DS #: 4533

APN: 138-02-202-015

PROJECT: FIRESTONE AT RANCHO & RED COACH

SUBMITTAL: 2ND

SCANNED BY/DATE: _____

CHECKED BY/DATE: _____

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: August 30, 2011
TO: **Land Development Services** Department of Public Works				**FROM:** Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Firestone at Rancho & Red Coach**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	SWC of Rancho Dr. & Red Coach Ave.			Firestone
File Number:	F:\Depot\DSMemos\DS4533B-ZNAE.doc			Bart Anderson, P.E., DevCo
Parcel Number:	138-02-202-015			CCRFCD
Zoning Action:	SDR-41578 & VAR-41579			NDOT
FEMA Flood Zone	YES X	NO		
Proposed Storm Drain	YES	NO X		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	7/20/2011	8/2/2011	Not Approved	$400.00	173128: $400
2nd Submittal	8/23/2011	8/29/2011	See Comments Below	$400.00	175552: $400
			TOTAL FEES (LDDRS):	**$800.00**	----

REMARKS: A portion of this site is located in a FEMA Special Flood Hazard Area, Zone AE. No mapping changes to the Flood Zone are proposed to be submitted to FEMA with this development.

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
X	is conditionally approved subject to Clark County Regional Flood Control District concurrence.

1. Flood Control will not recommend FEMA review and approval based upon the flood zone impacts. The provided HEC-RAS analysis shows negligible changes from the existing model to the proposed condition. Minor changes are shown to cross sections that were added into the model. The overall effect to the mapped flood zone is negligible. No structures are proposed within the FEMA Flood Zone.

2. The site is located in a **FEMA Zone AE**. Clark County Regional Flood Control District (CCRFCD) review and approval is required prior to the final acceptance of the drainage study by the City of Las Vegas. The engineer must send a copy of the report to the CCRFCD for review.

3. The existing public drainage easement (privately maintained) shown on Parcel Map File 111, Page 0012 for the eastern portion of the site is to remain. The Flood Zone is within this easement area and this easement cannot be vacated. Revise the grading plan accordingly.

4. It is recommended that the existing 10-foot wide public drainage easement crossing the western portion of the site as shown on Parcel Map File 111, Page 0012 be vacated as this project proposes a new 10-foot wide public drainage easement to be privately maintained along the southern boundary. The new easement must be granted and recorded by separate document prior to the final acceptance of the improvement plans.

5. Revise the flood zone boundary line at the northwest corner of Rancho Drive and Red Coach Avenue to include the existing swale alignment.

6. No improvements are proposed within the NDOT right-of-way for Rancho Drive.

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on July 1, 2011. If there are any questions regarding these new requirements, please contact Robert Welch in the Flood Section at (702) 229-2177 or Rick Schroder in Traffic Engineering at (702) 229-6327.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

NOTES: This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

END OF REMARKS

ays

T/R/S: T20S/R60E/02
AREA L-02

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

DS 4533

TRANSMITTAL

To: Albert Sung, P.E. **Date:** August 23, 2011

City of Las Vegas **Project No.:** RCI1104.000
333 N. Rancho Drive
Las Vegas, NV 89106

From: Kylie Rowbury, P.E.

Subject: Addendum No. 1 to the Technical Drainage Study for Firestone at Rancho & Red Coach

CC: Mark Failla, SHG **CC:**
CC: Eric Rietz, Rietz Consulting **CC:**
CC: **CC:**

Transmitting Via:
- ☐ Mail
- ☒ Messenger / MDS
- ☐ Federal Express
- ☐ Pickup

For:
- ☒ Review & Comment
- ☐ Per your Request
- ☐ Information/File

Acknowledgement of Receipt:
- ☐ Not Required
- ☒ Acknowledgement Required

Received By: AYS
Date: 8/23/11 Time: 4:55 PM

Copies	Description
1	$400 Submittal Fee (Check # 2358)
1	Addendum No. 1 to the Technical Drainage Study for Firestone at Rancho & Red Coach
1	Grading Plans & Details (bound)
1	Stamped and Signed Standard Form 1 (bound)
1	CD containing PDF of submittal documents & electronic HEC-RAS Analysis

PAID
AUG 24 2011
Development Service Center

Comments:

Enclosed please find the above listed items in support of our application of *Addendum No. 1 to the Technical Drainage Study for Firestone at Rancho & Red Coach*. Please contact us if there are any questions at 702-284-5300. Thanks.

Signed: Kylie Rowbury
Kylie Rowbury, P.E.

G:\SHG\Office Forms\Transmittal.doc

Please, notify us at (702) 284-5300 if there are any problems receiving this transmission.

City of Las Vegas

Development Services Center

731 South Fourth Street

Las Vegas, NV 89101

08/24/2011 08:27 Trn 175552
Cashier 890381

PRJ Permit # DS4533	$400.00
Subtotal	**$400.00**
Tax	$0.00
Total	**$400.00**
Received CHECK	$400.00
Check # 2358	
Change	$0.00

For questions related to this receipt call

702-229-6251

Mainframe GR # _____

Hansen Application # DS 4533

Hansen Fees $ 400

CLV Employee _____

☐ Planning

☒ Public Works

LDDRS Acct # 270040

Rec'd: 8/23/11

DS453

L-02

$400-

FEMA ZONE AE

SLATER HANIFAN GROUP

CONSULTING ENGINEERS & PLANNERS

5740 S. ARVILLE STREET, SUITE 216
LAS VEGAS, NEVADA 89118
PHONE: 702-284-5300 • FAX: 702-284-5399

TECHNICAL DRAINAGE STUDY
ADDENDUM NO. 1

Firestone at
Rancho & Red Coach

City of Las Vegas, Nevada

Job No.: RCI1104.000
Date: August 2010

Prepared By:
Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 ▪ Fax: 702-284-5399

Prepared For:
Firestone (c/o Jones Lang LaSalle Americas)
515 South Flower Street, Suite 1300
Los Angeles, CA 90071
Phone: 323-395-4601 ▪ Fax: 323-733-5347

Kylie Rowbury, P.E.
NV Professional Engineer No. 21172

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Firestone at Rancho & Red Coach – Addendum No. 1 Date: August 2011

Location of Development: a) Descriptive (Cross Streets): North/South: Rancho Drive

East/West: Red Coach Avenue

b) Section: 2 Township: 20 S Range: 60 E

c) APN: 138-02-202-015

Name of Owner/Developer: Tass C. Hardin & Lois I. Hardin Revocable Family Trust / Firestone (c/o Jones Lang LaSalle Americas)

Telephone No.: (323) 395-4601 Fax No.: (323) 733-5347 E-mail Address: Carrie.Gillis@am.jll.com

Address: 515 South Flower Street, Suite 1300, Los Angeles, CA 90071

Contact Person – Name: Kylie Rowbury, P.E. Telephone No.: (702) 284-5300

*E-mail Address: krowbury@shg-inc.com Fax No.: (702) 284-5399

Firm: Slater Hanifan Group

Address: 5740 S. Arville St. #216, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivison Map	☐	Clearing and grading Only
☐	Parcel Map	☐	Planned Unit Development	☒	Other (Please specify below)
☐	Large Parcel Map	☐	Building Permit		Commercial Development

1. Total Owned Land Area: At Site: ± 1.18 acres Being Developed/Disturbed: ± 1.18 acres

2. Is a portion or all of the subject property located in a FEMA Flood Hazard Area? ☒ Yes** ☐ No

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ Yes** ☒ No

4. Proposed type of development (Residential, Commercial, Etc.): Commercial

5. Approximate upstream land area which drains to the subject site: ± 1.8 acres

6. Has the site drainage been evaluated in the past? ☐ Yes** ☒ No If yes, please identify documentation:

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Rancho Drive alignment

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

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

*Newly Required Field

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

Revision	Date

Engineer's Seal

Local Entity File No.

REFERENCE: STANDARD FORM 1

Updated 05/01/2008

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

RCI1104.000

August 23, 2011

Albert Sung, P.E. – Flood Control Project Engineer
City of Las Vegas Department of Public Works
333 N. Rancho Drive
Las Vegas, Nevada 89106

Subject: Addendum No. 1 to the Technical Drainage Study for Firestone at Rancho & Red Coach (CLV # DS4431)

Dear Mr. Sung:

This letter is submitted in response to comments contained in the August 2, 2011 review memorandum, regarding the above referenced project. A copy of the City of Las Vegas (CLV) comment letter has been provided in Appendix A of this submittal. The comments have been individually addressed as follows:

1. **Comment:** *The site is located within a **FEMA Zone AE**. Clark County Regional Flood Control District (CCRFCD) review and approval is required prior to the final acceptance of the drainage study by the City of Las Vegas. The engineer must send a copy of the report to the CCRFCD for review;*

   Response: Noted. A copy of the drainage study will be submitted to CCRFCD upon conditional approval from the City of Las Vegas.

2. **Comment:** ***Exhibit H:** It is not understood how there is a big discrepancy in the water surface elevations at HEC-RAS Station 90+60.00 between the "FEMA Effective Model" and the "Proposed Condition" (2314.12 in FEMA Effective Model vs. 2313.72 in the Proposed Condition). Is the discrepancy resulted from current topography changes at the cross section? Flood Control staff cannot complete the hydraulic analysis review prior to this being addressed. It is advisable that the engineer to meet with City staff to resolve the issue prior to the submittal of the drainage addendum;*

   Response: A meeting was held with the City on August 8, 2011 to discuss the previously submitted HEC-RAS analysis for the adjacent SFHA. Per discussion, the approach to the HEC-RAS modeling for the flood zone has been revised with this study. The revised HEC-RAS analyses are included electronically on the enclosed CD and printouts of the results are included in Appendix B. The revised approach is as follows:

   Current Effective FIS Model: This model has been referenced from the Lone Mountain Apartments Study which corresponds to the current mapped flood zone per FEMA FIRM Panel 2155. The referenced HEC-RAS analysis is entitled TRY2.prj and is included in electronic form on the enclosed CD.

