area (sq ft)		146.29	
E.G. Slope (ft/ft)	0.004587	Area (sq ft)		146.29	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	69.38	Top Width (ft)		69.38	
Vel Total (ft/s)	3.28	Avg. Vel. (ft/s)		3.28	
Max Chl Dpth (ft)	4.78	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	7087.6	Conv. (cfs)		7087.6	
Length Wtd. (ft)	23.07	Wetted Per. (ft)		70.28	
Min Ch El (ft)	1946.67	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		1.96	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.06	2.08	
C & E Loss (ft)	0.01	Cum SA (acres)	0.05	0.88	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2874.04 Profile: 100-YEAR

E.G. Elev (ft)	1951.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.025	0.050	
W.S. Elev (ft)	1951.42	Reach Len. (ft)	39.68	24.94	17.95
Crit W.S. (ft)		Flow Area (sq ft)	74.79	99.71	
E.G. Slope (ft/ft)	0.001881	Area (sq ft)	74.79	99.71	
Q Total (cfs)	480.00	Flow (cfs)	229.44	250.56	
Top Width (ft)	93.23	Top Width (ft)	57.56	35.67	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)	3.07	2.51	
Max Chl Dpth (ft)	5.05	Hydr. Depth (ft)	1.30	2.80	
Conv. Total (cfs)	11067.9	Conv. (cfs)	5290.4	5777.5	
Length Wtd. (ft)	28.46	Wetted Per. (ft)	57.61	36.63	
Min Ch El (ft)	1946.37	Shear (lb/sq ft)	0.15	0.32	
Alpha	1.03	Stream Power (lb/ft s)	0.47	0.80	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.04	2.01	
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	0.85	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2849.1 Profile: 100-YEAR

E.G. Elev (ft)	1951.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.050	
W.S. Elev (ft)	1950.85	Reach Len. (ft)	38.99	24.28	10.13
Crit W.S. (ft)		Flow Area (sq ft)		82.03	
E.G. Slope (ft/ft)	0.013686	Area (sq ft)		82.03	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	35.99	Top Width (ft)		35.99	
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)		5.85	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		2.28	
Conv. Total (cfs)	4103.1	Conv. (cfs)		4103.1	
Length Wtd. (ft)	24.28	Wetted Per. (ft)		37.57	
Min Ch El (ft)	1946.42	Shear (lb/sq ft)		1.87	
Alpha	1.00	Stream Power (lb/ft s)		10.92	
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.01	1.96	
C & E Loss (ft)	0.06	Cum SA (acres)	0.01	0.83	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2824.82 Profile: 100-YEAR

E.G. Elev (ft)	1950.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.050	
W.S. Elev (ft)	1949.75	Reach Len. (ft)	22.37	25.04	27.85
Crit W.S. (ft)	1949.75	Flow Area (sq ft)		57.33	
E.G. Slope (ft/ft)	0.032775	Area (sq ft)		57.33	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	27.04	Top Width (ft)		27.04	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		2.12	
Conv. Total (cfs)	2651.4	Conv. (cfs)		2651.4	
Length Wtd. (ft)	25.04	Wetted Per. (ft)		29.53	
Min Ch El (ft)	1945.32	Shear (lb/sq ft)		3.97	
Alpha	1.00	Stream Power (lb/ft s)		33.26	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	0.01	1.92	
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.81	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2799.78 Profile: 100-YEAR

E.G. Elev (ft)	1950.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	1948.93	Reach Len. (ft)	23.04	25.15	28.16
Crit W.S. (ft)	1949.10	Flow Area (sq ft)		52.64	
E.G. Slope (ft/ft)	0.018403	Area (sq ft)		52.64	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	24.65	Top Width (ft)		24.65	
Vel Total (ft/s)	9.12	Avg. Vel. (ft/s)		9.12	
Max Chl Dpth (ft)	3.94	Hydr. Depth (ft)		2.14	
Conv. Total (cfs)	3538.3	Conv. (cfs)		3538.3	
Length Wtd. (ft)	25.15	Wetted Per. (ft)		26.42	
Min Ch El (ft)	1944.99	Shear (lb/sq ft)		2.29	
Alpha	1.00	Stream Power (lb/ft s)		20.87	
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.01	1.89	
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.79	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2774.63 Profile: 100-YEAR

E.G. Elev (ft)	1949.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.48	Wt. n-Val.		0.035	
W.S. Elev (ft)	1948.21	Reach Len. (ft)	36.10	24.19	18.16
Crit W.S. (ft)	1948.50	Flow Area (sq ft)		49.14	
E.G. Slope (ft/ft)	0.022362	Area (sq ft)		49.14	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	24.15	Top Width (ft)		24.15	
Vel Total (ft/s)	9.77	Avg. Vel. (ft/s)		9.77	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	3209.8	Conv. (cfs)		3209.8	
Length Wtd. (ft)	24.19	Wetted Per. (ft)		25.75	
Min Ch El (ft)	1944.75	Shear (lb/sq ft)		2.66	
Alpha	1.00	Stream Power (lb/ft s)		26.03	
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	0.01	1.86	
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.78	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2750.44 Profile: 100-YEAR

E.G. Elev (ft)	1949.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	1948.23	Reach Len. (ft)	30.61	25.02	22.40
Crit W.S. (ft)	1948.23	Flow Area (sq ft)		59.18	
E.G. Slope (ft/ft)	0.015185	Area (sq ft)		59.18	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	29.47	Top Width (ft)		29.47	
Vel Total (ft/s)	8.11	Avg. Vel. (ft/s)		8.11	
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)		2.01	
Conv. Total (cfs)	3895.2	Conv. (cfs)		3895.2	
Length Wtd. (ft)	25.02	Wetted Per. (ft)		30.65	
Min Ch El (ft)	1944.81	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)		14.85	
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.01	1.83	
C & E Loss (ft)	0.05	Cum SA (acres)	0.01	0.76	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2725.42 Profile: 100-YEAR

E.G. Elev (ft)	1948.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	1947.23	Reach Len. (ft)	21.47	25.25	27.50
Crit W.S. (ft)	1947.63	Flow Area (sq ft)		48.94	
E.G. Slope (ft/ft)	0.025054	Area (sq ft)		48.94	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	26.78	Top Width (ft)		26.78	
Vel Total (ft/s)	9.81	Avg. Vel. (ft/s)		9.81	
Max Chl Dpth (ft)	3.23	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	3032.5	Conv. (cfs)		3032.5	
Length Wtd. (ft)	25.25	Wetted Per. (ft)		27.76	
Min Ch El (ft)	1944.00	Shear (lb/sq ft)		2.76	
Alpha	1.00	Stream Power (lb/ft s)		27.04	
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	0.01	1.80	
C & E Loss (ft)	0.05	Cum SA (acres)	0.01	0.75	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2700.17 Profile: 100-YEAR

E.G. Elev (ft)	1947.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	1945.80	Reach Len. (ft)	16.35	24.37	29.93
Crit W.S. (ft)	1946.45	Flow Area (sq ft)		41.87	
E.G. Slope (ft/ft)	0.044900	Area (sq ft)		41.87	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	28.59	Top Width (ft)		28.59	
Vel Total (ft/s)	11.47	Avg. Vel. (ft/s)		11.47	
Max Chl Dpth (ft)	2.05	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	2265.3	Conv. (cfs)		2265.3	
Length Wtd. (ft)	24.37	Wetted Per. (ft)		29.10	
Min Ch El (ft)	1943.75	Shear (lb/sq ft)		4.03	
Alpha	1.00	Stream Power (lb/ft s)		46.24	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.01	1.77	
C & E Loss (ft)	0.08	Cum SA (acres)	0.01	0.73	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2675.8 Profile: 100-YEAR

E.G. Elev (ft)	1947.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	1946.78	Reach Len. (ft)	25.20	25.01	25.01
Crit W.S. (ft)	1946.01	Flow Area (sq ft)		96.21	
E.G. Slope (ft/ft)	0.004878	Area (sq ft)		96.21	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	43.34	Top Width (ft)		43.34	
Vel Total (ft/s)	4.99	Avg. Vel. (ft/s)		4.99	
Max Chl Dpth (ft)	3.18	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	6872.4	Conv. (cfs)		6872.4	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		44.08	
Min Ch El (ft)	1943.60	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		3.32	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.01	1.73	
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.71	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2650.79 Profile: 100-YEAR

E.G. Elev (ft)	1947.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	1946.73	Reach Len. (ft)	21.98	24.60	26.83
Crit W.S. (ft)		Flow Area (sq ft)		106.95	
E.G. Slope (ft/ft)	0.003644	Area (sq ft)		106.95	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	45.35	Top Width (ft)		45.35	
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)		4.49	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	7951.5	Conv. (cfs)		7951.5	
Length Wtd. (ft)	24.60	Wetted Per. (ft)		46.15	
Min Ch El (ft)	1943.40	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.37	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.01	1.68	
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.69	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2626.19 Profile: 100-YEAR

E.G. Elev (ft)	1946.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	1946.40	Reach Len. (ft)	19.32	24.41	28.81
Crit W.S. (ft)		Flow Area (sq ft)		84.33	
E.G. Slope (ft/ft)	0.006901	Area (sq ft)		84.33	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	40.32	Top Width (ft)		40.32	
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		2.09	
Conv. Total (cfs)	5777.9	Conv. (cfs)		5777.9	
Length Wtd. (ft)	24.41	Wetted Per. (ft)		41.13	
Min Ch El (ft)	1943.20	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)		5.03	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.01	1.62	
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.66	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2601.78 Profile: 100-YEAR

E.G. Elev (ft)	1946.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.050	
W.S. Elev (ft)	1946.20	Reach Len. (ft)	24.17	25.19	26.43
Crit W.S. (ft)		Flow Area (sq ft)		87.88	
E.G. Slope (ft/ft)	0.013976	Area (sq ft)		87.88	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	44.58	Top Width (ft)		44.58	
Vel Total (ft/s)	5.46	Avg. Vel. (ft/s)		5.46	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		1.97	
Conv. Total (cfs)	4060.3	Conv. (cfs)		4060.3	
Length Wtd. (ft)	25.19	Wetted Per. (ft)		45.33	
Min Ch El (ft)	1943.00	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)		9.24	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.01	1.57	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.64	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2576.59 Profile: 100-YEAR

E.G. Elev (ft)	1946.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.035	
W.S. Elev (ft)	1945.95	Reach Len. (ft)	36.89	25.23	18.12
Crit W.S. (ft)		Flow Area (sq ft)		88.37	
E.G. Slope (ft/ft)	0.007209	Area (sq ft)		88.37	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	47.17	Top Width (ft)		47.17	
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)		5.43	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		1.87	
Conv. Total (cfs)	5653.2	Conv. (cfs)		5653.2	
Length Wtd. (ft)	25.23	Wetted Per. (ft)		47.77	
Min Ch El (ft)	1943.06	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)		4.52	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.01	1.52	
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	0.61	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2551.36 Profile: 100-YEAR

E.G. Elev (ft)	1946.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.		0.035	
W.S. Elev (ft)	1945.38	Reach Len. (ft)	19.09	24.92	30.78
Crit W.S. (ft)	1945.38	Flow Area (sq ft)		69.51	
E.G. Slope (ft/ft)	0.016157	Area (sq ft)		69.51	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	47.67	Top Width (ft)		47.67	
Vel Total (ft/s)	6.91	Avg. Vel. (ft/s)		6.91	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	3776.3	Conv. (cfs)		3776.3	
Length Wtd. (ft)	24.92	Wetted Per. (ft)		48.01	
Min Ch El (ft)	1943.20	Shear (lb/sq ft)		1.46	
Alpha	1.00	Stream Power (lb/ft s)		10.08	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.01	1.48	
C & E Loss (ft)	0.10	Cum SA (acres)	0.01	0.59	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2526.44 Profile: 100-YEAR

E.G. Elev (ft)	1945.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	1943.55	Reach Len. (ft)	44.23	24.96	30.79
Crit W.S. (ft)	1944.15	Flow Area (sq ft)		45.06	
E.G. Slope (ft/ft)	0.061099	Area (sq ft)		45.06	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	43.82	Top Width (ft)		43.82	
Vel Total (ft/s)	10.65	Avg. Vel. (ft/s)		10.65	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		1.03	
Conv. Total (cfs)	1941.9	Conv. (cfs)		1941.9	
Length Wtd. (ft)	24.96	Wetted Per. (ft)		44.05	
Min Ch El (ft)	1941.83	Shear (lb/sq ft)		3.90	
Alpha	1.00	Stream Power (lb/ft s)		41.56	
Frctn Loss (ft)	1.22	Cum Volume (acre-ft)	0.01	1.44	
C & E Loss (ft)	0.42	Cum SA (acres)	0.01	0.56	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2501.48 Profile: 100-YEAR

E.G. Elev (ft)	1943.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	1937.68	Reach Len. (ft)	20.64	15.87	22.60
Crit W.S. (ft)	1938.84	Flow Area (sq ft)		24.44	
E.G. Slope (ft/ft)	0.040216	Area (sq ft)		24.44	
Q Total (cfs)	480.00	Flow (cfs)		480.00	
Top Width (ft)	30.50	Top Width (ft)		30.50	
Vel Total (ft/s)	19.64	Avg. Vel. (ft/s)		19.64	
Max Chl Dpth (ft)	1.29	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	2393.5	Conv. (cfs)		2393.5	
Length Wtd. (ft)	15.87	Wetted Per. (ft)		30.81	
Min Ch El (ft)	1936.39	Shear (lb/sq ft)		1.99	
Alpha	1.00	Stream Power (lb/ft s)		39.11	
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.01	1.42	
C & E Loss (ft)	0.57	Cum SA (acres)	0.01	0.54	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2485.61 Profile: 100-YEAR

E.G. Elev (ft)	1942.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	1930.78	Reach Len. (ft)	85.04	85.71	86.50
Crit W.S. (ft)	1933.03	Flow Area (sq ft)		19.02	
E.G. Slope (ft/ft)	0.041939	Area (sq ft)		19.02	
Q Total (cfs)	521.00	Flow (cfs)		521.00	
Top Width (ft)	12.44	Top Width (ft)		12.44	
Vel Total (ft/s)	27.39	Avg. Vel. (ft/s)		27.39	
Max Chl Dpth (ft)	1.63	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	2544.1	Conv. (cfs)		2544.1	
Length Wtd. (ft)	85.71	Wetted Per. (ft)		15.02	
Min Ch El (ft)	1929.15	Shear (lb/sq ft)		3.31	
Alpha	1.00	Stream Power (lb/ft s)		90.80	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	1.42	
C & E Loss (ft)		Cum SA (acres)	0.01	0.53	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2399.9 Profile: 100-YEAR

E.G. Elev (ft)	1938.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	1929.86	Reach Len. (ft)	23.41	23.41	23.41
Crit W.S. (ft)	1931.85	Flow Area (sq ft)		22.72	
E.G. Slope (ft/ft)	0.024788	Area (sq ft)		22.72	
Q Total (cfs)	525.00	Flow (cfs)		521.00	
Top Width (ft)	11.79	Top Width (ft)		11.79	
Vel Total (ft/s)	22.93	Avg. Vel. (ft/s)		22.93	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	3334.6	Conv. (cfs)		3334.6	
Length Wtd. (ft)	23.41	Wetted Per. (ft)		15.61	
Min Ch El (ft)	1927.92	Shear (lb/sq ft)		2.25	
Alpha	1.00	Stream Power (lb/ft s)		51.64	
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	0.01	1.38	
C & E Loss (ft)	0.19	Cum SA (acres)	0.01	0.51	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2376.49 Profile: 100-YEAR

E.G. Elev (ft)	1937.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	1929.75	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1931.66	Flow Area (sq ft)		23.81	
E.G. Slope (ft/ft)	0.021866	Area (sq ft)		23.81	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.96	Top Width (ft)		11.96	
Vel Total (ft/s)	22.05	Avg. Vel. (ft/s)		22.05	
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	3550.4	Conv. (cfs)		3550.4	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		15.98	
Min Ch El (ft)	1927.72	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)		44.84	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.01	1.37	
C & E Loss (ft)	0.12	Cum SA (acres)	0.01	0.50	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2351.49 Profile: 100-YEAR

E.G. Elev (ft)	1936.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	1929.52	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1931.38	Flow Area (sq ft)		24.49	
E.G. Slope (ft/ft)	0.019601	Area (sq ft)		24.49	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.86	Top Width (ft)		11.86	
Vel Total (ft/s)	21.44	Avg. Vel. (ft/s)		21.44	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	3749.9	Conv. (cfs)		3749.9	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		15.80	
Min Ch El (ft)	1927.42	Shear (lb/sq ft)		1.90	
Alpha	1.00	Stream Power (lb/ft s)		40.66	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.01	1.35	
C & E Loss (ft)	0.19	Cum SA (acres)	0.01	0.49	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2301.49 Profile: 100-YEAR

E.G. Elev (ft)	1935.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	1929.03	Reach Len. (ft)	25.00	25.01	25.00
Crit W.S. (ft)	1930.80	Flow Area (sq ft)		25.63	
E.G. Slope (ft/ft)	0.017010	Area (sq ft)		25.63	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.82	Top Width (ft)		11.82	
Vel Total (ft/s)	20.48	Avg. Vel. (ft/s)		20.48	
Max Chl Dpth (ft)	2.23	Hydr. Depth (ft)		2.17	
Conv. Total (cfs)	4025.4	Conv. (cfs)		4025.4	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		15.92	
Min Ch El (ft)	1926.80	Shear (lb/sq ft)		1.71	
Alpha	1.00	Stream Power (lb/ft s)		35.03	
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.01	1.33	
C & E Loss (ft)	0.09	Cum SA (acres)	0.01	0.48	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2276.48 Profile: 100-YEAR

E.G. Elev (ft)	1935.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	1928.82	Reach Len. (ft)	50.02	50.00	49.99
Crit W.S. (ft)	1930.54	Flow Area (sq ft)		26.22	
E.G. Slope (ft/ft)	0.015935	Area (sq ft)		26.22	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.81	Top Width (ft)		11.81	
Vel Total (ft/s)	20.02	Avg. Vel. (ft/s)		20.02	
Max Chl Dpth (ft)	2.28	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	4159.0	Conv. (cfs)		4159.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		16.04	
Min Ch El (ft)	1926.54	Shear (lb/sq ft)		1.63	
Alpha	1.00	Stream Power (lb/ft s)		32.55	
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)	0.01	1.31	
C & E Loss (ft)	0.11	Cum SA (acres)	0.01	0.47	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2226.48 Profile: 100-YEAR

E.G. Elev (ft)	1934.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	1928.31	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1929.96	Flow Area (sq ft)		27.00	
E.G. Slope (ft/ft)	0.014464	Area (sq ft)		27.00	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.63	Top Width (ft)		11.63	
Vel Total (ft/s)	19.44	Avg. Vel. (ft/s)		19.44	
Max Chl Dpth (ft)	2.40	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	4365.3	Conv. (cfs)		4365.3	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		16.06	
Min Ch El (ft)	1925.91	Shear (lb/sq ft)		1.52	
Alpha	1.00	Stream Power (lb/ft s)		29.53	
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	0.01	1.28	
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	0.46	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2201.48 Profile: 100-YEAR

E.G. Elev (ft)	1933.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.76	Wt. n-Val.		0.013	
W.S. Elev (ft)	1928.04	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1929.67	Flow Area (sq ft)		27.26	
E.G. Slope (ft/ft)	0.014094	Area (sq ft)		27.26	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.59	Top Width (ft)		11.59	
Vel Total (ft/s)	19.26	Avg. Vel. (ft/s)		19.26	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		2.35	
Conv. Total (cfs)	4422.3	Conv. (cfs)		4422.3	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		16.12	
Min Ch El (ft)	1925.62	Shear (lb/sq ft)		1.49	
Alpha	1.00	Stream Power (lb/ft s)		28.65	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.01	1.26	
C & E Loss (ft)	0.05	Cum SA (acres)	0.01	0.45	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2176.48 Profile: 100-YEAR

E.G. Elev (ft)	1933.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.61	Wt. n-Val.		0.013	
W.S. Elev (ft)	1927.79	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1929.39	Flow Area (sq ft)		27.62	
E.G. Slope (ft/ft)	0.013614	Area (sq ft)		27.62	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.57	Top Width (ft)		11.57	
Vel Total (ft/s)	19.00	Avg. Vel. (ft/s)		19.00	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		2.39	
Conv. Total (cfs)	4499.5	Conv. (cfs)		4499.5	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		16.24	
Min Ch El (ft)	1925.37	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)		27.48	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.01	1.25	
C & E Loss (ft)	0.06	Cum SA (acres)	0.01	0.45	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2151.48 Profile: 100-YEAR

E.G. Elev (ft)	1933.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	1927.58	Reach Len. (ft)	25.18	25.00	24.82
Crit W.S. (ft)	1929.15	Flow Area (sq ft)		28.09	
E.G. Slope (ft/ft)	0.012868	Area (sq ft)		28.09	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.47	Top Width (ft)		11.47	
Vel Total (ft/s)	18.69	Avg. Vel. (ft/s)		18.69	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	4628.2	Conv. (cfs)		4628.2	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		16.23	
Min Ch El (ft)	1925.08	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)		25.98	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.01	1.23	
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.44	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2126.48 Profile: 100-YEAR

E.G. Elev (ft)	1932.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	1927.29	Reach Len. (ft)	25.01	25.01	25.01
Crit W.S. (ft)	1928.85	Flow Area (sq ft)		28.14	
E.G. Slope (ft/ft)	0.012827	Area (sq ft)		28.14	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.52	Top Width (ft)		11.52	
Vel Total (ft/s)	18.66	Avg. Vel. (ft/s)		18.66	
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	4635.5	Conv. (cfs)		4635.5	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		16.26	
Min Ch El (ft)	1924.77	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)		25.85	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.01	1.22	
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.43	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2101.47 Profile: 100-YEAR

E.G. Elev (ft)	1932.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	1927.02	Reach Len. (ft)	25.00	25.01	25.01
Crit W.S. (ft)	1928.57	Flow Area (sq ft)		28.34	
E.G. Slope (ft/ft)	0.012595	Area (sq ft)		28.34	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.54	Top Width (ft)		11.54	
Vel Total (ft/s)	18.53	Avg. Vel. (ft/s)		18.53	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	4678.0	Conv. (cfs)		4678.0	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		16.32	
Min Ch El (ft)	1924.52	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)		25.29	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.01	1.20	
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.43	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2076.46 Profile: 100-YEAR

E.G. Elev (ft)	1932.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	1926.75	Reach Len. (ft)	25.00	25.01	25.01
Crit W.S. (ft)	1928.27	Flow Area (sq ft)		28.46	
E.G. Slope (ft/ft)	0.012754	Area (sq ft)		28.46	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.92	Top Width (ft)		11.92	
Vel Total (ft/s)	18.45	Avg. Vel. (ft/s)		18.45	
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)		2.39	
Conv. Total (cfs)	4648.8	Conv. (cfs)		4648.8	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		16.66	
Min Ch El (ft)	1924.29	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)		25.09	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.01	1.18	
C & E Loss (ft)	0.07	Cum SA (acres)	0.01	0.42	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2051.45 Profile: 100-YEAR

E.G. Elev (ft)	1931.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	1926.61	Reach Len. (ft)	24.83	24.93	25.12
Crit W.S. (ft)	1928.08	Flow Area (sq ft)		29.12	
E.G. Slope (ft/ft)	0.011910	Area (sq ft)		29.12	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.88	Top Width (ft)		11.88	
Vel Total (ft/s)	18.03	Avg. Vel. (ft/s)		18.03	
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	4810.7	Conv. (cfs)		4810.7	
Length Wtd. (ft)	24.93	Wetted Per. (ft)		16.76	
Min Ch El (ft)	1924.15	Shear (lb/sq ft)		1.29	
Alpha	1.00	Stream Power (lb/ft s)		23.29	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.01	1.17	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.41	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2026.52 Profile: 100-YEAR

E.G. Elev (ft)	1931.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	1926.30	Reach Len. (ft)	25.00	25.00	25.02
Crit W.S. (ft)	1927.77	Flow Area (sq ft)		29.09	
E.G. Slope (ft/ft)	0.011974	Area (sq ft)		29.09	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.99	Top Width (ft)		11.99	
Vel Total (ft/s)	18.05	Avg. Vel. (ft/s)		18.05	
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	4797.7	Conv. (cfs)		4797.7	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		16.79	
Min Ch El (ft)	1923.84	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		23.38	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.01	1.15	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.41	

Plan: 25 FL-ALIGN FL-ALIGN RS: 2001.52 Profile: 100-YEAR

E.G. Elev (ft)	1931.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	1926.01	Reach Len. (ft)	25.02	25.00	25.00
Crit W.S. (ft)	1927.47	Flow Area (sq ft)		29.11	
E.G. Slope (ft/ft)	0.011895	Area (sq ft)		29.11	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.88	Top Width (ft)		11.88	
Vel Total (ft/s)	18.04	Avg. Vel. (ft/s)		18.04	
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	4813.8	Conv. (cfs)		4813.8	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		16.72	
Min Ch El (ft)	1923.47	Shear (lb/sq ft)		1.29	
Alpha	1.00	Stream Power (lb/ft s)		23.31	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.01	1.13	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.40	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1976.52 Profile: 100-YEAR

E.G. Elev (ft)	1930.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	1925.72	Reach Len. (ft)	25.12	25.00	25.00
Crit W.S. (ft)	1927.20	Flow Area (sq ft)		29.14	
E.G. Slope (ft/ft)	0.011861	Area (sq ft)		29.14	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.92	Top Width (ft)		11.92	
Vel Total (ft/s)	18.02	Avg. Vel. (ft/s)		18.02	
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	4820.6	Conv. (cfs)		4820.6	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		16.74	
Min Ch El (ft)	1923.20	Shear (lb/sq ft)		1.29	
Alpha	1.00	Stream Power (lb/ft s)		23.22	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.01	1.12	
C & E Loss (ft)	0.05	Cum SA (acres)	0.01	0.39	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1951.52 Profile: 100-YEAR

E.G. Elev (ft)	1930.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.57	Wt. n-Val.		0.013	
W.S. Elev (ft)	1924.81	Reach Len. (ft)	75.59	74.96	75.08
Crit W.S. (ft)	1926.33	Flow Area (sq ft)		27.74	
E.G. Slope (ft/ft)	0.014133	Area (sq ft)		38.89	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	23.68	Top Width (ft)		23.68	
Vel Total (ft/s)	18.93	Avg. Vel. (ft/s)		18.93	
Max Chl Dpth (ft)	1.89	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	4416.2	Conv. (cfs)		4416.2	
Length Wtd. (ft)	74.96	Wetted Per. (ft)		16.87	
Min Ch El (ft)	1922.92	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)		27.45	
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	0.01	1.10	
C & E Loss (ft)	0.32	Cum SA (acres)	0.01	0.38	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1876.56 Profile: 100-YEAR

E.G. Elev (ft)	1929.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	1924.67	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1925.99	Flow Area (sq ft)		30.83	
E.G. Slope (ft/ft)	0.010115	Area (sq ft)		30.83	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	12.02	Top Width (ft)		12.02	
Vel Total (ft/s)	17.03	Avg. Vel. (ft/s)		17.03	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		2.57	
Conv. Total (cfs)	5220.0	Conv. (cfs)		5220.0	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		17.10	
Min Ch El (ft)	1922.08	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)		19.39	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.01	1.04	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.35	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1851.56 Profile: 100-YEAR

E.G. Elev (ft)	1928.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.54	Wt. n-Val.		0.013	
W.S. Elev (ft)	1924.38	Reach Len. (ft)	25.01	25.00	25.00
Crit W.S. (ft)	1925.72	Flow Area (sq ft)		30.72	
E.G. Slope (ft/ft)	0.010213	Area (sq ft)		30.72	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.98	Top Width (ft)		11.98	
Vel Total (ft/s)	17.09	Avg. Vel. (ft/s)		17.09	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	5194.9	Conv. (cfs)		5194.9	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		17.07	
Min Ch El (ft)	1921.78	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)		19.61	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.01	1.02	
C & E Loss (ft)	0.04	Cum SA (acres)	0.01	0.34	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1826.56 Profile: 100-YEAR

E.G. Elev (ft)	1928.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.40	Wt. n-Val.		0.015	
W.S. Elev (ft)	1924.19	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1925.48	Flow Area (sq ft)		31.19	
E.G. Slope (ft/ft)	0.013238	Area (sq ft)		31.19	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.92	Top Width (ft)		11.92	
Vel Total (ft/s)	16.83	Avg. Vel. (ft/s)		16.83	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	4562.9	Conv. (cfs)		4562.9	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		17.09	
Min Ch El (ft)	1921.52	Shear (lb/sq ft)		1.51	
Alpha	1.00	Stream Power (lb/ft s)		25.39	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.01	1.00	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.34	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1801.56 Profile: 100-YEAR

E.G. Elev (ft)	1928.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	1923.88	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1925.18	Flow Area (sq ft)		31.11	
E.G. Slope (ft/ft)	0.009747	Area (sq ft)		31.11	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.85	Top Width (ft)		11.85	
Vel Total (ft/s)	16.88	Avg. Vel. (ft/s)		16.88	
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	5317.7	Conv. (cfs)		5317.7	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		17.01	
Min Ch El (ft)	1921.23	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)		18.78	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.01	0.98	
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	0.33	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1776.56 Profile: 100-YEAR

E.G. Elev (ft)	1928.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.48	Wt. n-Val.		0.013	
W.S. Elev (ft)	1923.57	Reach Len. (ft)	24.90	24.98	25.08
Crit W.S. (ft)	1924.89	Flow Area (sq ft)		30.92	
E.G. Slope (ft/ft)	0.009954	Area (sq ft)		30.92	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	11.75	Top Width (ft)		11.75	
Vel Total (ft/s)	16.98	Avg. Vel. (ft/s)		16.98	
Max Chl Dpth (ft)	2.63	Hydr. Depth (ft)		2.63	
Conv. Total (cfs)	5262.2	Conv. (cfs)		5262.2	
Length Wtd. (ft)	24.98	Wetted Per. (ft)		17.01	
Min Ch El (ft)	1920.94	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)		19.18	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.01	0.97	
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	0.32	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1751.58 Profile: 100-YEAR

E.G. Elev (ft)	1927.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.78	Wt. n-Val.		0.013	
W.S. Elev (ft)	1922.98	Reach Len. (ft)	25.00	25.01	25.00
Crit W.S. (ft)	1924.36	Flow Area (sq ft)		29.94	
E.G. Slope (ft/ft)	0.011682	Area (sq ft)		29.94	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	13.15	Top Width (ft)		13.15	
Vel Total (ft/s)	17.54	Avg. Vel. (ft/s)		17.54	
Max Chl Dpth (ft)	2.28	Hydr. Depth (ft)		2.28	
Conv. Total (cfs)	4857.5	Conv. (cfs)		4857.5	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		17.70	
Min Ch El (ft)	1920.70	Shear (lb/sq ft)		1.23	
Alpha	1.00	Stream Power (lb/ft s)		21.63	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.01	0.95	
C & E Loss (ft)	0.02	Cum SA (acres)	0.01	0.32	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1726.57 Profile: 100-YEAR

E.G. Elev (ft)	1927.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.95	Wt. n-Val.		0.013	
W.S. Elev (ft)	1922.47	Reach Len. (ft)	25.01	25.00	25.00
Crit W.S. (ft)	1923.87	Flow Area (sq ft)		29.41	
E.G. Slope (ft/ft)	0.013204	Area (sq ft)		29.41	
Q Total (cfs)	525.00	Flow (cfs)		525.00	
Top Width (ft)	14.50	Top Width (ft)		14.50	
Vel Total (ft/s)	17.85	Avg. Vel. (ft/s)		17.85	
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	4568.9	Conv. (cfs)		4568.9	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		18.56	
Min Ch El (ft)	1920.44	Shear (lb/sq ft)		1.31	
Alpha	1.00	Stream Power (lb/ft s)		23.32	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.01	0.93	
C & E Loss (ft)	0.15	Cum SA (acres)	0.01	0.31	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1701.57 Profile: 100-YEAR

E.G. Elev (ft)	1926.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	1922.55	Reach Len. (ft)	39.81	34.17	29.44
Crit W.S. (ft)	1923.85	Flow Area (sq ft)		38.56	
E.G. Slope (ft/ft)	0.009624	Area (sq ft)		38.56	
Q Total (cfs)	652.00	Flow (cfs)		652.00	
Top Width (ft)	16.00	Top Width (ft)		16.00	
Vel Total (ft/s)	16.91	Avg. Vel. (ft/s)		16.91	
Max Chl Dpth (ft)	2.41	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	6646.1	Conv. (cfs)		6646.1	
Length Wtd. (ft)	34.17	Wetted Per. (ft)		20.82	
Min Ch El (ft)	1920.14	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)		18.82	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.01	0.91	
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	0.30	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1667.4 Profile: 100-YEAR

E.G. Elev (ft)	1926.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.76	Wt. n-Val.		0.013	
W.S. Elev (ft)	1921.79	Reach Len. (ft)	141.40	136.64	130.20
Crit W.S. (ft)	1924.21	Flow Area (sq ft)		37.24	
E.G. Slope (ft/ft)	0.014741	Area (sq ft)		37.24	
Q Total (cfs)	652.00	Flow (cfs)		652.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	17.51	Avg. Vel. (ft/s)		17.51	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	5370.1	Conv. (cfs)		5370.1	
Length Wtd. (ft)	136.64	Wetted Per. (ft)		26.27	
Min Ch El (ft)	1919.72	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		22.84	
Frctn Loss (ft)	1.56	Cum Volume (acre-ft)	0.01	0.88	
C & E Loss (ft)	0.41	Cum SA (acres)	0.01	0.29	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1530.0 Profile: 100-YEAR

E.G. Elev (ft)	1924.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	1921.19	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1921.72	Flow Area (sq ft)		44.05	
E.G. Slope (ft/ft)	0.009073	Area (sq ft)		44.05	
Q Total (cfs)	652.00	Flow (cfs)		652.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	14.80	Avg. Vel. (ft/s)		14.80	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	6844.8	Conv. (cfs)		6844.8	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		27.79	
Min Ch El (ft)	1918.74	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)		13.29	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	0.76	
C & E Loss (ft)	0.12	Cum SA (acres)	0.01	0.23	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1529.8 Profile: 100-YEAR

E.G. Elev (ft)	1924.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.58	Wt. n-Val.		0.013	
W.S. Elev (ft)	1919.87	Reach Len. (ft)	28.27	28.27	28.27
Crit W.S. (ft)	1921.01	Flow Area (sq ft)		47.74	
E.G. Slope (ft/ft)	0.020714	Area (sq ft)		47.74	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	42.50	Top Width (ft)		42.50	
Vel Total (ft/s)	17.18	Avg. Vel. (ft/s)		17.18	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	5697.5	Conv. (cfs)		5697.5	
Length Wtd. (ft)	28.27	Wetted Per. (ft)		44.75	
Min Ch El (ft)	1918.75	Shear (lb/sq ft)		1.38	
Alpha	1.00	Stream Power (lb/ft s)		23.70	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.01	0.75	
C & E Loss (ft)	0.06	Cum SA (acres)	0.01	0.23	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1515.66* Profile: 100-YEAR

E.G. Elev (ft)	1923.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.37	Wt. n-Val.		0.013	
W.S. Elev (ft)	1919.59	Reach Len. (ft)	28.27	28.27	28.27
Crit W.S. (ft)	1920.82	Flow Area (sq ft)		48.89	
E.G. Slope (ft/ft)	0.011975	Area (sq ft)		48.89	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	28.00	Top Width (ft)		28.00	
Vel Total (ft/s)	16.77	Avg. Vel. (ft/s)		16.77	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		1.75	
Conv. Total (cfs)	7493.3	Conv. (cfs)		7493.3	
Length Wtd. (ft)	28.27	Wetted Per. (ft)		31.49	
Min Ch El (ft)	1917.84	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)		19.47	
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.01	0.72	
C & E Loss (ft)	0.13	Cum SA (acres)	0.01	0.21	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1501.53 Profile: 100-YEAR

E.G. Elev (ft)	1923.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.92	Wt. n-Val.		0.013	
W.S. Elev (ft)	1919.65	Reach Len. (ft)	25.04	25.04	25.04
Crit W.S. (ft)	1920.55	Flow Area (sq ft)		51.61	
E.G. Slope (ft/ft)	0.007105	Area (sq ft)	14.42	51.61	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	31.91	Top Width (ft)	13.00	18.91	
Vel Total (ft/s)	15.89	Avg. Vel. (ft/s)		15.89	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		2.73	
Conv. Total (cfs)	9728.1	Conv. (cfs)		9728.1	
Length Wtd. (ft)	25.04	Wetted Per. (ft)		24.37	
Min Ch El (ft)	1916.92	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)		14.93	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.00	0.69	
C & E Loss (ft)	0.07	Cum SA (acres)	0.00	0.19	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1476.5 Profile: 100-YEAR

E.G. Elev (ft)	1923.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	1918.67	Reach Len. (ft)	12.84	12.84	12.84
Crit W.S. (ft)	1920.04	Flow Area (sq ft)		47.52	
E.G. Slope (ft/ft)	0.009014	Area (sq ft)		47.52	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.59	Top Width (ft)		18.59	
Vel Total (ft/s)	17.25	Avg. Vel. (ft/s)		17.25	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	8637.0	Conv. (cfs)		8637.0	
Length Wtd. (ft)	12.84	Wetted Per. (ft)		23.70	
Min Ch El (ft)	1916.11	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)		19.47	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		0.66	
C & E Loss (ft)	0.03	Cum SA (acres)		0.18	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1462.50 Profile: 100-YEAR

E.G. Elev (ft)	1923.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	1918.26	Reach Len. (ft)	23.32	23.32	23.32
Crit W.S. (ft)	1919.69	Flow Area (sq ft)		46.20	
E.G. Slope (ft/ft)	0.009589	Area (sq ft)		46.20	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	17.75	Avg. Vel. (ft/s)		17.75	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.57	
Conv. Total (cfs)	8373.9	Conv. (cfs)		8373.9	
Length Wtd. (ft)	23.32	Wetted Per. (ft)		23.13	
Min Ch El (ft)	1915.69	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)		21.22	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		0.65	
C & E Loss (ft)	0.03	Cum SA (acres)		0.17	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1451.37 Profile: 100-YEAR

E.G. Elev (ft)	1922.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	1917.69	Reach Len. (ft)	25.00	25.01	25.00
Crit W.S. (ft)	1919.20	Flow Area (sq ft)		44.83	
E.G. Slope (ft/ft)	0.010504	Area (sq ft)		44.83	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	18.29	Avg. Vel. (ft/s)		18.29	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		2.49	
Conv. Total (cfs)	8000.7	Conv. (cfs)		8000.7	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		22.98	
Min Ch El (ft)	1915.20	Shear (lb/sq ft)		1.28	
Alpha	1.00	Stream Power (lb/ft s)		23.40	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		0.62	
C & E Loss (ft)	0.03	Cum SA (acres)		0.17	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1426.37 Profile: 100-YEAR

E.G. Elev (ft)	1922.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	1917.08	Reach Len. (ft)	25.38	25.02	25.08
Crit W.S. (ft)	1918.66	Flow Area (sq ft)		43.57	
E.G. Slope (ft/ft)	0.011460	Area (sq ft)		43.57	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	18.82	Avg. Vel. (ft/s)		18.82	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		2.42	
Conv. Total (cfs)	7659.7	Conv. (cfs)		7659.7	
Length Wtd. (ft)	25.02	Wetted Per. (ft)		22.84	
Min Ch El (ft)	1914.66	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)		25.69	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)		0.60	
C & E Loss (ft)	0.03	Cum SA (acres)		0.15	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1401.35 Profile: 100-YEAR

E.G. Elev (ft)	1922.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.77	Wt. n-Val.		0.013	
W.S. Elev (ft)	1916.50	Reach Len. (ft)	27.16	25.15	22.91
Crit W.S. (ft)	1918.13	Flow Area (sq ft)		42.57	
E.G. Slope (ft/ft)	0.012306	Area (sq ft)		42.57	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	19.26	Avg. Vel. (ft/s)		19.26	
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	7391.9	Conv. (cfs)		7391.9	
Length Wtd. (ft)	25.15	Wetted Per. (ft)		22.73	
Min Ch El (ft)	1914.13	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)		27.72	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)		0.57	
C & E Loss (ft)	0.02	Cum SA (acres)		0.14	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1376.2 Profile: 100-YEAR

E.G. Elev (ft)	1921.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	1915.92	Reach Len. (ft)	25.55	25.03	24.62
Crit W.S. (ft)	1917.60	Flow Area (sq ft)		41.74	
E.G. Slope (ft/ft)	0.013064	Area (sq ft)		41.74	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	19.64	Avg. Vel. (ft/s)		19.64	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	7174.2	Conv. (cfs)		7174.2	
Length Wtd. (ft)	25.03	Wetted Per. (ft)		22.64	
Min Ch El (ft)	1913.60	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)		29.54	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		0.55	
C & E Loss (ft)	0.02	Cum SA (acres)		0.13	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1351.17 Profile: 100-YEAR

E.G. Elev (ft)	1921.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	1915.35	Reach Len. (ft)	25.06	25.01	24.96
Crit W.S. (ft)	1917.07	Flow Area (sq ft)		41.03	
E.G. Slope (ft/ft)	0.013775	Area (sq ft)		41.03	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	19.99	Avg. Vel. (ft/s)		19.99	
Max Chl Dpth (ft)	2.28	Hydr. Depth (ft)		2.28	
Conv. Total (cfs)	6986.6	Conv. (cfs)		6986.6	
Length Wtd. (ft)	25.01	Wetted Per. (ft)		22.56	
Min Ch El (ft)	1913.07	Shear (lb/sq ft)		1.56	
Alpha	1.00	Stream Power (lb/ft s)		31.26	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)		0.53	
C & E Loss (ft)	0.02	Cum SA (acres)		0.12	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1326.16 Profile: 100-YEAR

E.G. Elev (ft)	1921.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	1914.77	Reach Len. (ft)	27.06	25.02	23.19
Crit W.S. (ft)	1916.53	Flow Area (sq ft)		40.37	
E.G. Slope (ft/ft)	0.014467	Area (sq ft)		40.37	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	20.31	Avg. Vel. (ft/s)		20.31	
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	6817.5	Conv. (cfs)		6817.5	
Length Wtd. (ft)	25.02	Wetted Per. (ft)		22.49	
Min Ch El (ft)	1912.53	Shear (lb/sq ft)		1.62	
Alpha	1.00	Stream Power (lb/ft s)		32.94	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		0.50	
C & E Loss (ft)	0.02	Cum SA (acres)		0.11	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1301.14 Profile: 100-YEAR

E.G. Elev (ft)	1920.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.58	Wt. n-Val.		0.013	
W.S. Elev (ft)	1914.21	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	1916.00	Flow Area (sq ft)		39.84	
E.G. Slope (ft/ft)	0.015068	Area (sq ft)		39.84	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	20.58	Avg. Vel. (ft/s)		20.58	
Max Chl Dpth (ft)	2.21	Hydr. Depth (ft)		2.21	
Conv. Total (cfs)	6680.2	Conv. (cfs)		6680.2	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		22.43	
Min Ch El (ft)	1912.00	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		34.39	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		0.48	
C & E Loss (ft)	0.02	Cum SA (acres)		0.10	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1276.14 Profile: 100-YEAR

E.G. Elev (ft)	1920.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	1913.66	Reach Len. (ft)	25.88	24.99	24.17
Crit W.S. (ft)	1915.47	Flow Area (sq ft)		39.38	
E.G. Slope (ft/ft)	0.015622	Area (sq ft)		39.38	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	20.82	Avg. Vel. (ft/s)		20.82	
Max Chl Dpth (ft)	2.19	Hydr. Depth (ft)		2.19	
Conv. Total (cfs)	6560.7	Conv. (cfs)		6560.7	
Length Wtd. (ft)	24.99	Wetted Per. (ft)		22.38	
Min Ch El (ft)	1911.47	Shear (lb/sq ft)		1.72	
Alpha	1.00	Stream Power (lb/ft s)		35.74	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		0.46	
C & E Loss (ft)	0.01	Cum SA (acres)		0.09	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1251.15 Profile: 100-YEAR

E.G. Elev (ft)	1919.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	1913.11	Reach Len. (ft)	25.55	24.97	24.47
Crit W.S. (ft)	1914.94	Flow Area (sq ft)		38.97	
E.G. Slope (ft/ft)	0.016131	Area (sq ft)		38.97	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	21.04	Avg. Vel. (ft/s)		21.04	
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	6456.3	Conv. (cfs)		6456.3	
Length Wtd. (ft)	24.97	Wetted Per. (ft)		22.33	
Min Ch El (ft)	1910.94	Shear (lb/sq ft)		1.76	
Alpha	1.00	Stream Power (lb/ft s)		36.98	
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		0.43	
C & E Loss (ft)	0.01	Cum SA (acres)		0.08	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1226.18 Profile: 100-YEAR