5740 S. Arville Street #216, Las Vegas, NV 89118 ph (702) 284-5300 fax (702) 284-5399

Existing Condition Model: This model takes the Current Effective FIS Model and incorporates the existing improvements to the Sun Valley Auto site which is adjacent to the proposed Firestone site to the south. The HEC-RAS Sections for the Sun Valley Auto site (Stations 84+76.00 thru 86+16.00) have been referenced from the Sun Valley Auto CLOMR and have been incorporated into the Current Effective FIS Model. Note that the modeling of the existing Sun Valley Auto culvert at Station 85+33.00 appeared to be incorrect with the Sun Valley Auto Study. Therefore, the culvert was modeled differently with this study than the Sun Valley Auto Study based on the Sun Valley Auto grading plan and profile for the culvert. Please see the referenced Sun Valley Auto HEC-RAS analysis and the referenced grading Sheet 5 located in Appendix B.

In addition, the existing sections that encompass the Firestone site (Stations 86+68.00 thru 89+50.00) have been updated to reflect more current and accurate topographical information for the existing site. The revised existing condition Firestone sections have also been incorporated into the Current Effective FIS Model to create an Existing Condition Model. The Existing Condition Model depicts the developed condition of the Sun Valley Auto property and a more accurate existing condition for the Firestone site. The existing condition HEC-RAS analysis is entitled EX_FIRESTONE.prj and is included in electronic form on the enclosed CD. Note that although the Existing Condition Model differs from the Current Effective FIS Model, the existing condition model better depicts the current existing condition for the site and surrounding area. Therefore, the Existing Condition Model has been used as the basis of comparison for any changes within the flood zone due to the proposed Firestone improvements.

Proposed Condition Model: This model takes the Existing Condition Model described above and incorporates the proposed improvements to the Firestone site (Stations 86+68.00 thru 89+50.00). The proposed condition HEC-RAS analysis is entitled PR_FIRESTONE.prj and is included in electronic form on the enclosed CD.

As discussed, the proposed condition BFE's determined with the Proposed Condition Model have been compared against the BFE's determined with the Existing Condition Model to determine the impacts the proposed Firestone development has on the existing flood zone. HEC-RAS analyses are included in Appendix B and results are summarized in the table below.

HEC-RAS Analysis Comparison
FEMA Effective vs. Existing vs. Proposed

HEC-RAS Station	Sun Valley Auto[2] *CLOMR 07-09-1025R* WSE (ft)	FEMA Effective[1] *LOMR 05-09-0073P* WSE (ft)	Existing Condition WSE (ft)	Proposed Condition WSE (ft)	Δ WSE (ft) Proposed - Existing
94+72.00	--	2316.66	**2316.66**	**2316.66**	**0.00**
93+76.00	--	2316.40	**2316.40**	**2316.40**	**0.00**
93+24.00	--	2314.81	**2314.81**	**2314.81**	**0.00**
92+05.00	--	2314.50	**2314.50**	**2314.50**	**0.00**
91+14.00	--	2314.20	**2314.14**	**2314.14**	**0.00**
90+60.00	--	2314.12	**2313.72**	**2313.72**	**0.00**
89+50.00	2312.84	2313.74	**2312.24**	**2312.24**	**0.00**

5740 S. Arville Street #216, Las Vegas, NV 89118 ph (702) 284-5300 fax (702) 284-5399

HEC-RAS Analysis Comparison FEMA Effective vs. Existing vs. Proposed					
HEC-RAS Station	**Sun Valley Auto[2] *CLOMR 07-09-1025R* WSE (ft)**	**FEMA Effective[1] *LOMR 05-09-0073P* WSE (ft)**	**Existing Condition WSE (ft)**	**Proposed Condition WSE (ft)**	**Δ WSE (ft) Proposed - Existing**
88+62.00	2312.08	N/A	**2311.92**	**2311.82**	**-0.10**
88+32.00	2311.70	N/A	**2311.85**	**2311.79**	**-0.06**
88+02.00	2311.40	N/A	**2311.53**	**2311.49**	**-0.04**
87+44.00	2311.11	N/A	**2311.26**	**2311.20**	**-0.06**
86+68.00	2311.02	2311.03	**2311.08**	**2311.06**	**-0.02**
86+16.00	2310.60	N/A	**2310.59**	**2310.59**	**0.00**
85+86.00	2310.31	N/A	**2309.44**	**2309.44**	**0.00**
85+66.00	2310.36	N/A	**2310.04**	**2310.04**	**0.00**
85+06.00	2309.08	N/A	**2309.04**	**2309.04**	**0.00**
84+76.00	2309.06	2309.37	**2309.04**	**2309.04**	**0.00**
84+10.00	--	2308.72	**2308.70**	**2308.70**	**0.00**
82+77.00	--	2307.57	**2307.57**	**2307.57**	**0.00**
81+55.00	--	2306.61	**2306.61**	**2306.61**	**0.00**
79+39.00	--	2304.14	**2304.14**	**2304.14**	**0.00**

1 – Referenced from the Lone Mountain Apartments Study and associated LOMR 05-09-0073P.
2 – For informational purposes only. Referenced from the Sun Valley Auto Study and associated CLOMR 07-09-1025R.

Per the table above, the proposed Firestone improvement have minimal impacts to the BFE's thru the proposed site. Furthermore, the improvements actually result in a slight decrease in WSE. No increase in BFE is realized as a result of the proposed Firestone improvements. In addition, the impacts are only at stations adjacent to the Firestone site, and proposed BFE's match the existing condition BFE's for all locations outside of the Firestone site. Therefore, no negative impacts occur to adjacent properties and the improvements are considered acceptable.

Note that the BFE's determined with the Sun Valley Auto Study are reported in the table above for informational purposes to show that the proposed BFE's are similar to the BFE's used to design the Sun Valley Auto Site. Furthermore, note that the existing and proposed BFE's for Stations 84+10.00 to 91+14.00 vary slightly from the FEMA Effective BFE's, but are, in general, equal to or less than the FEMA Effective BFE's. The discrepancies at Stations 90+60.00 and 89+50.00 between the FEMA Effective BFE and the Existing Condition BFE are due to more accurate existing condition topographic information in that area which has been incorporated into the new baseline Existing Condition Model. Note that the BFE at those locations does not change from the existing condition to the proposed condition.

An updated flood zone inundation area has been depicted on revised Exhibit H located in Appendix B. The flood zone boundary has only been revised from Station 88+62.00 to 86+68.00 where a change in BFE's is indicated from the existing to the proposed condition. The boundary ties back in to the FEMA Effective flood zone boundary at Station 89+50.00 at the upstream end and 86+16.00 at the downstream end. The revised boundary reflects grading improvements to the Firestone site, as well as more accurate

5740 S. Arville Street #216, Las Vegas, NV 89118 ph (702) 284-5300 fax (702) 284-5399

topographical information for existing Rancho Drive. In reality, since there is minimal change to the BFE's, the flood zone boundary, specifically along the east adjacent to Rancho Drive, should not change. However, updated topographical information results in variation to the flood zone in this area. It is important to note, however, that the largest difference in BFE from the existing condition to the proposed condition is a decrease to 0.10-ft. Therefore, the impacts due to the proposed development are considered negligible. Furthermore, the revised inundation boundary shows that the proposed Firestone building is outside the limits and the proposed finished floor is elevated a minimum of 18-inches above the proposed WSE at the upstream side of the building. See the revised grading plans located in Appendix C showing the revised inundation limits, location of the HEC-RAS sections, and the proposed Firestone improvements.

3. **Comment:** *Vacation of all existing public drainage easements must be approved by the City Council prior to the final acceptance of the improvement plans;*

   Response: Noted. However, per discussion with Peter Jackson at the City of Las Vegas on August 23, 2011, the existing easement that encompasses the flood zone along the east boundary of the project site is not required to be vacated. The existing 10-foot-wide drainage easement along the west boundary of the site will be vacated. However, since the existing 10-foot easement is located within a parking area and does not impact the proposed building, the CLV will work with the developer and the vacation of the easement will not hold up permitting for the proposed project site.

4. **Comment:** *The proposed 10' public drainage easement along the southern boundary must be recorded by separate document prior to the final approval of the improvement plans;*

   Response: Noted.

5. **Comment:** *Detail Section 7 and Construction Note 3 do not match each other. Section 7 calls for a 5' landscape while Construction Note 3 calls for concrete sidewalk. Review and revise accordingly;*

   Response: Detail Section 7 and Construction Note 3 have been revised to match. Please see the revised grading plans located in Appendix C.

Additional Notes

NOTE: *The engineer must submit the drainage study to FEMA for a Conditional Letter of Map Revision (CLOMR). A favorable CLOMR must be obtained prior to the issuance of any permits. The developer/engineer must also obtain a Letter of Map Revision (LOMR) using the approved drainage study as technical support to inform FEMA of the modifications within the flood zone. The approved LOMR must be submitted to the City of Las Vegas prior to the release of the bond. REMA Elevation Certificates, shoeing as-built finish floor elevations, must be completed for each building in the FAMA A Zone. The certificate must be submitted to the City of Las Vegas Flood Control Section Prior to scheduling a framing inspection.*

5740 S. Arville Street #216, Las Vegas, NV 89118 ph (702) 284-5300 fax (702) 284-5399

Response: Noted. However, per August 8, 2011 meeting with City staff, it was determined that submittal to FEMA may be unnecessary given that the proposed improvements do not significantly impact the current BFE's and that a regional LOMR application will be prepared and submitted over the course of the next year Therefore, the impacts to the flood zone are considered negligible and a CLOMR and/or LOMR may not be required.

NOTE: *Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.*

Response: Acknowledged.

NOTE: *This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.*

Response: Acknowledged.

The revised plan, profile and detail sheets adopting the revisions addressed in this letter and the comments from the City of Las Vegas have been included in Appendix C. If you have any questions or require additional information, please do not hesitate to contact us at 284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP

Kylie Rowbury, P.E.
Flood Control Division

pc: Mark Failla, SHG
Eric Rietz, Rietz Consulting

5740 S. Arville Street #216, Las Vegas, NV 89118 ph (702) 284-5300 fax (702) 284-5399

APPENDIX

1. **Appendix A** –Comment Letter

2. **Appendix B** – Response to Comment No. 2

    (1) HEC-RAS Analyses
        (a) Referenced Current Effective FIS Model
        (b) Existing Condition Model
        (c) Proposed Condition Model
    (2) Revised Exhibit H
    (3) Referenced Sun Valley Auto HEC-RAS Analysis and Grading Sheet 5

3. **Appendix C** – Revised Grading, Profile and Detail Sheets

5740 S. Arville Street #216, Las Vegas, NV 89118 ph (702) 284-5300 fax (702) 284-5399

APPENDIX A

City of Las Vegas Comment Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: August 2, 2011 AMS
TO: Land Development Services Department of Public Works			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Firestone at Rancho & Red Coach		COPIES TO: Slater Hanifan Group
Cross Streets:	SWC of Rancho Dr. & Red Coach Ave.		Firestone
File Number:	F:\Depot\DSMemos\DS4533A-ZNAE.doc		Bart Anderson, P.E., DevCo
Parcel Number:	138-02-202-015		CCRFCD
Zoning Action:	SDR-41578 & VAR-41579		NDOT
FEMA Flood Zone	YES X	NO	
Proposed Storm Drain	YES	NO X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	7/20/2011	8/2/2011	See Comments Below	$400.00	173128; $400
			TOTAL FEES (LDDRS):		----

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.

1. The site is located in a **FEMA Zone AE**. Clark County Regional Flood Control District (CCRFCD) review and approval is required prior to the final acceptance of the drainage study by the City of Las Vegas. The engineer must send a copy of the report to the CCRFCD for review.

2. **Exhibit H**: It is not understood how there is a big discrepancy in the water surface elevations at HEC-RAS Station 90+60.00 between the "FEMA Effective Model" and the "Proposed Condition" (2314.12 in FEMA Effective Model vs. 2313.72 in the Proposed Condition). Is the discrepancy resulted from current topography changes at the cross section? Flood Control staff cannot complete the hydraulic analysis review prior to this being addressed. It is advisable that the engineer to meet with City staff to resolve the issue prior to the submittal of the drainage addendum.

3. Vacation of all existing public drainage easements must be approved by the City Council prior to the final acceptance of the improvement plans.

4. The proposed 10'-public drainage easement along the southern boundary must be recorded by separate document prior to the final approval of the improvement plans.

5. Detail Section 7 and Construction Note 3 do not match each other. Section 7 calls for a 5'-landscape while Construction Note 3 calls for concrete sidewalk. Review and revise accordingly.

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on July 1, 2011. If there are any questions regarding these new requirements, please contact Robert Welch in the Flood Section at (702) 229-2177 or Rick Schroder in Traffic Engineering at (702) 229-6327.

NOTE: The engineer must submit the drainage study to FEMA for a Conditional Letter of Map Revision (CLOMR). A favorable CLOMR must be obtained prior to the issuance of any permits. The developer/engineer must also obtain a Letter of Map Revision (LOMR) using the approved drainage study as technical support to inform FEMA of the modifications within the flood zone. The approved LOMR must be submitted to the *City of Las Vegas* prior to the release of the bond. FEMA Elevation Certificates, showing as-built finish floor elevations, must be completed for each building in the FEMA A Zone. The certificate must be submitted to the *City of Las Vegas Flood Control Section* prior to scheduling a framing inspection.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

NOTES: This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

END OF REMARKS
ays

T/R/S: T20S/R60E/02
AREA L-02

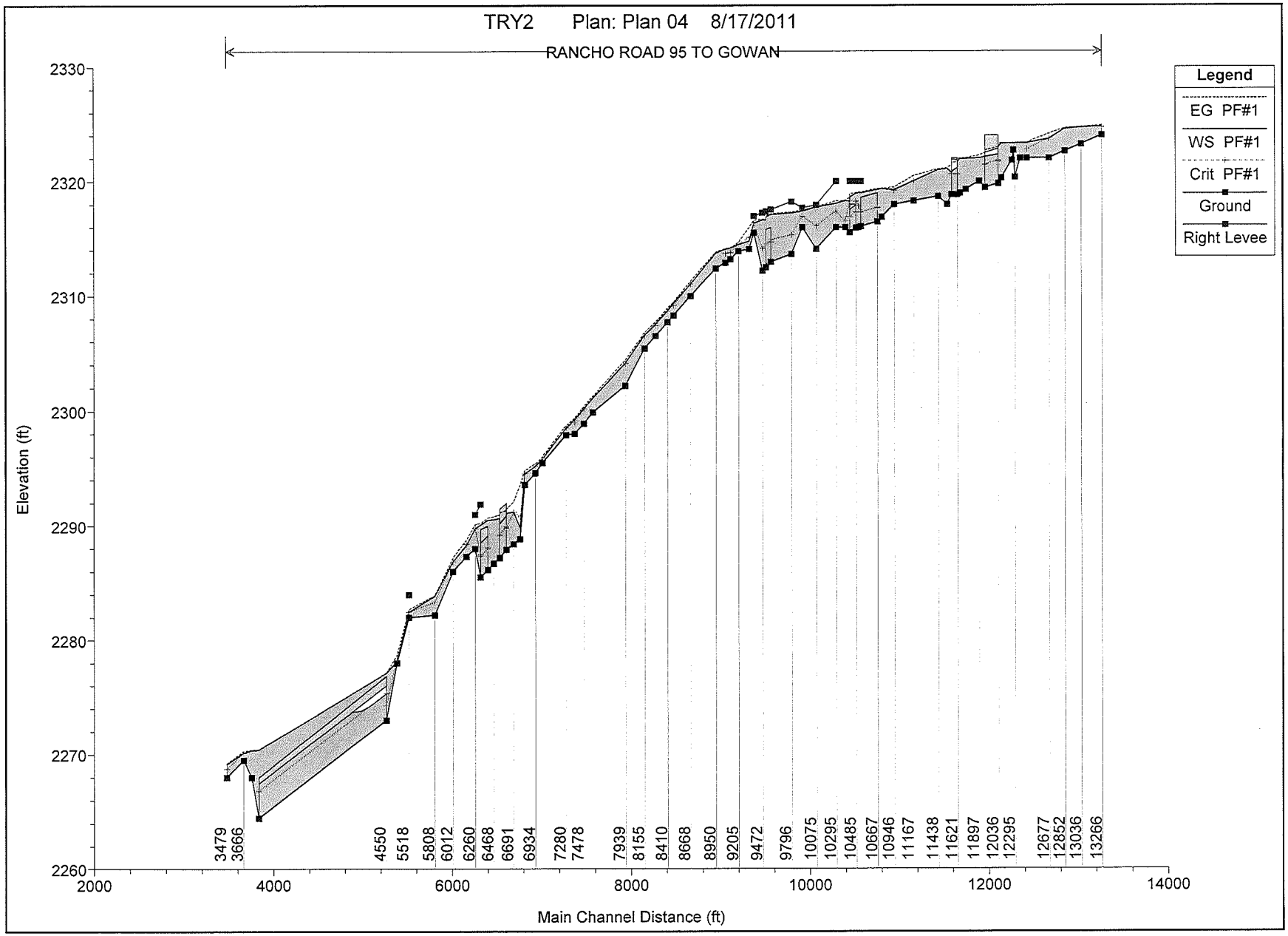
Post-it® Fax Note 7671	Date 8/3/11	# of pages ▶ 2
To Kylie Rowbury	From Albert Sung	
Co./Dept. SHG	Co. CLV	
Phone #	Phone # 229-200	
Fax # 284-5399	Fax #	

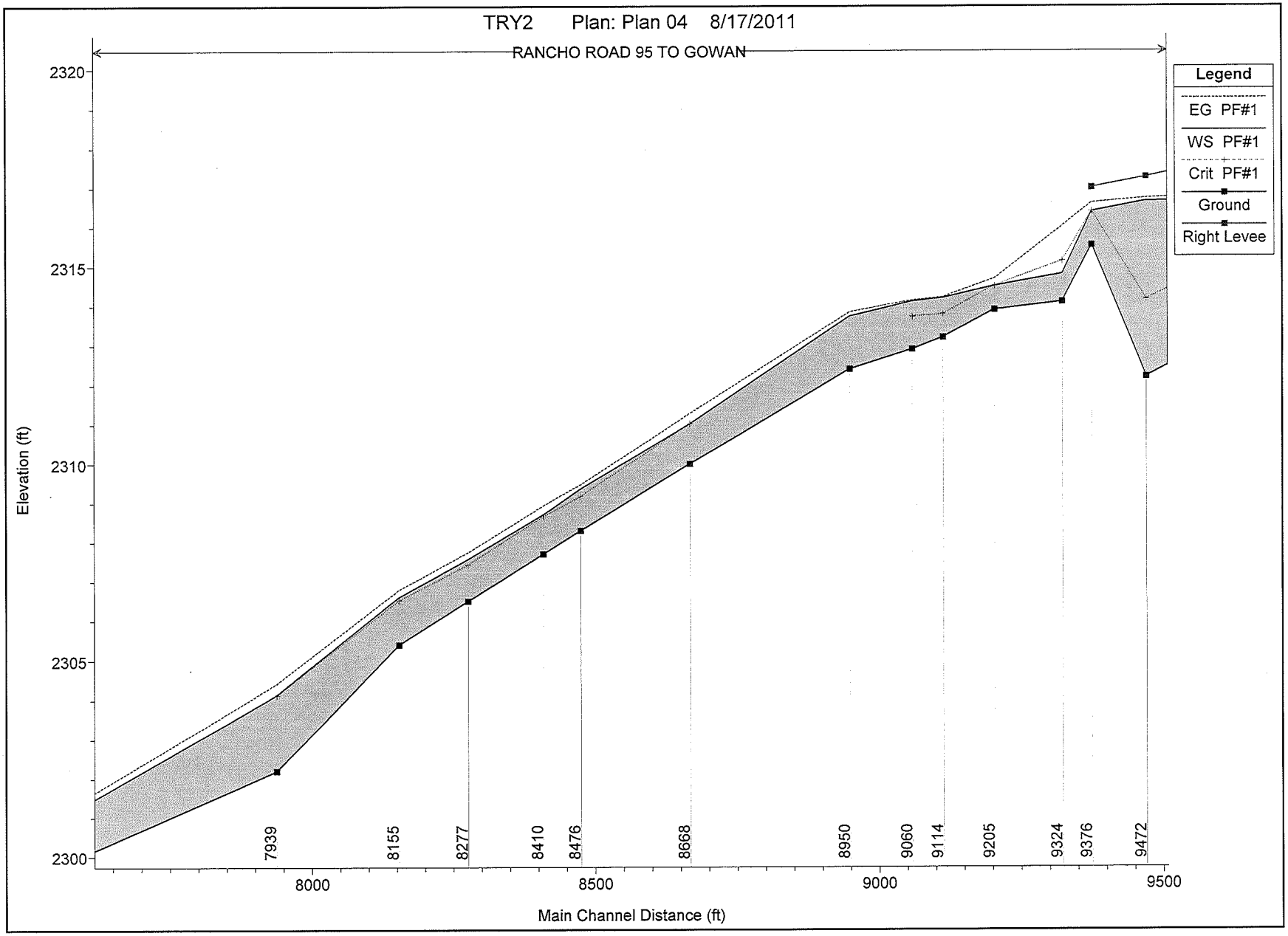
APPENDIX B

Response to Comment No. 2

Revised HEC-RAS Analysis & Exhibit H

Referenced Current Effective FIS Model


TRY2 Plan: Plan 04 8/17/2011
RANCHO ROAD 95 TO GOWAN
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Right Levee
Elevation (ft)
2330
2320
2310
2300
2290
2280
2270
2260
2000
4000
6000
8000
10000
12000
14000
Main Channel Distance (ft)
3479
3666
4550
5518
5808
6012
6260
6468
6691
6934
7280
7478
7939
8155
8410
8668
8950
9205
9472
9796
10075
10295
10485
10667
10946
11167
11438
11621
11897
12036
12295
12677
12852
13036
13266