E.G. Elev (ft)	1919.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	1912.55	Reach Len. (ft)	26.31	24.84	23.70
Crit W.S. (ft)	1914.40	Flow Area (sq ft)		38.61	
E.G. Slope (ft/ft)	0.016598	Area (sq ft)		38.61	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	21.24	Avg. Vel. (ft/s)		21.24	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		2.14	
Conv. Total (cfs)	6364.7	Conv. (cfs)		6364.7	
Length Wtd. (ft)	24.84	Wetted Per. (ft)		22.29	
Min Ch El (ft)	1910.40	Shear (lb/sq ft)		1.79	
Alpha	1.00	Stream Power (lb/ft s)		38.12	
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		0.41	
C & E Loss (ft)	0.01	Cum SA (acres)		0.07	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1201.34 Profile: 100-YEAR

E.G. Elev (ft)	1919.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	1912.01	Reach Len. (ft)	14.02	14.02	14.02
Crit W.S. (ft)	1913.88	Flow Area (sq ft)		38.32	
E.G. Slope (ft/ft)	0.016985	Area (sq ft)		38.32	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	21.40	Avg. Vel. (ft/s)		21.40	
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	6291.9	Conv. (cfs)		6291.9	
Length Wtd. (ft)	14.02	Wetted Per. (ft)		22.26	
Min Ch El (ft)	1909.88	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)		39.07	
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		0.39	
C & E Loss (ft)	0.07	Cum SA (acres)		0.06	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1151.6 Profile: 100-YEAR

E.G. Elev (ft)	1918.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	1911.94	Reach Len. (ft)	51.50	49.89	51.66
Crit W.S. (ft)	1913.81	Flow Area (sq ft)		41.27	
E.G. Slope (ft/ft)	0.015192	Area (sq ft)		41.27	
Q Total (cfs)	869.00	Flow (cfs)		869.00	
Top Width (ft)	18.00	Top Width (ft)		18.00	
Vel Total (ft/s)	21.06	Avg. Vel. (ft/s)		21.06	
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	7050.3	Conv. (cfs)		7050.3	
Length Wtd. (ft)	49.94	Wetted Per. (ft)		22.59	
Min Ch El (ft)	1909.65	Shear (lb/sq ft)		1.73	
Alpha	1.00	Stream Power (lb/ft s)		36.49	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		0.38	
C & E Loss (ft)	0.06	Cum SA (acres)		0.06	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1101.71 Profile: 100-YEAR

E.G. Elev (ft)	1916.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	1916.10	Reach Len. (ft)	25.09	25.09	25.09
Crit W.S. (ft)	1912.74	Flow Area (sq ft)		144.53	
E.G. Slope (ft/ft)	0.000409	Area (sq ft)		144.53	
Q Total (cfs)	869.00	Flow (cfs)		869.00	
Top Width (ft)	20.00	Top Width (ft)		20.00	
Vel Total (ft/s)	6.01	Avg. Vel. (ft/s)		6.01	
Max Chl Dpth (ft)	7.23	Hydr. Depth (ft)		7.23	
Conv. Total (cfs)	42969.4	Conv. (cfs)		42969.4	
Length Wtd. (ft)	25.09	Wetted Per. (ft)		34.45	
Min Ch El (ft)	1908.87	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)		0.64	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		0.27	
C & E Loss (ft)	0.05	Cum SA (acres)		0.03	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1076.62 Profile: 100-YEAR

E.G. Elev (ft)	1916.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	1916.20	Reach Len. (ft)	24.95	24.95	24.95
Crit W.S. (ft)		Flow Area (sq ft)		169.59	
E.G. Slope (ft/ft)	0.000268	Area (sq ft)		169.59	
Q Total (cfs)	869.00	Flow (cfs)		869.00	
Top Width (ft)	21.98	Top Width (ft)		21.98	
Vel Total (ft/s)	5.12	Avg. Vel. (ft/s)		5.12	
Max Chl Dpth (ft)	7.72	Hydr. Depth (ft)		7.72	
Conv. Total (cfs)	53095.1	Conv. (cfs)		53095.1	
Length Wtd. (ft)	24.95	Wetted Per. (ft)		37.41	
Min Ch El (ft)	1908.48	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.39	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		0.18	
C & E Loss (ft)	0.02	Cum SA (acres)		0.02	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1051.67 Profile: 100-YEAR

E.G. Elev (ft)	1916.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	1916.23	Reach Len. (ft)	17.29	17.29	17.29
Crit W.S. (ft)		Flow Area (sq ft)		182.64	
E.G. Slope (ft/ft)	0.000219	Area (sq ft)		182.64	
Q Total (cfs)	869.00	Flow (cfs)		869.00	
Top Width (ft)	22.44	Top Width (ft)		22.44	
Vel Total (ft/s)	4.76	Avg. Vel. (ft/s)		4.76	
Max Chl Dpth (ft)	8.14	Hydr. Depth (ft)		8.14	
Conv. Total (cfs)	58717.8	Conv. (cfs)		58717.8	
Length Wtd. (ft)	17.29	Wetted Per. (ft)		38.72	
Min Ch El (ft)	1908.09	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.31	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.08	
C & E Loss (ft)	0.03	Cum SA (acres)		0.01	

Plan: 25 FL-ALIGN FL-ALIGN RS: 1034.38 Profile: 100-YEAR

E.G. Elev (ft)	1916.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	1916.30	Reach Len. (ft)			
Crit W.S. (ft)	1911.09	Flow Area (sq ft)		218.36	
E.G. Slope (ft/ft)	0.000138	Area (sq ft)		218.36	
Q Total (cfs)	869.00	Flow (cfs)		869.00	
Top Width (ft)	25.75	Top Width (ft)		25.75	
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)		3.98	
Max Chl Dpth (ft)	8.48	Hydr. Depth (ft)		8.48	
Conv. Total (cfs)	74073.3	Conv. (cfs)		74073.3	
Length Wtd. (ft)		Wetted Per. (ft)		42.71	
Min Ch El (ft)	1907.82	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Appendix C-4

As-Built Condition Dual Crossing Calculations for Downstream Tail Water Elevation at UPRR Embankment

CALCULATIONS

Client: **CITY OF NORTH LAS VEGAS & CC REGIONAL FLOOD CONTROL DISTRICT**
 Project: **BROOKS CHANNEL PROJECT**
 Description: **UPRR CROSSING CULVERT HEADWATER CALCULATION - AS BUILT CONDITION**

Sheet: **1 of 1**
 Date: **4/15/2018**
 Job No:
 By: **NAN** Chkd By: **JRP**

CULVERT HEADWATER CALCULATION

Proposed Condition: Brooks Channel flow attenuated, Freeway Channel peak flow

This calculation determines the flow intercepted by each of the two culverts at the UPRR crossing and calculates the headwater depth at the upstream headwall.

The flow intercepted by each culvert is determined based on headlosses incurred by each facility until the headwater converges (equalizes)

Referencing WSPG Model "FWCI2CC-.OUT" from the CFC at Cheyenne Crossing Freeway Channel Analysis

8' PIPE CULVERT

DIAM: 8 FT
 n, roughness 0.013
 Hydraulic Radius, R 2 FT
 Q₁ 339 CFS
 LENGTH 110 FT
 Ke 0.5

AREA 50.26548 SQ FT
 Friction Slope Sf 0.001381 FT/FT
 hf 0.15196 FT

Velocity 6.744191 FT/S
 hv, Vel Head 0.706275 FT
 he 0.353137 FT

Tail Water Elev 1915.05 FT
 Outlet Inv Elev 1907.99 FT
 Inlet Inv Elev 1908.37 FT

Headwater Elev **1916.3**
 Headwater Depth 7.891372

Total HL 1.211372 FT

EX 8'X4' BOX CULVERT

WIDTH: 8
 HEIGHT: 4 FT
 n, roughness 0.013
 Hydraulic Radius, R 1.333333 FT
 Q₂ 212 CFS
 LENGTH 148 FT
 Ke 0.5

AREA 32 SQ FT
 Friction Slope Sf 0.002289 FT/FT
 hf 0.338764 FT

Velocity 6.625 FT/S
 hv, Vel Head 0.681531 FT
 he 0.340766 FT

Tail Water Elev 1914.92 FT
 Outlet Inv Elev 1904.41 FT
 Inlet Inv Elev 1907.82 FT

Headwater Elev **1916.3**
 Headwater Depth 8.461061

Total HL 1.361061 FT

CULVERT EQUATIONS:

HL = he + hf + hv Total headloss
 he = Ke (V² / 2g) Entrance headloss
 hf = (29n² L / R^{1.33}) (V² / 2g) Friction headloss
 hv = (V² / 2g) Velocity head

Q_{total} = **551 cfs**

62% Conveyed by Pipe Culvert
 38% Conveyed by Ex Box Culvert

Tail water depths from WSPG Analysis

Average Headwater Elev = 1916.3 feet

**Proposed Condition Losee Road Storm Drain Hydraulic
Analysis and Drop Inlet Calculations**

Losee Road Street Hydraulic Section Calculations

Worksheet for FM:1E-Q10

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Discharge	17.00	ft³/s
Section Definitions		

Station (ft)	Elevation (ft)
0+50.000	1.03
0+93.000	0.17
0+93.000	0.13
0+94.500	0.00
0+94.500	0.50
0+95.000	0.50
1+00.000	0.60

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+50.000, 1.03)	(0+93.000, 0.13)	0.016
(0+93.000, 0.13)	(1+00.000, 0.60)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.65	ft
Elevation Range	0.00 to 1.03	ft
Flow Area	7.18	ft²
Wetted Perimeter	31.55	ft
Hydraulic Radius	0.23	ft

Worksheet for FM:1E-Q10

Results

Top Width	30.95	ft
Normal Depth	0.65	ft
Critical Depth	0.62	ft
Critical Slope	0.00585	ft/ft
Velocity	2.37	ft/s
Velocity Head	0.09	ft
Specific Energy	0.74	ft
Froude Number	0.87	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.65	ft
Critical Depth	0.62	ft
Channel Slope	0.43	%
Critical Slope	0.00585	ft/ft

Cross Section for FM:1E-Q10

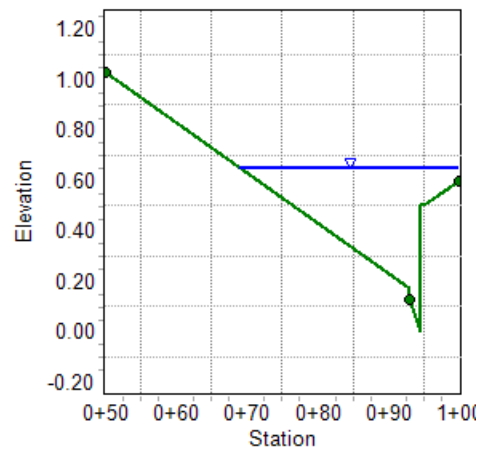
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Normal Depth	0.65	ft
Discharge	17.00	ft ³ /s

Cross Section Image



Project Description

Input Data

Station (ft)	Elevation (ft)

Roughness Segment Definitions

Options

Results

Bentley Systems, Inc. Haestad Methods Software Bentley ClientMaster V8i (SELECTseries 1) [08.11.01.03]

Worksheet for FM:1E-Q100

Results

Top Width	38.39	ft
Normal Depth	0.80	ft
Critical Depth	0.77	ft
Critical Slope	0.00529	ft/ft
Velocity	2.92	ft/s
Velocity Head	0.13	ft
Specific Energy	0.93	ft
Froude Number	0.91	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.80	ft
Critical Depth	0.77	ft
Channel Slope	0.43	%
Critical Slope	0.00529	ft/ft

Cross Section for FM:1E-Q100

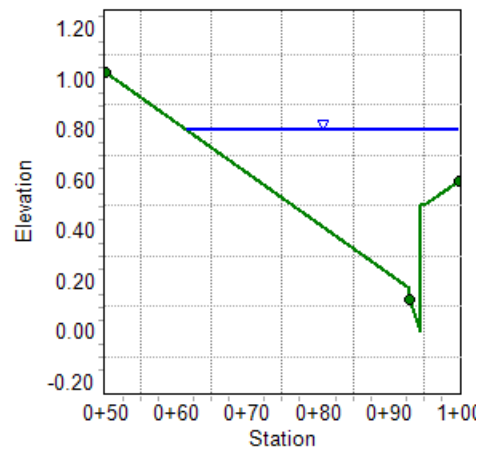
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Normal Depth	0.80	ft
Discharge	36.00	ft ³ /s

Cross Section Image



Worksheet for FM:1W-Q10

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.43 %
Discharge 99.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.000	0.60
0+05.000	0.50
0+05.500	0.50
0+05.500	0.00
0+07.000	0.13
0+07.000	0.17
0+50.000	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.60)	(0+07.000, 0.13)	0.013
(0+07.000, 0.13)	(0+50.000, 1.03)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 1.08 ft
Elevation Range 0.00 to 1.03 ft
Flow Area 25.27 ft²
Wetted Perimeter 51.09 ft
Hydraulic Radius 0.49 ft

Worksheet for FM:1W-Q10

Results

Top Width	50.00	ft
Normal Depth	1.08	ft
Critical Depth	1.07	ft
Critical Slope	0.00459	ft/ft
Velocity	3.92	ft/s
Velocity Head	0.24	ft
Specific Energy	1.32	ft
Froude Number	0.97	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.08	ft
Critical Depth	1.07	ft
Channel Slope	0.43	%
Critical Slope	0.00459	ft/ft

Cross Section for FM:1W-Q10

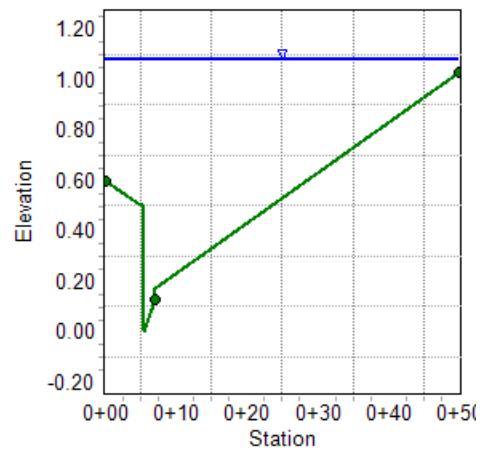
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Normal Depth	1.08	ft
Discharge	99.00	ft ³ /s

Cross Section Image



Project Description

Input Data

Elevation (ft)

Roughness Segment Definitions

Roughness Coefficient

Options

Results

Page 1 of 2

Worksheet for FM:1W-Q100

Results

Top Width	50.00	ft
Normal Depth	1.40	ft
Critical Depth	1.42	ft
Critical Slope	0.00391	ft/ft
Velocity	5.37	ft/s
Velocity Head	0.45	ft
Specific Energy	1.85	ft
Froude Number	1.04	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.40	ft
Critical Depth	1.42	ft
Channel Slope	0.43	%
Critical Slope	0.00391	ft/ft

Cross Section for FM:1W-Q100

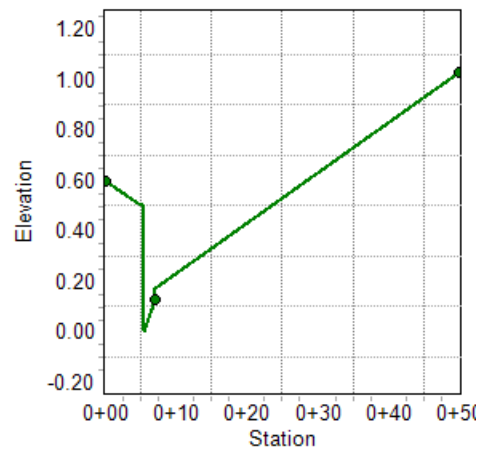
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Normal Depth	1.40	ft
Discharge	221.00	ft ³ /s

Cross Section Image



Worksheet for FM:2W-Q10

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Discharge	33.00	ft ³ /s
Section Definitions		

Station (ft)	Elevation (ft)
0+00.000	0.60
0+05.000	0.50
0+05.500	0.50
0+05.500	0.00
0+07.000	0.13
0+07.000	0.17
0+50.000	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.60)	(0+07.000, 0.13)	0.013
(0+07.000, 0.13)	(0+50.000, 1.03)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.78	ft
Elevation Range	0.00 to 1.03	ft
Flow Area	11.58	ft²
Wetted Perimeter	38.11	ft
Hydraulic Radius	0.30	ft

Worksheet for FM:2W-Q10

Results

Top Width	37.38	ft
Normal Depth	0.78	ft
Critical Depth	0.75	ft
Critical Slope	0.00535	ft/ft
Velocity	2.85	ft/s
Velocity Head	0.13	ft
Specific Energy	0.90	ft
Froude Number	0.90	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.78	ft
Critical Depth	0.75	ft
Channel Slope	0.43	%
Critical Slope	0.00535	ft/ft

Cross Section for FM:2W-Q10

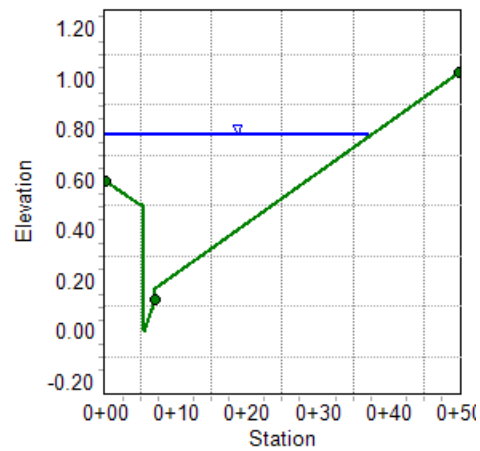
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Normal Depth	0.78	ft
Discharge	33.00	ft ³ /s

Cross Section Image



Worksheet for FM:2W-Q100

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.43 %
Discharge 102.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00.000	0.60
0+05.000	0.50
0+05.500	0.50
0+05.500	0.00
0+07.000	0.13
0+07.000	0.17
0+50.000	1.03

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.60)	(0+07.000, 0.13)	0.013
(0+07.000, 0.13)	(0+50.000, 1.03)	0.016

Options

Current Roughness Weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 1.09 ft
Elevation Range 0.00 to 1.03 ft
Flow Area 25.74 ft²
Wetted Perimeter 51.11 ft
Hydraulic Radius 0.50 ft

Worksheet for FM:2W-Q100

Results

Top Width	50.00	ft
Normal Depth	1.09	ft
Critical Depth	1.08	ft
Critical Slope	0.00456	ft/ft
Velocity	3.96	ft/s
Velocity Head	0.24	ft
Specific Energy	1.34	ft
Froude Number	0.97	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.09	ft
Critical Depth	1.08	ft
Channel Slope	0.43	%
Critical Slope	0.00456	ft/ft

Cross Section for FM:2W-Q100

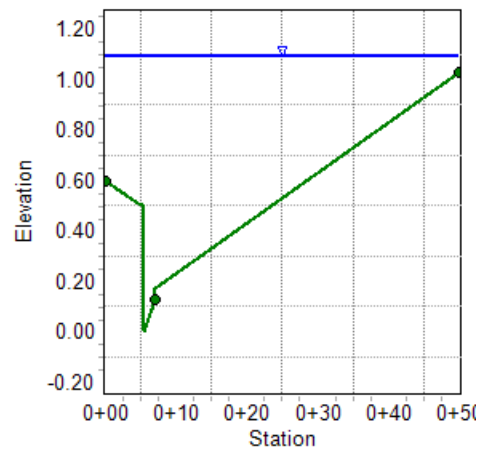
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.43	%
Normal Depth	1.09	ft
Discharge	102.00	ft ³ /s

Cross Section Image



Losee Road Local Facility Storm Drain WSPG Analysis

STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works
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Version 1.20
Serial Number 07010220

Oct 30, 2014 8:43:20

Input file : LOSSD100.TXT
Output file: LOSSD100.OUT

INPUT FILE LISTING

T1 BROOKS CHANNEL
T2 LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL-"SD3" STATIONING
T3 ULTIMATE CONDITION 100-YEAR PEAK FLOWS
SO 1000.001918.74 3 .013 1921.19
R 1012.451918.78 3 .013 45.0
R 1030.891918.84 3 .013 45.0
JX 1078.201919.01 3 6 .013 80.0 1919.01 45.0
R 1078.201919.01 3 .013
JX 1225.671919.52 3 2 1 .013 11.0 39.0 1919.85 1919.52 45.0 45.0
R 1233.001919.58 3 .013
WX 1233.001919.58 5 .013 45.0
R 1407.311920.68 5 .013
SH 1430.051920.84 5 .013

1
0 CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR SP CHANNEL DEFINITION LISTING PAGE 1
CODE NO TYPE PERS WIDTH DIAMETER WIDTH INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10)
CD 1 4 2.50
CD 2 4 1.50
CD 3 3 0 .00 7.00 .00 .00 .00
CD 4 4 3.50
CD 5 4 2.00
CD 6 4 3.00

PAGE NO 1

1
0 WATER SURFACE PROFILE - TITLE CARD LISTING

0 HEADING LINE NO 1 IS - BROOKS CHANNEL

0 HEADING LINE NO 2 IS - LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL-"SD3" STATIONING

0 HEADING LINE NO 3 IS - ULTIMATE CONDITION 100-YEAR PEAK FLOWS

PAGE NO 2

1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING

0 ELEMENT NO 1 IS A SYSTEM OUTLET * * * * * W S ELEV 1921.19
U/S DATA STATION INVERT SECT 3
1000.00 1918.74
0 ELEMENT NO 2 IS A REACH * * * * *
U/S DATA STATION INVERT SECT 3 N .013 RADIUS .00 ANGLE .00 ANG PT 45.00 MAN H 0
1012.45 1918.78
0 ELEMENT NO 3 IS A REACH * * * * *
U/S DATA STATION INVERT SECT 3 N .013 RADIUS .00 ANGLE .00 ANG PT 45.00 MAN H 0
1030.89 1918.84
0 ELEMENT NO 4 IS A JUNCTION * * * * *
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
1078.20 1919.01 3 6 0 .013 80.0 .0 1919.01 .00 45.00 .00
0 ELEMENT NO 5 IS A REACH * * * * *
U/S DATA STATION INVERT SECT 3 N .013 RADIUS .00 ANGLE .00 ANG PT 45.00 MAN H 0
1078.20 1919.01
0 ELEMENT NO 6 IS A JUNCTION * * * * *
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
1225.67 1919.52 3 2 1 .013 11.0 39.0 1919.85 1919.50 45.00 45.00
0 ELEMENT NO 7 IS A REACH * * * * *
U/S DATA STATION INVERT SECT 3 N .013 RADIUS .00 ANGLE .00 ANG PT 45.00 MAN H 0
1233.00 1919.58
0 ELEMENT NO 8 IS A WALL EXIT * * * * *
U/S DATA STATION INVERT SECT 5
1233.00 1919.58
0 ELEMENT NO 9 IS A REACH * * * * *
U/S DATA STATION INVERT SECT 5 N .013 RADIUS .00 ANGLE .00 ANG PT 45.00 MAN H 0
1407.31 1920.68
0 ELEMENT NO 10 IS A SYSTEM HEADWORKS * * * * *
U/S DATA STATION INVERT SECT 5 W S ELEV .00
1430.05 1920.84
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

PAGE 1

1
0 WATER SURFACE PROFILE LISTING

BROOKS CHANNEL
LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL-"SD3" STATIONING
ULTIMATE CONDITION 100-YEAR PEAK FLOWS
0 STATION INVERT DEPTH W.S. Q VEL VEL ENERGY SUPER CRITICAL HGT/ BASE/ ZL NO AVBPR
L/ELEM SO OF FLOW ELEV Q VEL HEAD GRD.EL. ELEV DEPTH DIA ID NO. ZR PIER

0 1000.00 1918.74 2.45 1921.19 145.0 8.45 1.11 1922.30 .00 2.37 3.00 7.00 .00 0 .00
0 12.45 .00322 .00333 .04
0 1012.45 1918.78 2.46 1921.24 145.0 8.40 1.10 1922.34 .00 2.37 2.49 3.00 7.00 .00 0 .00
0 18.44 .00325 .00329 .06
0 1030.89 1918.84 2.47 1921.31 145.0 8.38 1.09 1922.40 .00 2.37 2.48 3.00 7.00 .00 0 .00
0 JUNCT STR .00359 .00200 .09
0 1078.20 1919.01 3.34 1922.35 65.0 3.13 .15 1922.50 .00 1.39 3.00 7.00 .00 0 .00
0 1078.20 1919.01 3.34 1922.35 65.0 3.13 .15 1922.50 .00 1.39 3.00 7.00 .00 0 .00
0 JUNCT STR .00346 .00038 .06
0 1225.67 1919.52 3.03 1922.55 15.0 .72 .01 1922.55 .00 .52 3.00 7.00 .00 0 .00
0 3.22 .00818 .00004 .00
0 1228.89 1919.55 3.00 1922.55 15.0 .72 .01 1922.55 .00 .52 3.00 7.00 .00 0 .00
0 4.11 .00818 .00002 .00
0 1233.00 1919.58 2.97 1922.55 15.0 .72 .01 1922.55 .00 .52 3.00 7.00 .00 0 .00
0 WALL EXIT .00
0 1233.00 1919.58 2.97 1922.55 15.0 4.77 .35 1922.90 .00 1.40 2.00 .00 .00 0 .00
0 174.31 .00631 .00440 .77
0 1407.31 1920.68 2.63 1923.31 15.0 4.77 .35 1923.67 .00 1.40 2.00 .00 .00 0 .00
0 22.74 .00631 .00220 .05
0 1430.05 1920.84 2.63 1923.47 15.0 4.77 .35 1923.83 .00 1.40 2.00 .00 .00 0 .00

STORM DRAIN ANALYSIS PLUS

DI1

Original version by Los Angeles County Public Works
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Version 1.20
Serial Number 07010220

Mar 17, 2014 7: 5:11

Input file : di1.txt
Output file: di1.out

INPUT FILE LISTING

T1 BROOKS CHANNEL
T2 LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#1
T3 ULTIMATE CONDITION 100-YEAR PEAK FLOWS
S0 1000.001919.01 1 .013 1922.35
R 1085.401919.43 1 .013
SH 1085.401919.43 1 .013

SP

0 CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10) PAGE 1
CODE NO TYPE PIERS WIDTH DIAMETER WIDTH DROP

CD 1 4 3.00
ERROR MESSAGE NUMBER 7 IN SEQUENCE CHECKING THRU CHANNEL DEFINITION DATA
INVALID CARD CODE ENCOUNTERED WHILE PROCESSING CD AND PTS CARDS - CODE =

PAGE NO 1

1
0 WATER SURFACE PROFILE - TITLE CARD LISTING

0 HEADING LINE NO 1 IS - BROOKS CHANNEL

0 HEADING LINE NO 2 IS - LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#1

0 HEADING LINE NO 3 IS - ULTIMATE CONDITION 100-YEAR PEAK FLOWS

PAGE NO 2

1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING

0 ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
1000.00 1919.01 1 1922.35

0 ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1085.40 1919.43 1 .013 .00 .00 .00 0

0 ELEMENT NO 3 IS A SYSTEM HEADWORKS *
U/S DATA STATION INVERT SECT W S ELEV
1085.40 1919.43 1 .00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

PAGE 1

1
BROOKS CHANNEL
LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#1
ULTIMATE CONDITION 100-YEAR PEAK FLOWS

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
0 L/ELEM	SO					SF AVE			NORM DEPTH			ZR		
0 1000.00	1919.01	3.34	1922.35	80.0	11.32	1.99	1924.34	.00	2.77	3.00	.00	.00	0	.00
0 85.40	.00492					.01439	1.23			3.00	.00	.00	0	.00
0 1085.40	1919.43	4.15	1923.58	80.0	11.32	1.99	1925.57	.00	2.77	3.00	.00	.00	0	.00

STORM DRAIN ANALYSIS PLUS

DI2

Original version by Los Angeles County Public Works
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Version 1.20
Serial Number 07010220

Mar 17, 2014 7:10:48

Input file : di2.txt
Output file: di2.out

INPUT FILE LISTING

T1 BROOKS CHANNEL
T2 LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#2
T3 ULTIMATE CONDITION 100-YEAR PEAK FLOWS
S0 1000.001919.52 1 .013 1922.55
R 1073.841920.33 1 .013
SH 1073.841920.33 1 .013

SP

0 CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10) PAGE 1
CODE NO TYPE PIERS WIDTH DIAMETER WIDTH DROP

CD 1 4 2.50
ERROR MESSAGE NUMBER 7 IN SEQUENCE CHECKING THRU CHANNEL DEFINITION DATA
INVALID CARD CODE ENCOUNTERED WHILE PROCESSING CD AND PTS CARDS - CODE =

1 WATER SURFACE PROFILE - TITLE CARD LISTING PAGE NO 1

0 HEADING LINE NO 1 IS - BROOKS CHANNEL
0 HEADING LINE NO 2 IS - LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#2
0 HEADING LINE NO 3 IS - ULTIMATE CONDITION 100-YEAR PEAK FLOWS

1 WATER SURFACE PROFILE - ELEMENT CARD LISTING PAGE NO 2

0 ELEMENT NO 1 IS A SYSTEM OUTLET * * *
U/S DATA STATION INVERT SECT W S ELEV
1000.00 1919.52 1 1922.55
0 ELEMENT NO 2 IS A REACH * * *
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1073.84 1920.33 1 .013 .00 .00 .00 0
0 ELEMENT NO 3 IS A SYSTEM HEADWORKS * * *
U/S DATA STATION INVERT SECT W S ELEV
1073.84 1920.33 1 .00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
1 WATER SURFACE PROFILE LISTING PAGE 1

BROOKS CHANNEL
LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#2
ULTIMATE CONDITION 100-YEAR PEAK FLOWS
0 STATION INVERT DEPTH W.S. Q VEL VEL ENERGY SUPER CRITICAL HGT/ BASE/ ZL NO AVBPR
L/ELEM SO OF FLOW ELEV ELEV SF AVE GRD.EL. ELEV DEPTH DIA ID NO. PIER

0 1000.00 1919.52 3.03 1922.55 39.0 7.95 .98 1923.53 .00 2.11 2.50 .00 .00 0 .00
0 73.84 .01097 .00904 .67
0 1073.84 1920.33 2.89 1923.22 39.0 7.95 .98 1924.20 .00 2.11 2.50 .00 .00 0 .00
1

STORM DRAIN ANALYSIS PLUS

DI3

Original version by Los Angeles County Public Works
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Version 1.20
Serial Number 07010220

Mar 17, 2014 7:13:42

Input file : di3.txt
Output file: di3.out

INPUT FILE LISTING

T1 BROOKS CHANNEL
T2 LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#3
T3 ULTIMATE CONDITION 100-YEAR PEAK FLOWS
S0 1000.001919.52 1 .013 1922.55
R 1030.751920.00 1 .013
SH 1030.751920.00 1 .013

SP

0 CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10) PAGE 1
CODE NO TYPE PIERS WIDTH DIAMETER WIDTH DROP

CD 1 4 1.50
ERROR MESSAGE NUMBER 7 IN SEQUENCE CHECKING THRU CHANNEL DEFINITION DATA
INVALID CARD CODE ENCOUNTERED WHILE PROCESSING CD AND PTS CARDS - CODE =

1 WATER SURFACE PROFILE - TITLE CARD LISTING PAGE NO 1

0 HEADING LINE NO 1 IS - BROOKS CHANNEL

0 HEADING LINE NO 2 IS - LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#3

0 HEADING LINE NO 3 IS - ULTIMATE CONDITION 100-YEAR PEAK FLOWS

1 WATER SURFACE PROFILE - ELEMENT CARD LISTING PAGE NO 2

0 ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA STATION INVERT SECT W S ELEV
1000.00 1919.52 1 1922.55

0 ELEMENT NO 2 IS A REACH * * *

U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H
1030.75 1920.00 1 .013 .00 .00 .00 0

0 ELEMENT NO 3 IS A SYSTEM HEADWORKS * *

U/S DATA STATION INVERT SECT W S ELEV
1030.75 1920.00 1 .00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC PAGE 1

WATER SURFACE PROFILE LISTING

BROOKS CHANNEL
LOSEE ROAD STORM DRAIN SYSTEM - NORTH OF BROOKS CHANNEL DI#3
ULTIMATE CONDITION 100-YEAR PEAK FLOWS

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH	HGT/DIA	BASE/ID NO.	ZL	NO PIER	AVBPR
0 L/ELEM	S0					SF AVE			NORM DEPTH			ZR		
0 1000.00	1919.52	3.03	1922.55	11.0	6.22	.60	1923.15	.00	1.27	1.50	.00	.00	0	.00
0 30.75	.01561					.01097	.34					.00		
0 1030.75	1920.00	2.89	1922.89	11.0	6.22	.60	1923.49	.00	1.27	1.50	.00	.00	0	.00

1

Losee Road Drop Inlet Calculations

Worksheet for DI# 1-Q10

Project Description

Solve For Efficiency

Input Data

Discharge	75.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	12.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	12.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	56.35	%
Intercepted Flow	42.26	ft ³ /s
Bypass Flow	32.74	ft ³ /s
Spread	42.50	ft
Depth	0.94	ft
Flow Area	18.13	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	4.14	ft/s
Splash Over Velocity	15.63	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.41	
Grate Flow Ratio	0.10	
Equivalent Cross Slope	0.02695	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.08	
Total Interception Length	74.97	ft

Worksheet for DI# 1-Q10

Messages

Messages

Grate Length should be within the
defined range of HEC-22's Chart 5
(approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for DI# 1-Q100

Project Description

Solve For Efficiency

Input Data

Discharge	182.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	12.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	12.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	43.89	%
Intercepted Flow	79.87	ft ³ /s
Bypass Flow	102.13	ft ³ /s
Spread	59.33	ft
Depth	1.28	ft
Flow Area	35.27	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	5.16	ft/s
Splash Over Velocity	15.63	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.32	
Grate Flow Ratio	0.07	
Equivalent Cross Slope	0.02491	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.05	
Total Interception Length	114.05	ft

Worksheet for DI# 1-Q100

Messages

Messages

Grate Length should be within the
defined range of HEC-22's Chart 5
(approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for DI# 2-Q10

Project Description

Solve For Efficiency

Input Data

Discharge	99.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	5.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	24.56	%
Intercepted Flow	24.32	ft ³ /s
Bypass Flow	74.68	ft ³ /s
Spread	47.18	ft
Depth	1.04	ft
Flow Area	22.33	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	4.43	ft/s
Splash Over Velocity	9.11	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.07	
Grate Flow Ratio	0.09	
Equivalent Cross Slope	0.02623	ft/ft
Active Grate Length	2.50	ft
Length Factor	0.06	
Total Interception Length	85.62	ft

Worksheet for DI# 2-Q10

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for DI# 2-Q100

Project Description

Solve For Efficiency

Input Data

Discharge	221.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	5.00	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	17.77	%
Intercepted Flow	39.28	ft ³ /s
Bypass Flow	181.72	ft ³ /s
Spread	63.82	ft
Depth	1.37	ft
Flow Area	40.80	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	5.42	ft/s
Splash Over Velocity	9.11	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.05	
Grate Flow Ratio	0.07	
Equivalent Cross Slope	0.02455	ft/ft
Active Grate Length	2.50	ft
Length Factor	0.04	
Total Interception Length	124.82	ft

Worksheet for DI# 2-Q100

Messages

Messages

Grate Length should be within the
defined range of HEC-22's Chart 5
(approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for DI# 3-Q10

Project Description

Solve For Efficiency

Input Data

Discharge	8.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	7.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	67.82	%
Intercepted Flow	5.43	ft ³ /s
Bypass Flow	2.57	ft ³ /s
Spread	18.11	ft
Depth	0.46	ft
Flow Area	3.35	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	2.39	ft/s
Splash Over Velocity	11.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.37	
Grate Flow Ratio	0.24	
Equivalent Cross Slope	0.03705	ft/ft
Active Grate Length	3.75	ft
Length Factor	0.15	
Total Interception Length	24.20	ft

Worksheet for DI# 3-Q10

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for DI# 3-Q100

Project Description

Solve For Efficiency

Input Data

Discharge	21.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	7.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	51.21	%
Intercepted Flow	10.75	ft ³ /s
Bypass Flow	10.25	ft ³ /s
Spread	26.24	ft
Depth	0.62	ft
Flow Area	6.96	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	3.02	ft/s
Splash Over Velocity	11.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.28	
Grate Flow Ratio	0.16	
Equivalent Cross Slope	0.03153	ft/ft
Active Grate Length	3.75	ft
Length Factor	0.09	
Total Interception Length	39.97	ft

Worksheet for DI# 3-Q100

Messages

Messages

Grate Length should be within the
defined range of HEC-22's Chart 5
(approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for DI# 4-Q10

Project Description

Solve For Efficiency

Input Data

Discharge	17.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	7.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	54.67	%
Intercepted Flow	9.29	ft ³ /s
Bypass Flow	7.71	ft ³ /s
Spread	24.21	ft
Depth	0.58	ft
Flow Area	5.93	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	2.87	ft/s
Splash Over Velocity	11.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.30	
Grate Flow Ratio	0.18	
Equivalent Cross Slope	0.03256	ft/ft
Active Grate Length	3.75	ft
Length Factor	0.10	
Total Interception Length	35.89	ft

Worksheet for DI# 4-Q10

Messages

Messages

Grate Length should be within the
defined range of HEC-22's Chart 5
(approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for DI# 4-Q100

Project Description

Solve For Efficiency

Input Data

Discharge	36.00	ft ³ /s
Slope	0.430	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.30	%
Road Cross Slope	2.00	%
Roughness Coefficient	0.016	
Local Depression	0.13	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	7.50	ft
Grate Type	P-50 mm (P-1-7/8")	
Clogging	50.00	%
Curb Opening Length	7.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	42.96	%
Intercepted Flow	15.46	ft ³ /s
Bypass Flow	20.54	ft ³ /s
Spread	32.20	ft
Depth	0.74	ft
Flow Area	10.44	ft ²
Gutter Depression	0.09	ft
Total Depression	0.10	ft
Velocity	3.45	ft/s
Splash Over Velocity	11.14	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.23	
Grate Flow Ratio	0.13	
Equivalent Cross Slope	0.02930	ft/ft
Active Grate Length	3.75	ft
Length Factor	0.07	
Total Interception Length	52.39	ft

Worksheet for DI# 4-Q100

Messages

Messages

Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Appendix C-6

Proposed Condition WSPG Analysis:

As-built conditions for the

Central Freeway Channel

at Cheyenne Crossing

WSPG
ANALYSIS ULTIMATE CONDITION FLOWS
IN EXISTING FREEWAY CHANNEL
& RCB's BENEATH CHEYENNE AVENUE
FWCI2CA.out

STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works
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Version 1.20
Serial Number 07010220

Dec 20, 2016 13:34: 0

Input file : fwci2ca-.txt
Output file: fwci2ca-.out

INPUT FILE LISTING

T1 FREEWAY CHANNEL HYDRAULICS - EXISTING CELLS

T2 EXISTING CROSSING AS-BUILT ANALYSIS

T3 CENTRAL FWY CHAN TM FLOWS REFERENCED

SO	2775.751889.56	5	.013	1898.83
R	2775.751889.56	5	.013	
R	2825.751889.60	5	.013	
TS	2874.001889.71	4	.013	
R	3417.951890.20	4	.013	
R	3426.301890.06	4	.013	
WX	3426.301890.06	12	.013	
R	3426.301890.06	12	.013	
R	3785.871890.29	12	.013	
WX	3785.871890.29	19	.013	
R	3834.571890.59	19	.013	00.68
R	4010.281891.63	19	.013	
R	4174.711892.86	19	.013	
R	4333.311894.22	19	.013	
R	4449.841895.30	19	.013	
R	4566.271896.49	19	.013	
R	4623.851897.31	19	.013	
R	4678.301898.10	19	.013	
R	4679.341898.10	19	.013	
R	4746.411898.73	19	.013	
R	4780.211899.04	19	.013	11.04
R	4898.241900.33	19	.013	00.53
R	4999.671901.44	19	.013	05.79
R	5143.291902.82	19	.013	06.05
R	5143.961902.82	19	.013	
R	5161.451902.85	19	.013	
WE	5161.451902.85	19	.013	
R	5161.451902.85	21	.013	02.09
TS	5333.881903.10	22	.013	
SH	5333.881903.10	22	.013	

										SP										CHANNEL DEFINITION LISTING										PAGE 1	
0	CARD	SECT	CHN	NO OF	AVE	PIER	HEIGHT	WATER	SURFACE	PROFILE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)								
	CODE	NO	TYPE	PIERS	WIDTH	DIAMETER	1	BASE	WIDTH				DROP																		
	CD	4	1	0	.00	10.00	20.00	1.50	1.50	.00																					
	CD	5	1	0	.00	12.00	32.00	.00	1.50	.00																					
	CD	12	2	0	.00	11.00	17.00			.00																					
	CD	14	2	0	.00	11.00	50.00			.00																					
	CD	17	2	0	.00	12.00	38.00			.00																					
	CD	19	3	1	1.50	10.00	17.50	.00	.00	.00																					
	CD	20	2	0	.00	13.00	35.00			.00																					
	CD	21	2	0	.00	12.00	17.50			.00																					
	CD	22	2	0	.00	12.00	16.00			.00																					

1
0 WATER SURFACE PROFILE - TITLE CARD LISTING
0 HEADING LINE NO 1 IS -
0 FREeway CHANNEL HYDRAULICS - EXISTING CELLS 90% DESIGN
0 HEADING LINE NO 2 IS -
0 EXISTING CROSSING AS-BUILT ANALYSIS
0 HEADING LINE NO 3 IS -
0 CENTRAL FWY CHAN TM FLOWS REFERENCED
1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO 1 IS A SYSTEM OUTLET
0 ELEMENT NO 2 IS A REACH
0 ELEMENT NO 3 IS A REACH
0 ELEMENT NO 4 IS A TRANSITION
0 ELEMENT NO 5 IS A REACH
0 ELEMENT NO 6 IS A REACH
0 ELEMENT NO 7 IS A WALL EXIT
0 ELEMENT NO 8 IS A REACH
0 ELEMENT NO 9 IS A REACH
0 ELEMENT NO 10 IS A WALL EXIT

0	ELEMENT NO	1	IS A	SYSTEM OUTLET	STATION	INVERT	SECT	W S ELEV															
					2775.75	1889.56	5	1898.83															
					2775.75	1889.56	5		N	.013													
					2825.75	1889.60	5		N	.013													
					2874.00	1889.71	4		N	.013													
					3417.95	1890.20	4		N	.013													
					3426.30	1890.06	4		N	.013													
					3426.30	1890.06	12		N	.013													
					3785.87	1890.29	12		N	.013													
					3785.87	1890.29	19																

FWCI2CA-
0 ELEMENT NO 11 IS A REACH * * *
U/S DATA STATION 3834.57 INVERT 1890.59 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .60 MAN H 8
0 ELEMENT NO 12 IS A REACH * * *
U/S DATA STATION 4010.28 INVERT 1891.63 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 13 IS A REACH * * *
U/S DATA STATION 4174.71 INVERT 1892.86 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
PAGE NO 3

1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO 14 IS A REACH * * *
U/S DATA STATION 4333.31 INVERT 1894.22 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 15 IS A REACH * * *
U/S DATA STATION 4449.84 INVERT 1895.30 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 16 IS A REACH * * *
U/S DATA STATION 4566.27 INVERT 1896.49 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 17 IS A REACH * * *
U/S DATA STATION 4623.85 INVERT 1897.31 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 18 IS A REACH * * *
U/S DATA STATION 4678.30 INVERT 1898.10 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 19 IS A REACH * * *
U/S DATA STATION 4679.34 INVERT 1898.10 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 20 IS A REACH * * *
U/S DATA STATION 4746.41 INVERT 1898.73 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 21 IS A REACH * * *
U/S DATA STATION 4780.21 INVERT 1899.04 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 4
0 ELEMENT NO 22 IS A REACH * * *
U/S DATA STATION 4898.24 INVERT 1900.33 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .50 MAN H 3
0 ELEMENT NO 23 IS A REACH * * *
U/S DATA STATION 4999.67 INVERT 1901.44 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 9
0 ELEMENT NO 24 IS A REACH * * *
U/S DATA STATION 5143.29 INVERT 1902.82 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT 6.00 MAN H 5
0 ELEMENT NO 25 IS A REACH * * *
U/S DATA STATION 5143.96 INVERT 1902.82 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 26 IS A REACH * * *
U/S DATA STATION 5161.45 INVERT 1902.85 SECT 19 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 27 IS A WALL ENTRANCE * * *
U/S DATA STATION 5161.45 INVERT 1902.85 SECT 19 FP
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
PAGE NO 4