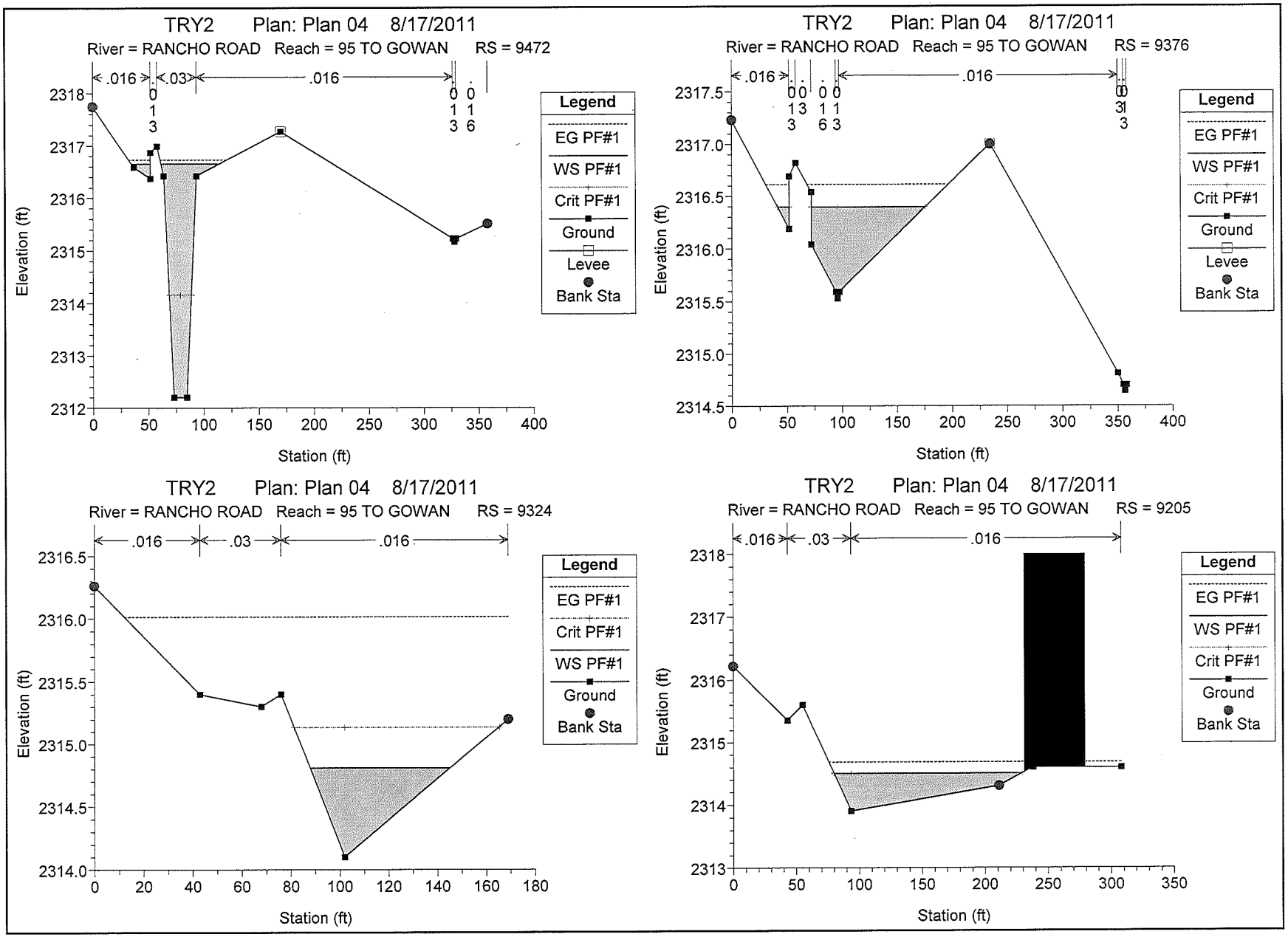

TRY2 Plan: Plan 04 8/17/2011
RANCHO ROAD 95 TO GOWAN
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Right Levee
Elevation (ft)
2320
2315
2310
2305
2300
7939
8155
8277
8410
8476
8668
8950
9060
9114
9205
9324
9376
9472
8000
8500
9000
9500
Main Channel Distance (ft)

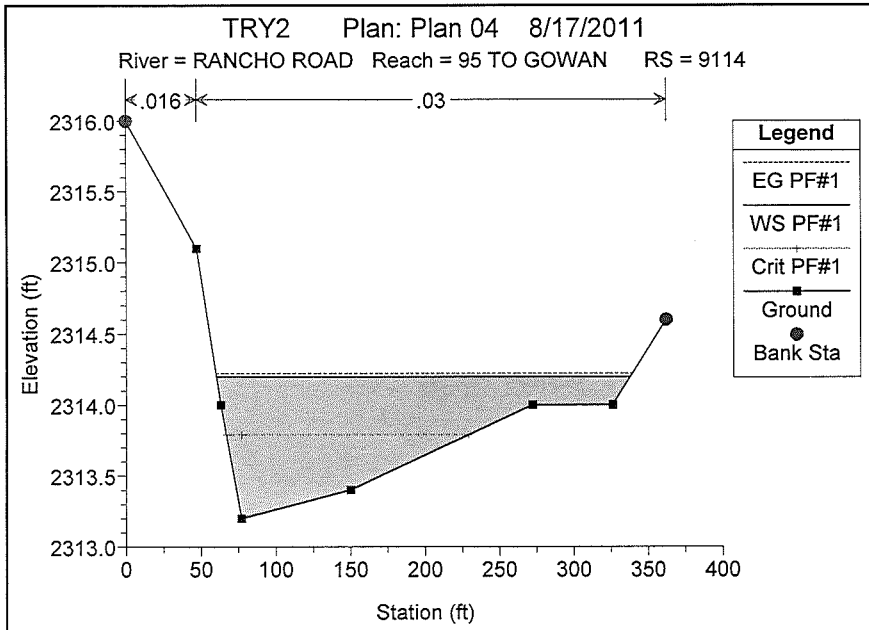
HEC-RAS Plan: Plan 02 River: RANCHO ROAD Reach: 95 TO GOWAN Profile: PF#1

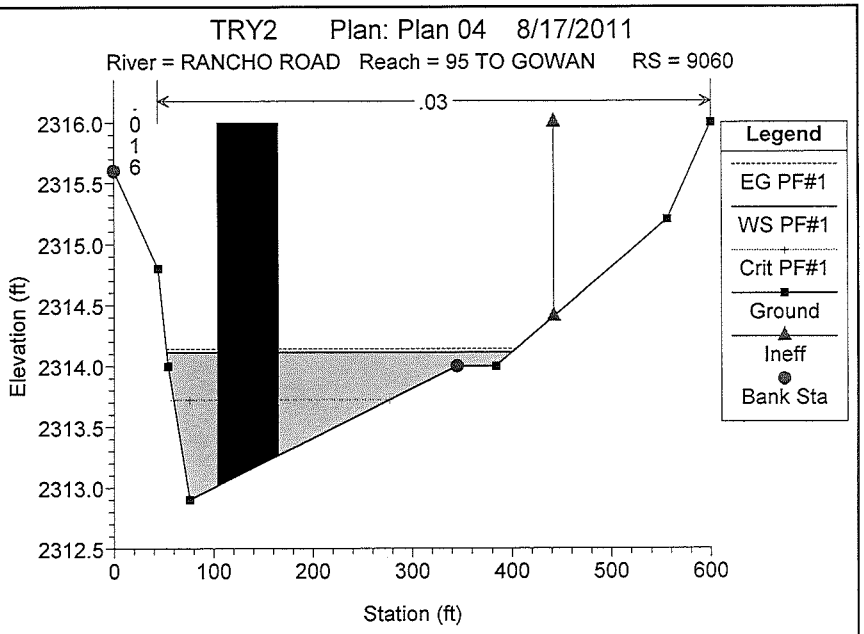
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Sta W.S. Lft	Sta W.S. Rgt
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)
95 TO GOWAN	13266	PF#1	192.00	2324.00	2324.78	2324.70	2324.89	0.006439	2.65	74.89	209.13	0.63	62.85	271.97
95 TO GOWAN	13036	PF#1	192.00	2323.20	2324.68		2324.70	0.000481	1.09	166.31	261.28	0.19	37.52	298.80
95 TO GOWAN	12852	PF#1	192.00	2322.60	2324.57		2324.63	0.001184	2.20	102.35	182.17	0.37	19.27	201.44
95 TO GOWAN	12677	PF#1	192.00	2322.00	2323.70	2323.70	2324.14	0.009989	5.32	36.11	42.49	1.02	40.40	82.90
95 TO GOWAN	12430	PF#1	192.00	2322.00	2323.33	2322.76	2323.37	0.000623	1.63	121.67	161.76	0.27	6.05	167.81
95 TO GOWAN	12355	PF#1	192.00	2322.00	2323.32		2323.33	0.000256	1.08	201.74	347.83	0.17	3.76	351.59
95 TO GOWAN	12295	PF#1	155.00	2320.35	2323.31		2323.32	0.000082	0.79	227.06	267.79	0.10	0.69	268.48
95 TO GOWAN	12280	PF#1	155.00	2322.68	2323.30		2323.32	0.000301	0.51	147.60	245.50	0.13	4.13	249.63
95 TO GOWAN	12264	PF#1	155.00	2321.80	2323.30		2323.31	0.000153	0.85	179.26	226.97	0.13	2.80	229.77
95 TO GOWAN	12145	PF#1	190.00	2320.30	2323.28		2323.30	0.000117	1.02	206.30	182.38	0.13	2.87	185.26
95 TO GOWAN	12111	PF#1	190.00	2319.81	2322.91	2321.69	2323.25	0.002352	4.72	40.24	13.00	0.47	19.00	32.00
95 TO GOWAN	12036		Culvert											
95 TO GOWAN	11961	PF#1	161.00	2319.46	2322.12		2322.46	0.002629	4.66	34.59	13.00	0.50	62.00	75.00
95 TO GOWAN	11897	PF#1	161.00	2320.00	2322.02		2322.22	0.003555	3.58	45.02	46.00	0.62	47.84	93.84
95 TO GOWAN	11748	PF#1	161.00	2319.30	2321.96		2322.02	0.000515	1.87	86.13	52.50	0.26	51.24	103.74
95 TO GOWAN	11683	PF#1	161.00	2319.00	2321.94		2321.99	0.000373	1.64	98.22	57.18	0.22	54.40	111.57
95 TO GOWAN	11653	PF#1	161.00	2318.84	2321.63	2320.52	2321.94	0.002287	4.44	36.26	13.00	0.47	75.00	88.00
95 TO GOWAN	11621		Culvert											
95 TO GOWAN	11590	PF#1	161.00	2318.86	2320.75		2321.42	0.007334	6.56	24.54	13.00	0.84	75.00	88.00
95 TO GOWAN	11538	PF#1	161.00	2318.00	2321.10		2321.15	0.000691	1.85	91.31	97.77	0.29	62.97	160.74
95 TO GOWAN	11438	PF#1	161.00	2318.70	2321.01		2321.07	0.000870	2.17	82.09	105.12	0.32	59.98	165.10
95 TO GOWAN	11167	PF#1	161.00	2318.30	2320.05	2320.05	2320.48	0.009349	5.27	30.60	37.32	0.99	72.42	109.74
95 TO GOWAN	10946	PF#1	161.00	2318.00	2319.30	2319.20	2319.51	0.001961	4.12	46.50	73.20	0.76	77.64	150.84
95 TO GOWAN	10807	PF#1	169.00	2316.90	2319.39		2319.41	0.000143	1.00	201.09	195.85	0.14	74.43	270.28
95 TO GOWAN	10758	PF#1	169.00	2316.50	2319.30	2317.69	2319.39	0.000544	2.38	79.58	73.41	0.25	74.00	183.48
95 TO GOWAN	10667		Culvert											
95 TO GOWAN	10575	PF#1	169.00	2316.09	2319.01	2317.54	2319.09	0.000346	2.21	76.38	70.11	0.37	76.88	146.99
95 TO GOWAN	10547	PF#1	169.00	2316.00	2319.01	2317.88	2319.06	0.001134	1.95	86.64	67.73	0.30	70.90	138.64
95 TO GOWAN	10518	PF#1	169.00	2315.96	2318.97	2318.27	2319.03	0.001287	1.98	85.24	75.75	0.33	70.74	146.49
95 TO GOWAN	10485		Culvert											
95 TO GOWAN	10450	PF#1	169.00	2315.54	2318.28	2318.28	2318.57	0.013946	4.37	38.63	62.65	0.98	75.79	138.45
95 TO GOWAN	10399	PF#1	169.00	2316.00	2318.33	2316.54	2318.34	0.000112	0.89	190.82	233.22	0.11	69.59	302.81
95 TO GOWAN	10295	PF#1	169.00	2316.00	2318.10	2317.41	2318.29	0.003025	3.52	48.07	32.19	0.51	74.60	106.79
95 TO GOWAN	10075	PF#1	169.00	2314.10	2317.78	2316.13	2317.82	0.001364	1.60	105.38	127.56	0.31	24.59	152.15
95 TO GOWAN	9918	PF#1	169.00	2316.00	2317.41	2316.96	2317.50	0.002998	2.50	67.48	75.94	0.47	75.75	151.69
95 TO GOWAN	9796	PF#1	169.00	2313.67	2317.26	2315.35	2317.35	0.000692	2.33	72.53	28.88	0.26	64.31	93.19
95 TO GOWAN	9566	PF#1	215.00	2312.98	2317.13	2314.91	2317.19	0.000596	2.05	104.77	95.94	0.35	28.67	132.10
95 TO GOWAN	9539		Culvert											
95 TO GOWAN	9512	PF#1	215.00	2312.50	2316.67	2314.44	2316.76	0.000675	2.43	88.52	54.58	0.34	39.83	105.06
95 TO GOWAN	9472	PF#1	215.00	2312.20	2316.66	2314.16	2316.73	0.000535	2.17	99.10	70.58	0.32	34.82	114.90
95 TO GOWAN	9376	PF#1	180.00	2315.53	2316.40	2316.40	2316.61	0.004397	3.73	48.25	114.18	1.01	41.67	175.86
95 TO GOWAN	9324	PF#1	180.00	2314.10	2314.81	2315.14	2316.01	0.035628	8.80	20.46	57.55	2.60	87.77	145.32
95 TO GOWAN	9205	PF#1	180.00	2313.90	2314.50	2314.50	2314.69	0.005060	3.44	53.35	149.45	0.97	79.84	229.29
95 TO GOWAN	9114	PF#1	180.00	2313.20	2314.20	2313.79	2314.22	0.001427	1.22	147.05	277.81	0.30	60.11	337.92
95 TO GOWAN	9060	PF#1	180.00	2312.90	2314.12	2313.72	2314.14	0.001494	1.32	139.72	287.03	0.31	52.55	400.59
95 TO GOWAN	8950	PF#1	180.00	2312.40	2313.74		2313.85	0.005768	2.58	69.81	121.23	0.60	52.65	234.88
95 TO GOWAN	8668	PF#1	180.00	2310.00	2311.03	2311.03	2311.28	0.016040	4.07	44.23	88.10	1.01	34.50	122.60

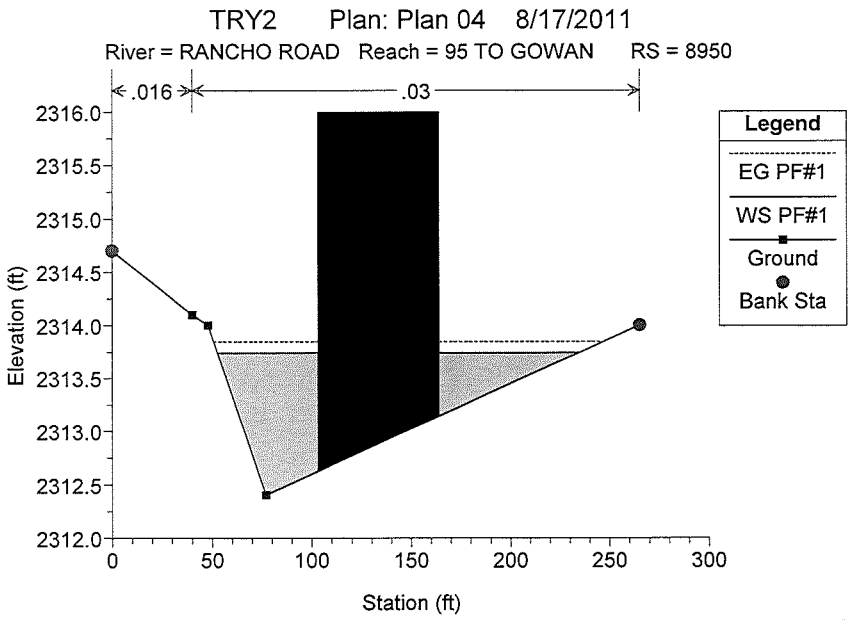
HEC-RAS Plan: Plan 02 River: RANCHO ROAD Reach: 95 TO GOWAN Profile: PF#1 (Continued)