1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS
0 ELEMENT NO 28 IS A REACH * * *
U/S DATA STATION 5161.45 INVERT 1902.85 SECT 21 N
.013 RADIUS .00 ANGLE .00 ANG PT 2.00 MAN H 9
0 ELEMENT NO 29 IS A TRANSITION * * *
U/S DATA STATION 5333.88 INVERT 1903.06 SECT 22 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 30 IS A SYSTEM HEADWORKS * * *
U/S DATA STATION 5333.88 INVERT 1903.06 SECT 22 N
.013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
W S ELEV .00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC
PAGE 1

1
WATER SURFACE PROFILE LISTING
FREeway CHANNEL HYDRAULICS - EXISTING CELLS 90% DESIGN
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED
0 STATION INVERT DEPTH W.S. Q VEL VEL ENERGY SUPER CRITICAL HGT/ BASE/ ZL NO AVBPR
ELEV OF FLOW ELEV ELEV Q VEL HEAD GRD.EL. ELEV DEPTH DIA ID NO. PIER BPR
0 L/ELEM SO SF AVE HF NORM DEPTH ZR

0 2775.75 1889.56 9.27 1898.83 2388.0 6.61 .68 1899.51 .00 5.34 12.00 32.00 .00 0 .00
0 50.00 .00080 .00029 .01 1.50
0 2825.75 1889.60 9.24 1898.84 2388.0 6.64 .68 1899.52 .00 5.34 12.00 32.00 .00 0 .00
0 TRANS STR .00228 .00039 .02 1.50
0 2874.00 1889.71 8.89 1898.60 2388.0 8.06 1.01 1899.61 .00 6.44 10.00 20.00 1.50 0 .00
0 499.76 .00090 .00052 .26 1.50
0 3373.76 1890.16 8.60 1898.76 2388.0 8.44 1.11 1899.87 .00 6.44 10.00 20.00 1.50 0 .00
0 HYDRAULIC JUMP 1.50
0 3373.76 1890.16 4.63 1894.79 2388.0 19.15 5.70 1900.49 .00 6.44 10.00 20.00 1.50 0 .00
0 44.19 .00090 .00570 .25 1.50
0 3417.95 1890.20 4.54 1894.74 2388.0 19.64 6.00 1900.73 .00 6.44 10.00 20.00 1.50 0 .00
0 8.35 -.01675 .00610 .05 1.50
0 3426.30 1890.06 4.46 1894.52 2388.0 20.08 6.27 1900.78 .00 6.44 10.00 20.00 1.50 0 .00
0 3426.30 1890.06 8.80 1898.86 2388.0 8.17 1.04 1899.90 .00 6.44 10.00 20.00 1.50 0 .00
0 WALL EXIT 1.50
0 3426.30 1890.06 8.80 1898.86 2388.0 15.96 3.96 1902.82 .00 8.49 11.00 17.00 .00 0 .00
0 35.40 .00064 .00260 .09 15.59
0 3461.70 1890.08 9.23 1899.31 2388.0 15.22 3.60 1902.91 .00 8.49 11.00 17.00 .00 0 .00
0 74.39 .00064 .00230 .17 15.59
0 3536.09 1890.13 9.68 1899.81 2388.0 14.51 3.27 1903.08 .00 8.49 11.00 17.00 .00 0 .00
0 126.18 .00064 .00203 .26 15.59
0 3662.26 1890.21 10.15 1900.36 2388.0 13.84 2.98 1903.34 .00 8.49 11.00 17.00 .00 0 .00
PAGE 2

1
WATER SURFACE PROFILE LISTING
FREeway CHANNEL HYDRAULICS - EXISTING CELLS 90% DESIGN
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED
0 STATION INVERT DEPTH W.S. Q VEL VEL ENERGY SUPER CRITICAL HGT/ BASE/ ZL NO AVBPR
ELEV OF FLOW ELEV ELEV Q VEL HEAD GRD.EL. ELEV DEPTH DIA ID NO. PIER BPR
Page 2

0 L/ELEM	SO					SF AVE	FWCI2CA-HF		NORM DEPTH			ZR	
0 123.61	.00064					.00182	.23		15.59			.00	
0 3785.87	1890.29	10.48	1900.77	2388.0	13.40	2.79	1903.56	.00	8.49		11.00	17.00	.00 0 .00
0 .00	.00064					.00087	.00		15.59			.00	
0 3785.87	1890.29	10.48	1900.77	2388.0	13.40	2.79	1903.56	.00	8.49		11.00	17.00	.00 0 .00
0 WALL EXIT												.00	
0 3785.87	1890.29	10.49	1900.78	2388.0	14.97	3.48	1904.26	.00	8.85		10.00	17.50	.00 1 1.50
0 48.70	.00616					.00594	.29		8.53			.00	
0 3834.57	1890.59	11.87	1902.46	2388.0	14.97	3.48	1905.95	.00	8.85		10.00	17.50	.00 1 1.50
0 175.71	.00592					.00594	1.04		8.67			.00	
0 4010.28	1891.63	11.88	1903.51	2388.0	14.97	3.48	1906.99	.00	8.85		10.00	17.50	.00 1 1.50
0 164.43	.00748					.00594	.98		7.88			.00	
0 4174.71	1892.86	11.63	1904.49	2388.0	14.97	3.48	1907.97	.00	8.85		10.00	17.50	.00 1 1.50
0 158.60	.00857					.00594	.94		7.45			.00	
0 4333.31	1894.22	11.21	1905.43	2388.0	14.97	3.48	1908.91	.00	8.85		10.00	17.50	.00 1 1.50
0 116.53	.00927					.00594	.69		7.22			.00	
0 4449.84	1895.30	10.82	1906.12	2388.0	14.97	3.48	1909.60	.00	8.85		10.00	17.50	.00 1 1.50
0 53.95	.01022					.00594	.32		6.94			.00	
0 4503.79	1895.85	10.59	1906.44	2388.0	14.97	3.48	1909.92	.00	8.85		10.00	17.50	.00 1 1.50
0 HYDRAULIC JUMP												.00	
0 4503.79	1895.85	6.75	1902.60	2388.0	22.11	7.60	1910.20	.00	8.85		10.00	17.50	.00 1 1.50
0 62.48	.01022					.01103	.69		6.94			.00	
0 4566.27	1896.49	6.71	1903.20	2388.0	22.23	7.68	1910.88	.00	8.85		10.00	17.50	.00 1 1.50
1													PAGE 3

WATER SURFACE PROFILE LISTING
FREeway CHANNEL HYDRAULICS - EXISTING CELLS 90% DESIGN
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.E.L.	SUPER ELEV	CRITICAL DEPTH	HGT/DIA	BASE/ID NO.	ZL	NO PIER	AVBPR
0 L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
0 57.58	.01424					.01078	.62		6.08			.00		
0 4623.85	1897.31	6.88	1904.19	2388.0	21.69	7.31	1911.50	.00	8.85	10.00	17.50	.00 1 1.50		
0 .00	.01424					.01045	.00		6.08			.00		
0 4623.85	1897.31	6.88	1904.19	2388.0	21.69	7.31	1911.50	.00	8.85	10.00	17.50	.00 1 1.50		
0 54.45	.01451					.01003	.55		6.04			.00		
0 4678.30	1898.10	7.12	1905.22	2388.0	20.96	6.83	1912.05	.00	8.85	10.00	17.50	.00 1 1.50		
0 1.04	.00000					.00962	.01		.00			.00		
0 4679.34	1898.10	7.11	1905.21	2388.0	21.00	6.85	1912.06	.00	8.85	10.00	17.50	.00 1 1.50		
0 .00	.00000					.00964	.00		.00			.00		
0 4679.34	1898.10	7.11	1905.21	2388.0	21.00	6.85	1912.06	.00	8.85	10.00	17.50	.00 1 1.50		
0 67.07	.00939					.00967	.65		7.18			.00		
0 4746.41	1898.73	7.09	1905.82	2388.0	21.06	6.89	1912.71	.00	8.85	10.00	17.50	.00 1 1.50		
0 33.80	.00917					.00974	.33		7.25			.00		
0 4780.21	1899.04	7.07	1906.11	2388.0	21.12	6.93	1913.04	.00	8.85	10.00	17.50	.00 1 1.50		
0 .00	.00917					.00978	.00		7.25			.00		
0 4780.21	1899.04	7.07	1906.11	2388.0	21.12	6.93	1913.04	.00	8.85	10.00	17.50	.00 1 1.50		
0 118.03	.01093					.00945	1.12		6.76			.00		
0 4898.24	1900.33	7.26	1907.59	2388.0	20.55	6.56	1914.15	.00	8.85	10.00	17.50	.00 1 1.50		
0 .00	.01093					.00913	.00		6.76			.00		
0 4898.24	1900.33	7.26	1907.59	2388.0	20.55	6.56	1914.15	.00	8.85	10.00	17.50	.00 1 1.50		
0 101.43	.01094					.00865	.88		6.75			.00		
0 4999.67	1901.44	7.60	1909.04	2388.0	19.64	5.99	1915.03	.00	8.85	10.00	17.50	.00 1 1.50		
1													PAGE 4	

WATER SURFACE PROFILE LISTING
FREeway CHANNEL HYDRAULICS - EXISTING CELLS 90% DESIGN
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.E.L.	SUPER ELEV	CRITICAL DEPTH	HGT/DIA	BASE/ID NO.	ZL	NO PIER	AVBPR
0 L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
0 .00	.01094					.00817	.00		6.75			.00		
0 4999.67	1901.44	7.60	1909.04	2388.0	19.64	5.99	1915.03	.00	8.85	10.00	17.50	.00 1 1.50		
0 23.94	.00961					.00808	.19		7.12			.00		
0 5023.61	1901.67	7.67	1909.34	2388.0	19.47	5.89	1915.23	.00	8.85	10.00	17.50	.00 1 1.50		
0 78.47	.00961					.00755	.59		7.12			.00		
0 5102.09	1902.42	8.04	1910.46	2388.0	18.56	5.35	1915.82	.00	8.85	10.00	17.50	.00 1 1.50		
0 32.68	.00961					.00672	.22		7.12			.00		
0 5134.76	1902.74	8.43	1911.17	2388.0	17.70	4.87	1916.04	.00	8.85	10.00	17.50	.00 1 1.50		
0 8.53	.00961					.00599	.05		7.12			.00		
0 5143.29	1902.82	8.85	1911.67	2388.0	16.87	4.42	1916.09	.00	8.85	10.00	17.50	.00 1 1.50		
0 .67	.00000					.00553	.00		.00			.00		
0 5143.96	1902.82	9.00	1911.82	2388.0	16.59	4.28	1916.09	.00	8.85	10.00	17.50	.00 1 1.50		
0 14.74	.00172					.00512	.08		10.00			.00		
0 5158.70	1902.85	9.44	1912.28	2388.0	15.82	3.89	1916.17	.00	8.85	10.00	17.50	.00 1 1.50		
0 2.75	.00172					.00480	.01		10.00			.00		
0 5161.45	1902.85	9.48	1912.33	2388.0	15.74	3.85	1916.18	.00	8.85	10.00	17.50	.00 1 1.50		
0 .00	.00172					.00239	.00		10.00			.00		
0 5161.45	1902.85	9.48	1912.33	2388.0	15.74	3.85	1916.18	.00	8.85	10.00	17.50	.00 1 1.50		
0 WALL ENTRANCE												.00		
0 5161.45	1902.85	10.44	1913.29	2388.0	13.07	2.65	1915.95	.00	8.33	12.00	17.50	.00 0 .00		
0 TRANS STR	.00122					.00203	.35					.00		
0 5333.88	1903.10	9.85	1912.91	2388.0	15.15	3.57	1916.48	.00	8.85	12.00	16.00	.00 0 .00		
1													PAGE 5	

WATER SURFACE PROFILE LISTING
FREeway CHANNEL HYDRAULICS - EXISTING CELLS 90% DESIGN
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED

0 STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.E.L.	SUPER ELEV	CRITICAL DEPTH	HGT/DIA	BASE/ID NO.	ZL	NO PIER	AVBPR
0 L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

1

**WSPG ANALYSIS
ULTIMATE CONDITION FLOWS
IN EXISTING FREEWAY CHANNEL
& RCB's BENEATH CHEYENNE AVENUE
*FWCI2CB.out***

STORM DRAIN ANALYSIS PLUS

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Version 1.20
Serial Number 07010220

May 15, 2018 17:53:19

Input file : FWCI2CB-.TXT
Output file: FWCI2CB-.OUT

INPUT FILE LISTING

T1 FREEWAY CHANNEL HYDRAULICS - NEW CELL
T2 AS BUILT 12'x10' RCB IN I-15
T3 CENTRAL FWY CHAN TM FLOWS REFERENCED
SO -3579.321890.60 22 .013 1898.83
R -3554.511890.61 22 .013
R -3530.831890.83 22 .013 54.28
WX -3530.831890.83 23 .013
R -3463.841891.11 23 .013
R -3440.311891.20 23 .013 53.92
R -2907.531893.42 23 .013
R -2312.701896.85 23 .013 0.160
R -1956.891898.90 23 .013 0.830
R -1854.771899.49 23 .013
R -1230.841902.45 23 .013
R -1211.451902.54 23 .013 44.43
R -1103.881903.04 23 .013
WE -1103.881903.04 22 .013
R -1084.001903.06 22 .013 44.55
SH -1010.001903.10 22 .013

1 SP
CHANNEL DEFINITION LISTING
0 CARD SECT CHN NO OF AVE PIER WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1
CODE NO TYPE PERS WIDTH HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10)
DIP
CD 4 1 0 .00 10.00 20.00 1.50 1.50 .00
CD 21 2 0 .00 12.00 43.00 .00
CD 22 2 0 .00 12.00 12.00 .00
CD 23 3 0 .00 10.00 12.00 .00 .00
CD 24 2 0 .00 12.00 45.00 .00

ERROR MESSAGE NUMBER 7 IN SEQUENCE CHECKING THRU CHANNEL DEFINITION DATA
INVALID CARD CODE ENCOUNTERED WHILE PROCESSING CD AND PTS CARDS - CODE =

1
0 WATER SURFACE PROFILE - TITLE CARD LISTING PAGE NO 1
0 HEADING LINE NO 1 IS -
0 FREeway CHANNEL HYDRAULICS - PROPOSED CELL
0 HEADING LINE NO 2 IS -
0 PROPOSED 12'x10' RCB IN I-15 90% DESIGN
0 HEADING LINE NO 3 IS -
0 CENTRAL FWY CHAN TM FLOWS REFERENCED

1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING PAGE NO 2
0 ELEMENT NO 1 IS A SYSTEM OUTLET *
U/S DATA STATION INVERT SECT
-3579.32 1890.60 22
W S ELEV
1898.83
0 ELEMENT NO 2 IS A REACH *
U/S DATA STATION INVERT SECT
-3554.51 1890.61 22 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .00 0
0 ELEMENT NO 3 IS A REACH *
U/S DATA STATION INVERT SECT
-3530.83 1890.83 22 N
.013 RADIUS ANGLE ANG PT MAN H
.00 54.28 .00 0
0 ELEMENT NO 4 IS A WALL EXIT *
U/S DATA STATION INVERT SECT
-3530.83 1890.83 23
0 ELEMENT NO 5 IS A REACH *
U/S DATA STATION INVERT SECT
-3463.84 1891.11 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .00 0
0 ELEMENT NO 6 IS A REACH *
U/S DATA STATION INVERT SECT
-3440.31 1891.20 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 53.92 .00 0
0 ELEMENT NO 7 IS A REACH *
U/S DATA STATION INVERT SECT
-2907.53 1893.42 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .00 0
0 ELEMENT NO 8 IS A REACH *
U/S DATA STATION INVERT SECT
-2312.70 1896.85 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .16 0
0 ELEMENT NO 9 IS A REACH *
U/S DATA STATION INVERT SECT
-1956.89 1898.90 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .83 0
0 ELEMENT NO 10 IS A REACH *
U/S DATA STATION INVERT SECT
-1854.77 1899.49 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .00 0
0 ELEMENT NO 11 IS A REACH *
U/S DATA STATION INVERT SECT
-1230.84 1902.45 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .00 0
0 ELEMENT NO 12 IS A REACH *
U/S DATA STATION INVERT SECT
-1211.45 1902.54 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 44.43 .00 0
0 ELEMENT NO 13 IS A REACH *
U/S DATA STATION INVERT SECT
-1103.88 1903.03 23 N
.013 RADIUS ANGLE ANG PT MAN H
.00 .00 .00 0
0 ELEMENT NO 14 IS A WALL ENTRANCE *
U/S DATA STATION INVERT SECT
-1103.88 1903.03 22 FP
.013

1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING PAGE NO 3
0 ELEMENT NO 15 IS A REACH *
U/S DATA STATION INVERT SECT
-1084.00 1903.06 22 N
.013 RADIUS ANGLE ANG PT MAN H
.00 44.55 .00 0

0 ELEMENT NO 16 IS A SYSTEM HEADWORKS
 U/S DATA STATION INVERT SECT
 -1010.00 1903.10 22
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

FWCI2CB-

W S ELEV
 .00

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

1 PAGE 1

WATER SURFACE PROFILE LISTING														
FREWAY CHANNEL HYDRAULICS - PROPOSED CELL														
PROPOSED 12'x10' RCB IN I-15 90% DESIGN														
CENTRAL FWY CHAN TM FLOWS REFERENCED														
0 STATION	INVERT ELEV SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL NO PIER	AVBPR
0 L/ELEM										NORM DEPTH			ZR	
0 -3579.32	1890.60	9.01	1899.61	1888.0	17.47	4.74	1904.35	.00	9.16		12.00	12.00	.00	.00
0 4.80	.00040					.00436	.02			22.00	12.00	12.00	.00	.00
0 -3574.52	1890.60	8.80	1899.40	1888.0	17.88	4.97	1904.37	.00	9.16		12.00	12.00	.00	.00
0 20.01	.00040					.00478	.10			22.00	12.00	12.00	.00	.00
0 -3554.51	1890.61	8.39	1899.00	1888.0	18.76	5.47	1904.47	.00	9.16		12.00	12.00	.00	.00
0 13.64	.00929					.00489	.07			6.64	12.00	12.00	.00	.00
0 -3540.87	1890.74	8.63	1899.37	1888.0	18.23	5.17	1904.53	.00	9.16		12.00	12.00	.00	.00
0 10.04	.00929					.00445	.04			6.64	12.00	12.00	.00	.00
0 -3530.83	1890.83	9.05	1899.88	1888.0	17.39	4.70	1904.58	.00	9.16		12.00	12.00	.00	.00
0 WALL EXIT													.00	
0 -3530.83	1890.83	9.05	1899.88	1888.0	17.39	4.70	1904.58	.00	9.16		10.00	12.00	.00	.00
0 33.09	.00418					.00418	.14			9.05	10.00	12.00	.00	.00
0 -3497.74	1890.97	9.05	1900.02	1888.0	17.39	4.70	1904.72	.00	9.16		10.00	12.00	.00	.00
0 33.90	.00418					.00412	.14			9.05	10.00	12.00	.00	.00
0 -3463.84	1891.11	9.16	1900.27	1888.0	17.17	4.58	1904.85	.00	9.16		10.00	12.00	.00	.00
0 23.53	.00382					.00397	.09			9.38	10.00	12.00	.00	.00
0 -3440.31	1891.20	9.31	1900.51	1888.0	16.90	4.44	1904.95	.00	9.16		10.00	12.00	.00	.00
0 9.00	.00417					.00391	.04			9.06	10.00	12.00	.00	.00
0 -3431.31	1891.24	9.27	1900.50	1888.0	16.98	4.48	1904.98	.00	9.16		10.00	12.00	.00	.00
0HYDRAULIC JUMP													.00	
0 -3431.31	1891.24	9.06	1900.30	1888.0	17.36	4.69	1904.98	.00	9.16		10.00	12.00	.00	.00
0 118.26	.00417					.00417	.49			9.06	10.00	12.00	.00	.00
1													PAGE	2

1 PAGE 2

WATER SURFACE PROFILE LISTING														
FREWAY CHANNEL HYDRAULICS - PROPOSED CELL														
PROPOSED 12'x10' RCB IN I-15 90% DESIGN														
CENTRAL FWY CHAN TM FLOWS REFERENCED														
0 STATION	INVERT ELEV SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL NO PIER	AVBPR
0 L/ELEM										NORM DEPTH			ZR	
0 -3313.05	1891.73	9.06	1900.79	1888.0	17.36	4.69	1905.48	.00	9.16		10.00	12.00	.00	.00
0 137.85	.00417					.00434	.60			9.06	10.00	12.00	.00	.00
0 -3175.21	1892.30	8.78	1901.08	1888.0	17.93	4.99	1906.08	.00	9.16		10.00	12.00	.00	.00
0 141.42	.00417					.00481	.68			9.06	10.00	12.00	.00	.00
0 -3033.78	1892.89	8.37	1901.26	1888.0	18.80	5.49	1906.76	.00	9.16		10.00	12.00	.00	.00
0 126.25	.00417					.00543	.69			9.06	10.00	12.00	.00	.00
0 -2907.53	1893.42	7.98	1901.40	1888.0	19.72	6.04	1907.44	.00	9.16		10.00	12.00	.00	.00
0 45.10	.00577					.00577	.26			7.98	10.00	12.00	.00	.00
0 -2862.43	1893.68	7.98	1901.66	1888.0	19.72	6.04	1907.70	.00	9.16		10.00	12.00	.00	.00
0 549.73	.00577					.00572	3.14			7.98	10.00	12.00	.00	.00
0 -2312.70	1896.85	8.03	1904.88	1888.0	19.60	5.97	1910.85	.00	9.16		10.00	12.00	.00	.00
0 355.81	.00576					.00544	1.93			7.98	10.00	12.00	.00	.00
0 -1956.89	1898.90	8.31	1907.21	1888.0	18.94	5.57	1912.78	.00	9.16		10.00	12.00	.00	.00
0 102.12	.00578					.00497	.51			7.97	10.00	12.00	.00	.00
0 -1854.77	1899.49	8.61	1908.10	1888.0	18.27	5.19	1913.29	.00	9.16		10.00	12.00	.00	.00
0 .00	.00578					.00474	.00			7.97	10.00	12.00	.00	.00
0 -1854.77	1899.49	8.61	1908.10	1888.0	18.27	5.19	1913.29	.00	9.16		10.00	12.00	.00	.00
0 364.38	.00474					.00474	1.73			8.61	10.00	12.00	.00	.00
0 -1490.39	1901.22	8.61	1909.83	1888.0	18.27	5.19	1915.02	.00	9.16		10.00	12.00	.00	.00
0 259.55	.00474					.00465	1.21			8.61	10.00	12.00	.00	.00
0 -1230.84	1902.45	8.75	1911.20	1888.0	17.98	5.03	1916.22	.00	9.16		10.00	12.00	.00	.00
0 19.39	.00465					.00455	.09			8.68	10.00	12.00	.00	.00
1														
PAGE														3

1 PAGE 3

WATER SURFACE PROFILE LISTING														
FREWAY CHANNEL HYDRAULICS - PROPOSED CELL														
PROPOSED 12'x10' RCB IN I-15 90% DESIGN														
CENTRAL FWY CHAN TM FLOWS REFERENCED														
0 STATION	INVERT ELEV SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL NO PIER	AVBPR
0 L/ELEM										NORM DEPTH			ZR	
0 -1211.45	1902.54	8.76	1911.30	1888.0	17.96	5.01	1916.31	.00	9.16		10.00	12.00	.00	0 .00
0 107.57	.00455					.00429	.46			8.75	10.00	12.00	.00	
0 -1103.88	1903.04	9.16	1912.19	1888.0	17.17	4.58	1916.77	.00	9.16		10.00	12.00	.00	0 .00
0 WALL ENTRANCE													.00	
0 -1103.88	1903.04	9.16	1912.20	1888.0	17.17	4.58	1916.77	.00	9.16		12.00	12.00	.00	0 .00
0 13.43	.00151					.00382	.05			13.67	12.00	12.00	.00	
0 -1090.45	1903.05	9.61	1912.66	1888.0	16.37	4.16	1916.83	.00	9.16		12.00	12.00	.00	0 .00
0 6.45	.00151					.00355	.02			13.67	12.00	12.00	.00	
0 -1084.00	1903.06	9.70	1912.76	1888.0	16.22	4.09	1916.85	.00	9.16		12.00	12.00	.00	0 .00
0 74.00	.00151					.00175	.13			13.67	12.00	12.00	.00	
0 -1010.00	1903.10	9.70	1912.80	1888.0	16.22	4.09	1916.89	.00	9.16		12.00	12.00	.00	0 .00
1														

1

**WSPG ANALYSIS
ULTIMATE CONDITION FLOWS
IN EXISTING FREEWAY CHANNEL
& RCB's BENEATH CHEYENNE AVENUE
*FWCI2CC.out***

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Version 1.20
Serial Number 07010220

May 21, 2018 13:50:14

Input file : fwci2cc-.txt
Output file: fwci2cc-.out

INPUT FILE LISTING

T1	FREEWAY CHANNEL HYDRAULICS - CHANN U/S OF CROSSING					
T2	EXISTING CROSSING AS-BUILT ANALYSIS					
T3	CENTRAL FWY CHAN TM FLOWS REFERENCED					
SO	5388.271903.10	22	.013		1912.91	
TS	5438.271903.13	22	.013			
R	5438.271903.13	4	.013			
R	5441.761903.20	4	.013			
TS	6617.211903.82	4	.013			
R	6667.211903.92	17	.013			
JX	6717.281904.00	1718	.013	339.0	1904.31	0.01
TS	6717.281904.00	16	.013			
R	6769.521904.10	16	.013			
JX	6772.871904.11	16 8	.013	212.0	1904.41	0.01
TS	6772.871904.11	15	.013			
R	6806.601904.17	15	.013			
TS	6891.641904.32	10	.013			
R	6909.491904.57	10	.013			
R	8349.321906.07	10	.013			
JX	8349.321906.07	1011	.013	71.0	1909.95	69.00
R	9961.211909.24	10	.013			
R	9961.531910.13	10	.013			
R	9995.991910.42	10	.013			
R	10092.781910.43	10	.013			351.5
R	10150.661910.63	10	.013			
R	10278.651910.64	10	.013			351.5
R	10438.111910.72	10	.013			
R	10543.481910.88	10	.013			446.5
R	10637.051910.92	10	.013			
R	10722.041911.19	10	.013			355.5
R	11810.551913.37	10	.013			
SH	11810.551913.37	10	.013		1923.69	

0	CARD	SECT	CHN	NO OF	AVE	PIER	WATER	SURFACE	PROFILE	SP	CHANNEL	DEFINITION	LISTING	Y(5)	Y(6)	Y(7)	Y(8)	PAGE	1
	CODE	NO	TYPE	PIERS	WIDTH		HEIGHT 1	BASE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)		Y(9)	Y(10)	
	CD	4	1	0	.00		10.00	20.00	1.50	1.50	.00								
	CD	8	2	0	.00		12.00	8.00			.00								
	CD	9	1	0	.00		10.00	20.00	1.50	.00	.00								
	CD	10	1	0	.00		10.00	15.00	1.50	1.50	.00								
	CD	11	1	0	.00		6.00	5.00	1.50	1.50	.00								
	CD	12	2	0	.00		11.00	35.00			.00								
	CD	13	2	0	.00		11.00	45.00			.00								
	CD	14	2	0	.00		11.00	50.00			.00								
	CD	15	2	0	.00		12.00	32.00			.00								
	CD	16	2	0	.00		12.00	40.00			.00								
	CD	17	2	0	.00		12.00	50.00			.00								
	CD	18	2	0	.00		12.00	9.00			.00								
	CD	19	2	0	.00		11.00	28.00			.00								
	CD	21	2	0	.00		12.00	38.00			.00								
	CD	22	2	0	.00		15.00	29.00			.00								

PAGE NO 1

0	WATER SURFACE PROFILE - TITLE CARD LISTING
0	
0	FREEWAY CHANNEL HYDRAULICS - CHANN U/S OF CROSSING
0	
0	EXISTING CROSSING AS-BUILT ANALYSIS
0	
0	CENTRAL FWY CHAN TM FLOWS REFERENCED
0	

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING															PAGE NO	
0	ELEMENT NO	1	IS A	SYSTEM OUTLET	STATION	INVERT	SECT								W S ELEV	
				U/S DATA	5388.27	1903.10	22								1912.91	
0	ELEMENT NO	2	IS A	TRANSITION	STATION	INVERT	SECT									
				U/S DATA	5438.27	1903.13	22								.013	
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS																
0	ELEMENT NO	3	IS A	REACH	STATION	INVERT	SECT									
				U/S DATA	5438.27	1903.13	4								.013	
								RADIUS			ANGLE	ANG PT	MAN H			
								.00			.00	.00	0			
0	ELEMENT NO	4	IS A	REACH	STATION	INVERT	SECT									
				U/S DATA	5441.76	1903.20	4								.013	
								RADIUS			ANGLE	ANG PT	MAN H			
								.00			.00	.00	0			
0	ELEMENT NO	5	IS A	TRANSITION	STATION	INVERT	SECT									
				U/S DATA	6617.21	1903.82	4								.013	
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS																
0	ELEMENT NO	6	IS A	REACH	STATION	INVERT	SECT									
				U/S DATA	6667.21	1903.92	17								.013	
								RADIUS			ANGLE	ANG PT	MAN H			
								.00			.00	.00	0			
0	ELEMENT NO	7	IS A	JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2							
				U/S DATA	6717.28	1904.00	17	18	0						.013	
										Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
										339.0	.0	1904.31	.00	.01	.00	
0	ELEMENT NO	8	IS A	TRANSITION	STATION	INVERT	SECT									
				U/S DATA	6717.28	1904.00	16								.013	
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING																

Page 1

FWCI2CC1.OUT
0 ELEMENT NO 9 IS A REACH U/S DATA STATION 6769.52 INVERT 1904.10 SECT 16 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 10 IS A JUNCTION U/S DATA STATION 6772.87 INVERT 1904.11 SECT 16 LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
0 ELEMENT NO 11 IS A TRANSITION U/S DATA STATION 6772.87 INVERT 1904.11 SECT 15 N .013
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO 12 IS A REACH U/S DATA STATION 6806.60 INVERT 1904.17 SECT 15 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 13 IS A TRANSITION U/S DATA STATION 6891.64 INVERT 1904.32 SECT 10 N .013
0 ELEMENT NO 14 IS A REACH U/S DATA STATION 6909.49 INVERT 1904.57 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 15 IS A REACH U/S DATA STATION 8349.32 INVERT 1906.07 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 16 IS A JUNCTION U/S DATA STATION 8349.32 INVERT 1906.07 SECT 10 LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
0 ELEMENT NO 17 IS A REACH U/S DATA STATION 9961.21 INVERT 1909.24 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 18 IS A REACH U/S DATA STATION 9961.53 INVERT 1910.13 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 19 IS A REACH U/S DATA STATION 9995.99 INVERT 1910.42 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 20 IS A REACH U/S DATA STATION 10092.78 INVERT 1910.43 SECT 10 N .013 RADIUS 351.50 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 21 IS A REACH U/S DATA STATION 10150.66 INVERT 1910.63 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 22 IS A REACH U/S DATA STATION 10278.65 INVERT 1910.64 SECT 10 N .013 RADIUS 351.50 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 23 IS A REACH U/S DATA STATION 10438.11 INVERT 1910.72 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
1
0 WATER SURFACE PROFILE - ELEMENT CARD LISTING

0 ELEMENT NO 24 IS A REACH U/S DATA STATION 10543.48 INVERT 1910.88 SECT 10 N .013 RADIUS 446.50 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 25 IS A REACH U/S DATA STATION 10637.05 INVERT 1910.92 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 26 IS A REACH U/S DATA STATION 10722.04 INVERT 1911.19 SECT 10 N .013 RADIUS 355.50 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 27 IS A REACH U/S DATA STATION 11810.55 INVERT 1913.37 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 28 IS A SYSTEM HEADWORKS U/S DATA STATION 11810.55 INVERT 1913.37 SECT 10 W S ELEV 1923.69
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

1
0 ELEMENT NO 24 IS A REACH U/S DATA STATION 10543.48 INVERT 1910.88 SECT 10 N .013 RADIUS 446.50 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 25 IS A REACH U/S DATA STATION 10637.05 INVERT 1910.92 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
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0 ELEMENT NO 25 IS A REACH U/S DATA STATION 10637.05 INVERT 1910.92 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 26 IS A REACH U/S DATA STATION 10722.04 INVERT 1911.19 SECT 10 N .013 RADIUS 355.50 ANGLE .00 ANG PT .00 MAN H 0
0 ELEMENT NO 27 IS A REACH U/S DATA STATION 11810.55 INVERT 1913.37 SECT 10 N .013 RADIUS .00 ANGLE .00 ANG PT .00 MAN H 0
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0 ELEMENT NO 26 IS A REACH U/S DATA STATION 10722.04 INVERT 1911.19 SECT 10 N .013 RADIUS 355.50 ANGLE .00 ANG PT .00 MAN H 0
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0 ELEMENT NO 28 IS A SYSTEM HEADWORKS U/S DATA STATION 11810.55 INVERT 1913.37 SECT 10 W S ELEV 1923.69
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

FWCI2CC1.OUT													
0 L/ELEM	ELEV SO	OF FLOW	ELEV			HEAD SF AVE	GRD.E.L. HF	ELEV	DEPTH		DIA	ID NO.	PIER ZR
0	33.73	.00178				.00091	.03		7.93		12.00	32.00	.00
0	6806.60	1904.17	10.02	1914.19	3725.0	11.62	2.10	1916.29	.00	7.49			.00
0	6806.60	1904.17											.00
0	6891.64	1904.32	8.24	1912.56	3725.0	16.53	4.25	1916.80	.00	9.17	10.00	15.00	1.50
0	6891.64	1904.32											.00
0	6894.85	1904.36	8.32	1912.68	3725.0	16.30	.00237	.01		5.21	10.00	15.00	1.50
0	6894.85	1904.36					4.13	1916.81	.00	9.17			1.50
0	6903.23	1904.48	8.59	1913.08	3725.0	15.54	.00219	.02		5.21	10.00	15.00	1.50
0	6903.23	1904.48					3.75	1916.83	.00	9.17			1.50
0	6907.98	1904.55	8.88	1913.43	3725.0	14.82	.00192	.01		5.21	10.00	15.00	1.50
0	6907.98	1904.55					3.41	1916.84	.00	9.17			1.50
0	6909.49	1904.57	9.17	1913.74	3725.0	14.13	.00169	.00		5.21	10.00	15.00	1.50
0	6909.49	1904.57					3.10	1916.84	.00	9.17			1.50
0	6949.52	1904.61	9.47	1914.08	3725.0	13.47	.00148	.06		10.16	10.00	15.00	1.50
0	6949.52	1904.61					2.82	1916.90	.00	9.17			1.50
0	7146.72	1904.82	9.78	1914.59	3725.0	12.84	.00130	.26		10.16	10.00	15.00	1.50
0	7146.72	1904.82					2.56	1917.16	.00	9.17			1.50
0	7948.50	1905.65	10.09	1915.75	3725.0	12.24	.00115	.92		10.16	10.00	15.00	1.50
0	7948.50	1905.65					2.33	1918.08	.00	9.17			1.50
0	8349.32	1906.07	10.12	1916.19	3725.0	12.19	.00107	.43		10.16	10.00	15.00	1.50
0	8349.32	1906.07					2.31	1918.50	.00	9.17			1.50
0	8349.32	1906.07	10.55	1916.62	3654.0	11.24	.00096	.00		9.08	10.00	15.00	1.50
0	8349.32	1906.07					1.96	1918.58	.00	9.08			1.50

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WATER SURFACE PROFILE LISTING
FREEMWAY CHANNEL HYDRAULICS - CHANN U/S OF CROSSING
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED

0 STATION	INVERT ELEV SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.E.L. HF	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL PIER	NO PIER	AVBPR
0 L/ELEM														
0	125.81	.00197				.00092	.12		8.60		10.00	15.00	1.50	
0	8475.13	1906.32	10.22	1916.54	3654.0	11.78	2.16	1918.70	.00	9.08			1.50	.00
0	8475.13	1906.32					.00105	.12		8.60	10.00	15.00	1.50	
0	8587.64	1906.54	9.90	1916.44	3654.0	12.36	2.37	1918.82	.00	9.08			1.50	.00
0	8587.64	1906.54					.00116	.08		8.60	10.00	15.00	1.50	
0	8656.02	1906.67	9.69	1916.37	3654.0	12.76	2.53	1918.90	.00	9.08			1.50	.00
0	8656.02	1906.67					3.75	1918.91	.00	9.08			1.50	.00
0	8656.02	1906.67	8.48	1915.16	3654.0	15.54	.00208	.18		8.60	10.00	15.00	1.50	
0	8744.06	1906.85	8.46	1915.31	3654.0	15.60	3.78	1919.09	.00	9.08			1.50	.00
0	8744.06	1906.85					.00224	.87		8.60	10.00	15.00	1.50	
0	9130.68	1907.61	8.19	1915.79	3654.0	16.36	4.16	1919.95	.00	9.08			1.50	.00
0	9130.68	1907.61					.00255	.66		8.60	10.00	15.00	1.50	
0	9388.83	1908.11	7.92	1916.04	3654.0	17.16	4.57	1920.61	.00	9.08			1.50	.00
0	9388.83	1908.11					.00290	.62		8.60	10.00	15.00	1.50	
0	9601.51	1908.53	7.66	1916.20	3654.0	17.99	5.03	1921.23	.00	9.08			1.50	.00
0	9601.51	1908.53					.00331	.62		8.60	10.00	15.00	1.50	
0	9789.51	1908.90	7.41	1916.31	3654.0	18.87	5.54	1921.85	.00	9.08			1.50	.00
0	9789.51	1908.90					.00377	.65		8.60	10.00	15.00	1.50	
0	9961.21	1909.24	7.17	1916.41	3654.0	19.79	6.09	1922.50	.00	9.08			1.50	.00
0	9961.21	1909.24					.00401	.00		8.60	10.00	15.00	1.50	
0	9961.21	1909.24	7.17	1916.41	3654.0	19.79	6.09	1922.50	.00	9.08			1.50	.00

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WATER SURFACE PROFILE LISTING
FREEMWAY CHANNEL HYDRAULICS - CHANN U/S OF CROSSING
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED

0 STATION	INVERT ELEV SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.E.L. HF	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL PIER	NO PIER	AVBPR
0 L/ELEM														
0	.09	2.77858				.00381	.00		1.15		10.00	15.00	1.50	
0	9961.30	1909.50	7.37	1916.87	3654.0	19.03	5.63	1922.50	.00	9.08			1.50	.00
0	9961.30	1909.50					.00338	.00		1.15	10.00	15.00	1.50	
0	9961.40	1909.76	7.62	1917.38	3654.0	18.15	5.12	1922.50	.00	9.08			1.50	.00
0	9961.40	1909.76					.00297	.00		1.15	10.00	15.00	1.50	
0	9961.47	1909.97	7.88	1917.85	3654.0	17.30	4.65	1922.50	.00	9.08			1.50	.00
0	9961.47	1909.97					.00261	.00		1.15	10.00	15.00	1.50	
0	9961.53	1910.13	8.14	1918.27	3654.0	16.50	4.23	1922.50	.00	9.08			1.50	.00
0	9961.53	1910.13					.00239	.02		5.91	10.00	15.00	1.50	
0	9968.68	1910.19	8.23	1918.42	3654.0	16.23	4.09	1922.52	.00	9.08			1.50	.00
0	9968.68	1910.19					.00219	.03		5.91	10.00	15.00	1.50	
0	9984.47	1910.32	8.51	1918.83	3654.0	15.48	3.72	1922.55	.00	9.08			1.50	.00
0	9984.47	1910.32					.00193	.02		5.91	10.00	15.00	1.50	
0	9993.24	1910.40	8.79	1919.18	3654.0	14.76	3.38	1922.57	.00	9.08			1.50	.00
0	9993.24	1910.40					.00169	.00		5.91	10.00	15.00	1.50	
0	9995.99	1910.42	9.08	1919.50	3654.0	14.07	3.08	1922.57	.42	9.08			1.50	.00
0	9995.99	1910.42					.00149	.02		17.41	10.00	15.00	1.50	
0	10008.62	1910.42	9.37	1919.80	3654.0	13.41	2.80	1922.59	.39	9.08			1.50	.00
0	10008.62	1910.42					.00131	.06		17.41	10.00	15.00	1.50	
0	10050.96	1910.43	9.68	1920.10	3654.0	12.79	2.54	1922.65	.37	9.08			1.50	.00
0	10050.96	1910.43					.00118	.05		17.41	10.00	15.00	1.50	
0	10092.78	1910.43	9.86	1920.29	3654.0	12.43	2.40	1922.70	.35	9.08			1.50	.00

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WATER SURFACE PROFILE LISTING
FREEMWAY CHANNEL HYDRAULICS - CHANN U/S OF CROSSING
EXISTING CROSSING AS-BUILT ANALYSIS
CENTRAL FWY CHAN TM FLOWS REFERENCED

0 STATION	INVERT ELEV SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.E.L. HF	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL PIER	NO PIER	AVBPR
0 L/ELEM														
0	.00	.00010				.00113	.00		17.41		10.00	15.00	1.50	
0	10092.78	1910.43	9.86	1920.29	3654.0	12.43	2.40	1922.70	.00	9.08			1.50	.00
0	10092.78	1910.43					.00121	.04		7.45	10.00	15.00	1.50	
0	10123.85	1910.54	9.55	1920.09	3654.0	13.04	2.64	1922.73	.00	9.08			1.50	.00
0	10123.85	1910.54					.00131	.01		7.45	10.00	15.00	1.50	
0	10130.24	1910.56	9.47	1920.03	3654.0	13.21	2.71	1922.74	.00	9.08			1.50	.00
0	10130.24	1910.56					3.50	1922.75	.00	9.08			1.50	.00
0	10130.24	1910.56	8.69	1919.25	3654.0	15.00	.00184	.02		7.45	10.00	15.00	1.50	
0	10140.18	1910.59	8.79	1919.38	3654.0	14.76	3.38	1922.76	.00	9.08			1.50	.00

FWCI2CC1.OUT													
0	10.48	.00345				.00169	.02		7.45			1.50	
0	10150.66	1910.63	9.08	1919.71	3654.0	14.07	3.08	1922.78	.42	9.08		1.50	0 .00
0	12.41	.00008					.00149	.02		18.55	10.00	15.00	1.50
0	10163.07	1910.63	9.37	1920.01	3654.0	13.41	2.80	1922.80	.39	9.08		1.50	0 .00
0	41.47	.00008					.00131	.05		18.55	10.00	15.00	1.50
0	10204.54	1910.63	9.68	1920.31	3654.0	12.79	2.54	1922.86	.37	9.08		1.50	0 .00
0	74.11	.00008					.00115	.09		18.55	10.00	15.00	1.50
0	10278.65	1910.64	9.98	1920.62	3654.0	12.21	2.32	1922.94	.00	9.08		1.50	0 .00
0	159.46	.00050					.00103	.16		12.03	10.00	15.00	1.50
0	10438.11	1910.72	10.23	1920.95	3654.0	11.77	2.15	1923.10	.25	9.08		1.50	0 .00
0	105.37	.00152					.00101	.11		9.17	10.00	15.00	1.50
0	10543.48	1910.88	10.08	1920.96	3654.0	12.04	2.25	1923.21	.00	9.08		1.50	0 .00

PAGE 6

WATER SURFACE PROFILE LISTING
 FREEWAY CHANNEL HYDRAULICS - CHANN U/S OF CROSSING
 EXISTING CROSSING AS-BUILT ANALYSIS
 CENTRAL FWY CHAN TM FLOWS REFERENCED

0 STATION	INVERT ELEV SO	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD SF AVE	ENERGY GRD.EL. HF	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL PIER	NO PIER	AVBPR
0 L/ELEM										NORM DEPTH		ZR		

0	93.57	.00043				.00101	.09			12.49		1.50		
0	10637.05	1910.92	10.23	1921.15	3654.0	11.76	2.15	1923.30	.00	9.08		1.50	0 .00	
0	.00	.00043					.00097	.00		12.49	10.00	15.00	1.50	
0	10637.05	1910.92	10.23	1921.15	3654.0	11.76	2.15	1923.30	.72	9.08		1.50	0 .00	
0	48.99	.00318					.00104	.05		7.61	10.00	15.00	1.50	
0	10686.04	1911.08	9.91	1920.99	3654.0	12.34	2.37	1923.36	.77	9.08		1.50	0 .00	
0	36.00	.00318					.00118	.04		7.61	10.00	15.00	1.50	
0	10722.04	1911.19	9.62	1920.81	3654.0	12.91	2.59	1923.40	.83	9.08		1.50	0 .00	
0	.00	.00318					.00125	.00		7.61	10.00	15.00	1.50	
0	10722.04	1911.19	9.62	1920.81	3654.0	12.91	2.59	1923.40	.00	9.08		1.50	0 .00	
0	.55	.00200					.00125	.00		8.56	10.00	15.00	1.50	
0	10722.59	1911.19	9.61	1920.81	3654.0	12.92	2.59	1923.40	.00	9.08		1.50	0 .00	
OHYDRAULIC JUMP														
0	10722.59	1911.19	8.56	1919.75	3654.0	15.34	3.66	1923.41	.00	9.08		1.50	0 .00	
0	595.81	.00200					.00200	1.19		8.56	10.00	15.00	1.50	
0	11318.41	1912.38	8.56	1920.94	3654.0	15.34	3.66	1924.60	.00	9.08		1.50	0 .00	
0	432.69	.00200					.00190	.82		8.56	10.00	15.00	1.50	
0	11751.09	1913.25	8.79	1922.04	3654.0	14.76	3.38	1925.42	.00	9.08		1.50	0 .00	
0	59.46	.00200					.00169	.10		8.56	10.00	15.00	1.50	
0	11810.55	1913.37	9.08	1922.45	3654.0	14.07	3.08	1925.52	.00	9.08		1.50	0 .00	

Appendix D

Reference Material

Appendix D-1 & D-2

Reference Material

Included with separate CD

Appendix E

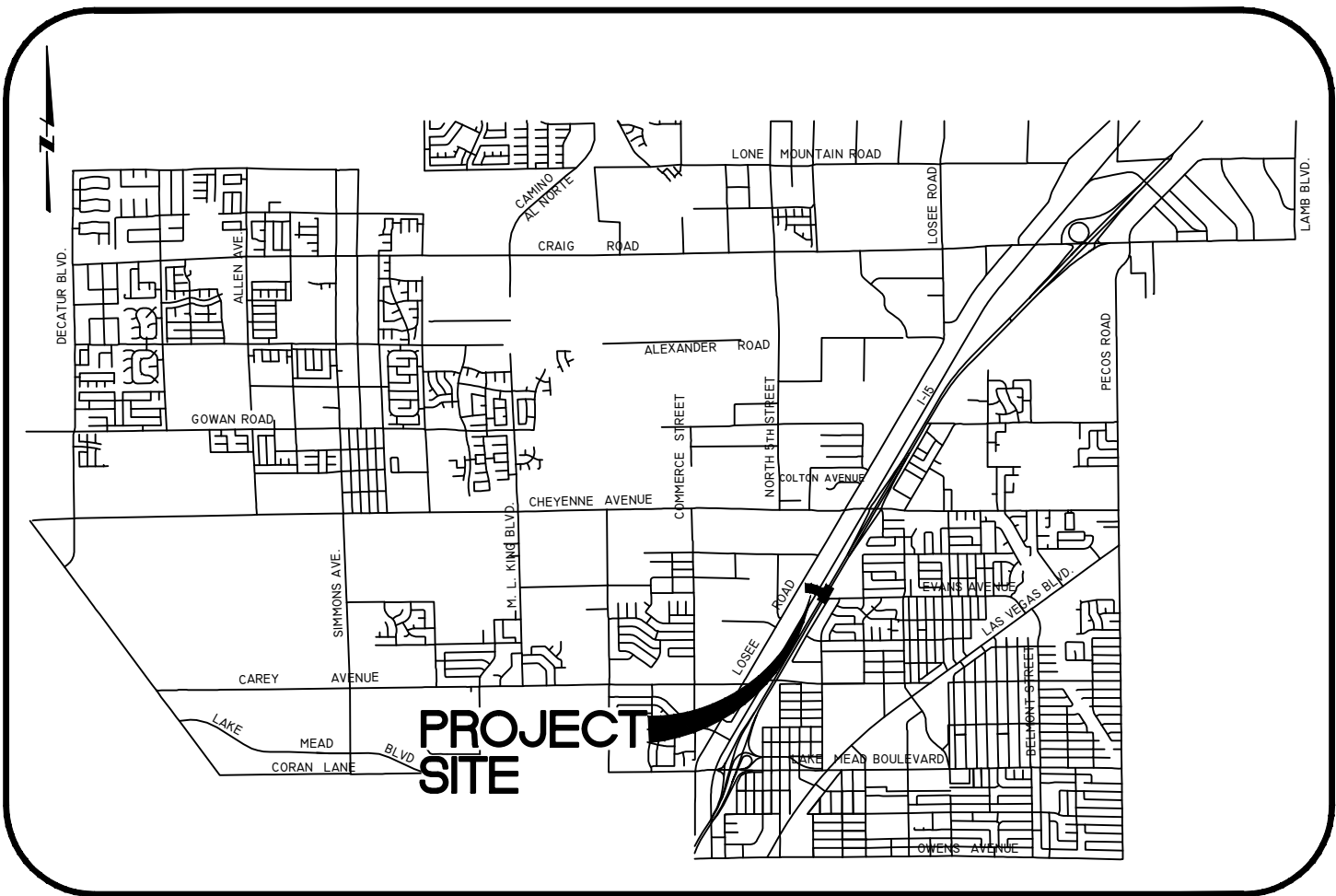
As Built Plans

CITY OF NORTH LAS VEGAS
DEPARTMENT OF PUBLIC WORKS
BROOKS CHANNEL FLOOD CONTROL PROJECT

BID NO. 1455
LABOR COMMISSION NO. PWP-CL-2015-3
FUNDED BY:

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

RECORD DRAWING
This record drawing has been prepared, entirely or in part on the basis of unverified information compiled and furnished by others to the preparer who is not responsible for any inaccuracies, errors or omissions which may have been incorporated into the document as a result.