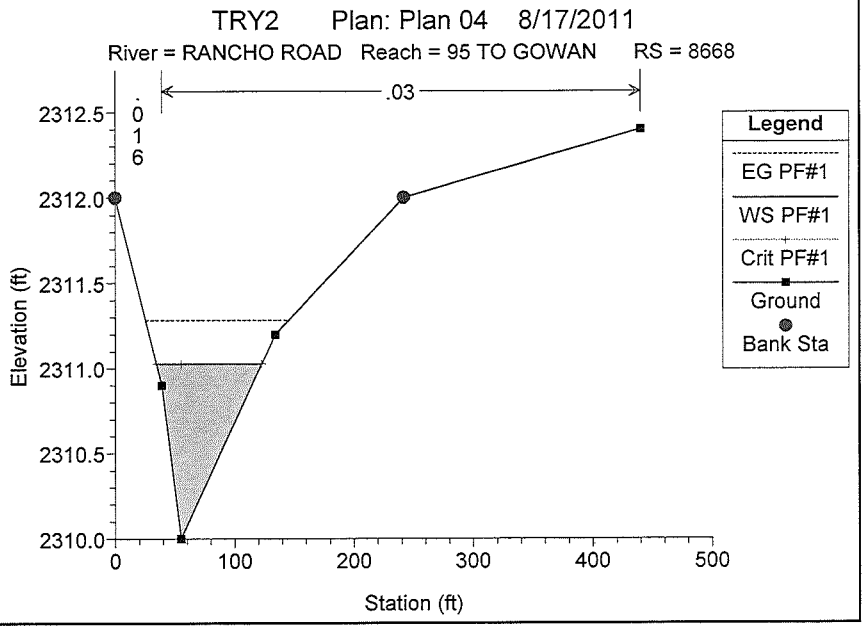
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Sta W.S. Lft	Sta W.S. Rgt
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)
95 TO GOWAN	8476	PF#1	180.00	2308.30	2309.37	2309.18	2309.47	0.005759	2.55	70.48	131.40	0.61	40.58	171.98
95 TO GOWAN	8410	PF#1	180.00	2307.70	2308.72	2308.67	2308.94	0.011374	3.79	47.53	85.01	0.89	39.99	125.00
95 TO GOWAN	8277	PF#1	180.00	2306.50	2307.57	2307.43	2307.74	0.007234	3.28	54.86	87.63	0.73	39.37	127.00
95 TO GOWAN	8155	PF#1	180.00	2305.40	2306.61	2306.52	2306.79	0.008324	3.39	53.13	99.40	0.82	19.76	119.15
95 TO GOWAN	7939	PF#1	180.00	2302.20	2304.14	2304.12	2304.42	0.014898	4.26	42.28	73.54	0.99	42.65	116.19
95 TO GOWAN	7578	PF#1	198.00	2299.90	2301.14		2301.29	0.005749	3.12	63.55	102.93	0.70	20.94	123.87
95 TO GOWAN	7478	PF#1	198.00	2298.90	2300.20	2300.20	2300.42	0.014444	3.77	52.45	112.43	0.97	25.57	138.00
95 TO GOWAN	7373	PF#1	198.00	2298.00	2299.25	2298.99	2299.37	0.004295	2.78	71.15	103.86	0.59	22.60	126.46
95 TO GOWAN	7280	PF#1	198.00	2297.90	2298.52	2298.52	2298.74	0.011789	3.75	52.77	120.95	1.00	11.39	132.34
95 TO GOWAN	7016	PF#1	158.00	2295.50	2295.87	2295.91	2296.06	0.008495	3.52	44.91	170.45	1.21	17.83	188.27
95 TO GOWAN	6934	PF#1	158.00	2294.60	2295.18	2295.23	2295.41	0.007499	3.84	41.10	124.36	1.18	8.88	133.24
95 TO GOWAN	6815	PF#1	158.00	2293.60	2294.57	2294.57	2294.82	0.004878	4.05	39.06	79.28	1.02	7.49	86.77
95 TO GOWAN	6763	PF#1	230.00	2288.87	2289.86	2290.80	2293.57	0.116280	15.46	14.88	15.00	2.74	46.00	61.00
95 TO GOWAN	6691	PF#1	230.00	2288.40	2291.24	2291.23	2292.10	0.012268	7.44	30.91	17.73	0.99	51.27	69.00
95 TO GOWAN	6609	PF#1	230.00	2287.91	2291.14	2289.84	2291.49	0.003102	4.75	48.45	15.00	0.47	47.00	62.00
95 TO GOWAN	6572		Culvert											
95 TO GOWAN	6535	PF#1	230.00	2287.21	2290.68	2289.17	2290.98	0.002283	4.39	53.37	18.96	0.42	43.38	62.34
95 TO GOWAN	6468	PF#1	230.00	2286.70	2290.58		2290.82	0.001990	3.95	59.34	26.18	0.42	44.82	71.00
95 TO GOWAN	6404	PF#1	230.00	2286.17	2290.52	2288.11	2290.70	0.001211	3.49	68.76	31.97	0.29	39.32	71.29
95 TO GOWAN	6362		Culvert											
95 TO GOWAN	6321	PF#1	230.00	2285.53	2290.12	2287.47	2290.25	0.000735	3.07	84.01	49.92	0.25	27.69	77.61
95 TO GOWAN	6260	PF#1	230.00	2288.00	2289.78	2289.78	2290.13	0.007758	4.71	48.87	72.49	1.01	16.64	89.13
95 TO GOWAN	6161	PF#1	230.00	2287.30	2288.27	2288.41	2288.79	0.028069	5.85	40.76	82.40	1.34	61.90	144.30
95 TO GOWAN	6012	PF#1	230.00	2286.00	2286.88	2286.88	2287.19	0.014781	4.47	51.48	170.60	1.01	55.66	226.26
95 TO GOWAN	5808	PF#1	230.00	2282.20	2283.87	2283.33	2283.92	0.001924	1.92	119.57	143.50	0.37	84.12	227.62
95 TO GOWAN	5518	PF#1	230.00	2282.00	2282.48	2282.48	2282.67	0.016576	3.51	65.62	167.49	0.99	49.93	217.42
95 TO GOWAN	5382	PF#1	146.00	2278.00	2278.19	2278.33	2278.68	0.122527	5.65	25.85	138.96	2.31	70.81	209.77
95 TO GOWAN	5264	PF#1	146.00	2273.01	2277.11	2274.30	2277.12	0.000060	0.64	229.00	104.74	0.08	84.71	189.46
95 TO GOWAN	4550		Culvert											
95 TO GOWAN	3836	PF#1	146.00	2264.48	2270.40		2270.44	0.000814	1.52	96.36	82.18	0.25	55.41	137.59
95 TO GOWAN	3756	PF#1	146.00	2268.00	2270.37		2270.39	0.000377	1.11	131.03	104.92	0.18	56.31	161.23
95 TO GOWAN	3666	PF#1	146.00	2269.50	2270.14	2270.10	2270.28	0.013292	2.99	48.85	129.01	0.86	55.33	184.34
95 TO GOWAN	3479	PF#1	146.00	2268.00	2269.15	2268.76	2269.22	0.003000	2.18	66.93	92.77	0.45	80.15	172.92

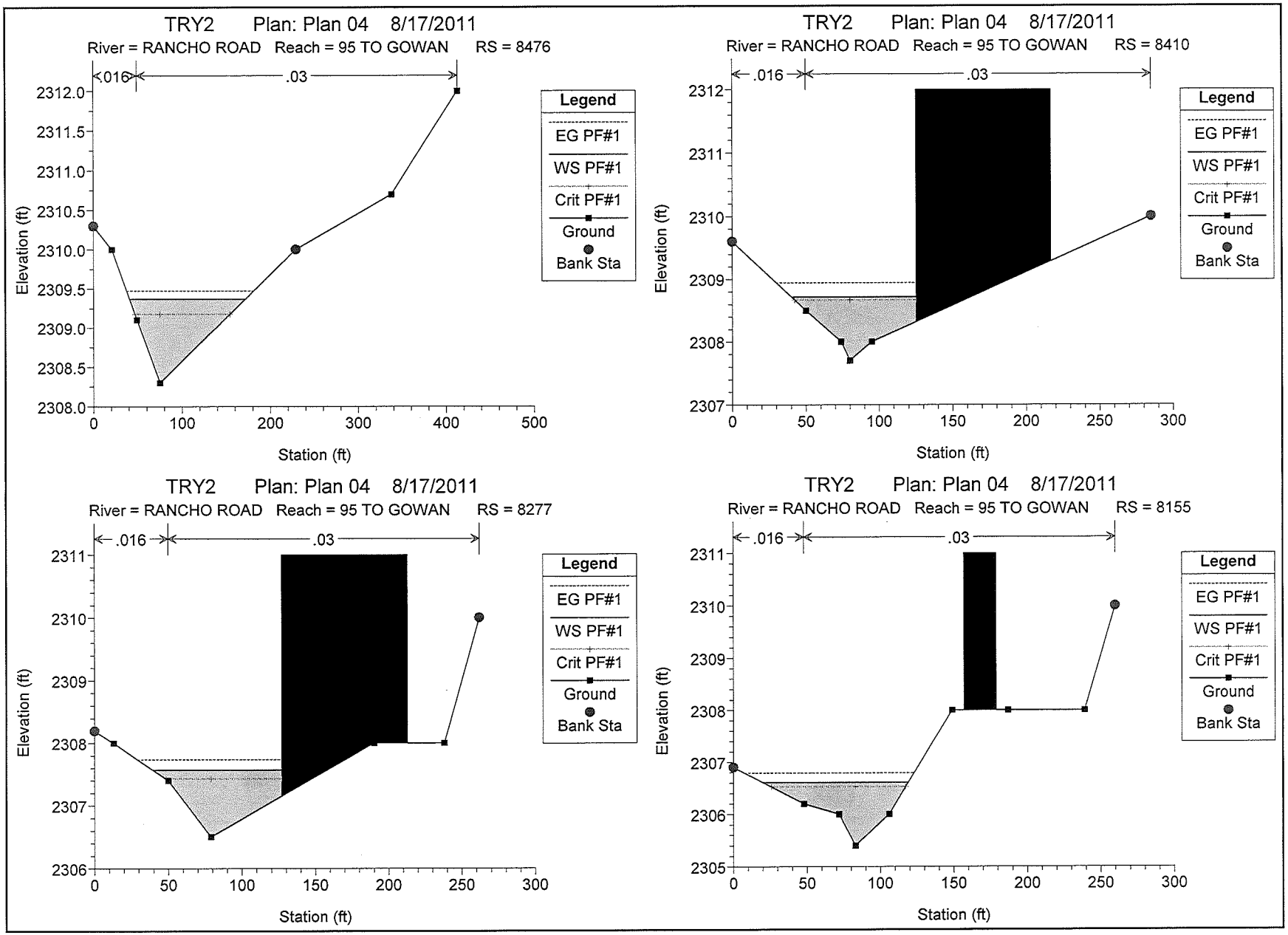

TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9472
.016
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9376
.016
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9324
.016
.03
.016
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9205
.016
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