VICINITY MAP
NOT TO SCALE



REVIEWED & APPROVED BY:

JENNIFER DOODY, P.E., CFM DEPUTY DIRECTOR OF PUBLIC WORKS	DATE	ALYSSA REYNOLDS, P.E., PTOE CITY TRAFFIC ENGINEER	DATE	LORENA CANDELARIO, SR/WA REAL PROPERTY COORDINATOR	DATE	NV ENERGY – DISTRIBUTION	DATE
GALE Wm. FRASER, II, P.E. GENERAL MANAGER / CHIEF ENGINEER CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT	DATE	GARY HANCOCK, P.L.S. ACTING CITY SURVEYOR	DATE	COX COMMUNICATIONS LAS VEGAS INC.	DATE	NV ENERGY – TRANSMISSION	DATE
DALE DAFFERN, P.E. MANAGER, ENGINEERING AND CONSTRUCTION SERVICES	DATE	JOHN RUNIKS MANAGER, INFRASTRUCTURE MAINTENANCE	DATE	CENTRAL TELEPHONE COMPANY, d/b/a CENTURY LINK	DATE		
DAN LE, P.E., CFM PUBLIC WORKS PROJECT MANAGER	DATE	ROBERT A. McLAUGHLIN, P.E. MANAGER, DEVELOPMENT AND FLOOD CONTROL	DATE	SOUTHWEST GAS CORPORATION	DATE		

ALL DRAWINGS, SPECIFICATIONS AND SPECIAL TECHNICAL REQUIREMENTS ASSOCIATED WITH THE PROJECT AND IMPROVEMENTS PRESENTED HEREIN HAVE BEEN ACCOMPLISHED UNDER THE SUPERVISION OF RESPONSIBLE PROFESSIONAL(S) HAVING THE APPROPRIATE REGISTRATION TO SERVE IN THIS CAPACITY BASED ON THE SCOPE OF THIS SPECIFIC PROJECT, AND IN ACCORDANCE WITH THE STATUTORY PROVISIONS OF THE NEVADA REVISED STATUTES (NRS) AND THE NEVADA ADMINISTRATIVE CODE (NAC) INCLUDING: NRS 278, NRS 338, NRS 623, NAC 338, NAC 623 AND NAC 625 CERTIFICATION SIGNIFYING COMPLIANCE WITH STATUTORY AND RELATED ADMINISTRATIVE CODE REQUIREMENTS IS HEREBY PROVIDED BY THE RESPONSIBLE PROFESSIONAL(S) IN THE FORM OF A STAMP OR SEAL PLACED ON THE PROJECT DOCUMENTS.

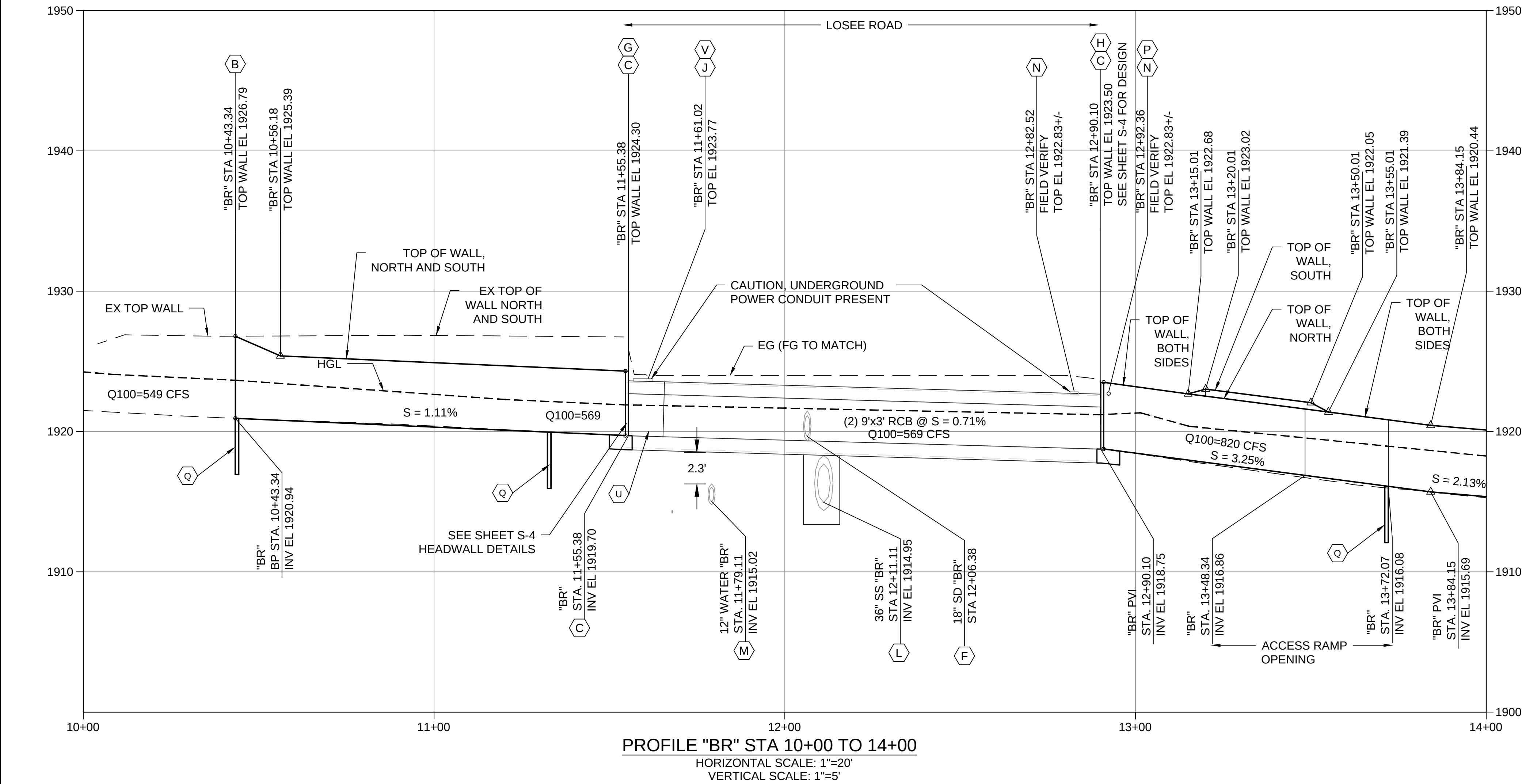
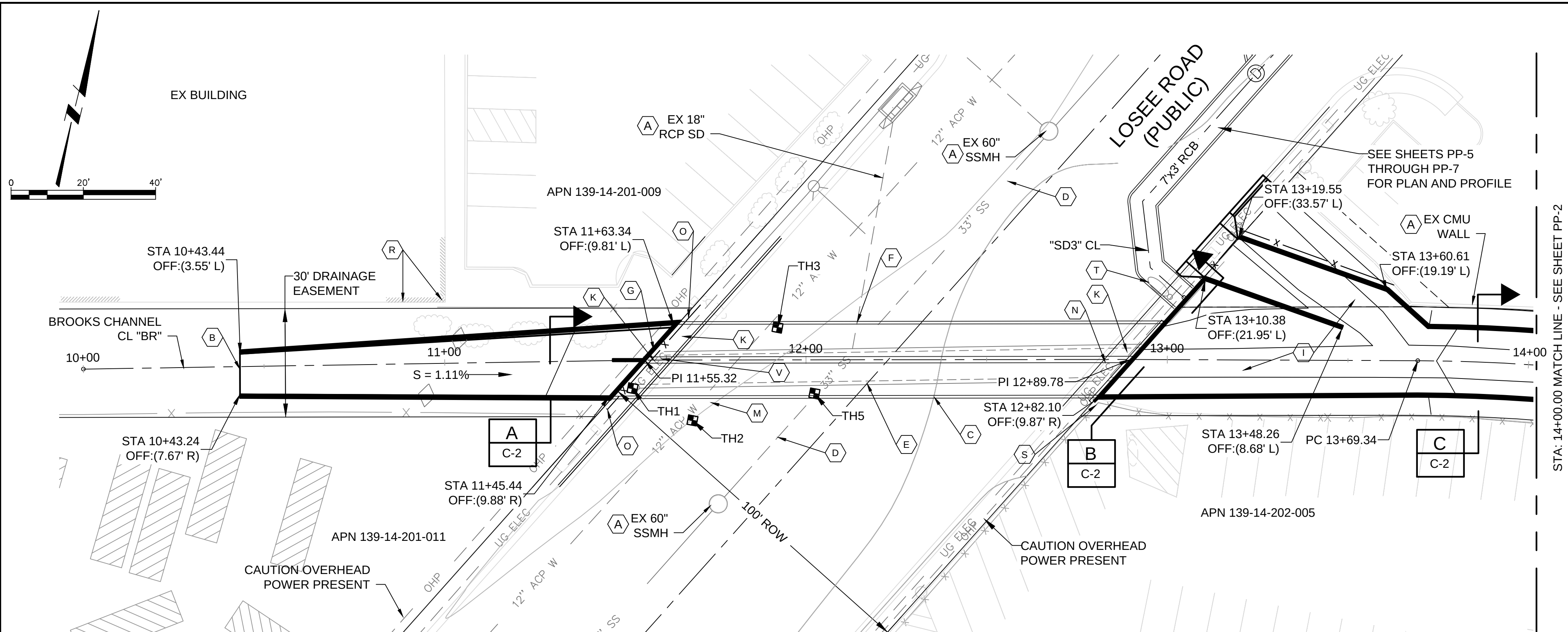


THE AFFIXED CENTURY LINK NEVADA APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

NV ENERGY COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

GENERAL - COVER SHEET BROOKS CHANNEL LOSEE ROAD TO FREEWAY CHANNEL CITY OF NORTH LAS VEGAS	MWH® 3010 WEST CHARLESTON BLVD. SUITE 100 LAS VEGAS, NV 89102 (702) 878-8010	PROFESSIONAL ENGINEER JARAH R. PARKE EXP. 12-31-18 CIVIL No. 20345 STATE OF NEVADA				8/1/18	
		SCALE: NA		REVISIONS			
		NO.	DESCRIPTION	DATE	BY		
		1	CONFORMED DWG	2/2/2015	RVV		
		2	RECORD DWG	8/31/2018	SMW		

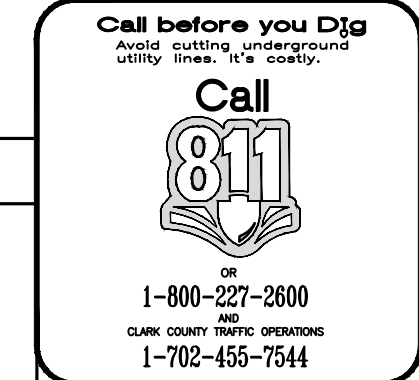


GENERAL SHEET NOTES

1. CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
2. CALL KINDER MORGAN GAS AT 811 FOR STANDBY WHEN EXCAVATING NEAR HIGH PRESSURE FUEL LINES

SHEET KEYNOTES

- A. PROTECT IN PLACE
- B. BEGIN TRANSITION FROM 12"x6.5' TO 20"x5' RECTANGULAR CHANNEL, FROM "BR" STA 10+43.34 TO "BR" STA 11+55.38 PER SECTION A / SHEET C-2
- C. CONSTRUCT (2) 9'X3' RCB STORM DRAIN, FROM "BR" STA 11+55.38 TO "BR" STA 12+90.10
- D. REMOVE EX 33" RCP SANITARY SEWER AND INSTALL 36" PVC SANITARY SEWER, REFER TO SHEET PP-8 FOR PLAN AND PROFILE
- E. REMOVE EX 8'X3' RCB STORM DRAIN BENEATH LOSEE ROAD
- F. TIE EX 18" RCP STORM DRAIN INTO NEW (2) 9'X3' RCB STORM DRAIN PER CONNECTION DETAIL S-906 / SHEET GS-3
- G. CONSTRUCT CONC HEADWALL PER SECTION D / SHEET S-4
- H. CONSTRUCT CONC HEADWALL PER SECTION B / SHEET C-2
- I. RECONSTRUCT CONCRETE CHANNEL AND ACCESS RAMP AT DOWNSTREAM END OF RCB STORM DRAIN, SEE SHEET GR-1 FOR GRADING DETAIL
- J. RELOCATE EX UNDERGROUND ELECTRIC POWER CONDUIT (3-1/0 1 - 4" C) BENEATH NEW (2)9'X3' RCB STORM DRAIN, PROVIDE MIN 18" SEPARATION COORDINATE WITH NV ENERGY TO RELOCATE
- K. INSTALL SIDEWALK DRAINS PER CCAUSD DWG# 236, REFER TO SHEET GR-1 FOR PLACEMENT LOCATION AND LENGTHS
- L. CONSTRUCT REINFORCED CONCRETE ENCASEMENT OF SANITARY SEWER, SEE SHEET PP-8 FOR PROFILE
- M. REMOVE AND REPLACE EX 12" ACP WATER LINE WITH NEW DIP MATERIAL, REFER TO SHEET PP-8 FOR PROFILE INVERTS AND STATIONING
- N. RELOCATE EX UNDERGROUND ELECTRIC POWER CONDUIT (3-336 AA 1-2/0 ACSR); MOUNT THE POWER CONDUIT INSIDE 4" DIAMETER RIGID GALVANIZED STEEL CONDUIT MOUNTED TO THE HEADWALL FACE; STEEL CONDUIT TO BE LOCATED 12" BELOW INVERT OF SIDEWALK DRAINS. SEE SHEET GC-4 / DETAIL E-212
- O. INSTALL CHAIN LINK FENCE AT BACK OF SIDE WALK PER DETAIL C-900/SHEET GC-1, FROM "BR" STA 11+44.87, OFF 13.1' R TO "BR" STA 11+70.77, OFF 15.6' L, CONNECT TO EX CHAIN LINK FENCES ON BOTH SIDES OF DRAINAGE EASEMENT
- P. RELOCATE EX FO AND CABLE UTILITY CONDUITS IN SIDEWALK; MOUNT THE POWER CONDUIT INSIDE 4" DIAMETER RIGID GALVANIZED STEEL CONDUIT MOUNTED TO THE HEADWALL FACE; STEEL CONDUIT TO BE LOCATED 12" BELOW INVERT OF SIDEWALK DRAINS. SEE SHEET GC-4 / DETAIL E-212
- Q. CONSTRUCT CUTOFF WALL PER DETAIL S-109/SHEET GS-1, REFER TO SHEETS S-1 THROUGH S-2 FOR EXACT WALL STATION (TYP)
- R. CAUTION, EXISTING BUILDING LIMITS, CONTRACTOR SHALL PROVIDE SHORING PROTECTION DURING EXCAVATION PER SPECIFICATION SECTION 206 - STRUCTURE EXCAVATION
- S. INSTALL CHAIN LINK FENCE AT BACK OF SIDEWALK PER DETAIL C-900 / SHEET GC-1 BETWEEN NEW RAILING AND EXISTING CHAIN LINK FENCE.
- T. RELOCATE STREETLIGHT AND ASSOCIATED FIBER OPTIC LINES PER GR-1.
- U. CONSTRUCT WESTERN MOST RCB SECTIONS AS CAST IN PLACE PER SHEET S-9.
- V. RELOCATE EX POWER, COX COMMUNICATIONS, AND FIBER OPTIC UTILITIES BELOW PROPOSED RCB.

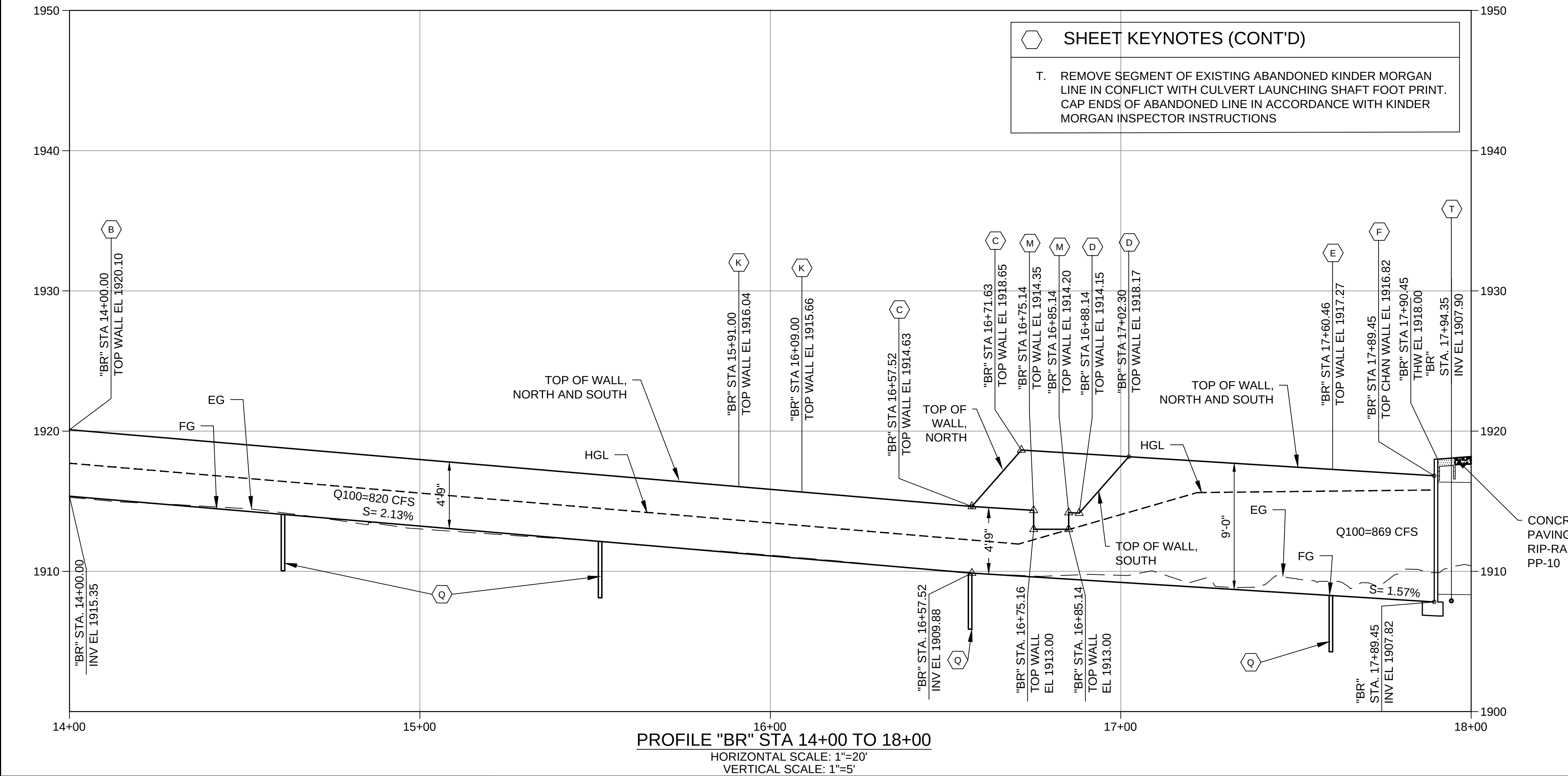
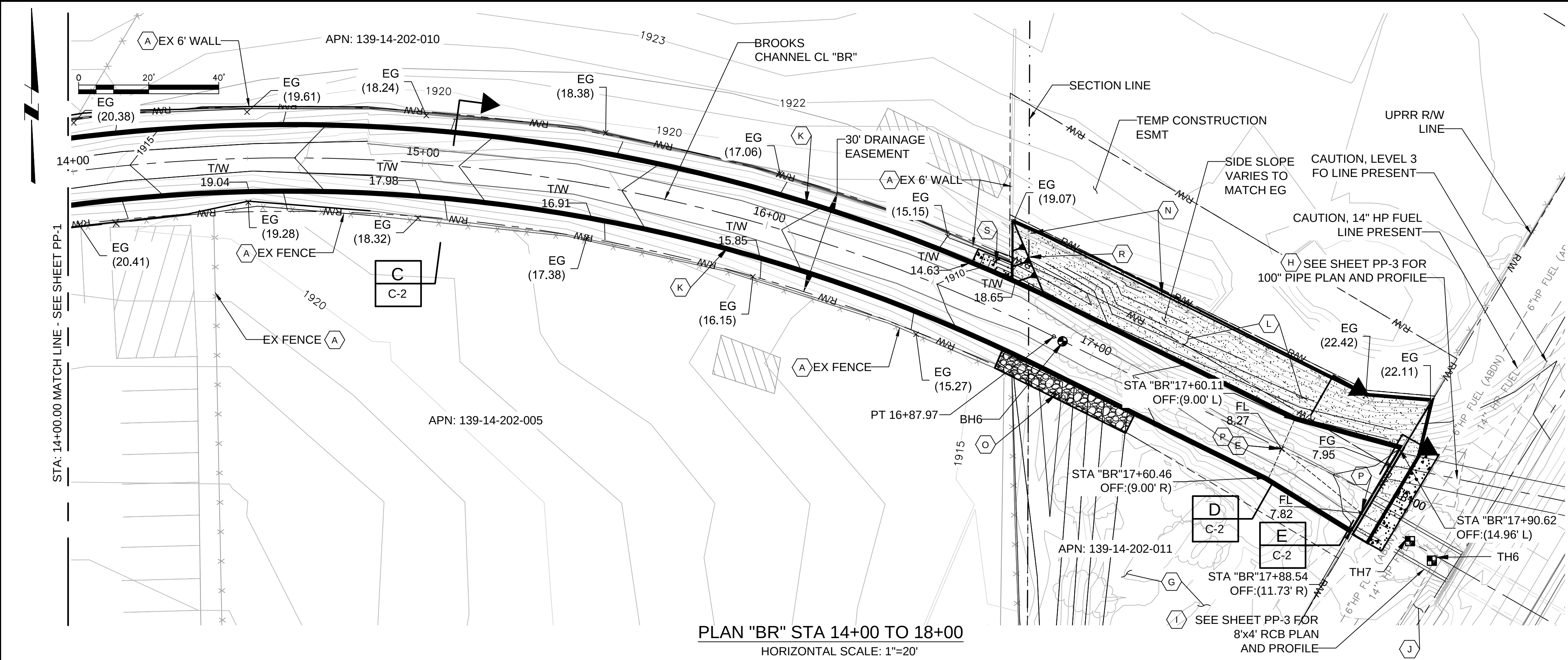


RECORD DRAWING

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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

REVISIONS		NO.		DESCRIPTION		DATE		BY	
1		1		CONFORMED DWG		2/2/2015		RVV	
2		2		RECORD DWG		8/31/2018		SMW	
SCALE: AS SHOWN		DESIGN: R. VALDEZ		DRAWN: N. NATALE		CHECKED: S. CHAVEZ		APPROVED: J. PARKE	
DATE: OCTOBER 2014		PROFESSIONAL ENGINEER		JAHAR R. PARKE		EXP. 12-31-19		CIVIL	
3010 WEST CHARLESTON BLVD. SUITE 100 LAS VEGAS, NV 89102 (702) 878-8010		CIV - CHANNEL PLAN AND PROFILE STA 10+00 TO 14+00		PROJECT TITLE		BROOKS CHANNEL		SHEET NO.	
CITY OF NORTH LAS VEGAS		CITY OF NORTH LAS VEGAS		LOCATION		LOSEE ROAD TO FREEWAY CHANNEL		PP-1	
SHEET 15 OF 46									



GENERAL SHEET NOTES

- CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
- CALL KINDER MORGAN GAS AT 702-643-1282 FOR STANDBY WHEN EXCAVATING NEAR HIGH PRESSURE FUEL LINES

SHEET KEYNOTES

- A. PROTECT IN PLACE
- B. CONSTRUCT 18" WIDE X 4'-9" HIGH RECTANGULAR REINFORCED CONCRETE CHANNEL PER SECTION C / SHEET C-2, "BR" STA 14+00.00 TO "BR" STA 16+57.52
- C. CONSTRUCT 18" WIDE RECTANGULAR REINFORCED CONCRETE CHANNEL PER SECTION D / SHEET C-2, BEGIN NORTH CHANNEL TOP OF WALL ELEVATION TAPER FROM "BR" STA 16+57.52, OFF: 9' L TO "BR" STA 16+71.63, OFF: 9' L
- D. CONSTRUCT 18" WIDE RECTANGULAR REINFORCED CONCRETE CHANNEL PER SECTION D / SHEET C-2, BEGIN SOUTH CHANNEL TOP OF WALL ELEVATION TAPER FROM "BR" STA 16+88.14, OFF: 9' R TO "BR" STA 17+02.30, OFF: 9' R
- E. CONSTRUCT RECTANGULAR REINFORCED CONCRETE CHANNEL PER SECTION D / SHEET C-2, BEGIN WIDTH TRANSITION FROM 18' TO 27' WIDE, FROM "BR" STA: 17+60.46 TO "BR" STA 17+89.45
- F. END 27" WIDE RECTANGULAR REINFORCED CONCRETE CHANNEL, CONSTRUCT CUSTOM CONCRETE HEADWALL PER SECTION E / SHEET C-2
- G. FILL PARCEL 139-14-202-011 TO LIMITS AND ELEVATIONS PER CONTOUR GRADING PER SHEET GR-2
- H. INSTALL 100" INSIDE DIAMETER STEEL PIPE CULVERT BENEATH UPRR EMBANKMENT
- I. INSTALL 8'X4' RCB CULVERT, CONNECT TO EXISTING CULVERT IN PLACE
- J. GRADE NEW RAIL ROAD ACCESS ROAD OVER TOP OF PROPOSED 96" DIAMETER PIPE AND 8'X4' RCB CULVERTS PER SHEET PP-10
- K. INSTALL CHANNEL ACCESS LADDER PER DETAIL C-910 / SHEET GC-3 AT "BR" STA 15+91.00, OFF: 9' R, AND "BR" STA 16+09.00, OFF: 9' L
- L. INSTALL CONCRETE SLOPE PAVING PER DETAIL C-909 / SHEET GC-2 FROM "BR" STA 16+63.91, OFF: 25.23' L TO "BR" STA 17+92.94, OFF: 31.9' L
- M. CONSTRUCT 10' WIDE DRAINAGE SIDE NOTCH IN SOUTH CHANNEL WALL, FROM "BR" STA 16+75.14, OFF: 9' R TO "BR" STA 16+85.14, OFF: 9' R
- N. REMOVE AND REPLACE EX PRECAST CONCRETE BARRIER RAIL AND CHAIN LINK FENCE ALONG LIMITS OF SLOPE PAVING, FROM "BR" STA 16+63.91, OFF: 25.2' L TO "BR" STA 17+92.94, OFF: 31.9' L; MATCH EX BARRIER RAIL STYLE FOR DRAINAGE
- O. INSTALL GROUTED RIP RAP PAD IN FRONT OF SIDE DRAINAGE NOTCH PER DETAIL C-908 / SHEET GC-2, FROM "BR" STA 16+76.26, OFF: 9' R TO "BR" STA 17+18.51, OFF: 9' R
- P. BEGIN FLOW LINE CROSS SECTION WARP AT "BR" STA 17+60.46 TOWARDS 8'X4' RCB INLET INVERT
- Q. CONSTRUCT CUTOFF WALL (TYP) PER DETAIL S-109 / SHEET GS-1, REFER TO SHEETS S-1 THROUGH S-2 FOR EXACT WALL STATIONS
- R. CONSTRUCT HINGE IN SLOPE PAVING SO THAT SW CORNER MATCHES EX GRADE.
- S. INSTALL 20-FOOT LONG GROUTED RIP-RAP. FROM FLOW LINE AND GRADE TO DRAIN FROM BLOCK WALL OPENING TO OVER CHANNEL WALL AT THE WEST TOE OF THE WALL HEIGHT TRANSITION.

**EXTREME CAUTION!!!
HIGH PRESSURE
PETROLEUM LINES
PRESENT**



RECORD DRAWING

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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

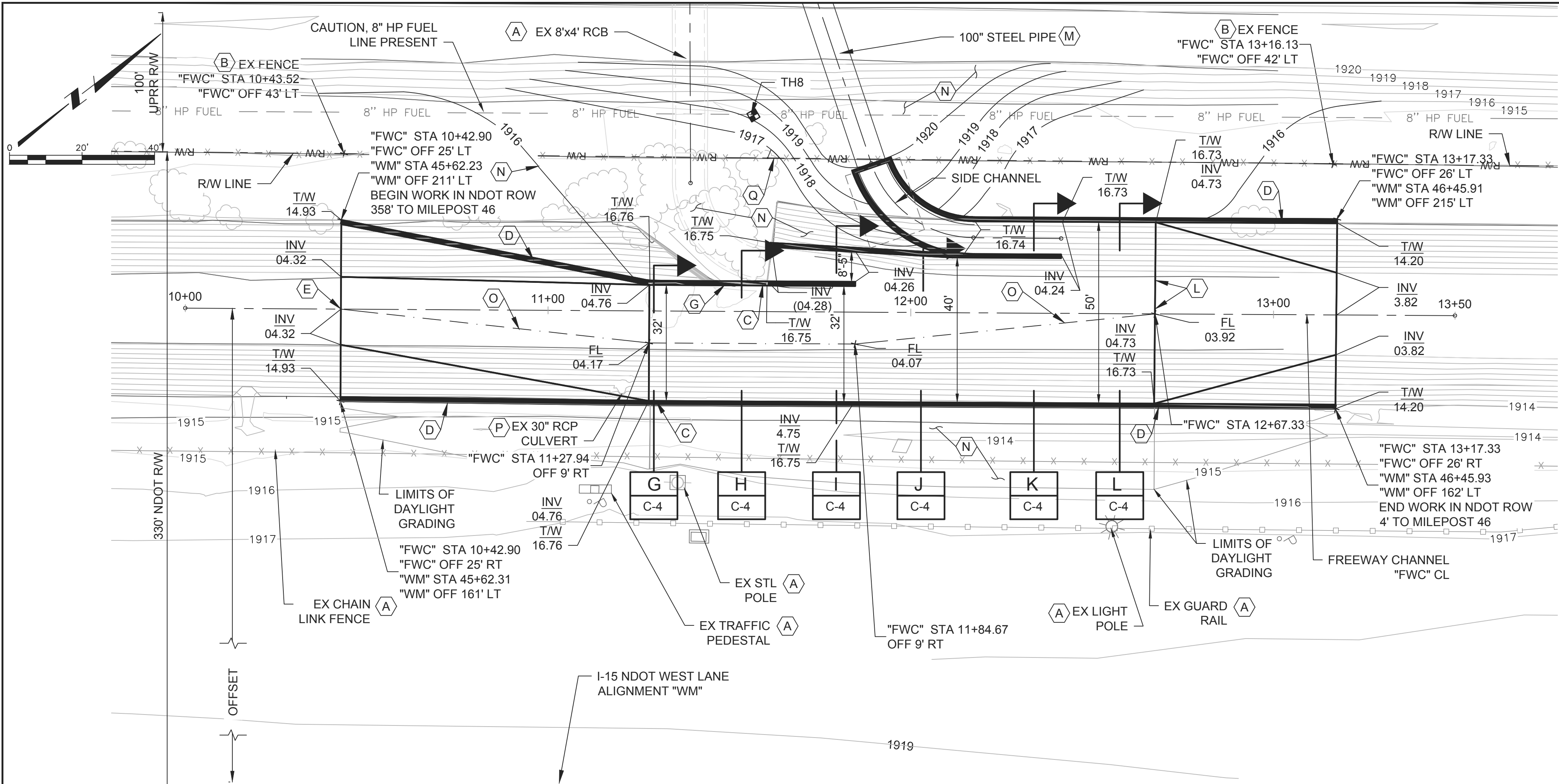
REVISIONS		NO.	DESCRIPTION	DATE	BY
1	CONFORMED DWG	1	CONFORMED DWG	2/2/2015	RVV
2	RECORD DWG	2	RECORD DWG	8/31/2018	SMW

SCALE: AS SHOWN	DESIGN: R VALDEZ	DRAWN: N NATALE	CHECKED: S CHAVEZ	APPROVED: J PARKE	DATE: OCTOBER 2014

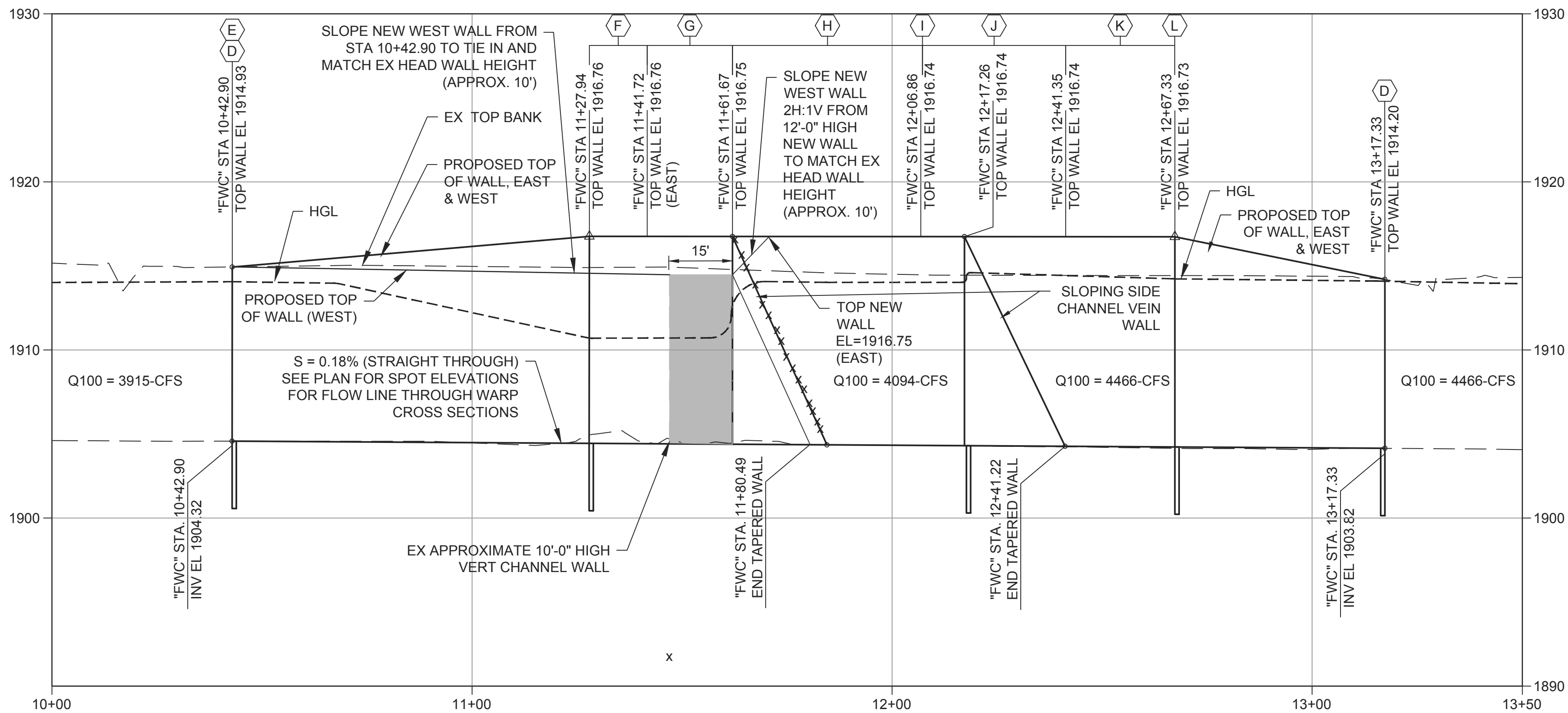
PROFESSIONAL ENGINEER JAHAR R. PARKE EXP. 12-31-19 CIVIL No. 20945	3010 WEST CHARLESTON BLVD. SUITE 100 LAS VEGAS, NV 89102 (702) 878-8010

CIV - CHANNEL PLAN AND PROFILE STA 14+00 TO 18+00	BROOKS CHANNEL LOSEE ROAD TO FREEWAY CHANNEL CITY OF NORTH LAS VEGAS

SHEET NO. PP-2	SHEET 16 OF 46



PLAN "FWC" ALIGNMENT STA 10+00 TO 13+50
HORIZONTAL SCALE: 1"=20'



PROFILE "FWC" STA 10+00 TO 13+50
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

GENERAL SHEET NOTES

1. CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
2. SEE SHEET R-1 FOR REMOVAL LIMITS.
3. CALL KINDER MORGAN GAS AT 702-643-1282 FOR STANDBY WHEN EXCAVATING NEAR HIGH PRESSURE FUEL LINES

SHEET KEYNOTES

- A. PROTECT IN PLACE
- B. REMOVE AND REPLACE
- C. INSTALL CHANNEL ACCESS LADDER, PER DETAIL C-910 / SHEET GC-3 AT "FWC" STA 11+29.98, OFF 25' RT, AND "FWC" STA 11+59.09, OFF 7' LT
- D. INSTALL POST AND CABLE FENCE ALONG CHANNEL WALL FROM "FWC" STA: 10+42.90 TO "FWC" STA: 13+17.33, BOTH SIDES PER DETAIL C-911 / SHEET GC-4
- E. BEGIN TRANSITION FROM EX TRAPEZOIDAL CHANNEL TO 32"X12' RECTANGULAR CHANNEL SECTION; FROM "FWC" STA 10+42.90 TO "FWC" STA 11+27.94
- F. CONSTRUCT 32"X12' RECTANGULAR CHANNEL PER SECTION G / SHEET C-4, "FWC" STA 11+27.94 TO "FWC" STA 11+41.72
- G. CONSTRUCT 32"X12' RECTANGULAR CHANNEL PER SECTION H / SHEET C-4, "FWC" STA 11+41.72 TO "FWC" STA 11+61.67; TIE PROPOSED NORTH CHANNEL WALL INTO EX 8"X4' RCB OUTLET STRUCTURE PER STRUCTURAL DWG'S
- H. CONSTRUCT VARYING WIDTH RECTANGULAR CHANNEL (42"6" TO 41"0"X12") WITH SIDE CHANNEL VEIN WALL PER SECTION I / SHEET C-4 FROM "FWC" STA 11+61.67 TO "FWC" STA 11+84.49, CONTINUE WIDTH TAPER TO TOTAL WIDTH OF 40' BY "FWC" STA 12+06.86
- I. CONSTRUCT 40"X12' RECTANGULAR CHANNEL PER SECTION J /SHEET C-4, AT "FWC" STA 12+06.86
- J. CONSTRUCT 50"X12' RECTANGULAR CHANNEL WITH SIDE CHANNEL VEIN WALL PER SECTION K/ SHEET C-4 FROM "FWC" STA 12+06.86 TO "FWC" 12+41.35
- K. CONSTRUCT 50"X12' RECTANGULAR CHANNEL PER SECTION L / SHEET C-4 FROM "FWC" STA 12+41.35 TO "FWC" 12+67.33
- L. BEGIN TRANSITION FROM 50"X12' RECTANGULAR CHANNEL TO EX TRAPEZOIDAL CHANNEL FROM "FWC" STA 12+67.33 TO "FWC" STA 13+17.33
- M. SEE SHEET PP-3 FOR 100" STEEL PIPE STORM DRAIN AND SIDE CHANNEL PLAN AND PROFILE
- N. FILL AND RE-GRADE PER FINISHED GRADE CONTOURS, DEPICTED THIS SHEET
- O. ADJUST FLOW LINE TOWARD CENTER OF CONFLUENCE CHANNEL SECTION PER STATION-OFFSETS PROVIDED
- P. CONNECT EX 30" RCP CULVERT TO NEW CHANNEL WALL PER STRUCTURAL DETAIL S-906/SHEET GS-3, MATCH EX INVERT ELEVATION
- Q. INSTALL CHAIN LINK GATE PER DETAIL C-903 / SHEET GC-1.

RECORD DRAWING

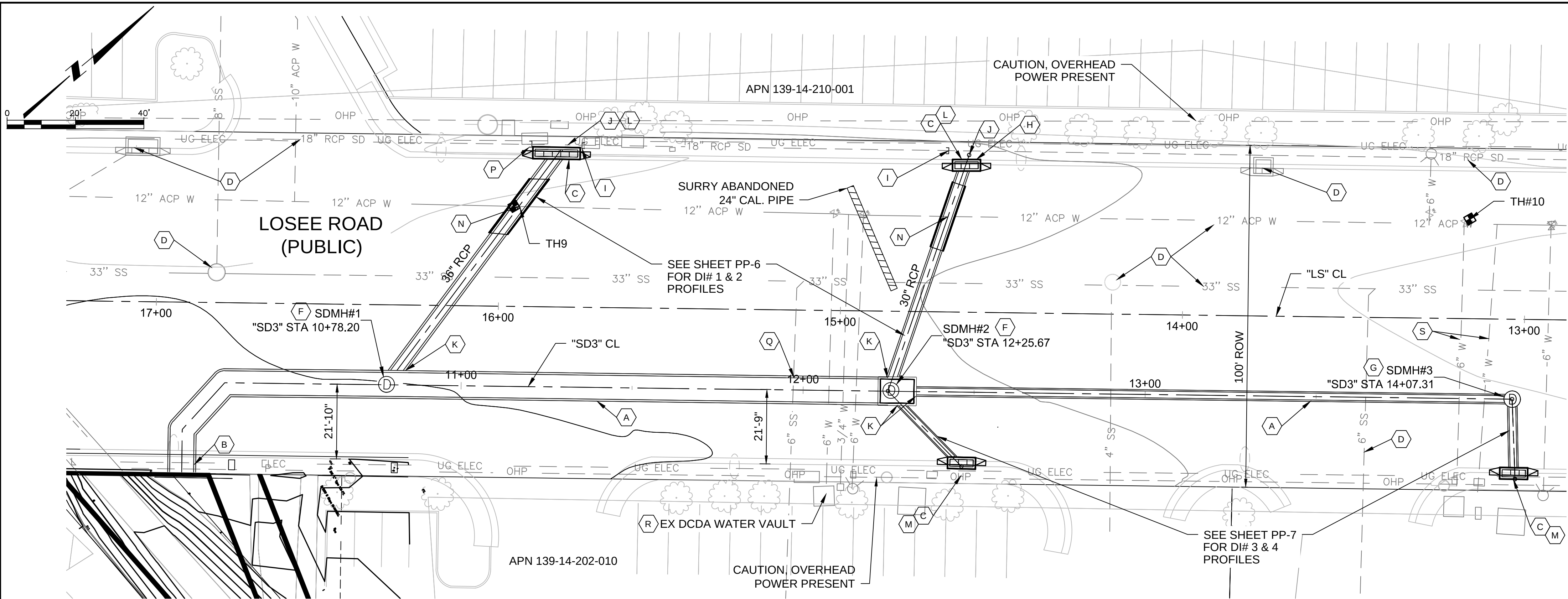
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EXTREME CAUTION!!!
HIGH PRESSURE
PETROLEUM LINES
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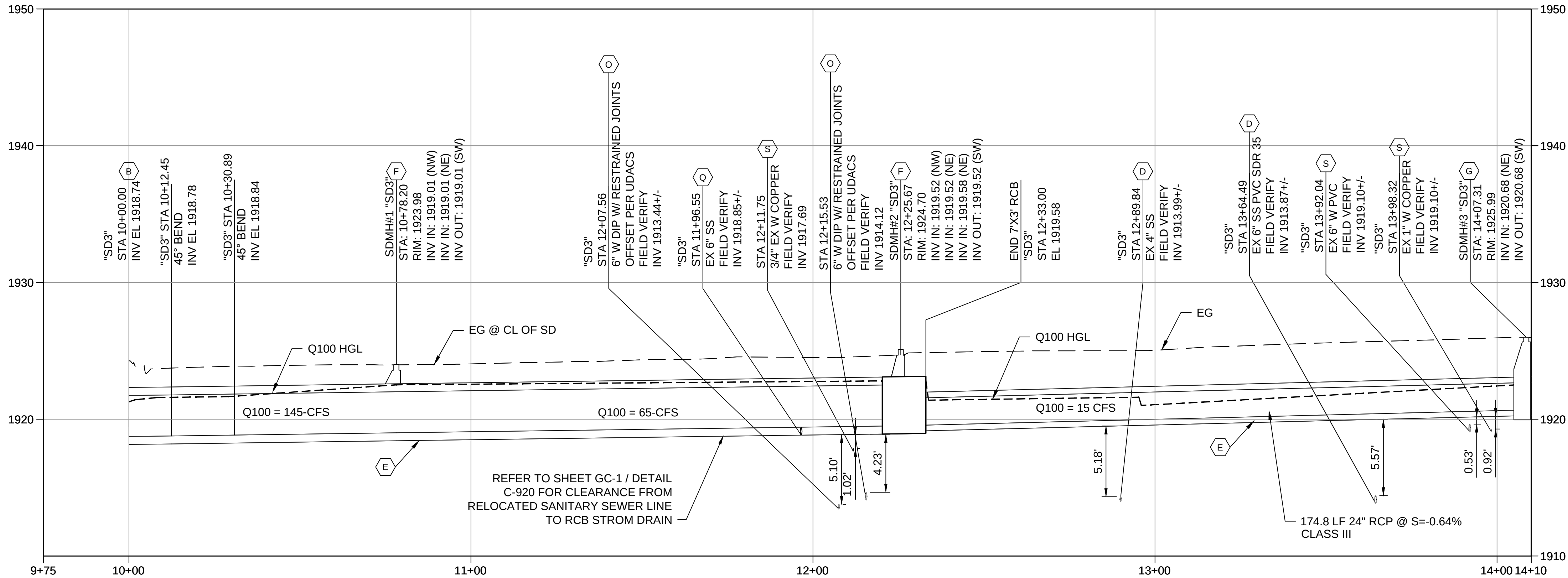


CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

REVISIONS		BY	
NO.	DESCRIPTION	DATE	DATE
1	CONFORMED DWG	2/2/2015	R/V
2	RECORD DWG	8/31/2018	SMW
SCALE: AS SHOWN		DESIGN: R. VALDEZ	
DRAWN: N. NATALE		CHECKED: S. CHAVEZ	
APPROVED: J. PARKE		DATE: OCTOBER 2014	
PROFESSIONAL ENGINEER		STATE OF NEVADA	
JAHAR R. PARKE		EXP. 12-31-19	
CIVIL		No. 20895	
MWH		3010 WEST	
CHARLESTON BLVD.		SUITE 100	
LAS VEGAS, NV 89102		(702) 878-8010	
CIV-FWY CHANNEL PLAN & PROFILE STA 10+00 TO 13+50		PROJECT TITLE	
BROOKS CHANNEL		LOCATION	
LOSEE ROAD TO FREEWAY CHANNEL		SHEET NO.	
CITY OF NORTH LAS VEGAS		PP-4	
		SHEET 18 OF 46	



PLAN "SD3" STA 10+00 TO 14+10
HORIZONTAL SCALE: 1"=20'



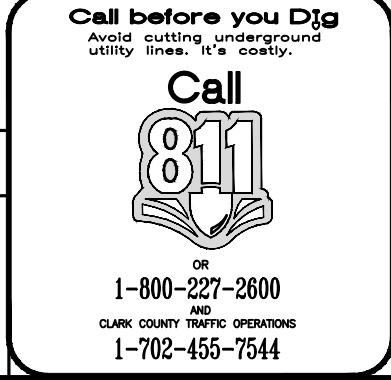
PROFILE "SD3" STA 10+00 TO 14+10
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

GENERAL SHEET NOTES

- CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
- RELOCATE ALL ELECTRICAL, COMMUNICATION, AND FO LINES LOCATED IN SIDEWALK AT LOCATION OF DROP INLETS AROUND IMPROVEMENTS; COORDINATE RELOCATIONS WITH NV ENERGY, COX CABLE, AND CENTURY LINK.
- LINEAR FOOTAGE (LF) SLOPES AND INVERTS OF STORM DRAIN AS SHOWN ON PLANS ARE CALCULATED HORIZONTALLY FROM CENTERLINE OF STRUCTURE TO CENTERLINE OF STRUCTURE.

SHEET KEYNOTES

- INSTALL STORM DRAIN PIPING
- CONNECT STORM DRAIN OUTLET TO CONCRETE HEADWALL PER SECTION B / SHEET C-2
- CONSTRUCT CURB AND GUTTER DROP INLET TYPE CM PER CCAUSD DWG # 422
- PROTECT IN PLACE
- STORM DRAIN PIPE TRENCH AND BEDDING PER DETAIL C-906 / SHEET GC-2
- CONSTRUCT 60" DIAMETER RISER TYPE MANHOLE WITH MANHOLE STEPS EXTENDING INTO SIDE WALL OF RCB PER CCAUSD DWG # 410
- CONSTRUCT 60" DIAMETER TYPE I STORM DRAIN MANHOLE PER CCAUSD DWG # 403.
- CONNECT EX 18" RCP STORM DRAIN TO PROPOSED DROP INLET
- ABANDON IN PLACE EX 18" RCP STORM DRAIN FROM "SD3" STA 12+42.13, OFF 70.5' L TO "SD3" STA 11+19.80, OFF 70.9' L PER DETAIL C-907 / SHEET GC-2
- REMOVE 15' SEGMENT OF EX 18" STORM DRAIN TO INSTALL NEW DROP INLET
- CONNECT PROPOSED STORM DRAIN LATERALS TO NEW RCB PER STRUCTURAL DETAIL S-906 / SHEET GS-3
- RELOCATE EX UNDERGROUND ELECTRIC POWER CONDUIT (3-1/0 1-4"C) AROUND NEW DROP INLET, COORDINATE WITH NV ENERGY TO RELOCATE
- RELOCATE EX UNDERGROUND ELECTRIC POWER CONDUIT (3-336 AA 1-2/0 ACSR) AROUND NEW DROP INLET, COORDINATE WITH NV ENERGY TO RELOCATE
- ENCASE STORM DRAIN LINE OVER WATER LINE CROSSING WITH CLSM SLURRY, SEE SHEET PP-6.
- VERTICALLY RELOCATE EX WATER SERVICE LINES UNDER NEW STORM DRAIN PER UDACSPLATE # 21 & #23, RESTRAIN ALL JOINTS
- CAP EX 18" RCP STORM DRAIN, DO NOT CONNECT TO PROPOSED DROP INLET, AT "SD3" STA 11+19.80, OFF 70.9' L.
- RELOCATE 6" SS PER DETAIL C-920 / GC-1.
- REMOVE EX 4" DCDA VALVE ASSEMBLY AND REPLACE WITH NEW 6" RPDA ASSEMBLY.
- PROTECT UTILITY IN PLACE, NO RELOCATION REQUIRED.

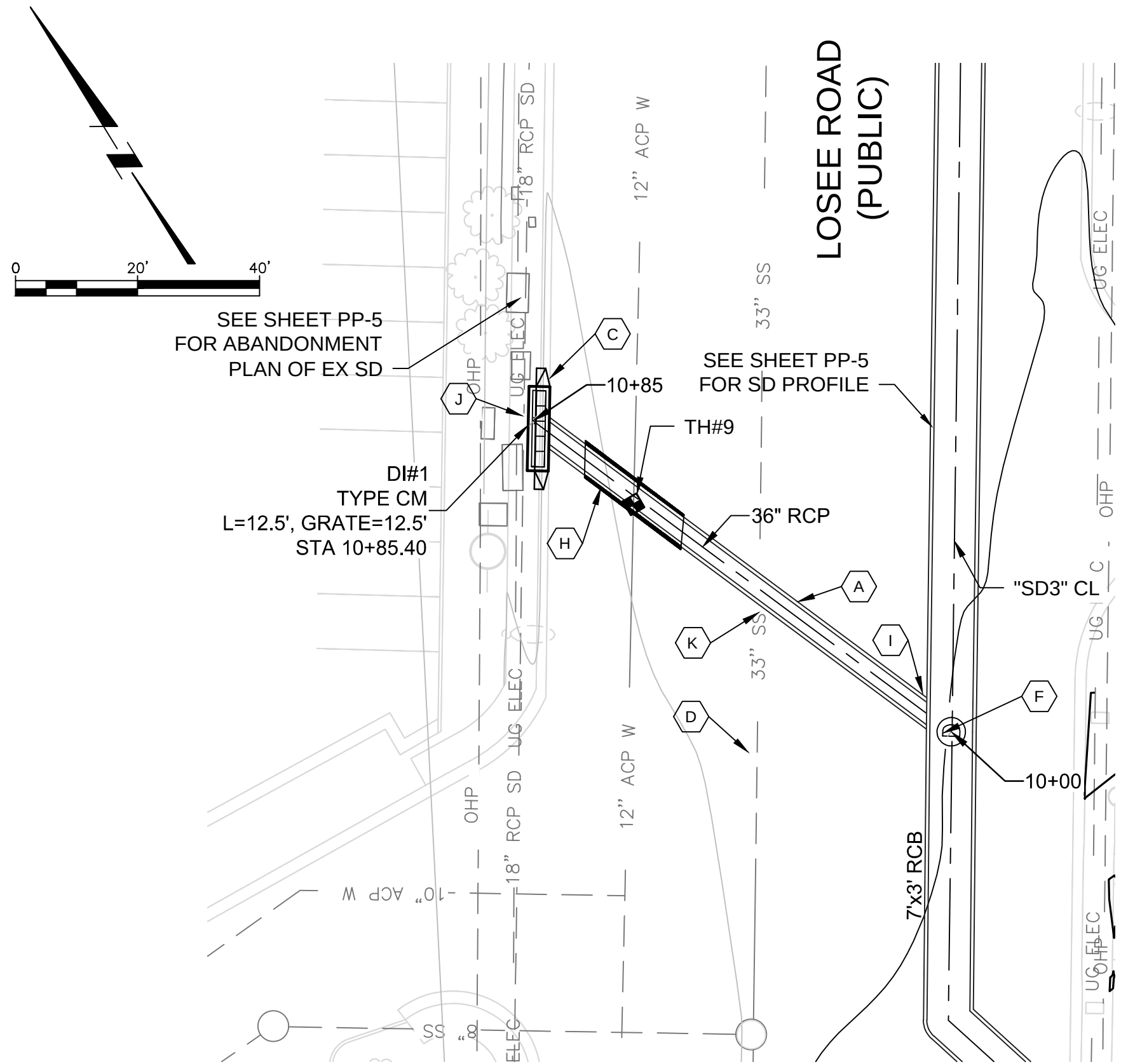


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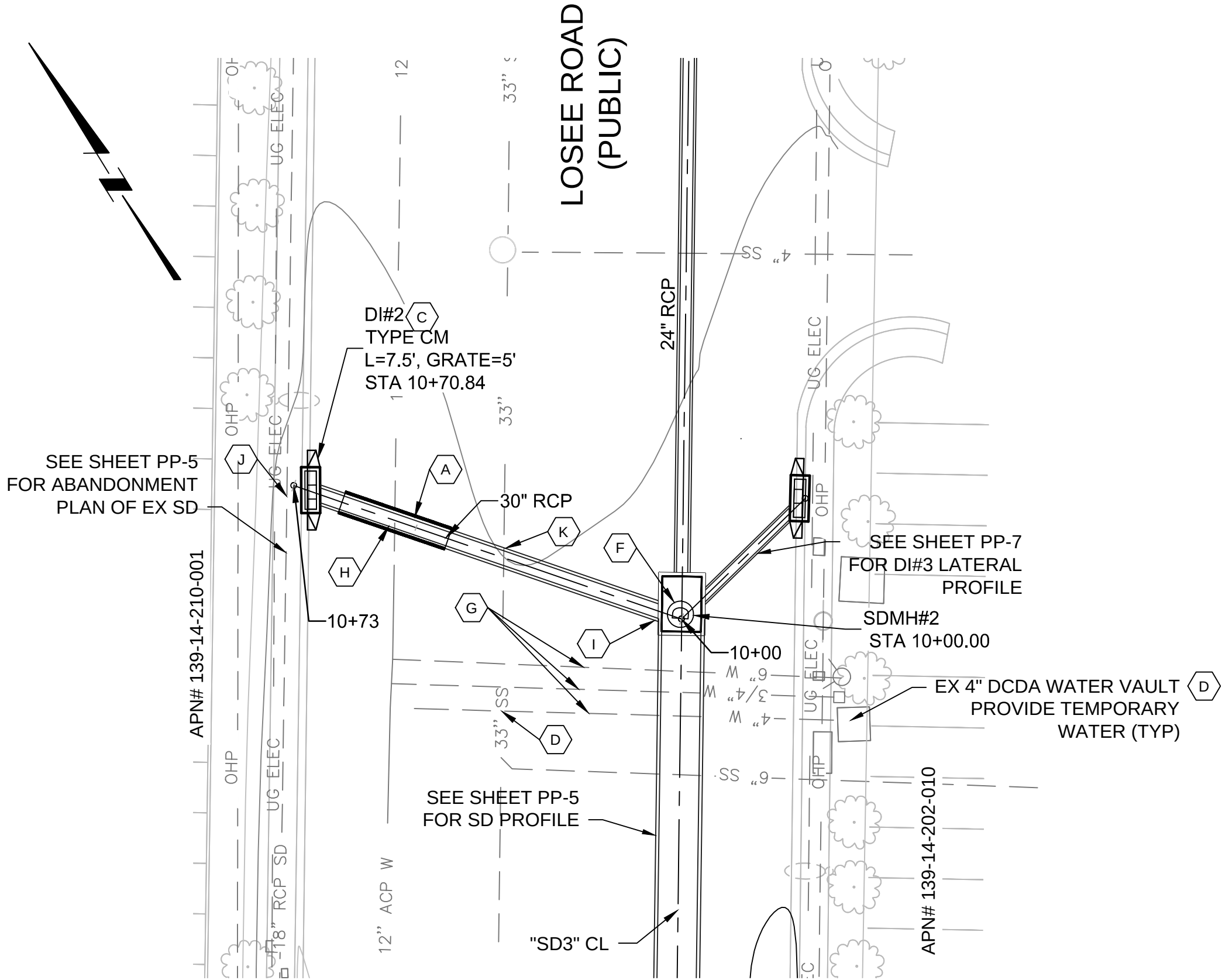
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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

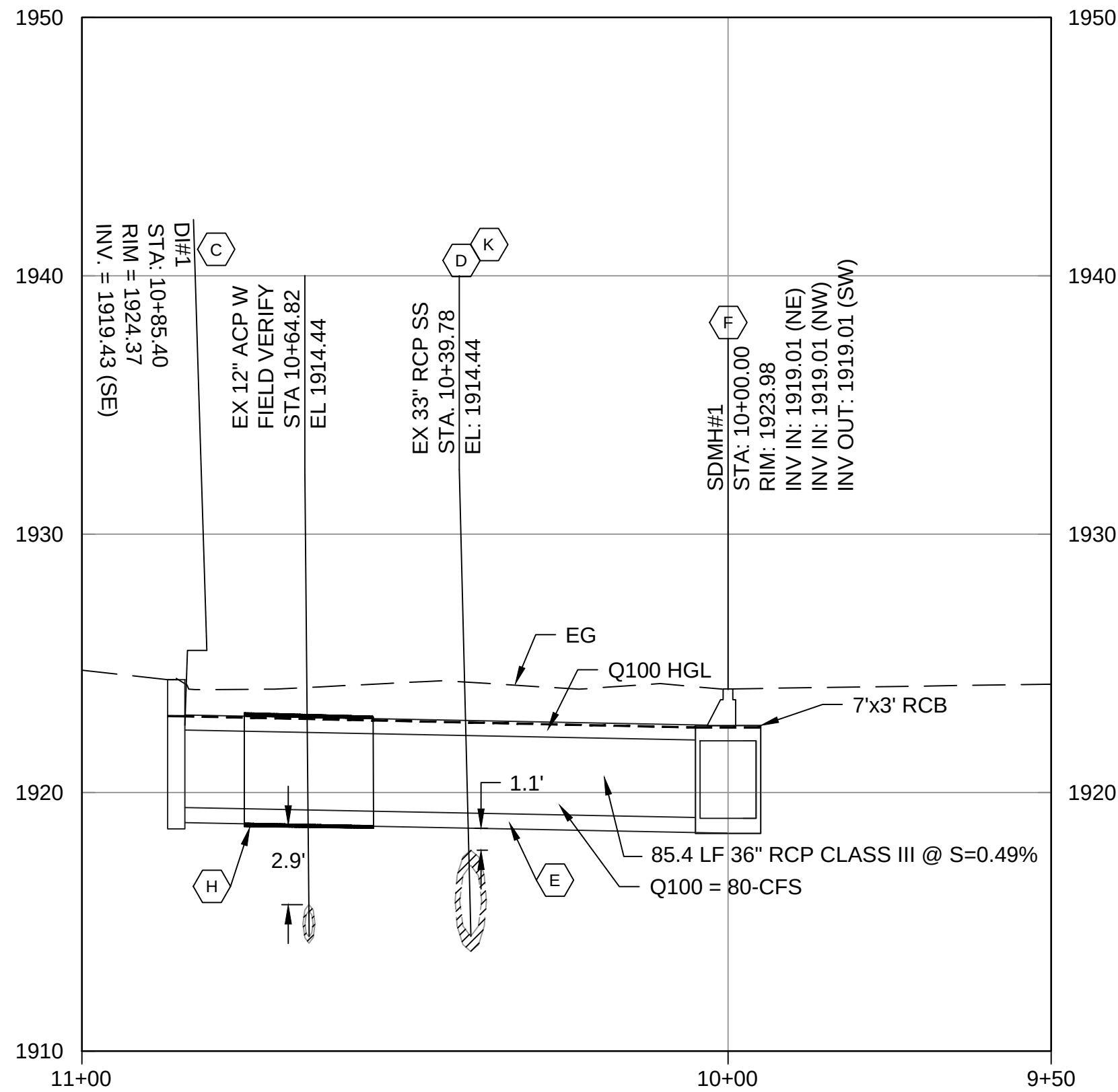
REVISIONS		NO.	DESCRIPTION	DATE	BY
1		1	CONFORMED DWG	2/2/2015	RJV
2		2	RECORD DWG	8/31/2018	SMW
SCALE: AS SHOWN					
DESIGN: R. VALDEZ					
DRAWN: R. VALDEZ					
CHECKED: S. CHAVEZ					
APPROVED: J. PARKE					
DATE: OCTOBER 2014					
PROFESSIONAL ENGINEER					
JAHAR R. PARKE					
EXP. 12-31-19					
CIVIL					
No. 20945					
3010 WEST					
CHARLESTON BLVD.					
SUITE 100					
LAS VEGAS, NV 89102					
(702) 878-8010					
CIVIL-STORM DRAIN PLAN & PROFILE STA 10+00 TO 14+10					
BROOKS CHANNEL					
LOSEE ROAD TO FREEWAY CHANNEL					
CITY OF NORTH LAS VEGAS					
SHEET NO.					
PP-5					
SHEET 19 OF 46					



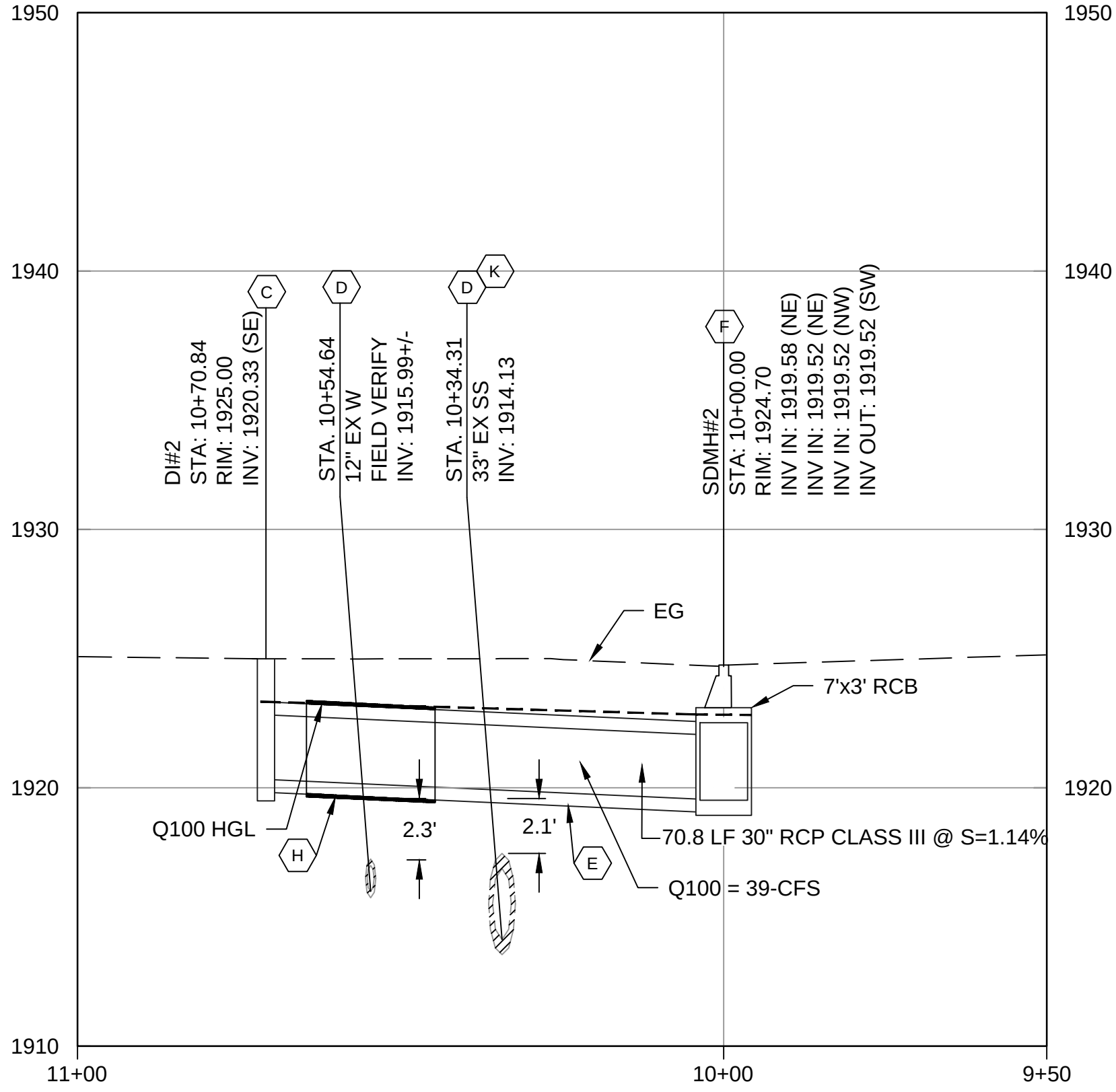
DI# 1 PLAN
HORIZONTAL SCALE: 1"=20'



DI# 2 PLAN
HORIZONTAL SCALE: 1"=20'



DI# 1 PROFILE
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'



DI# 2 PROFILE
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'

GENERAL SHEET NOTES

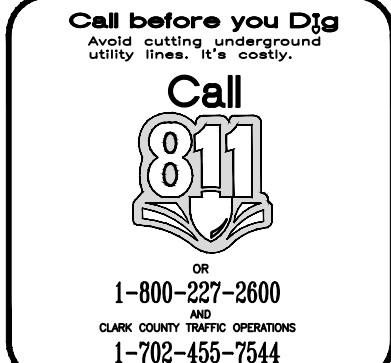
- CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
- RELOCATE ALL ELECTRICAL, COMMUNICATION, AND FO LINES LOCATED IN SIDEWALK AT LOCATION OF DROP INLETS AROUND IMPROVEMENTS; COORDINATE RELOCATIONS WITH NV ENERGY, COX CABLE, AND CENTURY LINK.
- LINEAR FOOTAGE (LF) SLOPES AND INVERTS OF STORM DRAIN AS SHOWN ON PLANS ARE CALCULATED HORIZONTALLY FROM CENTERLINE OF STRUCTURE TO CENTERLINE OF STRUCTURE

SHEET KEYNOTES

- INSTALL STORM DRAIN PIPING
- NOTE NOT USED
- CONSTRUCT CURB AND GUTTER DROP INLET, TYPE CM PER CCAUSD DWG# 422
- PROTECT IN PLACE
- STORM DRAIN PIPE TRENCH AND BEDDING PER DETAIL C-906 / SHEET GC-2
- CONSTRUCT 48" RISER TYPE MANHOLE WITH MANHOLE STEPS EXTENDING INTO RCB PER CCAUSD DWG # 410
- VERTICALLY RELOCATE EX WATER LINES UNDER NEW STORM DRAIN PER UDACS PLATE #21 & #23, RESTRAIN ALL JOINTS.
- ENCASE STORM DRAIN LINE WITH 4" THICK CLSM SLURRY, EXTEND ENCASEMENT 10-FT BOTH SIDES OF CROSSING.
- CONNECT PROPOSED STORM DRAIN LATERALS TO NEW RCB PER STRUCTURAL DETAIL S-906 / SHEET GS-3
- RELOCATE EX UNDERGROUND ELECTRIC POWER CONDUIT (3-1/0 1-4"C) AROUND NEW DROP INLET, COORDINATE WITH NV ENERGY TO RELOCATE
- PROVIDE STRUCTURAL SUPPORT FOR EX SANITARY SEWER CROSSING PER DRAWING SD-21 OF THE DCSWCS

RECORD DRAWING

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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

REVISIONS		NO.		DATE		BY	
DESCRIPTION		CONFORMED DWG		2/2/2015		RVV	
RECORD DWG		2		8/31/2018		SMW	
SCALE: AS SHOWN		DESIGN: R. VALDEZ		DRAWN: R. VALDEZ		CHECKED: S. CHAVEZ	
APPROVED: J. PARKE		DATE: OCTOBER 2014					
PROFESSIONAL ENGINEER		J. PARKE		EXP. 12-31-1988		CIVIL	
MWH		3010 WEST CHARLESTON BLVD.		SUITE 100		LAS VEGAS, NV 89102	
CIVIL - STORM DRAIN PLAN AND PROFILE LATERALS - 1		BROOKS CHANNEL		LOSEE ROAD TO FREEWAY CHANNEL		CITY OF NORTH LAS VEGAS	

SHEET NO.

PP-6

SHEET 20 OF 46



1. CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
2. RELOCATE ALL ELECTRICAL, COMMUNICATION, AND FO LINES LOCATED IN SIDEWALK AT LOCATION OF DROP INLETS AROUND IMPROVEMENTS; COORDINATE RELOCATIONS WITH NV ENERGY, COX CABLE, AND CENTURY LINK.
3. LINEAR FOOTAGE (LF) SLOPES AND INVERTS OF STORM DRAIN AS SHOWN ON PLANS ARE CALCULATED HORIZONTALLY FROM CENTERLINE OF STRUCTURE TO CENTERLINE OF STRUCTURE

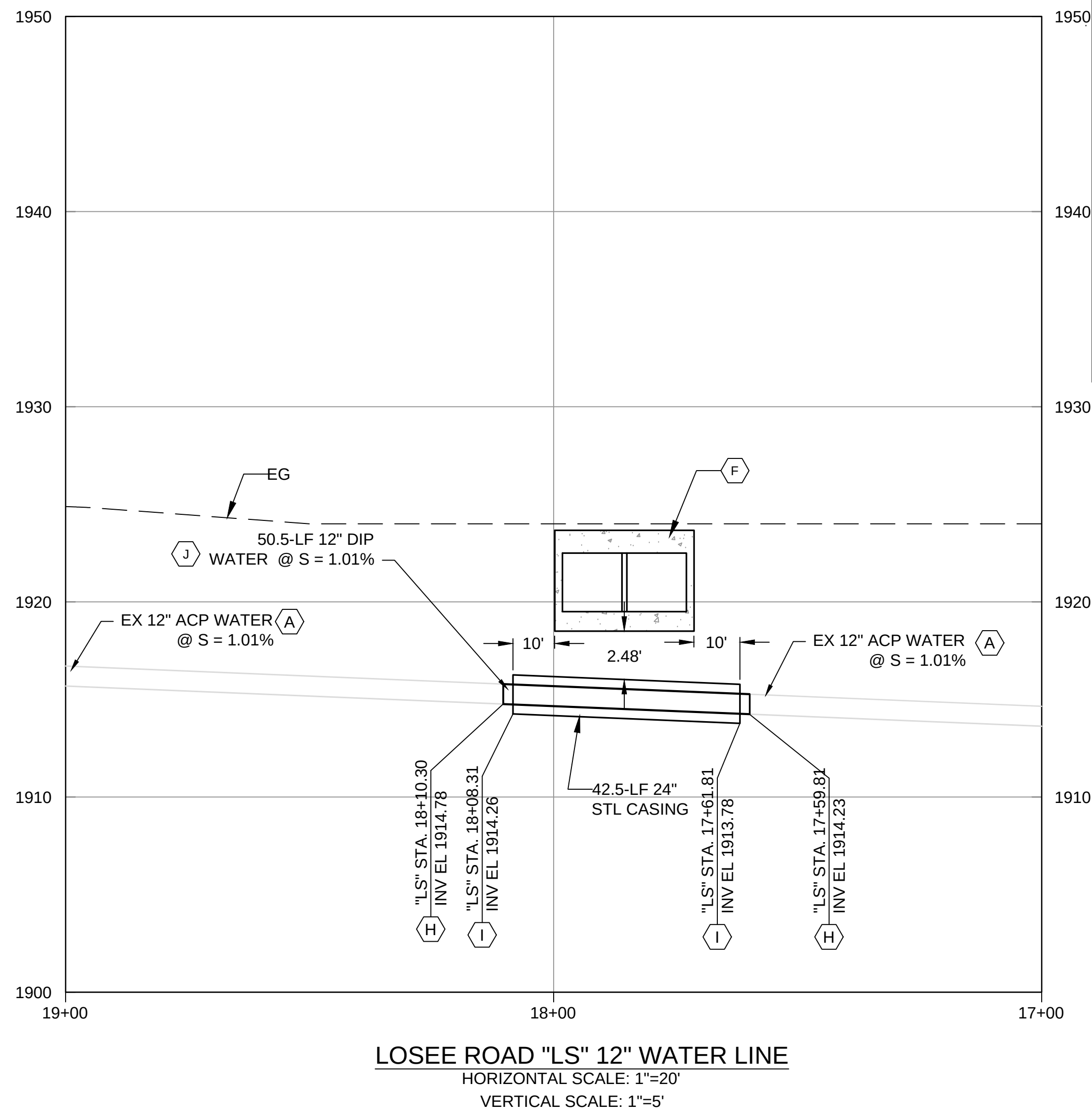
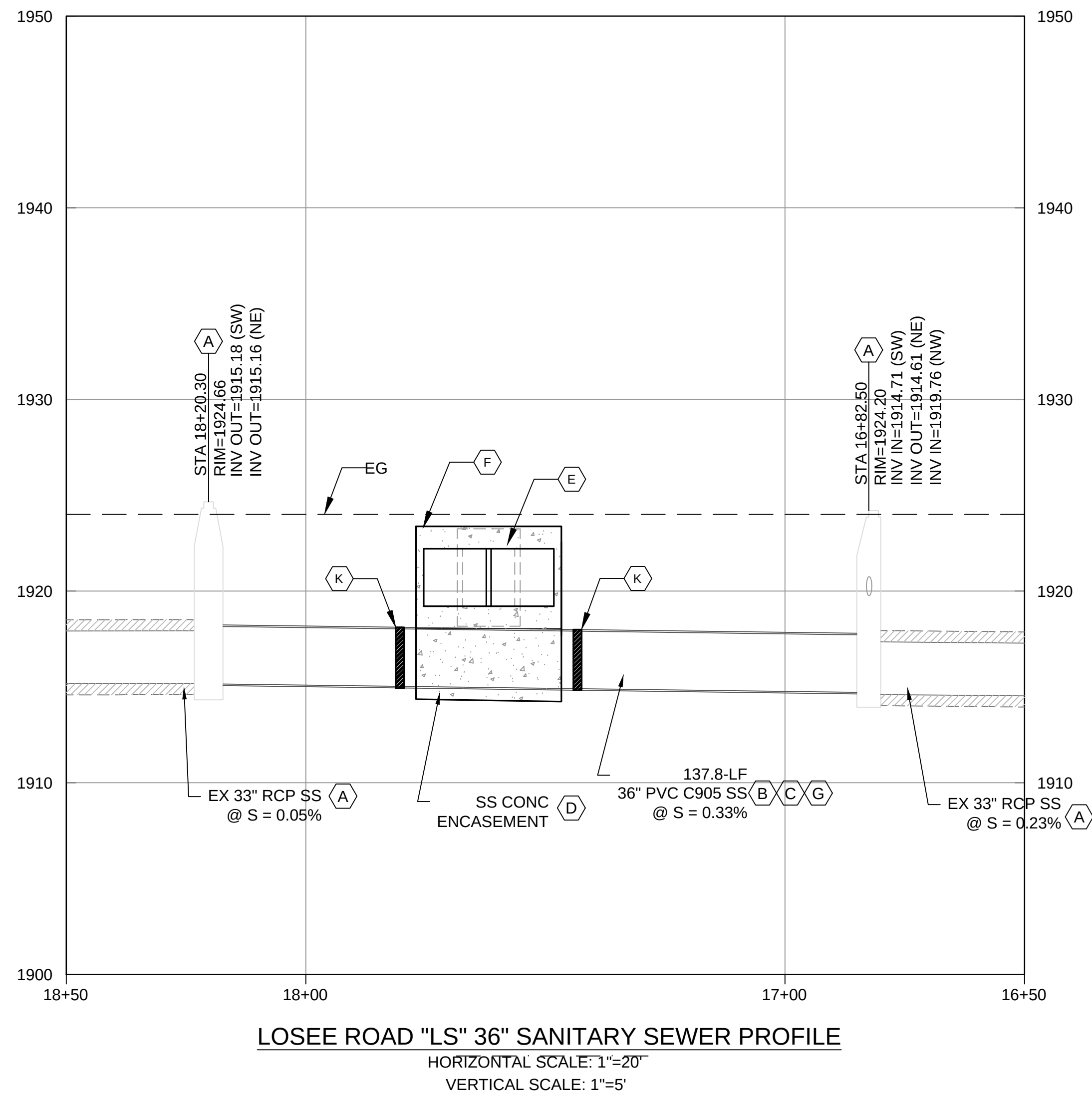
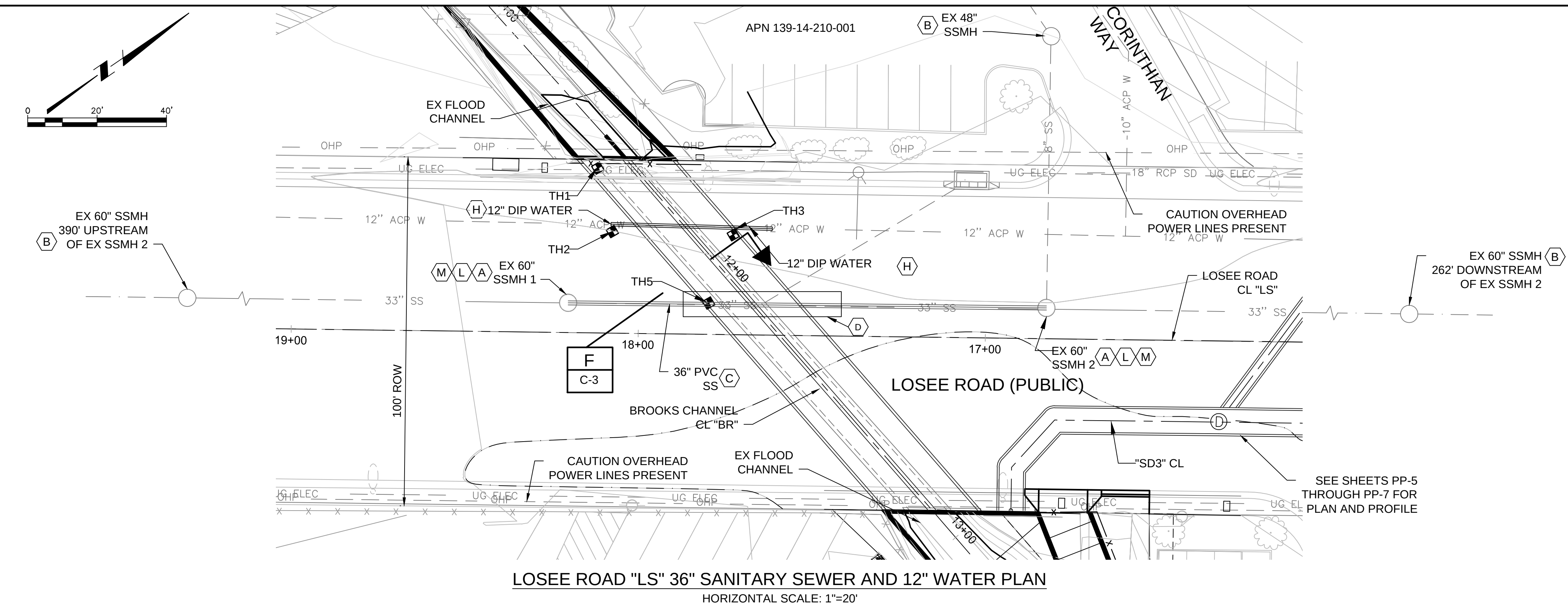
- A. INSTALL STORM DRAIN PIPING
- B. CONSTRUCT 60" DIAMETER TYPE I STORM DRAIN MANHOLE PER CCAUSD DWG # 403.
- C. CONSTRUCT CURB AND GUTTER DROP INLET TYPE CM PER CCAUSD DWG # 422
- D. PROTECT IN PLACE
- E. STORM DRAIN PIPE TRENCH AND BEDDING PER DETAIL C-906/SHEET GC-2
- F. CONSTRUCT 48" DIAMETER RISER TYPE MANHOLE
- G. ENCASE STORM DRAIN LATERALS WITH 4" CLSM SLURRY, SEE SHEET PP-8
- H. VERTICALLY RELOCATE EX WATER LINES PER UDACS PLATE #21 & #23, RESTRAIN ALL JOINTS
- I. CONNECT PROPOSED STORM DRAIN LATERALS TO NEW RCB PER STRUCTURAL DETAIL S-906 / SHEET GS-3
- J. RELOCATE EX UNDERGROUND ELECTRIC POWER CONDUIT (3-336 AA 1-2/0 ACSR) AROUND NEW DROP INLET, COORDINATE WITH NV ENERGY TO RELOCATE
- K. PROVIDE STRUCTURAL SUPPORT FOR EX SANITARY SEWER CROSSING PER DRAWING SD-21 OF THE DCSWCS

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SUITE 100
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(702) 878-8010

SHEET 21 OF 46



GENERAL SHEET NOTES

1. CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
2. 36" SANITARY SEWER AND 12" WATER LINES ARE STATIONED ALONG LOSEE ROAD CENTER LINE.
3. CONTRACTOR SHALL NOT EXPOSE MORE THAN 10 LINEAR FEET OF 33-INCH RCP SEWER AT ANY GIVEN TIME.