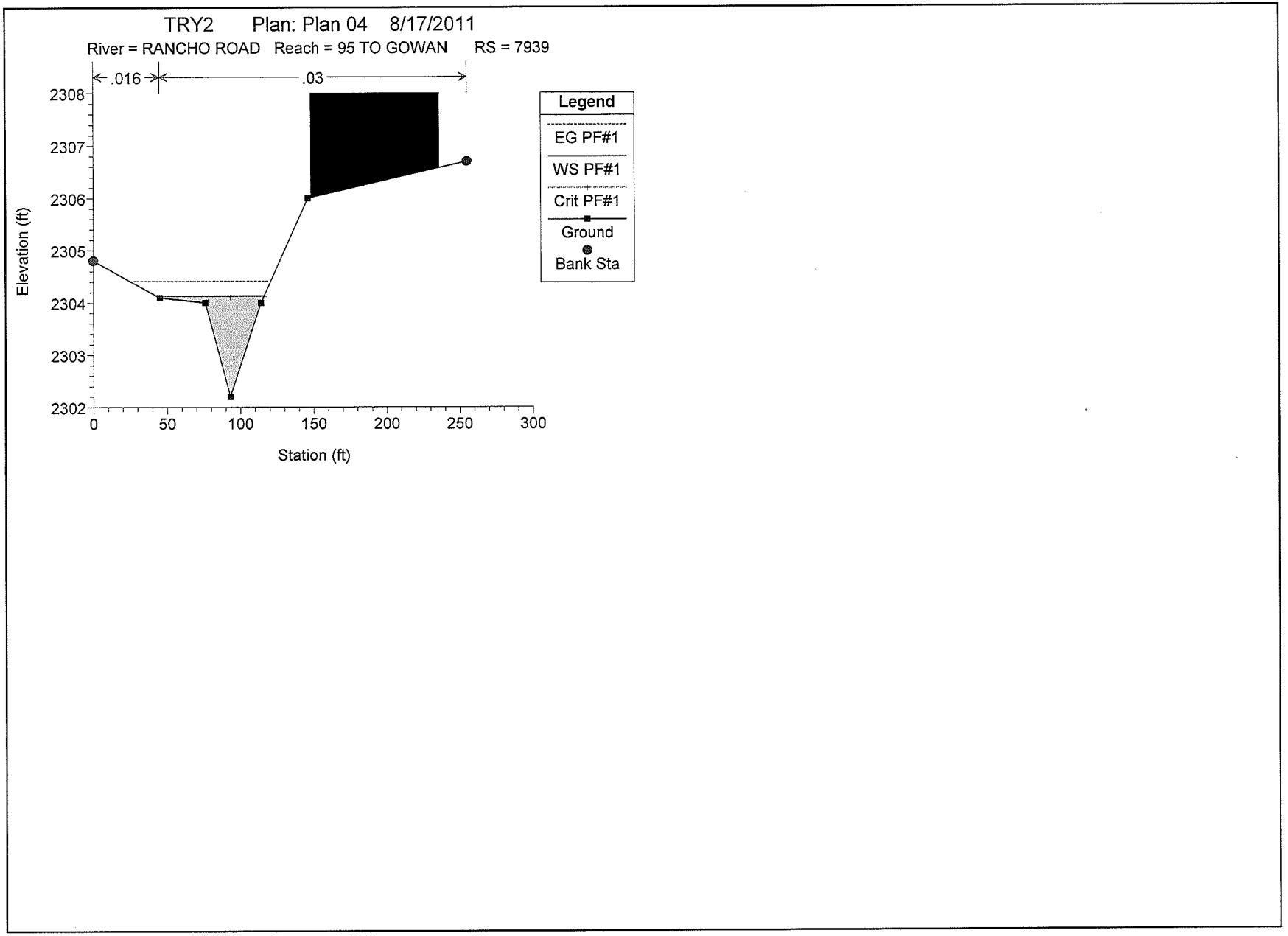

TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9114
.016
.03
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9060
.03
.016
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Ineff
Bank Sta


TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8950
.016
.03
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Ground
Bank Sta


TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8668
.03
.016
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8476
.016
.03
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8410
.016
.03
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8277
.016
.03
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8155
.016
.03
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


TRY2 Plan: Plan 04 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7939
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
2308
2307
2306
2305
2304
2303
2302
0
50
100
150
200
250
300
Station (ft)

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X         X    X      X   X     X  X    X
X     X  X         X           X   X    X    X   X
XXXXXXX  XXXX      X       XXX  XXXX     XXXXXX   XXXX
X     X  X         X           X  X     X    X       X
X     X  X         X    X      X   X    X    X       X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: TRY2
Project File : TRY2.prj
Run Date and Time: 9/14/2004 2:03:49 PM

Project in English units

Project Description:
O 74

PLAN DATA

Plan Title: Plan 04
Plan File : C:\TEMP\HEC\REVISED\TRY2.p04

Geometry Title: Cross-sections
Geometry File : C:\TEMP\HEC\REVISED\TRY2.g01

Flow Title : REV-FLOW
Flow File : C:\TEMP\HEC\REVISED\TRY2.f02

Plan Summary Information:
Number of: Cross Sections = 72 Mulitple Openings = 0
Culverts = 8 Inline Weirs = 0
Bridges = 0

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

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: REV-FLOW
Flow File : C:\TEMP\HEC\REVISED\TRY2.f02

Flow Data (cfs)

River	Reach	RS	PF#1
RANCHO ROAD	95 TO GOWAN	13266	192
RANCHO ROAD	95 TO GOWAN	12295	155
RANCHO ROAD	95 TO GOWAN	12145	190
RANCHO ROAD	95 TO GOWAN	11961	161
RANCHO ROAD	95 TO GOWAN	10807	169
RANCHO ROAD	95 TO GOWAN	10399	169
RANCHO ROAD	95 TO GOWAN	9566	215
RANCHO ROAD	95 TO GOWAN	9376	180
RANCHO ROAD	95 TO GOWAN	7578	198
RANCHO ROAD	95 TO GOWAN	7016	158
RANCHO ROAD	95 TO GOWAN	6763	230
RANCHO ROAD	95 TO GOWAN	5382	146

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RANCHO ROAD	95 TO GOWAN	PF#1	Normal S = .0022	Normal S = .003

GEOMETRY DATA

Geometry Title: Cross-sections
Geometry File : C:\TEMP\HEC\REVISED\TRY2.g01

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 13266

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2328	30	2326	84	2324	168	2324.4	210	2324.6
379	2325.1								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	168	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	168	275	230	.001	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2324.89	Element			
Vel Head (ft)	0.10	Wt. n-Val.		0.030	0.016
W.S. Elev (ft)	2324.79	Reach Len. (ft)	275.00	230.00	0.00
Crit W.S. (ft)	2324.70	Flow Area (sq ft)		58.12	18.41
E.G. Slope (ft/ft)	0.006061	Area (sq ft)		58.12	18.41
Q Total (cfs)	192.00	Flow (cfs)		150.73	41.27
Top Width (ft)	211.98	Top Width (ft)		105.36	106.61
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.59	2.24
Max Chl Dpth (ft)	0.79	Hydr. Depth (ft)		0.55	0.17
Conv. Total (cfs)	2466.3	Conv. (cfs)		1936.2	530.1
Length Wtd. (ft)	132.78	Wetted Per. (ft)		105.38	106.61
Min Ch El (ft)	2324.00	Shear (lb/sq ft)		0.21	0.07
Alpha	1.01	Stream Power (lb/ft s)		0.54	0.15
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.03	17.81	1.69
C & E Loss (ft)	0.02	Cum SA (acres)	0.10	19.15	3.17

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 13036

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2328	25	2326	44	2324	72	2323.2	102	2324
127	2324	202	2324	358	2325.1				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	127	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	102	229	184	.001	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2324.70	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.030	0.018
W.S. Elev (ft)	2324.68	Reach Len. (ft)	229.00	184.00	0.00
Crit W.S. (ft)		Flow Area (sq ft)		65.01	101.30
E.G. Slope (ft/ft)	0.000481	Area (sq ft)		65.01	101.30
Q Total (cfs)	192.00	Flow (cfs)		70.95	121.05
Top Width (ft)	261.28	Top Width (ft)		64.48	196.80
Vel Total (ft/s)	1.15	Avg. Vel. (ft/s)		1.09	1.19
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.01	0.51
Conv. Total (cfs)	8754.7	Conv. (cfs)		3235.2	5519.5
Length Wtd. (ft)	91.21	Wetted Per. (ft)		64.54	196.80
Min Ch El (ft)	2323.20	Shear (lb/sq ft)		0.03	0.02
Alpha	1.01	Stream Power (lb/ft s)		0.03	0.02
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.03	17.49	1.69
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	18.70	3.17

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12852

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2326	27	2324	47	2322.6	68	2324	83	2324
102	2324	293	2325.1						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	83	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	68	175	175	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2324.63	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.025	0.018
W.S. Elev (ft)	2324.57	Reach Len. (ft)	175.00	175.00	175.00
Crit W.S. (ft)	2324.28	Flow Area (sq ft)		54.45	48.11
E.G. Slope (ft/ft)	0.001178	Area (sq ft)		54.45	48.11
Q Total (cfs)	192.00	Flow (cfs)		119.39	72.61
Top Width (ft)	182.40	Top Width (ft)		48.75	133.65
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		2.19	1.51
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.12	0.36
Conv. Total (cfs)	5594.8	Conv. (cfs)		3478.9	2115.8
Length Wtd. (ft)	175.00	Wetted Per. (ft)		48.87	133.66
Min Ch El (ft)	2322.60	Shear (lb/sq ft)		0.08	0.03
Alpha	1.10	Stream Power (lb/ft s)		0.18	0.04
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	0.03	17.24	1.69
C & E Loss (ft)	0.04	Cum SA (acres)	0.10	18.46	3.17

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12677

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2326	32	2324.3	38	2324	54	2322	88	2324
101	2324	164	2324	315	2324.7				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	32	.025	101	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
32	88	247	247	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2324.14	Element			
Vel Head (ft)	0.44	Wt. n-Val.		0.025	
W.S. Elev (ft)	2323.70	Reach Len. (ft)	247.00	247.00	247.00
Crit W.S. (ft)	2323.70	Flow Area (sq ft)		36.11	
E.G. Slope (ft/ft)	0.009989	Area (sq ft)		36.11	
Q Total (cfs)	192.00	Flow (cfs)		192.00	
Top Width (ft)	42.49	Top Width (ft)		42.49	
Vel Total (ft/s)	5.32	Avg. Vel. (ft/s)		5.32	
Max Chl Dpth (ft)	1.70	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	1921.1	Conv. (cfs)		1921.1	
Length Wtd. (ft)	247.00	Wetted Per. (ft)		42.65	
Min Ch El (ft)	2322.00	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)		2.81	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.03	17.06	1.59
C & E Loss (ft)	0.12	Cum SA (acres)	0.10	18.28	2.90

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12430

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	18	2322	44	2322	64	2322.2	140	2323.1
250	2324	401	2324						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	64	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	64	75	75	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2323.38	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.025	0.016