 SHEET KEYNOTES

- A. PROTECT IN PLACE
- B. PLUG EX MANHOLES; PROVIDE FOR BYPASS FLOW AROUND MANHOLES; SEE SPECIFICATION SECTION 690 FOR BYPASS PUMPING REQUIREMENTS
- C. REMOVE EX 33" RCP SANITARY SEWER LINE BETWEEN EX MANHOLES AND INSTALL NEW 36" PVC C905 SANITARY SEWER LINE; CONNECT TO EX MANHOLES WITH FIELD-INSTALLED FLEXIBLE CONNECTIONS PER DCSWCS SECTION 4.9.5 FROM "LS" STA 16+82.50, OFF 8.9' R, TO "LS" STA 18+20.30, OFF 8.6' R.
- D. CONSTRUCT CONCRETE ENCASEMENT PROTECTION OVER 36" PVC SS LINE WITH CONSTRUCTION OF NEW RCB STORM CROSSING, SEE SECTION F /SHEET C-3
- E. REMOVE EX 8'X3' RCB STORM DRAIN
- F. CONSTRUCT (2)9'X3' RCB STORM DRAIN
- G. INSTALL SANITARY SEWER PIPELINE TRENCH AND BEDDING PER DCSWCS STANDARD DWG NO. SD-14 AND SD-18
- H. CUT AND REMOVE EX 12" ACP WATER LINE FROM "LS" STA 17+59.81 OFF: 28.3' R TO "LS" STA 18+10.31, OFF: 29.2' R; INSTALL 12" DIP WATER LINE AND CONNECT TO EXISTING WATER LINE WITH TRANSITION COUPLING
- I. INSTALL 24" DIAMETER STEEL SLEEVE WITH INTERNAL PIPE SPACERS PER UDACS PLATE NO. 23 FROM "LS" STA 17+61.81 OFF: 28.3' R TO "LS" STA 18+08.31 OFF: 29.2' R
- J. INSTALL WATER LINE WITH TRENCH SECTION PER UDACS PLATE NO. 17
- K. ANCHOR SS PVC PIPE TO TRENCH PER CONTRACTOR'S MEANS AND METHODS PRIOR TO POURING CONC. ENCASEMENT TO PREVENT FLOTATION & MAINTAIN DESIGN INVERT ELEVATIONS.
- L. ADJUST EX MANHOLES TO FG
- M. CONNECT SANITARY SEWER LINE TO EX MANHOLES PER CNLV FIELD DIRECTIVE (REFERENCE RFI #32)

RECORD DRAWING

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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

(DRAWING TITLE)		(PROJECT TITLE)		(LOCATION)	
CIVIL - SANITARY SEWER AND WATER PLAN AND PROFILE		BROOKS CHANNEL		CITY OF NORTH LAS VEGAS	
LOSEE ROAD TO FREEWAY CHANNEL					

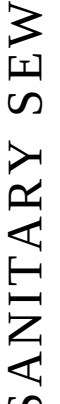
SHEET NO.

PP-8

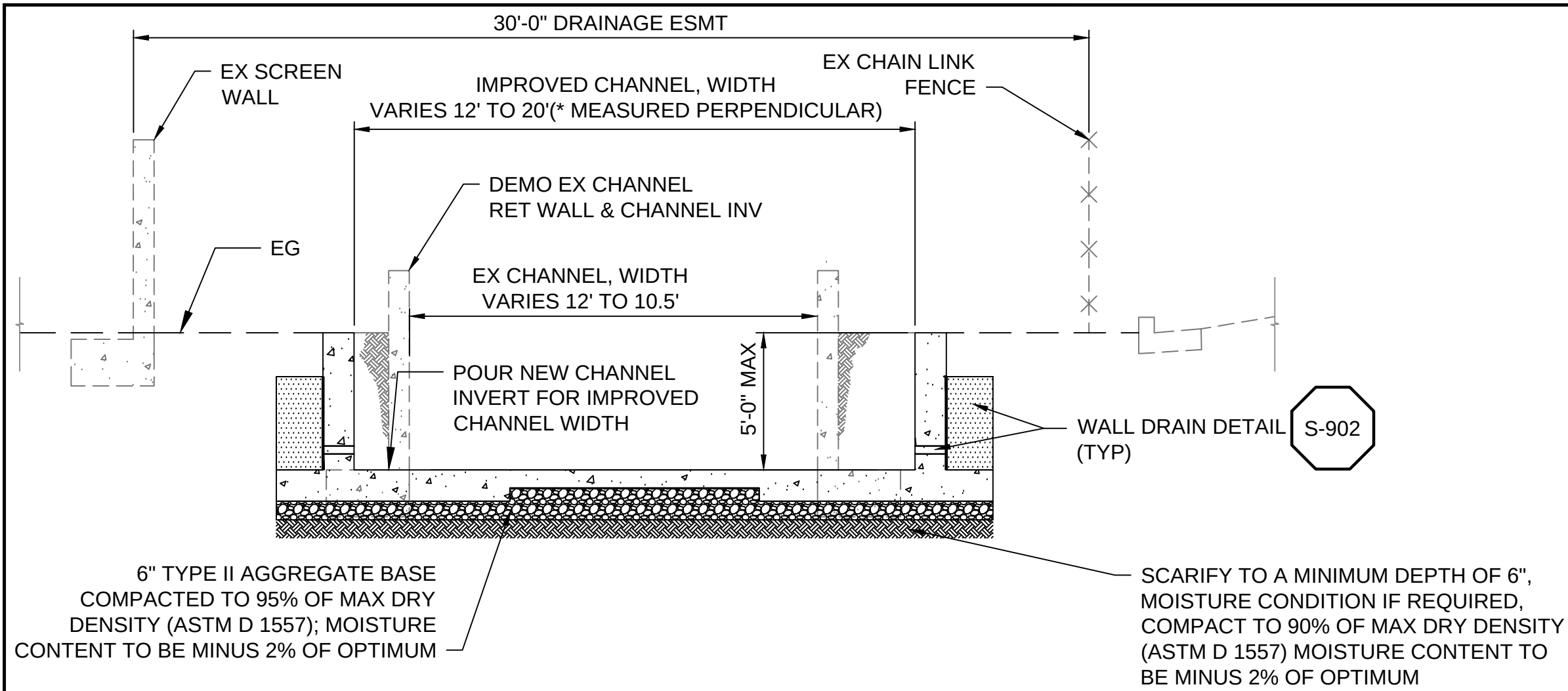
SHEET 22 OF 46

MWH[®]

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SUITE 100
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(702) 878-8010

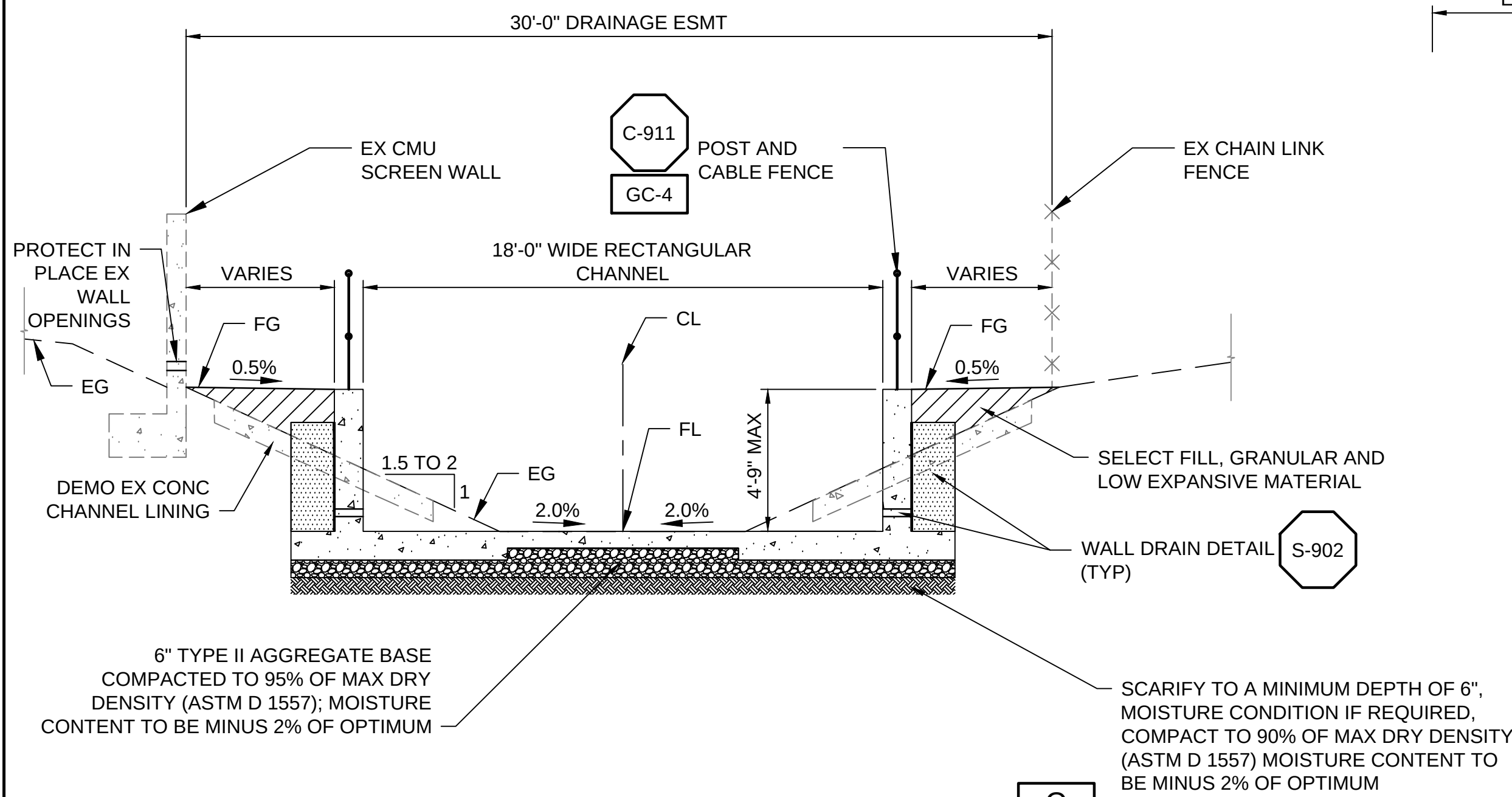


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DESIGN:	R VALDEZ	NO.	DESCRIPTION	DATE	BY
DRAWN:	R VALDEZ	1	CONFORMED DWG	2/2/2015	RVV
CHECKED:	S CHAVEZ	2	RECORD DWG	8/31/2018	SMW
APPROVED: J PARKE					
DATE: OCTOBER 2014					



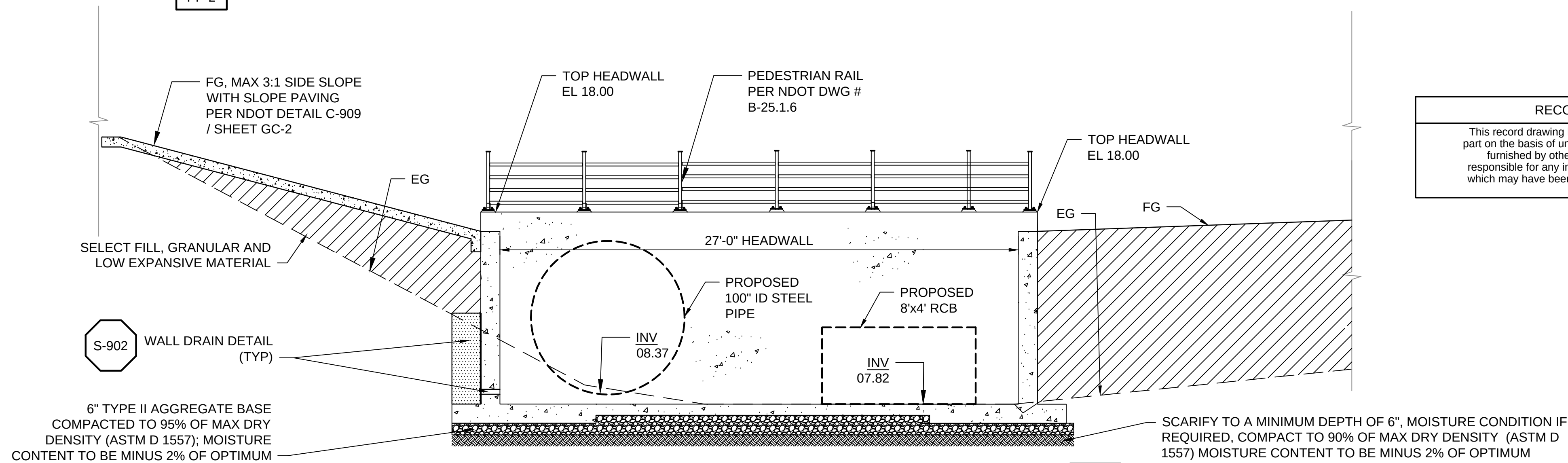
LOSEE ROAD CULVERT CROSSING SECTION
"BR" STA: 10+43 TO STA: 11+55

A
PP-1



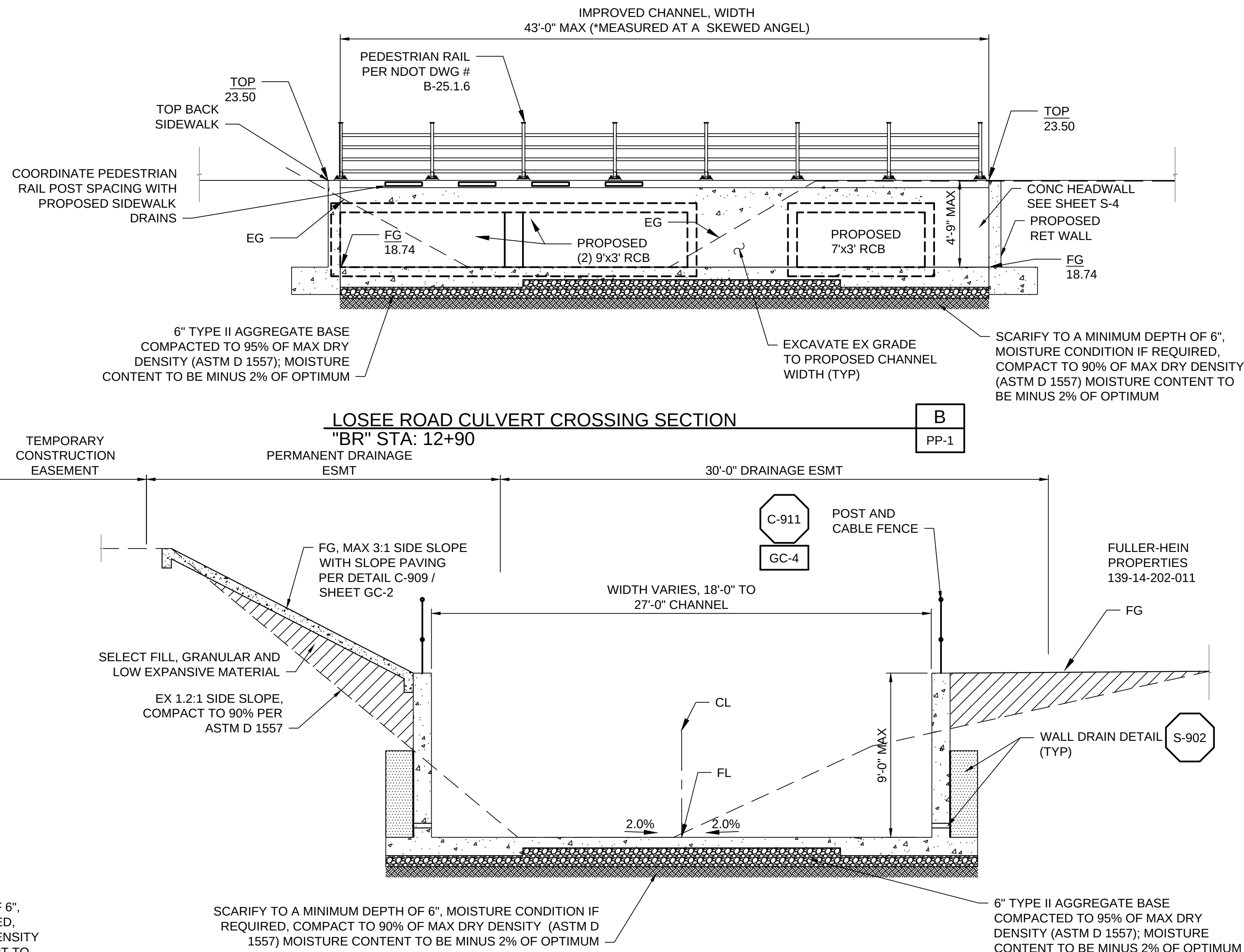
BROOKS CHANNEL TYPICAL CROSS SECTION
"BR" STA: 13+72 TO "BR" STA: 16+57

C
PP-1
PP-2



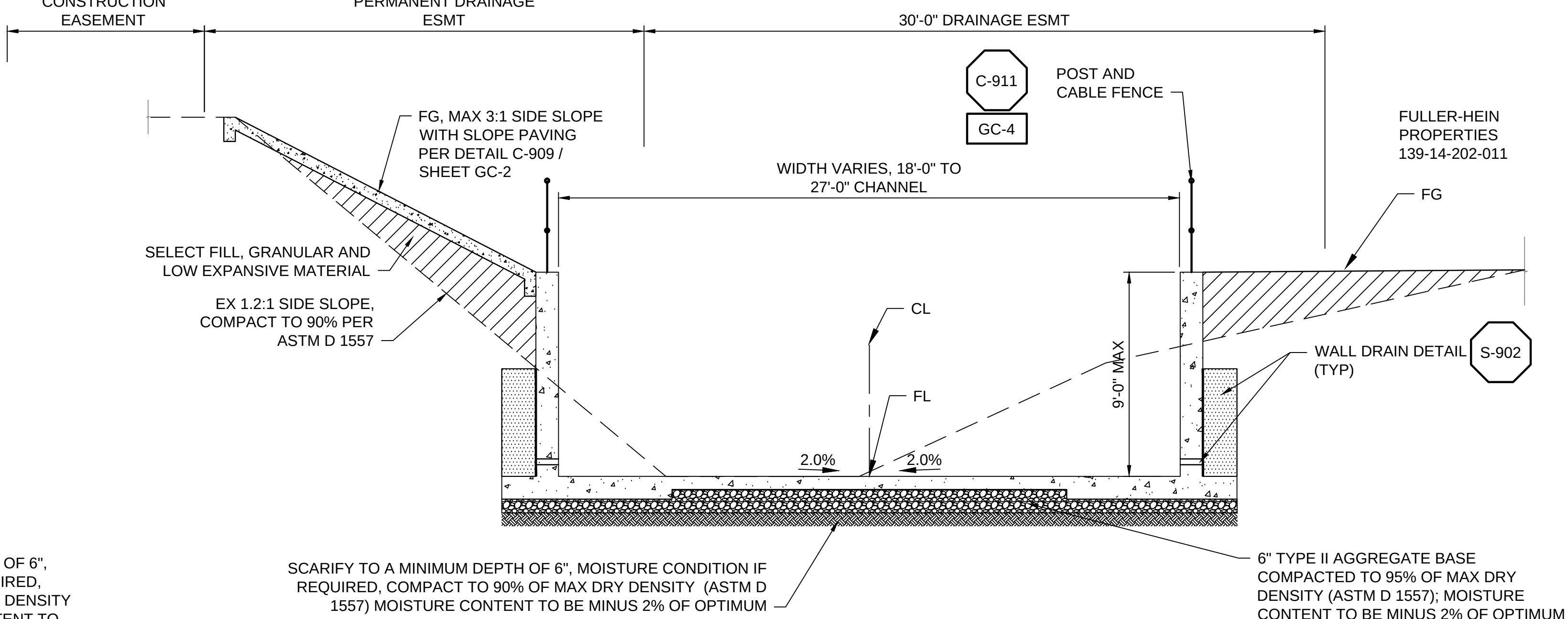
HEADWALL AT RAIL ROAD TYPICAL CROSS SECTION
"BR" STA: 17+89

E
PP-2



LOSEE ROAD CULVERT CROSSING SECTION
"BR" STA: 12+90

B
PP-1



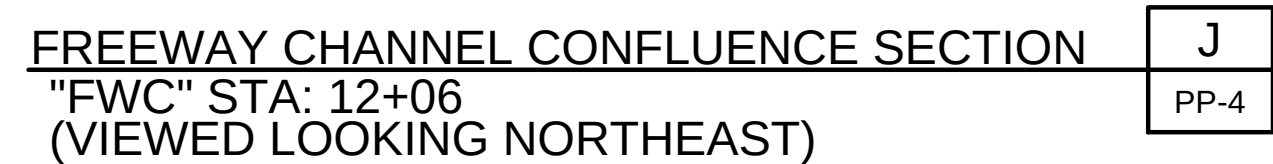
BROOKS CHANNEL TYPICAL CROSS SECTION
"BR" STA: 17+60 TO STA: 17+89

D
PP-2

RECORD DRAWING
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REVISIONS		NO.	DESCRIPTION	DATE	BY
1	CONFORMED DWG	1	CONFORMED DWG	2/2/2015	RJV
2	RECORD DWG	2	RECORD DWG	8/31/2018	SMW
SCALE: NO. SCALE		DESIGN: R VALDEZ	DRAWN: R VALDEZ	CHECKED: S CHAVEZ	APPROVED: J PARKE
DATE: OCTOBER 2014					
PROFESSIONAL ENGINEER					
JAHAR R. PARKE					
EXP. 12-31-19					
CIVIL					
No. 20945					
MWH					
3010 WEST CHARLESTON BLVD.					
SUITE 100					
LAS VEGAS, NV 89102					
(702) 878-8010					
CIVIL - CROSS SECTIONS - I					
BROOKS CHANNEL					
LOSEE ROAD TO FREEWAY CHANNEL					
CITY OF NORTH LAS VEGAS					
SHEET NO.					
C-2					
SHEET 26 OF 46					

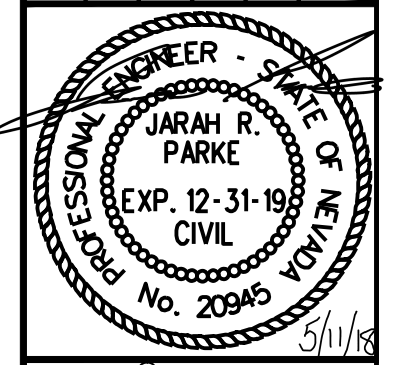


1. FOR OVER EXCAVATION BEYOND NEATLINE EXCAVATION LIMITS, REFER TO SPECIFICATIONS SECTION 203 OF SPECIAL PROVISIONS.
2. EXCAVATION NEATLINE DEPICTS THE MINIMUM LIMITS OF CHANNEL EXCAVATION THAT IS REQUIRED FOR CHANNEL CONSTRUCTION; CONTRACTOR IS RESPONSIBLE TO CONFORM TO OSHA SAFETY SLOPE REQUIREMENTS
3. MIRAFI G200N DRAINAGE COMPOSITE, OR APPROVED EQUAL, MAY BE USED PER MANUFACTURER'S SPECIFICATION, IN LIEU OF WRAPPED DRAIN BACKFILL FOR VERTICAL CHANN WALLS AND WALL DRAINS ONLY; DRAINAGE COMPOSITE MAY NOT BE USED UNDER CHANNEL SLAB
4. CONTRACTOR TO ADJUST FLOW LINE TOWARD CENTER OF CONFLUENCE CHANNEL PER STATION-OFFSET INFORMATION DEPICTED ON SHEET PP-4; CHANNEL SIDE SLOPE TO VARY FROM 2% THROUGH CONFLUENCE CHANNEL SEGMENTS

- A. PROTECT IN PLACE EX 1-15 GUARD RAIL AND CHAIN LINK FENCE
- B. 6" TYPE II AGGREGATE BASE COMPACTED TO 95% OF MAX DRY DENSITY (ASTM D 1557); MOISTURE CONTENT TO BE MINUS 2% OF OPTIMUM
- C. INSTALL POST AND CABLE FENCE, BOTH SIDES PER DETAIL C-911 / SHEET GC-4
- D. 4" WEEP HOLE PER STRUCTURAL DETAIL S-902
- E. STRUCTURAL FILL PER SPECIFICATION SECTION 203 (TYP)
- F. SELECTED BACKFILL PER SPECIFICATION SECTION 207 (TYP)
- G. SCARIFY NATIVE TO A MINIMUM DEPTH OF 6", MOISTURE CONDITION IF REQUIRED, COMPACT TO 90% OF MAX DRY DENSITY (ASTM D 1557) MOISTURE CONTENT TO BE MINUS 2% OF OPTIMUM
- H. TIE IN NEW CHANNEL INVERT SLAB TO EXISTING 8'X4' RCB OUTLET STRUCTURE VERTICAL WALL PER STRUCTURAL DWGS.

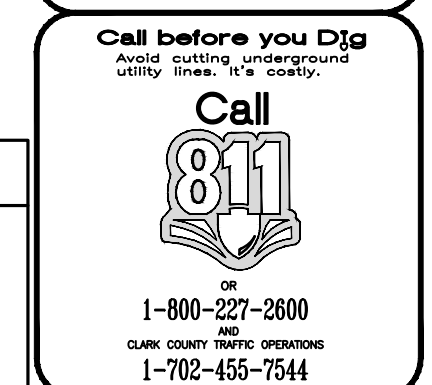
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SCALE:	NO SCALE
DESIGN:	R VALDEZ
DRAWN:	R VALDEZ
CHECKED:	S CHAVEZ
APPROVED:	J PARKE
DATE:	OCTOBER 2014

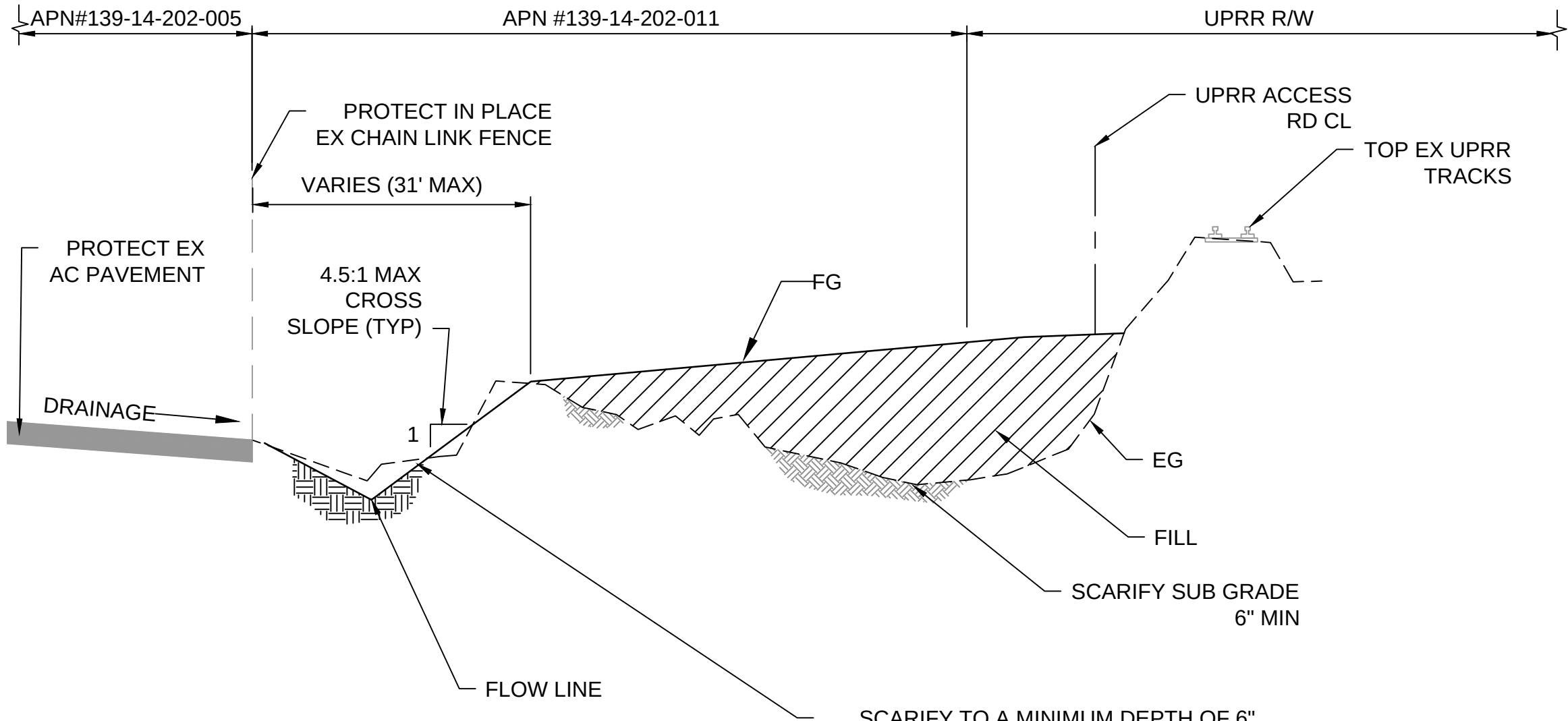


**BROOKS CHANNEL
LOSEE ROAD TO FREEWAY CHANNEL
CITY OF NORTH LAS VEGAS**

SHEET NO.
C-4
SHEET 28 OF 46



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NOTE:
REFER TO SHEET GR-2 FOR CONTOUR GRADING
AND DRAINAGE

CROSS SECTION

M
GR-2

AVOID HITTING OVERHEAD POWER LINES

CALL BEFORE YOU DO OVERHEAD

1-702-227-2929

Call before you Dig

Avoid cutting underground utility lines. It's costly.

Call 811

1-800-227-2600

OR

CALL YOUR PUBLIC AGENCIES

1-702-455-7544

RECORD DRAWING

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3010 WEST CHARLESTON BLVD.
SUITE 100
LAS VEGAS, NV 89102
(702) 878-8010

PROFESSIONAL ENGINEER

JARAH R. PARKE

EXP. 12-31-18

CIVIL

No. 20945

SCALE:	NO. SCALE
DESIGN:	R VALDEZ
DRAWN:	R VALDEZ
CHECKED:	S CHAVEZ
APPROVED:	J PARKE
DATE:	OCTOBER 2014

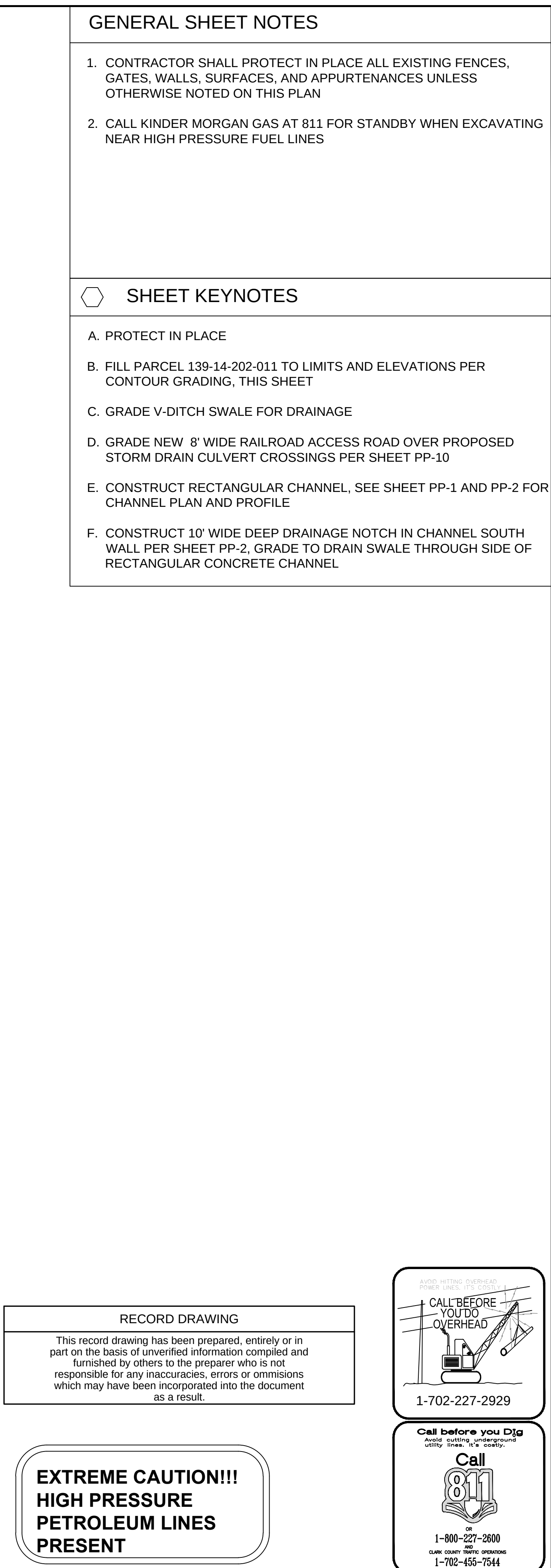
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	CONFORMED DWG	2/2/2015	R/V
2	RECORD DWG	8/31/2018	S/M

CIVIL - CROSS SECTIONS - IV	(DRAWING TITLE)
BROOKS CHANNEL	(PROJECT TITLE)
LOSEE ROAD TO FREEWAY CHANNEL	(LOCATION)
CITY OF NORTH LAS VEGAS	

SHEET NO.

C-5

SHEET 29 OF 46

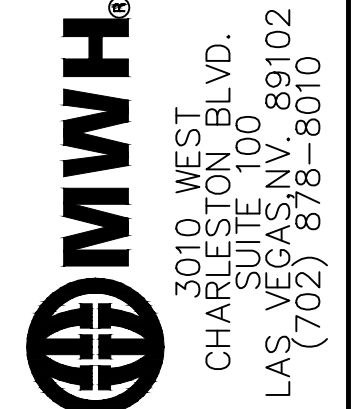
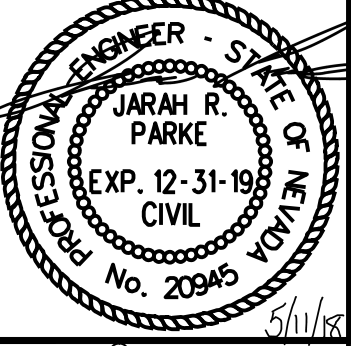


1. CONTRACTOR SHALL PROTECT IN PLACE ALL EXISTING FENCES, GATES, WALLS, SURFACES, AND APPURTENANCES UNLESS OTHERWISE NOTED ON THIS PLAN
2. CALL KINDER MORGAN GAS AT 811 FOR STANDBY WHEN EXCAVATING NEAR HIGH PRESSURE FUEL LINES

- A. PROTECT IN PLACE
- B. FILL PARCEL 139-14-202-011 TO LIMITS AND ELEVATIONS PER CONTOUR GRADING, THIS SHEET
- C. GRADE V-DITCH SWALE FOR DRAINAGE
- D. GRADE NEW 8' WIDE RAILROAD ACCESS ROAD OVER PROPOSED STORM DRAIN CULVERT CROSSINGS PER SHEET PP-10
- E. CONSTRUCT RECTANGULAR CHANNEL, SEE SHEET PP-1 AND PP-2 FOR CHANNEL PLAN AND PROFILE
- F. CONSTRUCT 10' WIDE DEEP DRAINAGE NOTCH IN CHANNEL SOUTH WALL PER SHEET PP-2, GRADE TO DRAIN SWALE THROUGH SIDE OF RECTANGULAR CONCRETE CHANNEL

REVISIONS				
NO.	DESCRIPTION	DATE	BY	
1	CONFORMED DWG	2/2/2015	RW	
2	RECORD DWG	8/31/2016	SMW	

SCALE: 1" = 10'
DESIGN: R VALDEZ
DRAWN: N NATALE
CHECKED: S CH
APPROVED: J PAR
DATE: OCTOBER 2



CIVIL - GRADING DETAIL - II

**BROOKS CHANNEL
LOSEE ROAD TO FREEWAY CHANNEL
CITY OF NORTH LAS VEGAS**

(DRAWING TITLE)

(PROJECT TITLE)

SHEET NO.

GR-2

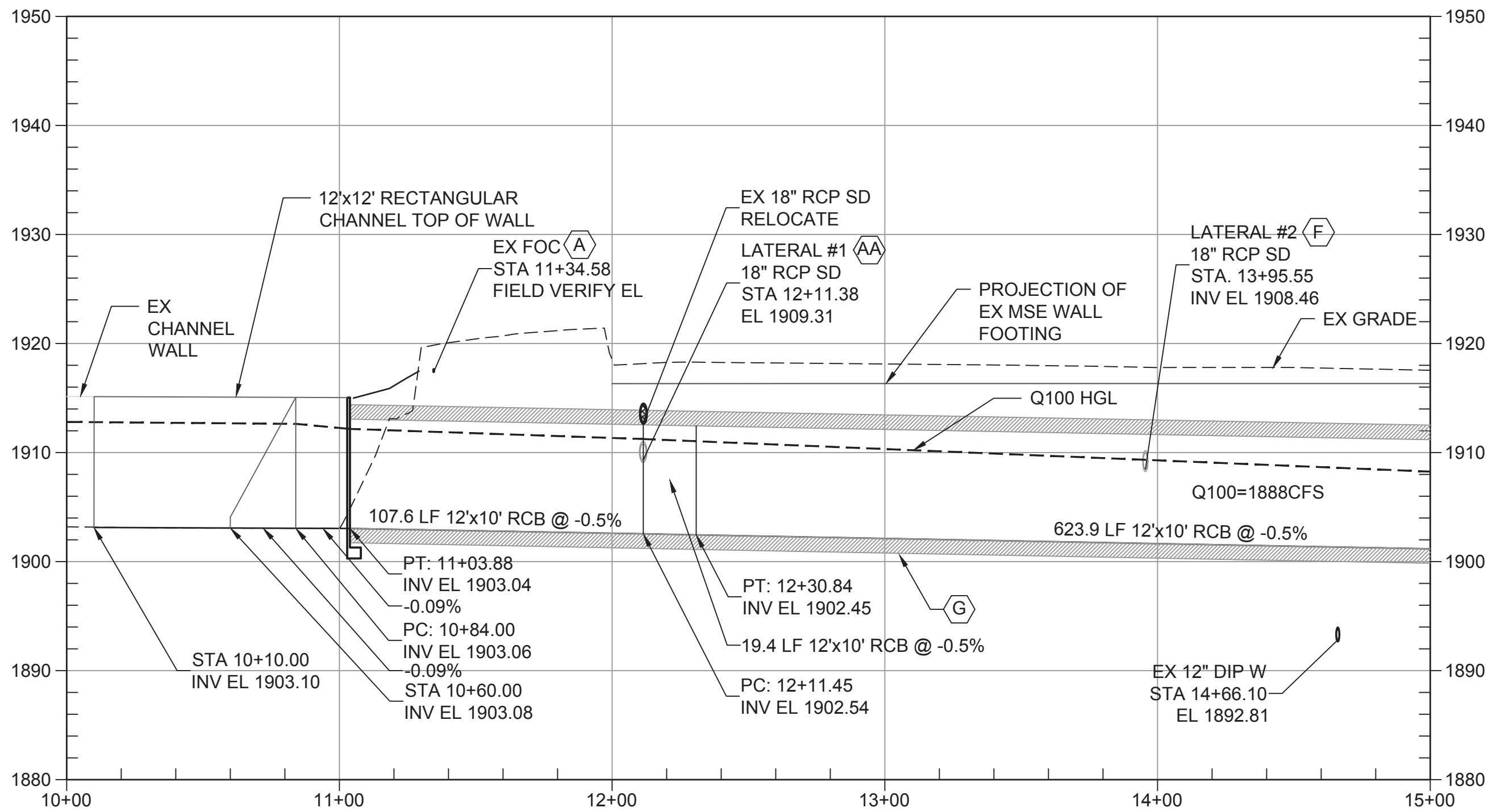
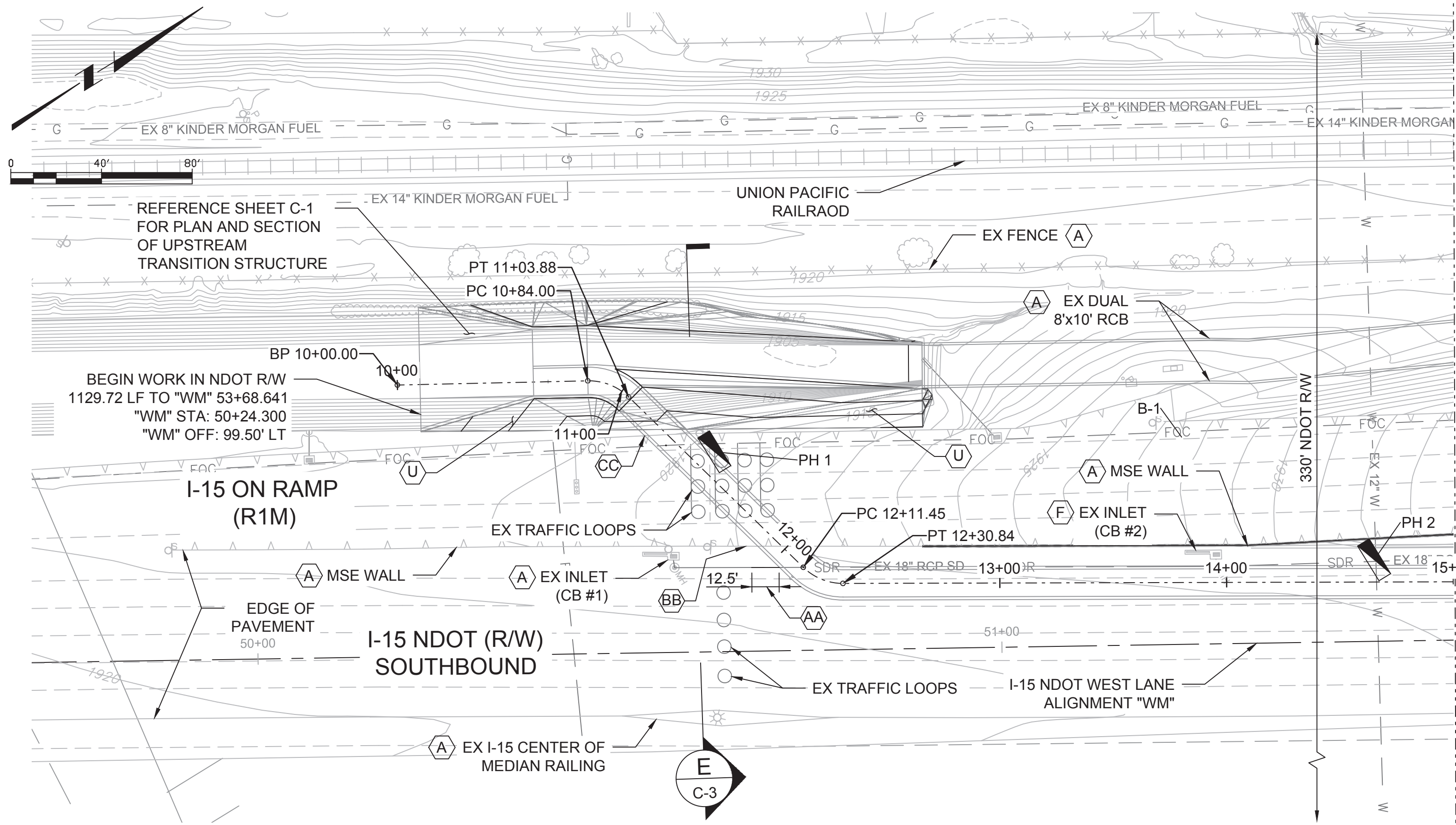
SHEET 31 OF 46

RECORD DRAWING

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**EXTREME CAUTION!!!
HIGH PRESSURE
PETROLEUM LINES
PRESENT**

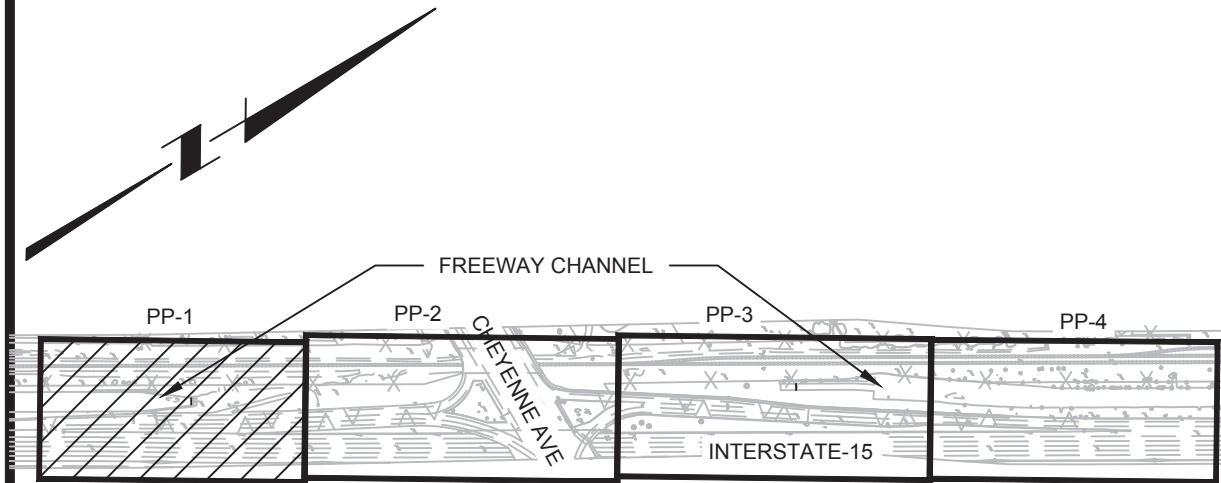




RECORD DRAWING

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KEY PLAN

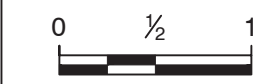


GENERAL NOTES

- REFER TO SHEET G-3 FOR OVERALL SHEET INDEX LIST.
- ALL UTILITIES DEPICTED THROUGHOUT DRAWINGS ARE APPROXIMATE ONLY AND ALL UTILITIES MAY NOT BE SHOWN. CONTRACTOR MUST VERIFY AND PERFORM POTHOLES OF ALL UTILITIES SHOWN OR MARKED IN THE FIELD, PRIOR TO CONSTRUCTION.
- ALL EXISTING UTILITIES SHALL BE PROTECTED IN PLACE UNLESS SHOWN OTHERWISE
- REPLACE ALL TRAFFIC CONTROL DEVICES (SIGNALS, LOOPS, CONDUITS, SIGNS, AND PAVEMENT MARKINGS), UNDER CITY OF NORTH LAS VEGAS AND NDOT JURISDICTION THAT ARE DISTURBED DURING CONSTRUCTION.
- REFER TO SHEETS R-1 AND R-2 FOR LIMITS OF SAWCUT PAVEMENT REPLACEMENT AND REMOVAL OF OTHER APPURTENANCES.
- RESTORE EXISTING GRADES AND SURFACES TO ORIGINAL CONDITIONS.
- CONTRACTOR SHALL LIMIT CONSTRUCTION WORK ACTIVITY TO WITHIN THE LIMITS OF THE RIGHT-OF-WAY.

SHEET KEYNOTES

- A. PROTECT IN PLACE.
- F. REPLACE SLOTTED DRAIN AND TYPE 2 DROP INLET. CONNECT TO NEW 12' x 10' RCB PER DETAIL C-904/SHEET GC-1 AND STRUCTURAL DETAILS S-144 AND S-906.
- G. INSTALL RCB PER TRENCH DETAIL C-902 / SHEET GC-1.
- U. INSTALL SLOPE PAVING PER DETAIL C-903/SHEET GC-1 THE BETWEEN BARRIER RAIL AND NEW CHANNEL WALL.
- AA. CUT EX 18" RCP STORM DRAIN AND CONNECT TO RCB WITH 12.5-LF OF NEW RCP SLOPED AT 50% MAXIMUM. INSTALL CONCRETE COLLAR PER DETAIL C-900 / SHEET GC-1 AT PIPE SAWCUT LOCATION.
- BB. REBUILD PORTION OF MSE WALL, BARRIER SLAB, AND BARRIER RAIL, REFER TO SHEET GS-5 FOR REPAIR DETAILS AND SPECIFICATION SECTION 640.
- CC. REBUILD PORTION OF CAST IN PLACE RETAINING WALL AND BARRIER RAIL, REFER TO SHEET S-3 FOR REPAIR DETAIL.



WARNING
IF THIS BAR DOES NOT MEASURE 1"
THEN DRAWING IS NOT TO SCALE

CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

PLAN AND PROFILE 10+00 TO 15+00

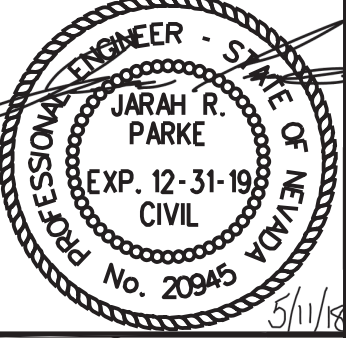
CENTRAL FREEWAY CHANNEL
AT CHEYENNE PROJECT
CITY OF NORTH LAS VEGAS

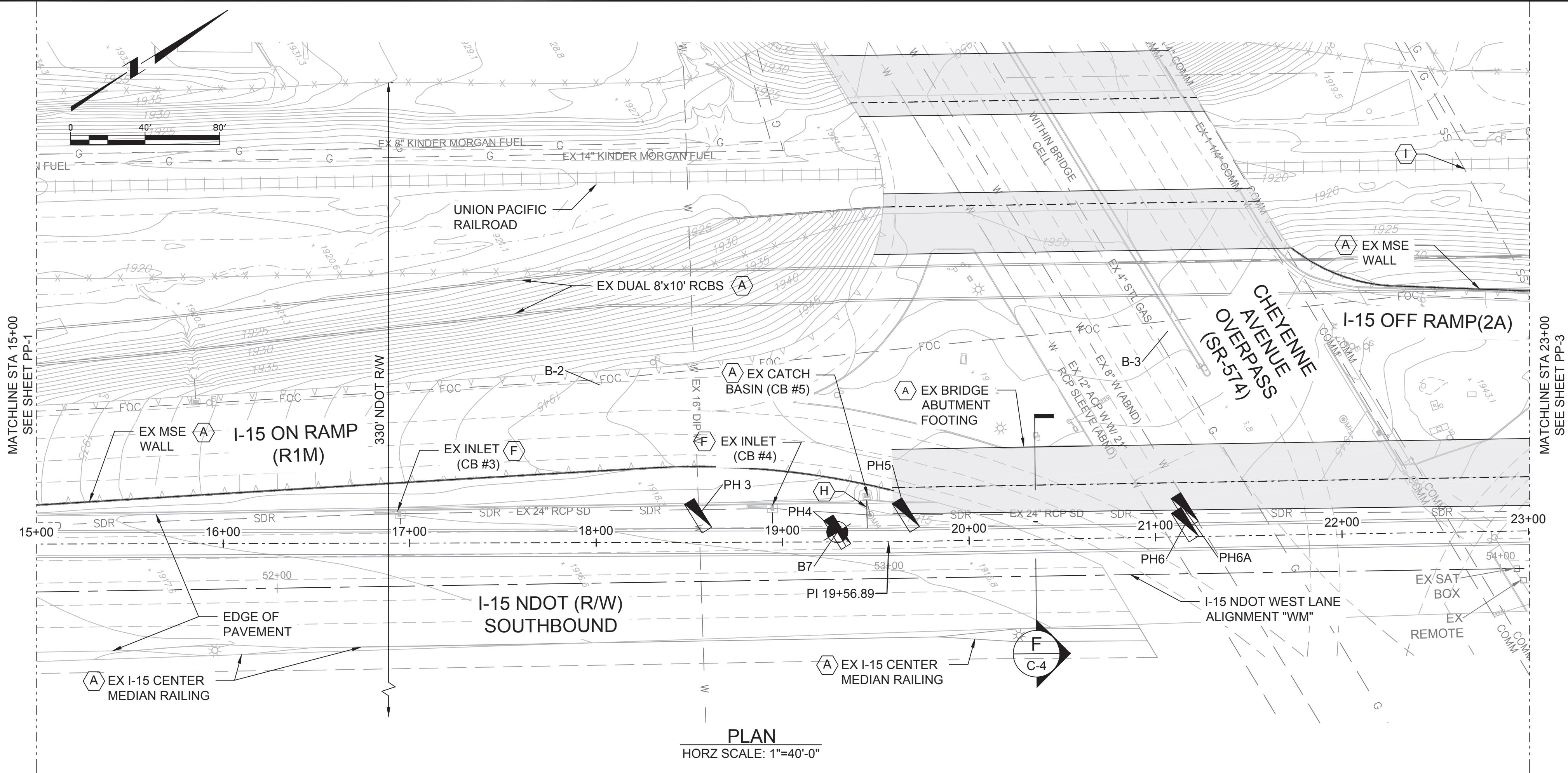
SHEET NO.

PP-1

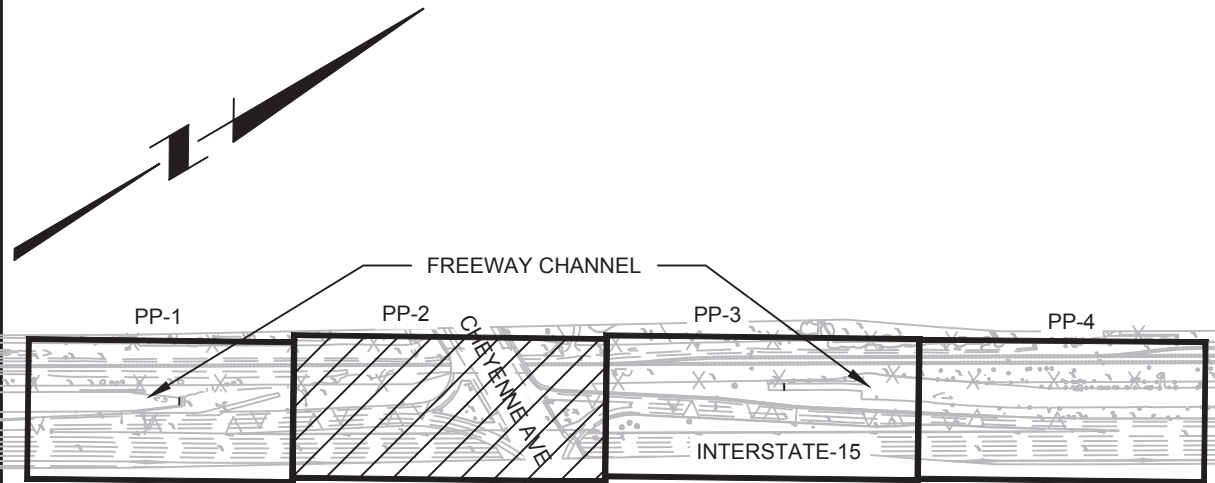
SHEET 10 OF 29

REVISIONS		SCALE: AS SHOWN	DESIGN: R. VALDEZ	DRAWN: T. BAE	CHECKED: J. HURLESS	APPROVED: J. PARKE	DATE: DECEMBER 2016
NO.	DESCRIPTION	RECORD DWG	BY	DATE	BY	DATE	BY
1				3/19/2018			





KEY PLAN

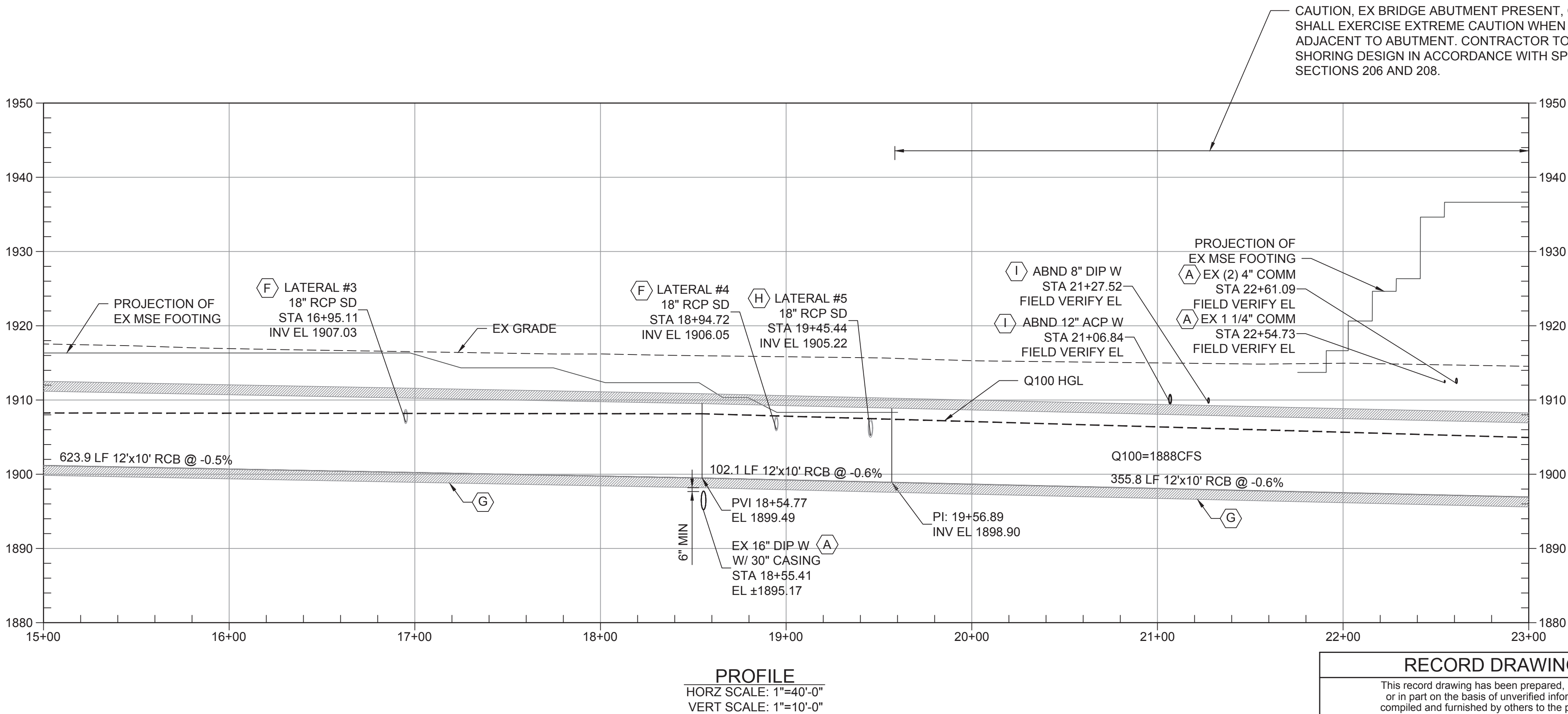


GENERAL NOTES

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- ALL EXISTING UTILITIES SHALL BE PROTECTED IN PLACE UNLESS SHOWN OTHERWISE.
- REPLACE ALL TRAFFIC CONTROL DEVICES (SIGNALS, LOOPS, CONDUITS, SIGNS, AND PAVEMENT MARKINGS), UNDER CITY OF NORTH LAS VEGAS AND NDOT JURISDICTION THAT ARE DISTURBED DURING CONSTRUCTION.
- REFER TO SHEETS R-1 AND R-2 FOR LIMITS OF SAWCUT PAVEMENT REPLACEMENT.
- RESTORE EXISTING GRADES AND SURFACES TO ORIGINAL CONDITIONS.
- CONTRACTOR SHALL LIMIT CONSTRUCTION WORK ACTIVITY TO WITHIN THE LIMITS OF THE RIGHT-OF-WAY.

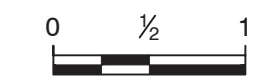
SHEET KEYNOTES

- A. PROTECT IN PLACE.
- F. REPLACE SLOTTED DRAIN AND TYPE 2 DROP INLET CONNECT TO NEW 12' x 10' RCB PER DETAIL C-904/SHEET GC-1.
- G. INSTALL RCB PER TRENCH DETAIL C-902 / SHEET GC-1.
- H. CUT EX RCP STORM DRAIN AND INSTALL CONCRETE COLLAR PER DETAIL C-900/SHEET GC-1 AND CONNECT TO NEW RCB PER STRUCTURAL DETAILS S-906 AND S-144. SLOPE BETWEEN CONCRETE COLLAR AND NEW RCB PER LATERAL ELEVATIONS DEPICTED ON PROFILE AND IN DETAIL C-904/SHEET GC-1.
- I. REMOVE AND DISPOSE EX ABANDONED WATER LINES IF IN CONFLICT WITH THE NEW RCB VERTICAL ALIGNMENT TO THE LIMITS OF THE TRENCH, CAP ENDS PER DETAIL C-905/SHEET GC-1.



RECORD DRAWING

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WARNING
IF THIS BAR DOES NOT MEASURE 1"
THEN DRAWING IS NOT TO SCALE

CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

PLAN AND PROFILE 15+00 TO 23+00

CENTRAL FREEWAY CHANNEL
AT CHEYENNE PROJECT
CITY OF NORTH LAS VEGAS

SHEET NO.

PP-2

SHEET 11 OF 29

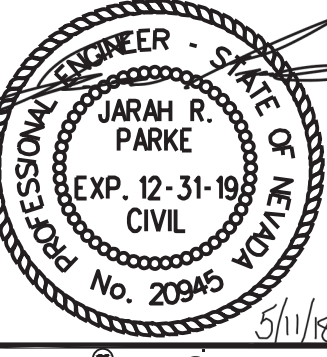
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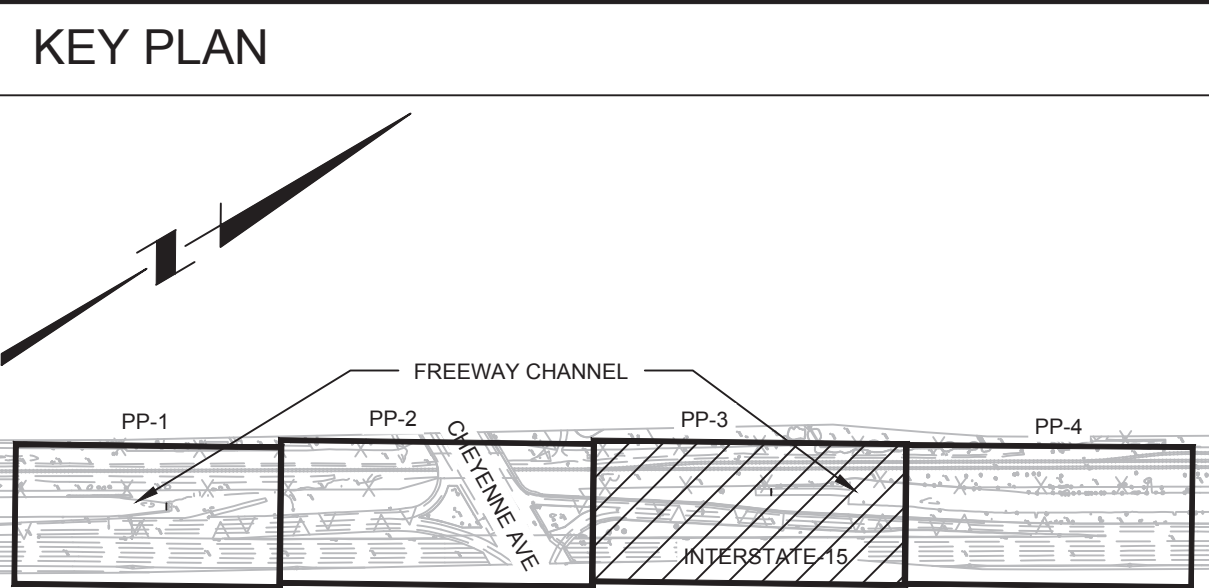
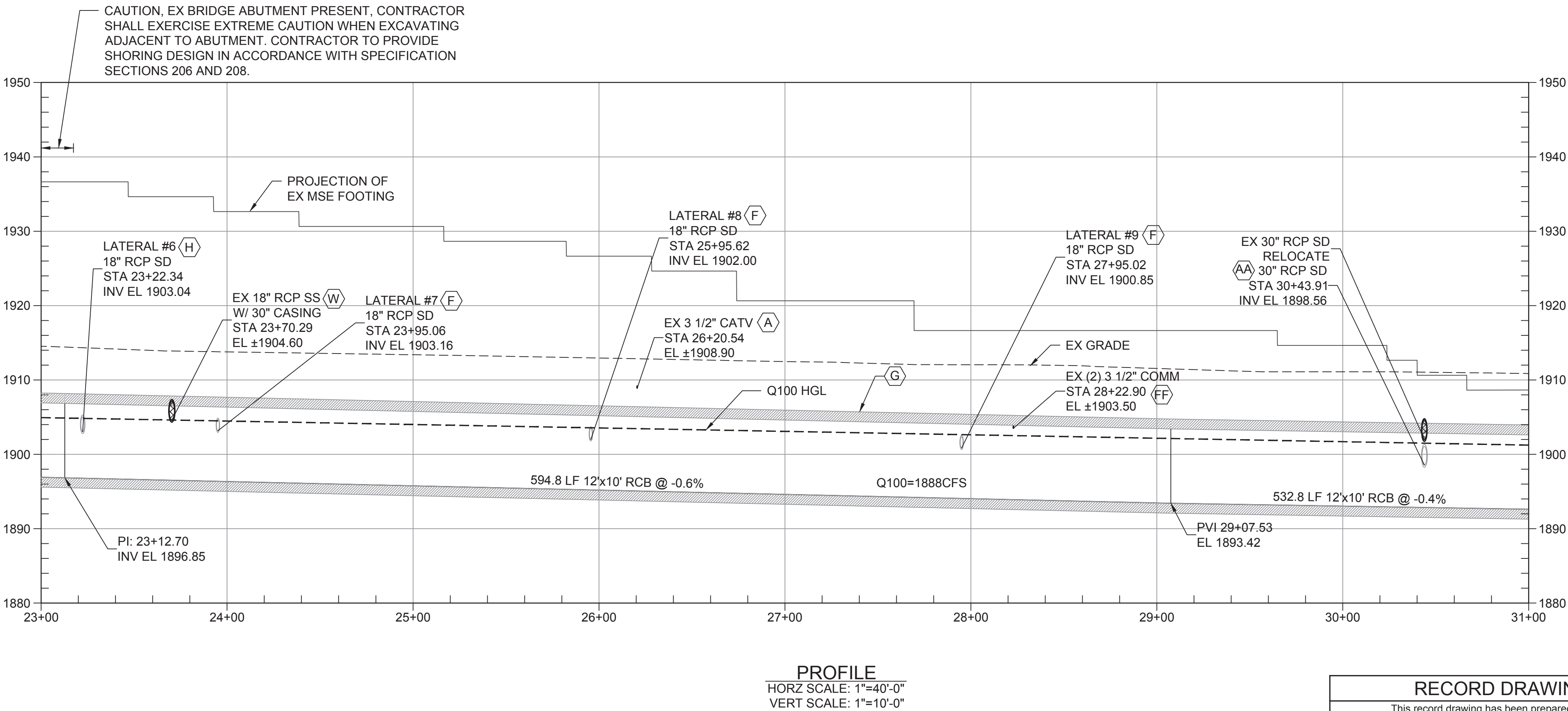
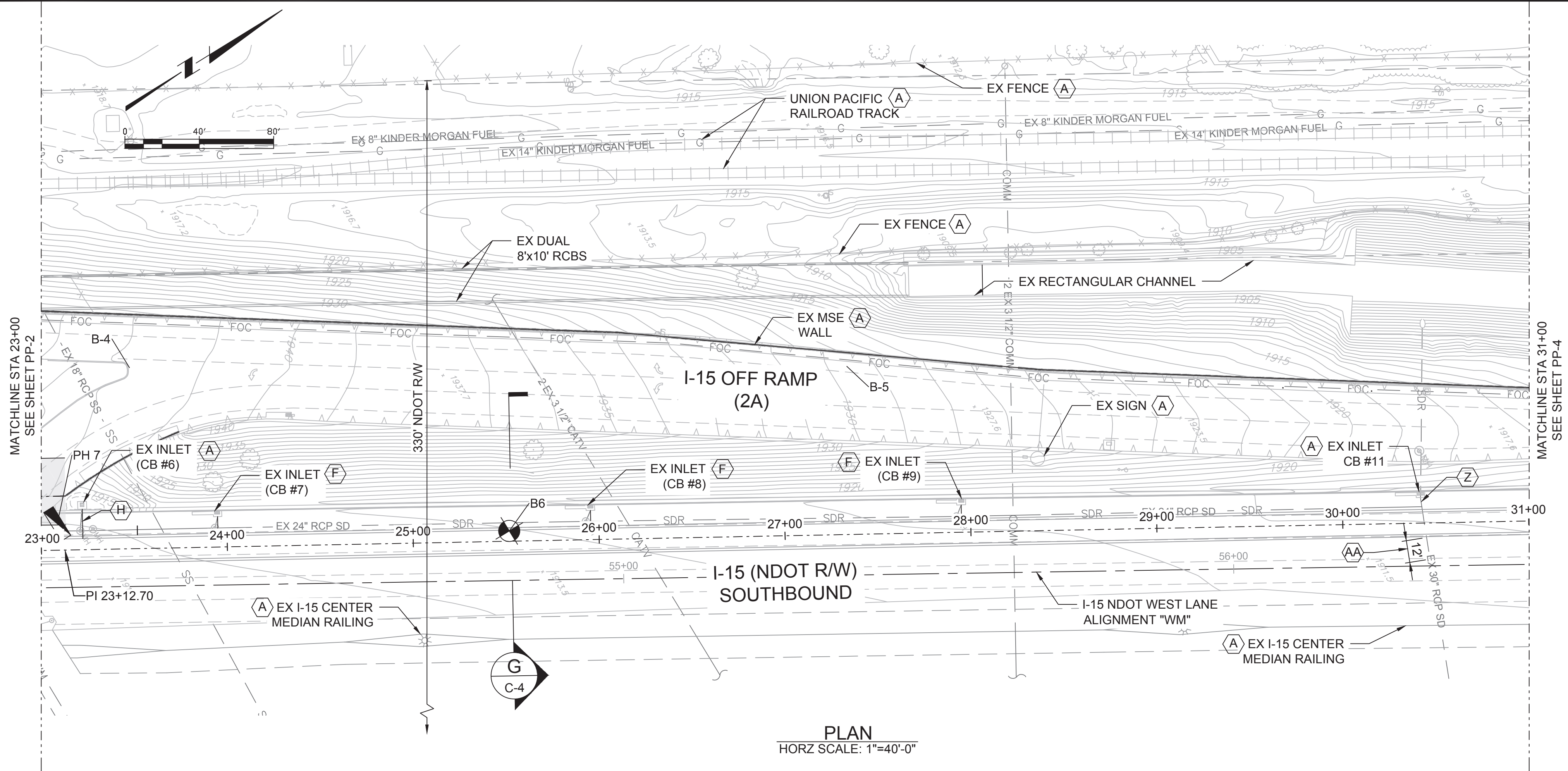
(PROJECT TITLE)

(LOCATION)

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	RECORD DWG	3/19/2018	BNR





- GENERAL NOTES**
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 - REFER TO SHEETS R-1 AND R-2 FOR LIMITS OF SAWCUT PAVEMENT REPLACEMENT.
 - RESTORE EXISTING GRADES AND SURFACES TO ORIGINAL CONDITIONS.
 - CONTRACTOR SHALL LIMIT CONSTRUCTION WORK ACTIVITY TO WITHIN THE LIMITS OF THE RIGHT-OF-WAY.

- SHEET KEYNOTES**
- A. PROTECT IN PLACE.
 - F. REPLACE SLOTTED DRAIN AND TYPE 2 DROP INLET. CONNECT TO NEW 12' x 10' RCB PER DETAIL C-904/SHEET GC-1 AND STRUCTURAL DETAILS S-906 AND S-144.
 - G. INSTALL RCB PER TRENCH DETAIL C-902 / SHEET GC-1.
 - H. CUT EX RCP STORM DRAIN AND INSTALL CONCRETE COLLAR PER DETAIL C-900/SHEET GC-1 AND CONNECT TO NEW RCB PER STRUCTURAL DETAILS S-906 AND S-144. SLOPE BETWEEN CONCRETE COLLAR AND NEW RCB PER LATERAL ELEVATIONS DEPICTED ON PROFILE AND IN DETAIL C-904/SHEET GC-1.
 - W. REMOVE EX 18" RCP SS WITH 30" STEEL CASING TO THE LIMITS OF THE RCB TRENCH. CAP ENDS PER DETAIL C-905/SHEET GC-1.
 - Z. CUT AND CAP EX RCP STORM DRAIN PROTRUDING FROM INLET. REMAINING RCP STUB LENGTH SHALL NOT EXTEND MORE THAN 12" FROM INLET WALL. INSTALL END CAP, SIMILAR TO DETAIL C-905 / SHEET GC-1.
 - AA. CUT EX 30" RCP STORM DRAIN AND CONNECT TO RCB WITH 12-LF OF NEW 30" RCP SLOPED AT 50% MAXIMUM. INSTALL CONCRETE COLLAR PER DETAIL C-900 / SHEET GC-1 AT PIPE SAW CUT LOCATION.
 - FF. EX CONDUIT CONFLICTS WITH RCB. PARTIALLY EXCAVATE ALONG CONDUIT TO EXPOSE CONDUIT, GAIN SLACK, AND RAISE CONDUIT OVER THE RCB. ENCASE CONDUIT IN CLSM AS PART OF THE BACKFILL PROCESS.

WARNING

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

PLAN AND PROFILE 23+00 TO 31+00

CENTRAL FREEWAY CHANNEL AT CHEYENNE PROJECT

CITY OF NORTH LAS VEGAS

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	RECORD DWG	3/19/2018	BNR

SCALE: AS SHOWN

DESIGN: R. VALDEZ

DRAWN: T. BAE

CHECKED: J. HURLESS

APPROVED: J. PARKE

DATE: DECEMBER 2016

PROJECT NO.

PP-3

SHEET 12 OF 29



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6. RESTORE EXISTING GRADES AND SURFACES TO ORIGINAL CONDITIONS.
7. CONTRACTOR SHALL LIMIT CONSTRUCTION WORK ACTIVITY TO WITHIN THE LIMITS OF THE RIGHT-OF-WAY.

- A. PROTECT IN PLACE.
- G. INSTALL RCB PER TRENCH DETAIL C-902 / SHEET GC-01.
- U. INSTALL SLOPE PAVING PER DETAIL C-903/SHEET GC-1 BETWEEN THE BARRIER RAIL AND NEW CHANNEL WALL.
- Z. CUT EX 24" RCP STORM DRAIN AND CONNECT TO CHANNEL WALL PER STRUCTURAL DETAIL S-144 / SHEET GS-1.



CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

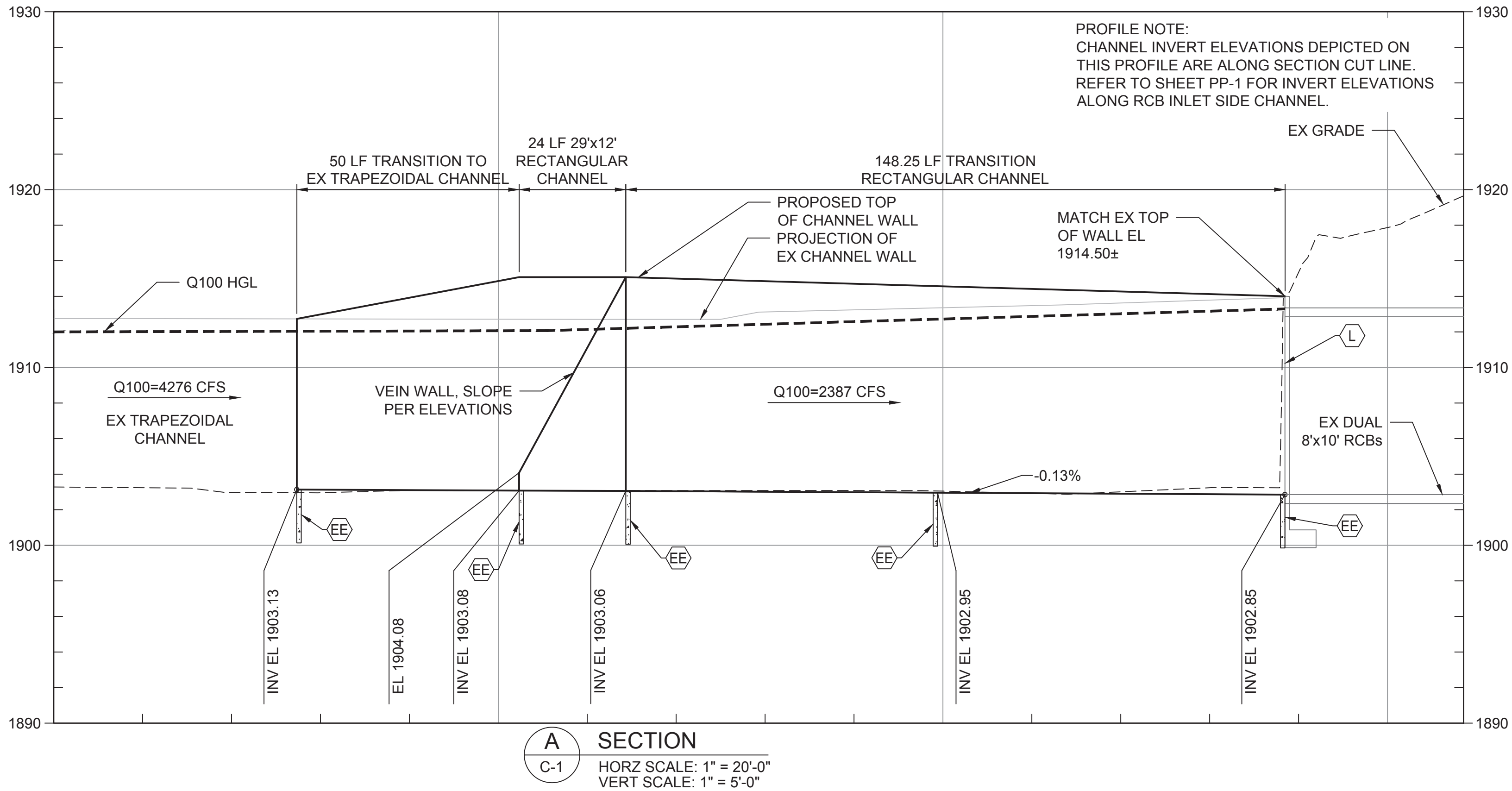
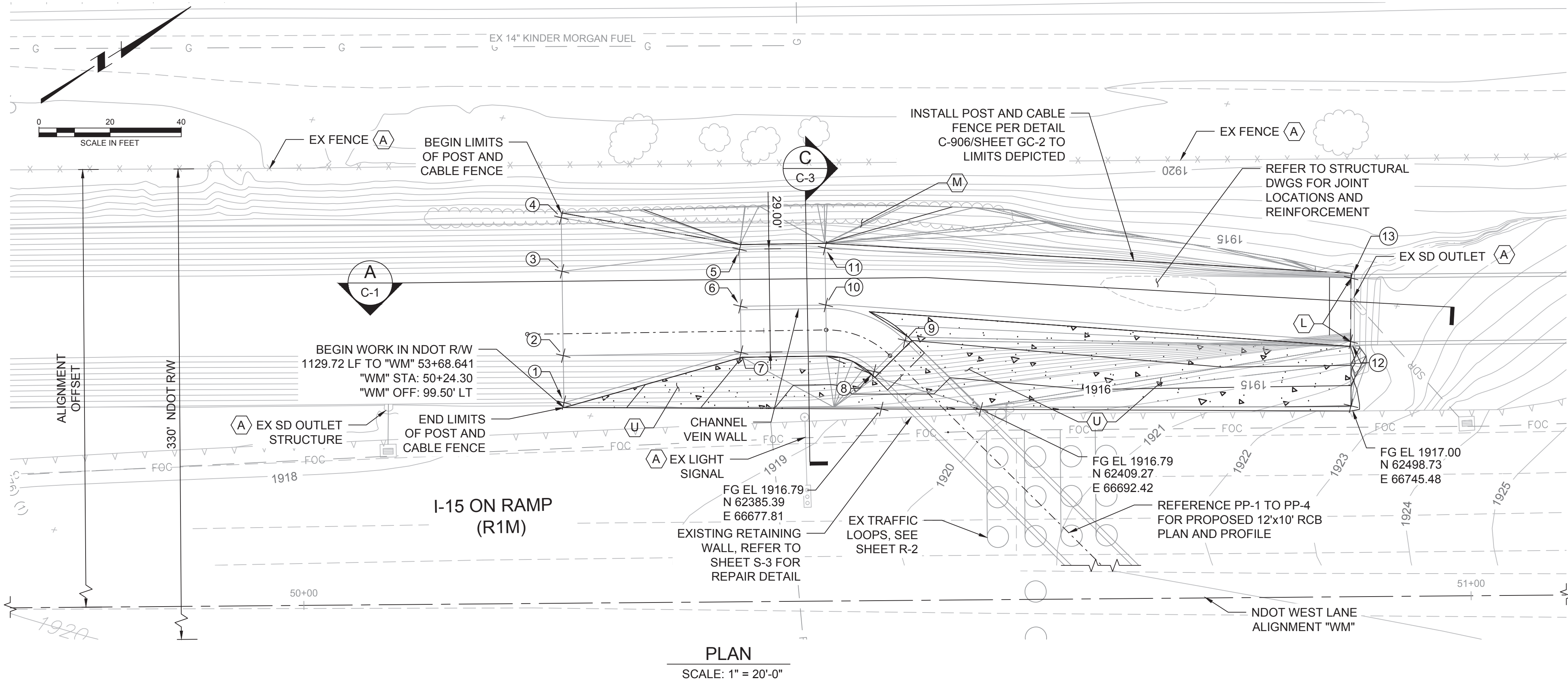
PLAN AND PROFILE 31+00 TO 36+92

**CENTRAL FREEWAY CHANNEL
AT CHEYENNE PROJECT**

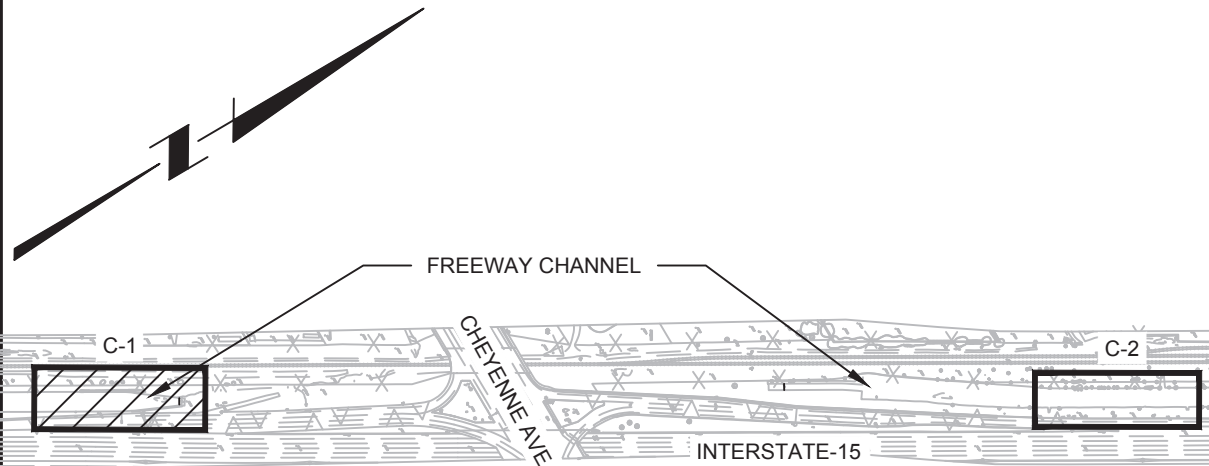
CITY OF NORTH LAS VEGAS

PP-4

SHEET 13 OF 29



KEY PLAN



GENERAL NOTES

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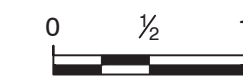
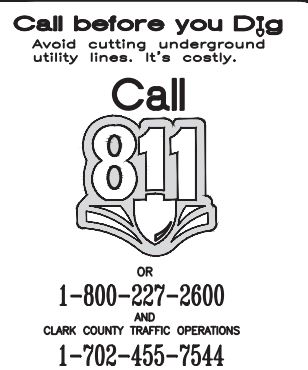
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SHEET KEYNOTES

- A. PROTECT IN PLACE
- L. TIE IN PROPOSED RECTANGULAR CHANNEL TO EX HEADWALL, REFER TO STRUCTURAL DWGS
- M. SELECT FILL PER SPECIFICATIONS
- U. SLOPE PAVING PER DETAIL C-903/SHEET GC-1 BETWEEN RETAINING WALL AND NEW CHANNEL WALL
- EE. CONSTRUCT CUTOFF WALL PER DETAIL S-109, S-109-A, & S-109 B/ SHEET GS-1. REFER TO SHEETS S-1 & S-4 FOR EXACT WALL LOCATIONS FROM STRUCTURE DIMENSIONS.

UPSTREAM STRUCTURE				
POINT #	NORTHING	EASTING	TOP OF WALL EL	INV EL
1	62310.03	66630.06	1913.16	N/A
2	62316.71	66618.66	N/A	1903.13
3	62328.69	66598.24	N/A	1903.13
4	62336.32	66585.23	1914.82	N/A
5	62374.58	66618.82	1915.08	1903.08
6	62366.49	66632.62	1904.08	1903.08
7	62359.91	66643.83	1915.08	1903.08
8	62389.12	66667.77	1915.04	1903.04
9	62401.07	66664.83	1915.04	1903.04
10	62387.19	66644.76	1915.06	1903.06
11	62395.28	66630.96	1915.06	1903.06
12	62508.04	66730.02	1914.50	1902.85
13	62517.39	66714.83	1914.50	1902.85



WARNING
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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

UPSTREAM TRANSITION STRUCTURE PLAN AND SECTION

CENTRAL FREEWAY CHANNEL AT CHEYENNE PROJECT CITY OF NORTH LAS VEGAS

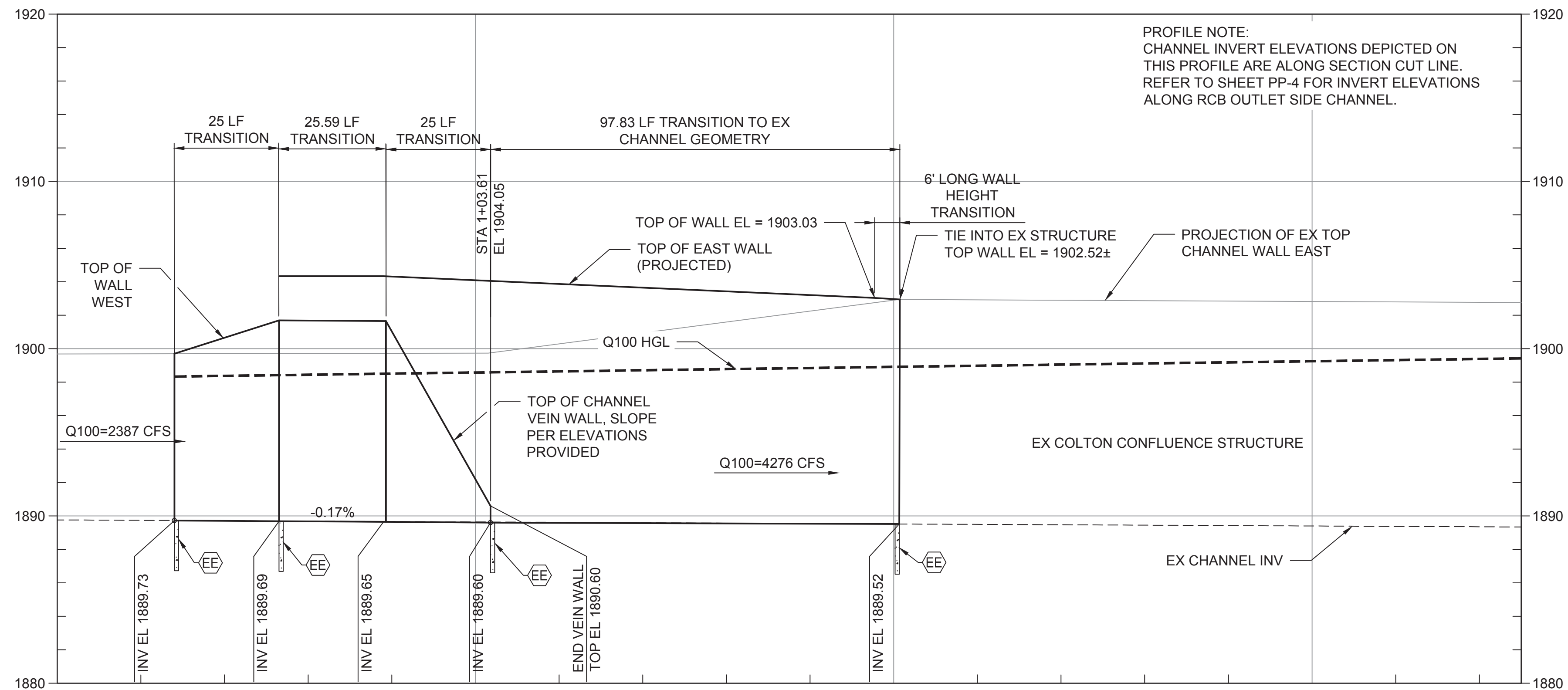
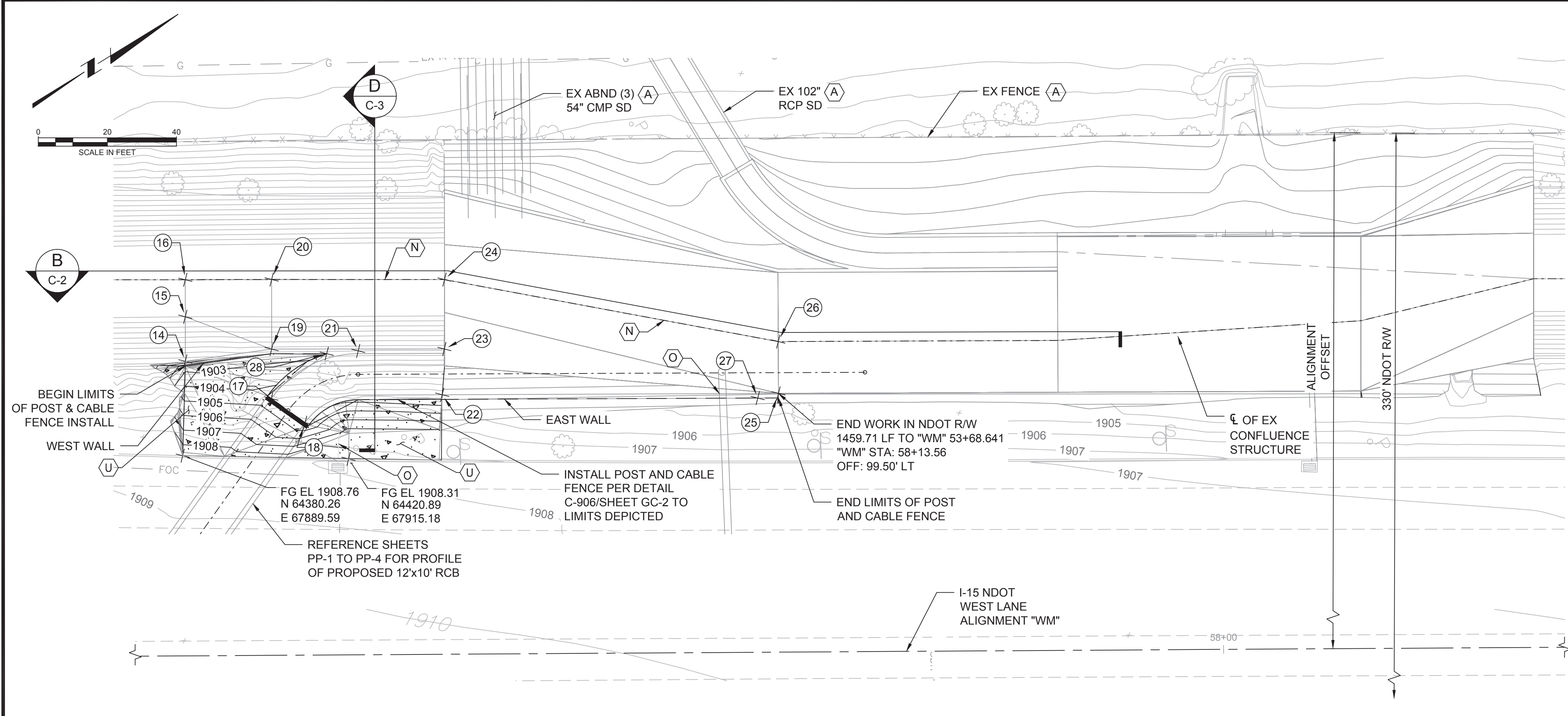
SHEET NO.

C-1

SHEET 14 OF 29

REVISIONS		SCALE: AS SHOWN	DESIGN: R. VALDEZ	DRAWN: T. BAE	CHECKED: J. HURLESS	APPROVED: J. PARKE	DATE: DECEMBER 2016
NO.	DESCRIPTION	RECORD DWG	BY	DATE	BY	DATE	BY
1				3/19/2018			



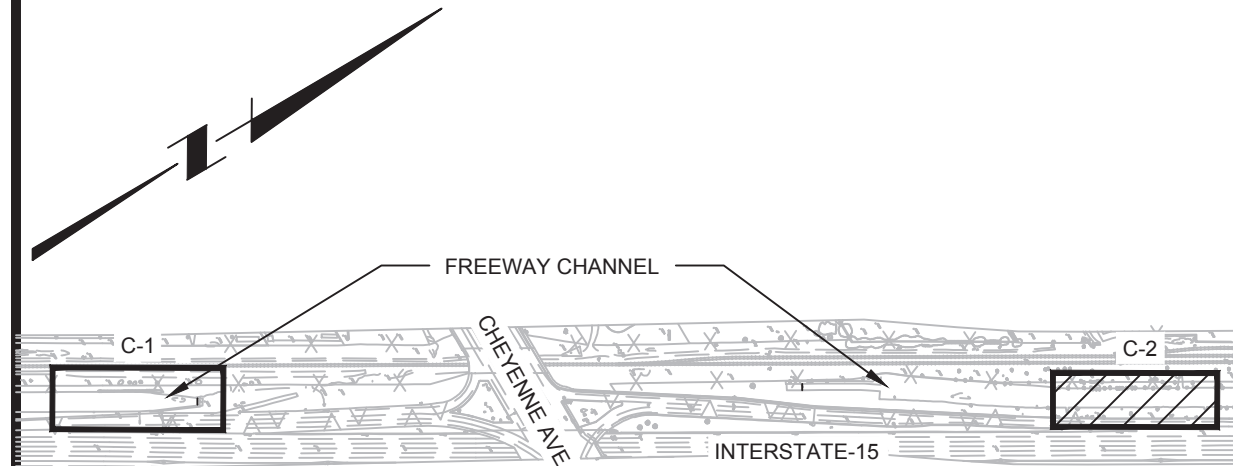


B SECTION
C-2
HORZ SCALE: 1" = 20'-0"
VERT SCALE: 1" = 5'-0"

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KEY PLAN



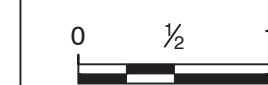
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- CONTRACTOR SHALL LIMIT CONSTRUCTION WORK ACTIVITY TO WITHIN THE LIMITS OF THE RIGHT-OF-WAY.

SHEET KEYNOTES

- A. PROTECT IN PLACE.
- N. EX CONCRETE CHANNEL TO BE CUT AT FLOWLINE, REFERENCE SHEET R-1 FOR LIMITS.
- O. TIE IN EX SD TO NEW CHANNEL GEOMETRY PER STRUCTURAL DETAILS
- U. INSTALL SLOPE PAVING PER DETAIL C-903/SHEET GC-1 BETWEEN BARRIER RAIL AND NEW CHANNEL WALL
- EE. CONSTRUCT CUTOFF WALL PER DETAIL S-109, S-109-A, & S-109 B/ SHEET GS-1. REFER TO SHEETS S-1 & S-4 FOR EXACT WALL LOCATIONS FROM STRUCTURE DIMENSIONS.

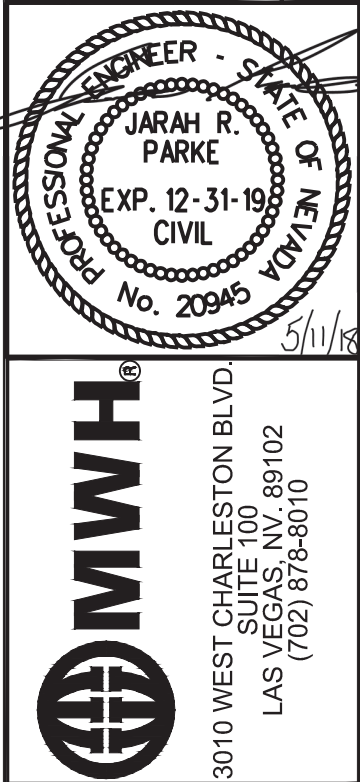
DOWNSTREAM STRUCTURE				
POINT #	NORTHING	EASTING	TOP OF WALL EL	INV EL
14	64395.03	67866.58	1899.73	N/A
15	64401.68	67855.54	N/A	1889.73
16	64407.21	67846.36	N/A	1889.73
17	64410.77	67888.68	1904.33	1890.83
18	64415.53	67899.69	1904.33	1890.83
19	64418.26	67876.47	1901.69	1889.69
20	64428.66	67859.20	N/A	1889.69
21	64439.43	67889.85	1902.23	1890.23
22	64453.69	67913.28	1903.10	1889.60
23	64461.06	67902.26	1890.60	1889.60
24	64471.48	67885.08	N/A	1889.60
25	64537.22	67963.23	1902.52	1889.52
26	64544.92	67950.35	N/A	1889.52
27	64531.39	67961.29	1903.03	1889.53
28	64431.21	67885.83	1902.36	1890.36



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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

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DESCRIPTION	RECORD DWG						
DATE	3/19/2018						
BY	BNR						



DOWNSTREAM TRANSITION STRUCTURE PLAN
CENTRAL FREEWAY CHANNEL
AT CHEYENNE PROJECT
CITY OF NORTH LAS VEGAS

SHEET NO.	C-2
SHEET 15 OF 29	

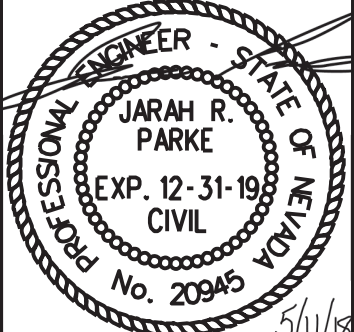


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- A. PROTECT IN PLACE
- P. TYPE II AGGREGATE BASE COMPACT TO 95% MIN DRY DENSITY
- Q. INSTALL POST AND CABLE FENCE PER DETAIL C-906 / SHEET GC-2
- R. STRUCTURAL FILL PER SPECIFICATIONS
- S. SELECTED BACKFILL PER SPECIFICATIONS
- T. SCARIFY NATIVE MATERIAL TO A MINIMUM 6" DEPTH AND COMPACT TO A MINIMUM 90% DRY DENSITY
- U. SLOPE PAVING PER DETAIL C-903/SHEET GC-1

SCALE: AS SHOWN		REVISIONS			
DESIGN:	R. VALDEZ	NO.	DESCRIPTION	DATE	BY
DRAWN:	T. BAE	1	RECORD DWG	3/19/2018	BNR
CHECKED:	J. HURLESS				
APPROVED:	J. PARKE				
DATE:	DECEMBER 2016				



SECTIONS I

CENTRAL FREEWAY CHANNEL AT CHEYENNE PROJECT

CITY OF NORTH LAS VEGAS

(DRAWING TITLE)

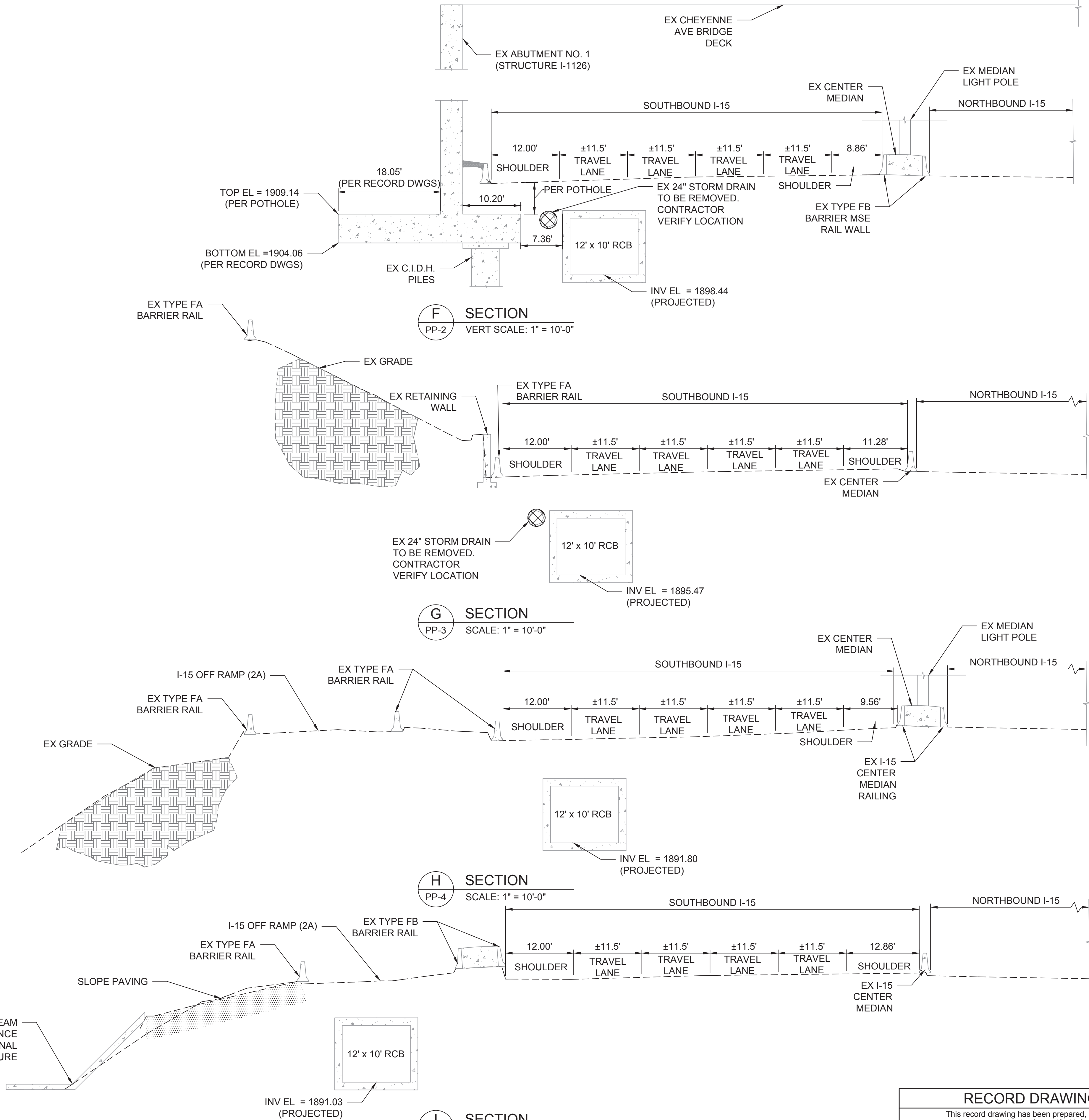
SHEET NO.

C-3

SHEET 16 OF 29



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CITY OF NORTH LAS VEGAS - DEPARTMENT OF PUBLIC WORKS - ENGINEERING SERVICES DIVISION

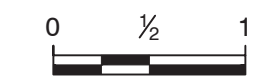
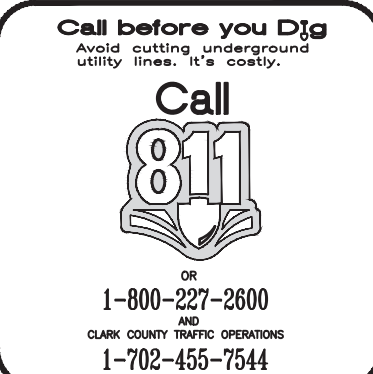
REVISIONS		DATE	BY
DESCRIPTION	RECORD DWG	3/19/2018	BNR
NO.	1		
SCALE: AS SHOWN		DESIGN: R. VALDEZ	BY
		DRAWN: T. BAE	BNR
		CHECKED: J. HURLESS	
		APPROVED: J. PARKE	
		DATE: DECEMBER 2016	

JARAH R. PARKE
EXP. 12-31-19
CIVIL
No. 20345

MWH
3010 WEST CHARLESTON BLVD
SUITE 100
LAS VEGAS, NV 89102
(702) 878-8010

SECTIONS II	PROJECT TITLE	LOCATION
CENTRAL FREEWAY CHANNEL AT CHEYENNE PROJECT		
CITY OF NORTH LAS VEGAS		

SHEET NO.	17 OF 29
C-4	



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Appendix F

Environmental Screening Assessment and Permits

Section 8 Environmental Screening Report

March 13, 2014

Ms. Jennifer Doody
City of North Las Vegas
2250 Las Vegas Boulevard North
North Las Vegas, Nevada 89030

**RE: BROOKS CHANNEL FLOOD CONTROL PROJECT SECTION 8
ENVIRONMENTAL SCREENING**

Dear Ms. Doody:

INTRODUCTION

This document provides an analysis of the potential environmental impacts related to the construction of the proposed Brooks Channel Flood Control Improvements. The project is located approximately 0.1-miles south of the intersection of Brooks Street and Losee Road, in North Las Vegas. The project would extend from Losee Road to the Central Freeway Channel facility running parallel to Interstate 15 (I-15). This analysis was conducted pursuant to Chapter 8 of the *Supplemental Programmatic Environmental Impact Statement, Clark County Regional Flood Control District (CCRFCD) 2002 Master Plan Update, Final September 2004* (BLM 2004), hereafter referred to as the SEIS, which outlines the process necessary to determine the appropriate level of National Environmental Policy Act (NEPA) documentation for a particular facility.

PROJECT DESCRIPTION

The Brooks Channel Flood Control Project will construct CCRFCD 2013 Master Plan Update (MPU) facilities LVBR 0000 and upgrade LVBR 0005 and 0011. The facility includes a storm crossing located beneath the existing Union Pacific Rail Road (UPRR) track alignment, which is located west of I-15. Specifically, the 1,000-linear foot project will consist of the following components:

- Installation of an enlarged reinforced concrete box (RCB) beneath Losee Road;
- Demolition of a deteriorated trapezoidal concrete channel, regarding and reconstruction of a new rectangular concrete channel;
- Construction of upsized storm drain pipe culvert crossing beneath the UPRR; and,
- Construction of a channel confluence section within the existing Central Freeway Channel alignment, located west of I-15.

Additionally, a local 400-linear foot storm drain system is also proposed to be installed within Losee Road north of the Brooks Channel crossing to alleviate localized flooding.



Figure 1.

Location of the Brooks Channel Improvements Project.

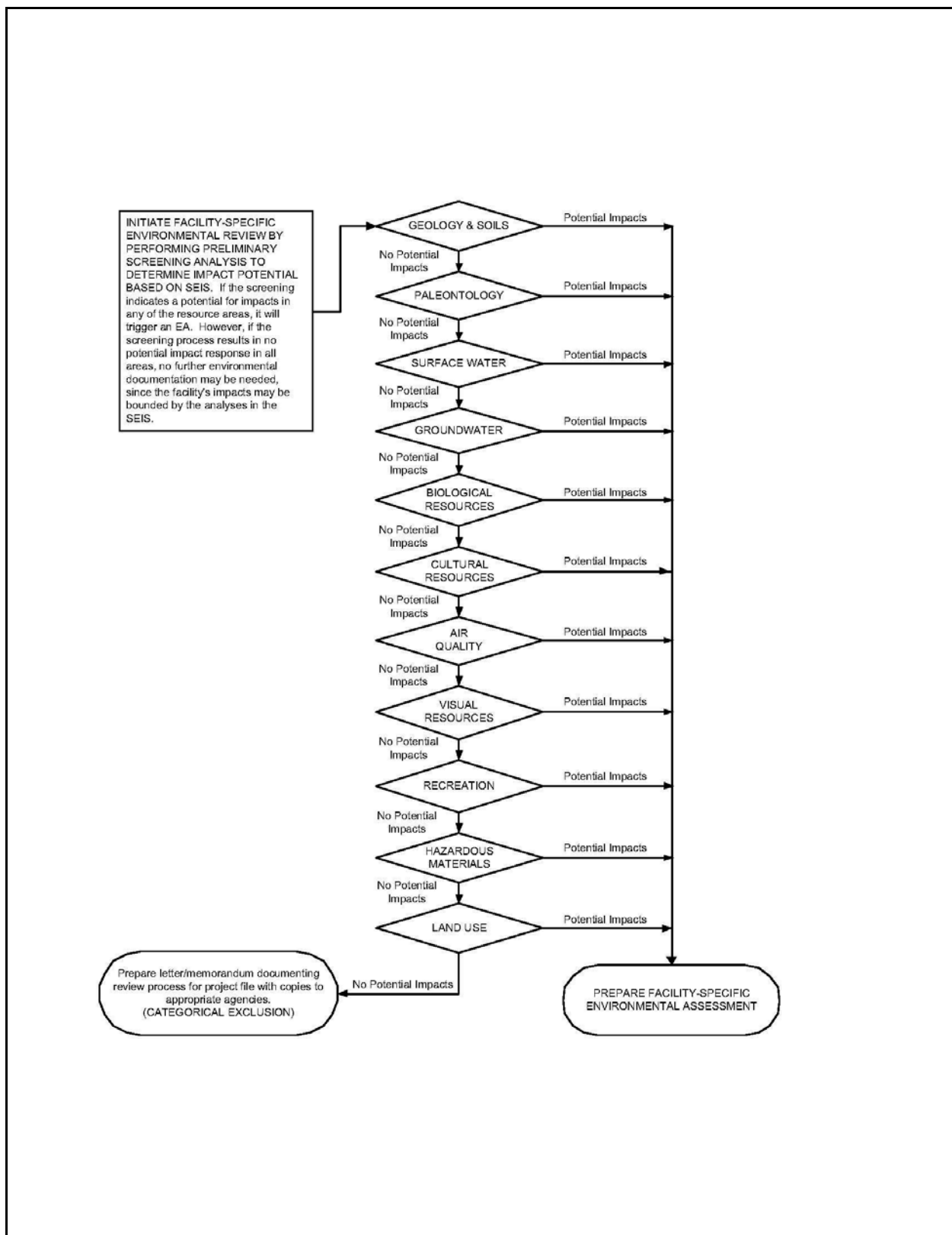
LVBR0005 is an existing trapezoidal concrete channel with an average width and height of 9-feet and 5-feet respectively. The channel is 375 feet long.

Finally, LVBR0000 will consist of a concrete lined trapezoidal channel with an average bottom width and height of 9-feet and 5.5-feet respectively and will connect facility LVBR0005 to LV150059 beneath the UPRR track alignment.

SECTION 8 SCREENING

The preliminary project-specific analysis process shown in **Figure 2** specifies that preliminary screening analyses be conducted for a series of potentially impacted resources. If no potential impacts are documented, the SEIS and associated Decision Record directs that a letter or memorandum documenting the review process should be prepared and submitted to the appropriate agencies. The project can then proceed without further analysis. This level of documentation conforms to the Bureau of Land Management Categorical Exclusion level of NEPA documentation.

NewFields conducted such screenings utilizing existing documents and other resources such as the SEIS, archaeological records stored at the Desert Research Institute in Las Vegas, and the CCRFCD Flood Zone Advanced web site.



Reference Source: BLM 2004, Figure 8.1-1

Figure 2. Preliminary Project-specific Analysis Screening Process

Field inspection, the SEIS, aerial photographs, and the CCRFCD web site indicate the project area consists mainly of previously developed commercial neighborhoods. From North 5th Street to the eastern end of the proposed project area, an industrial character is dominant. The area does not contain any unmodified geology, soils, or paleontological resources. However, the SEIS indicates that a series of alluvial faults extend across segments of the project area. The proximity of these faults should be mitigated through appropriate engineering design.

The project is designed to improve surface water flows in the area, so there would be a beneficial impact to this resource. Screening for compliance with Section 404 of the Clean Water Act was conducted. Excavation to construct the concrete channel and box culverts may impact or be impacted by groundwater resources because groundwater occurs at shallow depths in the project area (GeoTek, Inc 2010). Impacts to groundwater could be minimized through engineering design, stabilizing excavations or subgrades, and other Best Management Practices (BMPs), which would reduce potential impacts to insignificant levels.

An archaeological records search indicates that some important cultural resources have been recorded in the project area. Kiel Ranch is located at Carey and Losee and dates to the earliest non-native use of the Las Vegas Valley. However, the site will not be impacted by the proposed development. An architectural review revealed that no buildings more than 50 years old are located adjacent to the Area of Potential Effect (DuBarton 2014). The adjacent buildings consist of metal and concrete block buildings focused on commercial and industrial pursuits. None are eligible for listing on the National Register of Historic Places. Biologists surveyed the project area, and no threatened and endangered or species of concern were observed. Therefore, there would be no threat to these resources.

The proposed project would not change the existing land use and recreational opportunities found in the neighborhood, so there would be no threat to these resources. The visual character of the area would not be changed by the proposed project as the commercial/industrial character would remain the same. Potential spills of hazardous materials during construction would be minimized through BMPs such that potential impacts would be reduced to insignificant levels.

The project area is located in Hydrographic Basin 212 (Las Vegas Valley) where emissions of concern include PM₁₀, CO emissions, ozone precursors (nitrogen oxides [NO_x], and volatile organic compounds [VOC]). The Clark County Department of Air Quality and Environmental Management (CCDAQM), regulates and permits construction activities that generate air pollutants and fugitive dust within Clark County. In fulfilling this responsibility, the CCDAQM often requires implementation of mitigation measures, such as application of water combined with other dust suppressants. The contractor will be required to comply with all mitigation measures stipulated in the construction permits.

Other resources were considered at the programmatic level in the SEIS (BLM 2004). That document indicates there would be either short-term and minor, or no impacts to socioeconomics, transportation, noise, and environmental justice. Therefore, no facility-specific evaluations are necessary. The results of this screening are summarized in **Table 1**.

Table 1. Recommended Mitigation Measures for the Brooks Channel Project.

Resource	Potential Impact	Mitigation
Geology and Soils	Based on review of the CCRFCD SEIS and the Geotechnical Evaluation Report (GeoTek, Inc. 2010), a previously mapped subsidence fault crosses the proposed alignment. This fault is reportedly caused by subsidence-induced movement. Also, review of the Clark County Soils Guidelines Map (1998) indicates that soils in the project area are within a special geotechnical consideration area. These expansive soils may require special engineering design. Such design options reduce potential impacts to the proposed project.	Although geotechnical evaluations were previously completed for this project in 2010, more geotechnical investigations are planned prior to finalized design and construction. It is likely that any potential impacts could be mitigated to insignificance through engineering design.
Paleontology	The SEIS (BLM 2004) indicates that the proposed project is in an area of low paleontological potential. Additionally, field inspections, aerial photographs, and the CCRFCD web site indicate the project area consists of previously developed urban and industrial neighborhoods. Houses, buildings, transportation infrastructure, introduced plant landscaping, and graded/filled soils make up the current environment (see Figure 1). The area is unlikely to contain any paleontological resources.	None required.
Surface Water	The project is designed to improve surface water flows in the area, so there would be a beneficial impact to this resource. No adverse impacts to surface water are expected to occur, since the proposed project: (1) will not divert water from downstream habitat that depends upon that water, and (2) would occur in previously disturbed areas. Screening for compliance with Section 404 of the Clean Water Act was conducted by NewFields in August, 2012. The proposed project would disturb less than 2 acres of Waters of the United States, and therefore would qualify for the CCRFCD Regional General Permit (RGP) 7.	Mitigation measures should be implemented in compliance with those prescribed in the 404 permit.
Groundwater	The SEIS (BLM 2004) and the Geotechnical Evaluations Report (GeoTek, Inc. 2010) indicate that the proposed project is in an area of shallow groundwater (i.e., less than about 30 feet). Construction activities may affect, and be affected by, the shallow groundwater system (BLM 2004). It is unlikely that the proposed project would impact deeper groundwater aquifers, since seepage rates from shallow groundwater into these aquifers would be very low due to existing fine-grained geologic formations (BLM 2004).	Although geotechnical evaluations were previously completed for this project in 2010, more geotechnical investigations are planned prior to finalized design and construction. It is likely that any potential impacts could be mitigated to insignificance through engineering design, stabilizing excavations or subgrades, and other BMPs.

Table 1. Recommended Mitigation Measures for the Brooks Channel Project.

Resource	Potential Impact	Mitigation
Biological Resources	The SEIS (BLM 2004) indicates that some sensitive wildlife may occur in the project area. However, biologists surveyed the project area and found no threatened, endangered, or sensitive species. Construction activities will be short-term and temporary. Additionally, since the project occurs in a disturbed urban and industrial environment, neither construction nor operation of the facility will result in the temporary disturbance or permanent removal of previously undisturbed habitat. Therefore, no potential threats or impacts to these resources are expected to occur. The proposed project does not occur in an area of known distributions of noxious weeds.	None required.
Cultural Resources	The SEIS (BLM 2004) and the facility-specific evaluation described below indicate there are no potential threats or impacts to cultural resources. The SEIS (BLM 2004) indicates that the proposed project is in an area of low to moderate archaeological sensitivity, and moderate historical resources sensitivity. A facility-specific procedure was performed for the proposed Brooks Channel project that involved a literature review and field reconnaissance to identify any historic buildings in or near the proposed facility location. These studies found that previous cultural resource investigations adequately characterized the project area. No cultural resources or historic buildings will be impacted.	None required.
Transportation	The programmatic analysis in the SEIS (BLM 2004) indicate that there would be either short-term, minor, or no impacts to this resource, and that screening evaluations are not necessary at the project-specific level.	Consult with local transportation planning authorities, as required, and develop alternative traffic flow patterns or construction schedules if necessary, to minimize the potential for congestion and delays during construction.
Air Quality	The project area is located in Hydrographic Basin 212 (Las Vegas Valley) where emissions of concern include particulate matter of 10 microns in diameter or smaller (PM ₁₀), carbon monoxide (CO) emissions, ozone precursors (nitrogen oxides [NO _x], and volatile organic compounds [VOC]). The Clark County Department of Air Quality and Environmental Management (CCDAQM), regulates and permits construction activities that generate air pollutants and fugitive dust within Clark County. In fulfilling this responsibility, the CCDAQM often requires implementation of mitigation measures, such as application of water combined with other dust suppressants.	The contractor will be required to comply with all mitigation measures stipulated in the construction permits.
Visual Resources	The visual character of the area would not be changed by the proposed project as the character of the area would remain the same.	None required.

Table 1. Recommended Mitigation Measures for the Brooks Channel Project.

Resource	Potential Impact	Mitigation
Noise	The programmatic analysis in the SEIS (BLM 2004) indicates that there would be either short-term, minor, or no impacts to this resource, and that screening evaluations are not necessary at the project-specific level.	BMPs during construction would be implemented as necessary in accordance with County and City of North Las Vegas applicable statutes and permits.
Hazardous Materials	A Phase I Environmental Report was completed by Ninyo & Moore in August 2012. General solid waste debris consisting of wood, plastic, metal, and glass was observed across the project site. No evidence of Aboveground Storage Tanks or Underground Storage Tanks were observed on the project site. Review of environmental databases indicated that 54 facilities in the vicinity (but not adjoining) of the project site have handled hazardous materials or petroleum products and/or have been listed as reported releases of hazardous materials or petroleum products. Based on the distance from the project site, regulatory status of these facilities, and/or assumed groundwater flow direction in the vicinity of the project site, there is a low likelihood that these facilities represent and environmental concern to the project site at this time.	Standard hazardous waste and material management BMPs should be implemented during construction as required by applicable state and federal regulations, to minimize the generation of hazardous waste and ensure its proper disposal.
Land Use & Recreation	The proposed project would not change the existing land use and recreational opportunities found in the neighborhood, so there would be no threat to these resources. The proposed project is not within a wilderness study area.	None required.
Socioeconomics	The programmatic analysis in the SEIS (BLM 2004) indicates that there would be either short-term, minor, or no impacts to this resource, and that screening evaluations are not necessary at the project-specific level.	None required.
Environmental Justice	The programmatic analysis in the SEIS (BLM 2004) indicates that there would be either short-term, minor, or no impacts to this resource, and that screening evaluations are not necessary at the project-specific level.	None required.

CONCLUSIONS

In conclusion, this letter report serves as documentation that the upgrades proposed for the Brooks Channel would have no impacts to any resources providing that appropriate permitting procedures, BMP's, and engineering designs are incorporated into the construction procedures. Per the SEIS (BLM 2004), preparation of an Environmental Assessment is not necessary and this letter report serves as documentation that the proposed project does not require further NEPA documentation.

Sincerely,

NEWFIELDS COMPANIES, LLC

A handwritten signature in cursive script, appearing to read "Stephanie Locke".

Stephanie Locke
Senior Environmental Scientist

cc: Tim Sutko, CCRFCD

REFERENCES

BLM (Bureau of Land Management) 2004. *Supplemental Programmatic Environmental Impact Statement, Clark County Regional Flood Control District 2002 Master Plan Update, Final September 2004*. SWCA, Inc. Environmental Consultants, Las Vegas, Nevada.

CCRFGD (Clark County Regional Flood Control District) 2007. *Environmental Impact Study Reporting System*. Available online at: <http://breccia.ccrfgd.org/eisreport/>.

DuBarton, Anne 2014. *Cultural and Architectural Resources Overview for the Brooks Channel Storm Drain Improvements*. NewFields, Las Vegas, Nevada.

GeoTek, Inc. 2010. *Geotechnical Evaluation Report for the Brooks Flood Control Improvements North 5th Street to Interstate 15 North Las Vegas Nevada*. Prepared for the City of North Las Vegas Engineering Services Division.

Appendix F-2

Section 8 Approval Email

Jarah Parke

From: Tim Sutko <TSutko@regionalflood.org>
Sent: Wednesday, March 12, 2014 1:40 PM
To: Jill Reilly; Jarah Parke; Steve Parrish
Cc: Stephanie Locke (slocke@newfields.com); Sean Milne; Jennifer Doody; Shaun Fisher; Ken MacDonald
Subject: Brooks Channel Section 8 analysis

I have reviewed the Section 8 Environmental Screening Report prepared by NewFields for MWH Global on behalf of the City of North Las Vegas for the Brooks Channel and find it acceptable. The Brooks Channel includes 2013 MPU facilities **LVBR0000**, **LVBR0005** and **LVBR0011**. This 1000 linear foot project includes an RCB beneath Losee Road, replacement of a deteriorated trapezoidal concrete channel with a rectangular concrete channel, a new and enlarged culvert beneath the UPRR tracks, and a channel confluence section at the existing Central Freeway Channel. The proposed project also includes a 400 linear foot storm drain within the Losee Road alignment north of Brooks Channel.

The following resources may require mitigation:

Geology & Soils – standard engineering design and construction practices are expected to provide adequate mitigation.

Groundwater - standard engineering design and construction practices are expected to provide adequate mitigation.

Air Quality – The construction contractor will be required to comply with all mitigation measures stipulated on ground disturbance/grading permits obtained from the Clark County Department of Air Quality and Environmental Management.

Surface Water – Best Management Practices to control storm water quality exiting the construction site should be developed and included in the construction specifications. The proposed project includes fill activities that require a 404 Permit and the Corps Regulatory office should be contacted in this regard. It is anticipated that the Corps will permit this facility using the District's Regional General Permit 7.

Hazardous Materials – Standard hazardous waste and material management BMPs should be implemented during construction as required by applicable state and federal regulations in order to minimize the generation of hazardous waste and ensure its proper disposal.

With the exception of the 404 permit, the District's Policies and Procedures regarding environmental permitting as a pre-requisite for construction funding eligibility have been satisfied. Please provide the District with a copy of the 404 Permit when issued, or documentation that a 404 Permit is not required for this project.

Please don't hesitate to contact me if you have any questions or require additional information.

Thanks

Timothy E. Sutko
Senior Hydrologist/Environmental Mitigation Manager
Clark County Regional Flood Control District
600 S. Grand Central Parkway
Suite 300
Las Vegas, NV 89106

702 685-0000
702 685-0001 (FAX)
TSutko@regionalflood.org

U.S. Army Corps of Engineers – 404 Permit



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

June 3, 2014

Regulatory Division SPK-2014-00276-SG

Mr. Dan Le
City of North Las Vegas
2250 Las Vegas Boulevard North
North Las Vegas, Nevada 89030

Dear Mr. Le:

We are responding to your April 7, 2014 request for a Department of the Army permit for the Brooks Channel Flood Control Project. This approximately 795-linear feet (0.5941 acres) project involves activities, including discharges of dredged or fill material, in waters of the United States for installation of an enlarged reinforced concrete box (RCB) beneath Losee Road, removal of the deteriorated trapezoidal concrete channel and construction of a new rectangular channel downstream of Losee Road, construction of upsized storm drain crossing beneath the UPRR, and construction of a channel confluence section within the existing Central Freeway Channel alignment. A local storm drain system is also proposed to be installed within Losee Road north of the Brooks channel crossing to alleviate localized flooding. The project is located on Brooks Channel, Section 14, Township 20 S, Range 61 E, Mount Diablo Meridian, Latitude 36.21254°, Longitude -115.13067°, North Las Vegas, Clark County, Nevada (Enclosure 1).

Based on the information you provided, the proposed activity, resulting in the temporary impacts to approximately 795-linear feet (0.5941 acres) of an existing flood control channel, is authorized by Regional General Permit number #7: CONSTRUCTION AND MAINTENANCE OF FLOOD CONTROL FACILITIES IN CLARK COUNTY, NEVADA. Your work must comply with the general terms and conditions listed on the enclosed Regional General Permit information sheet (Enclosure 2) and the following special conditions:

Special Conditions

1. You shall comply with all terms and condition of the attached April 11, 2014 Section 401 Water Quality Certification (Enclosure 3).
2. Activities may not cause a take of any migratory birds, their parts, nests, eggs, and nestlings. Destruction of riparian vegetation shall be avoided to the maximum extent practicable. Unavoidable vegetation clearing and surface disturbance shall be conducted outside critical breeding, nesting, and fledging seasons. The USFWS recommends that a qualified biologist survey the area prior to land clearing for the presence of Western burrowing

owls. Holes, gaps or hollow spaces in the proposed facilities or structures could cause cavity-nesting migratory birds to enter and become entrapped in these spaces. Holes, as small as 0.75-inch in diameter, could trap birds. We recommend that gaps or narrow open hollow spaces in the proposed facilities or structures be closed during construction to prevent bird entry. In addition, open-ended posts of any material or color used to mark boundaries at construction sites should be capped; however, since caps can deteriorate over time, use of solid posts is preferred. To prevent raptors and other migratory birds from getting their feet trapped in metal sign posts, any exposed holes near the top of posts shall be filled with rivets, bolts or nuts.

You must sign the enclosed Compliance Certification and return it to this office within 30 days after completion of the authorized work (Enclosure 4).

This verification is valid from the date of this letter until the Regional General Permit expires on August 7, 2018 or is modified, reissued, or revoked, whichever comes first. Failure to comply with the General Conditions of this Regional General Permit, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey on our website under *Customer Service Survey*. For more information regarding our program, please visit our website at www.spk.usace.army.mil/Missions/Regulatory.aspx.

Please refer to identification number SPK-2014-00276-SG in any correspondence concerning this project. If you have any questions, please contact me at 196 E Tabernacle Street Room 30, St. George, Utah 84770, by email at Patricia.L.McQueary@usace.army.mil, or telephone at 435-986-3979.

Sincerely,



Patricia L. McQueary
Senior Regulatory Project Manager
St. George Regulatory Office
Sacramento District

Enclosures

cc: (w/o encls)

Mr. Tim Sutko, Environmental Mitigation Manager, Clark County Regional Flood Control District, 600 South Grand Central Parkway Suite 300 Las Vegas, NV 89106-4511

Ms. Jean Stone, NDEP, 901 S. Stewart Street Suite 4001, Carson City, Nevada 89701-5249

Mr. Jason Ferrin, NDEP, 901 S. Stewart Street Suite 4001, Carson City, Nevada 89701-5249

COMPLIANCE CERTIFICATION

Permit File Number: SPK-2014-00276-SG

Regional General Permit Number: #7

Permittee: Mr. Dan Le
City of North Las Vegas
2250 Las Vegas Boulevard North
North Las Vegas, Nevada 89030

County: Clark

Date of Verification: June 1, 2014

Within 30 days after completion of the activity authorized by this permit, sign this certification and return it to the following address:

U.S. Army Corps of Engineers
Sacramento District
St. George Field Office
196 East Tabernacle Street Room 30
St. George, Utah 84770
Patricia.I.mcqueary@usace.army.mil

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of the permit your authorization may be suspended, modified, or revoked. If you have any questions about this certification, please contact the U.S. Army Corps of Engineers.

* * * * *

I hereby certify that the work authorized by the above-referenced permit, including all the required mitigation, was completed in accordance with the terms and conditions of the permit verification.

Signature of Permittee

Date

Jarah Parke

From: Tim Sutko <TSutko@regionalflood.org>
Sent: Wednesday, March 12, 2014 1:40 PM
To: Jill Reilly; Jarah Parke; Steve Parrish
Cc: Stephanie Locke (slocke@newfields.com); Sean Milne; Jennifer Doody; Shaun Fisher; Ken MacDonald
Subject: Brooks Channel Section 8 analysis

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Thanks

Timothy E. Sutko
Senior Hydrologist/Environmental Mitigation Manager
Clark County Regional Flood Control District
600 S. Grand Central Parkway
Suite 300
Las Vegas, NV 89106

702 685-0000
702 685-0001 (FAX)
TSutko@regionalflood.org

Appendix G

Notification Letter to Residents

Mayor
John J. Lee

City Manager
Dr. Qiong X. Liu, P.E., PTOE

Council Members
Anita G. Wood
Pamela A. Goynes-Brown
Wade W. Wagner
Isaac E. Barron

Public Works Department
Engineering and Construction Services Division
2250 Las Vegas Boulevard, North • Suite 610 • North Las Vegas, Nevada 89030
Telephone: (702)633-1206 • Fax: (702)633-1158 • TDD: (800)326-6868
www.cityofnorthlasvegas.com

September 17, 2015

Subject: Brooks Channel Flood Control Project – Conditional Letter of Map Revisions (CLOMR) Request to FEMA

Dear Property Owner:

You are receiving this letter because your property is adjacent to the limits of Brooks Channel. Brooks Channel is categorized as a Special Flood Hazard Area (SFHA) approximate Zone "A" on the Flood Insurance Rate Map (FIRM) published by the Federal Emergency Management Agency (FEMA). This FIRM is included as an attachment to this letter.

The City of North Las Vegas will construct new channel portion as well as a storm drain sewer system within Losee Road to direct flows towards Interstate-15 (I-15). The improvements will remove the SFHA Zone "A" as flood flows will be captured and conveyed within the proposed channel.

The City of North Las Vegas is processing SFHA modification through a formal Conditional Letter of Map Revision (CLOMR) request to FEMA. Legal notification to all property owners affected by the proposed action is required. This letter shall be considered your legal notification of the proposed changes. If you have any questions regarding this notification, or wish to request additional information regarding the CLOMR request, please contact the City of North Las Vegas Department of Public Works.

Sincerely,

Dan Le, P.E., CFM
Public Works Project Manager
Phone: 702-633-1932
Email: led@cityofnorthlasvegas.com

DL/rvv

Attachment: FEMA FIRM Map

Mayor
John J. Lee

City Manager
Dr. Qiong X. Liu, P.E., PTOE

Council Members
Anita G. Wood
Pamela A. Goynes-Brown
Wade W. Wagner
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www.cityofnorthlasvegas.com

Septiembre 17, 2015

Subject: Brooks Channel Flood Control Project – Conditional Letter of Map Revisions (CLOMR) Request to FEMA

Estimado Dueño de Propiedad:

Usted está recibiendo esta carta porque su propiedad se encuentra junto a los límites del Canal Brooks. Una parte del canal Brooks está clasificado como una Área Especial de Inundaciones de Peligro (SFHA) Zona "A" en el mapa "Flood Insurance Rate Map" (FIRM), publicado por la Agencia Federal de Manejo de Emergencias (FEMA). El mapa "FIRM" se incluye como anexo a esta carta.

La Ciudad de North Las Vegas va a construir un nuevo canal y sistema de drenaje cruzando Losee Road hasta la carretera interestatal 15 (I-15). El sistema de canal y drenaje capturará los flujos de inundación y los transportara por debajo del suelo. El sistem de drenaje retirara la Zona "A" de inundaciones.

La Ciudad de North Las Vegas está procesando la modificación a la Zona "A" de inundaciones través de una solicitud CLOMR para revisar el mapa FIRM. Se requiere la notificación legal a todos los propietarios afectados por la actuación propuesta. Esta carta se considerará la notificación legal de los cambios propuestos. Si usted tiene alguna pregunta acerca de esta notificación, o si desea solicitar información adicional sobre la solicitud CLOMR, por favor póngase en contacto con la Ciudad de North Las Departamento de Obras Públicas Vegas.

Atentamente,

Dan Le, P.E., CFM
Public Works Project Manager
Phone: 702-633-1932
Email: led@cityofnorthlasvegas.com

DL/rvv

Anexo: Mapa "FIRM"

	PARCEL NO.	OWNER NAME:	OWNER MAILING ADDRESS:	PARCEL ADDRESS:
1	139-15-615-002	HARLAN LAND CO.	9010 E TOLLHOUSE RD CLOVIS CA 93619-9751	204 E MAYFLOW AVENUE
2	139-15-615-025	5599 INC.	201 E MAYFLOWER AVE NORTH LAS VEGAS NV 89030-3962	201 E MAYFLOWER AVENUE
3	139-15-603-006	5TH & BROOKS LLC	5180 ROGERS ST LAS VEGAS NV 89118-1543	
4	139-14-201-009	JAVSE CORINTHIAN LLC	15-04 130TH ST COLLEGE POINT NY 11356-2418	570 CORINTHIAN WAY
5	139-14-201-014	JARAMILLO FAMILY TRUST AND JARAMILLO GEORGE & JENNY L TRS	3095 E VIKING RD LAS VEGAS NV 89121-4313	
6	139-14-201-011	PARISH FAMILY TRUST AND MARITAL TR	P O BOX 715 COLMESNEIL TX 75938-0715	2861 LOSEE ROAD
7	139-14-202-005	DEVELOPMENT CO AMERICA	P O BOX 520 WESTMINSTER MD 21158-0520	2860 LOSEE ROAD
9	139-14-202-011	FULLER-HEIN PROPERTIES	P O BOX 759 CARDIFF CA 92007-0759	
10	139-14-202-010	FULLER-HEIN PROPERTIES	P O BOX 759 CARDIFF CA 92007-0759	2900 LOSEE ROAD

Appendix H

Data CD