W.S. Elev (ft)	2323.34	Reach Len. (ft)	75.00	75.00	75.00
Crit W.S. (ft)	2322.76	Flow Area (sq ft)		67.68	55.89
E.G. Slope (ft/ft)	0.000597	Area (sq ft)		67.68	55.89
Q Total (cfs)	192.00	Flow (cfs)		108.82	83.18
Top Width (ft)	163.30	Top Width (ft)		58.05	105.25
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.61	1.49
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)		1.17	0.53
Conv. Total (cfs)	7855.8	Conv. (cfs)		4452.4	3403.4
Length Wtd. (ft)	75.00	Wetted Per. (ft)		58.13	105.25
Min Ch El (ft)	2322.00	Shear (lb/sq ft)		0.04	0.02
Alpha	1.00	Stream Power (lb/ft s)		0.07	0.03
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.03	16.76	1.43
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	17.99	2.60

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12355

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	11	2322	37	2322	57	2322.1	158	2322.8
383	2323.4	484	2324						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	57	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	57	60	60	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2323.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.025	0.016
W.S. Elev (ft)	2323.33	Reach Len. (ft)	60.00	60.00	60.00
Crit W.S. (ft)		Flow Area (sq ft)		64.96	141.06
E.G. Slope (ft/ft)	0.000242	Area (sq ft)		64.96	141.06
Q Total (cfs)	192.00	Flow (cfs)		68.46	123.54
Top Width (ft)	352.47	Top Width (ft)		53.31	299.17
Vel Total (ft/s)	0.93	Avg. Vel. (ft/s)		1.05	0.88
Max Chl Dpth (ft)	1.33	Hydr. Depth (ft)		1.22	0.47
Conv. Total (cfs)	12333.7	Conv. (cfs)		4398.0	7935.6
Length Wtd. (ft)	60.00	Wetted Per. (ft)		53.43	299.17
Min Ch El (ft)	2322.00	Shear (lb/sq ft)		0.02	0.01
Alpha	1.02	Stream Power (lb/ft s)		0.02	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.03	16.65	1.26
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	17.90	2.26

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12295

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	2	2322	5	2320.35	38	2322	56	2322.1
175	2322.8	394	2324						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	56	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	56	15	15	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2323.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.025	0.016
W.S. Elev (ft)	2323.32	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		100.80	127.63
E.G. Slope (ft/ft)	0.000081	Area (sq ft)		100.80	127.63
Q Total (cfs)	155.00	Flow (cfs)		79.38	75.62
Top Width (ft)	268.73	Top Width (ft)		55.32	213.42
Vel Total (ft/s)	0.68	Avg. Vel. (ft/s)		0.79	0.59
Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)		1.82	0.60
Conv. Total (cfs)	17245.1	Conv. (cfs)		8831.4	8413.7
Length Wtd. (ft)	15.00	Wetted Per. (ft)		56.33	213.42
Min Ch El (ft)	2320.35	Shear (lb/sq ft)		0.01	0.00
Alpha	1.06	Stream Power (lb/ft s)		0.01	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.03	16.53	1.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	17.82	1.90

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12280

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	7	2322.81	22	2322.68	37	2323.11	56	2322
179	2322.9	374	2324						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	56	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	37	16	16	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2323.32	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.030	0.017
W.S. Elev (ft)	2323.31	Reach Len. (ft)	16.00	16.00	16.00
Crit W.S. (ft)		Flow Area (sq ft)		15.32	134.26
E.G. Slope (ft/ft)	0.000290	Area (sq ft)		15.32	134.26
Q Total (cfs)	155.00	Flow (cfs)		7.75	147.25
Top Width (ft)	246.97	Top Width (ft)		32.92	214.05
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)		0.51	1.10
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)		0.47	0.63
Conv. Total (cfs)	9098.6	Conv. (cfs)		455.1	8643.5
Length Wtd. (ft)	16.00	Wetted Per. (ft)		32.97	214.09
Min Ch El (ft)	2322.68	Shear (lb/sq ft)		0.01	0.01
Alpha	1.08	Stream Power (lb/ft s)		0.00	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.03	16.51	1.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	17.81	1.83

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12264

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	8	2322	20	2321.8	27	2322	53	2322
62	2322	183	2323	339	2324				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	53	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	27	119	119	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2323.31	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.025	0.018
W.S. Elev (ft)	2323.30	Reach Len. (ft)	119.00	119.00	119.00
Crit W.S. (ft)		Flow Area (sq ft)		30.01	149.58
E.G. Slope (ft/ft)	0.000153	Area (sq ft)		30.01	149.58
Q Total (cfs)	155.00	Flow (cfs)		25.32	129.68
Top Width (ft)	227.20	Top Width (ft)		24.21	203.00
Vel Total (ft/s)	0.86	Avg. Vel. (ft/s)		0.84	0.87
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.24	0.74
Conv. Total (cfs)	12544.4	Conv. (cfs)		2049.3	10495.1
Length Wtd. (ft)	119.00	Wetted Per. (ft)		24.37	203.00
Min Ch El (ft)	2321.80	Shear (lb/sq ft)		0.01	0.01
Alpha	1.00	Stream Power (lb/ft s)		0.01	0.01
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.03	16.50	0.98
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	17.80	1.75

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12145

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	8	2322	22	2320.3	68	2322	251	2324
323	2326								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	68	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	68	34	34	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2323.30	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.025	0.016
W.S. Elev (ft)	2323.28	Reach Len. (ft)	34.00	34.00	34.00
Crit W.S. (ft)		Flow Area (sq ft)		131.24	75.25
E.G. Slope (ft/ft)	0.000117	Area (sq ft)		131.24	75.25
Q Total (cfs)	190.00	Flow (cfs)		133.91	56.09

Top Width (ft)	182.48	Top Width (ft)		65.13	117.35
Vel Total (ft/s)	0.92	Avg. Vel. (ft/s)		1.02	0.75
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)		2.01	0.64
Conv. Total (cfs)	17603.1	Conv. (cfs)		12406.9	5196.2
Length Wtd. (ft)	34.00	Wetted Per. (ft)		65.42	117.35
Min Ch El (ft)	2320.30	Shear (lb/sq ft)		0.01	0.00
Alpha	1.06	Stream Power (lb/ft s)		0.01	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.03	16.28	0.67
C & E Loss (ft)	0.03	Cum SA (acres)	0.10	17.67	1.32

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12111

INPUT
Description: Upsteam Side of Dual 6' x 3' RCB's at Rainbow
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	19	2324	19	2319.81	32	2319.81	32	2324
202	2324	259	2325	318	2326				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	259	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
19	32	150.01	150.01	150.01	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2323.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.025	
W.S. Elev (ft)	2322.91	Reach Len. (ft)	150.01	150.01	150.01
Crit W.S. (ft)	2321.69	Flow Area (sq ft)		40.25	
E.G. Slope (ft/ft)	0.002349	Area (sq ft)		40.25	
Q Total (cfs)	190.00	Flow (cfs)		190.00	
Top Width (ft)	13.00	Top Width (ft)		13.00	
Vel Total (ft/s)	4.72	Avg. Vel. (ft/s)		4.72	
Max Chl Dpth (ft)	3.10	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	3920.2	Conv. (cfs)		3920.2	
Length Wtd. (ft)	150.01	Wetted Per. (ft)		19.19	
Min Ch El (ft)	2319.81	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)		1.45	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	16.22	0.64
C & E Loss (ft)		Cum SA (acres)	0.10	17.64	1.27

CULVERT RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12036

INPUT
Description: Dual 6' x 3' RCB's at the Rainbow and Rancho Intersection Culvert
16
Distance from Upstream XS = .1
Deck/Roadway Width = 149.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
19	2324	32	2324	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	19	2324	19	2319.81	32	2319.81	32	2324
202	2324	259	2325	318	2326				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	259	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
19	32	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
62	2324	75	2324	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	41	2324	62	2324	62	2319.46	75	2319.46
75	2324	123	2324	229	2324.3	326	2326		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	41	.025

Bank Sta: Left	Right	Coeff Contr.	Expan.
62	75	.1	.3

```
Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    2324
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       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                .1   149.9       .013                  .5                 1
Number of Barrels =  2
Upstream   Elevation =  2319.81
Centerline Stations
    Sta.    Sta.
      22      29
Downstream Elevation =  2319.46
Centerline Stations
    Sta.    Sta.
      65      72

CULVERT OUTPUT    Profile #PF#1
Culvert ID : Culvert #1

  Culv Q (cfs)              190.00    Culv Ful Lngh (ft)
  # Barrels                      2    Culv Vel US (ft/s)          6.26
  Q Barrel (cfs)             95.00    Culv Vel DS (ft/s)          5.94
  E.G. US. (ft)           2323.25    Culv Inv El Up (ft)      2319.81
  W.S. US. (ft)           2322.91    Culv Inv El Dn (ft)      2319.46
  E.G. DS (ft)            2322.46    Culv Frctn Ls (ft)          0.28
  W.S. DS (ft)            2322.13    Culv Ext Lss (ft)           0.21
  Delta EG (ft)              0.79    Culv Ent Lss (ft)           0.30
  Delta WS (ft)              0.78    Q Weir (cfs)
  E.G. IC (ft)            2323.20    Weir Sta Lft (ft)
  E.G. OC (ft)            2323.25    Weir Sta Rgt (ft)
  Culvert Control          Outlet    Weir Submerg
  Culv WS Inlet (ft)      2322.34    Weir Max Depth (ft)
  Culv WS Outlet (ft)     2322.13    Weir Avg Depth (ft)
  Culv Nml Depth (ft)        2.37    Wr Flw Area (sq ft)
  Culv Crt Depth (ft)        1.98    Min El Weir Flow (ft)    2324.01


CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11961

INPUT
Description: Downstream Side of Dual 6' x 3' RCB's at Rainbow
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      41    2324      62    2324      62 2319.46      75 2319.46
      75    2324     123    2324     229  2324.3     326    2326

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      41    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            62      75               64      64      64              .1       .3

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)            2322.46    Element                 Left OB    Channel   Right OB
  Vel Head (ft)                0.34    Wt. n-Val.                         0.025
  W.S. Elev (ft)            2322.13    Reach Len. (ft)           64.00      64.00      64.00
  Crit W.S. (ft)                       Flow Area (sq ft)                    34.65
  E.G. Slope (ft/ft)       0.002616    Area (sq ft)                         34.65
  Q Total (cfs)              161.00    Flow (cfs)                          161.00
  Top Width (ft)              13.00    Top Width (ft)                       13.00
  Vel Total (ft/s)             4.65    Avg. Vel. (ft/s)                      4.65
  Max Chl Dpth (ft)            2.67    Hydr. Depth (ft)                      2.67
  Conv. Total (cfs)          3147.9    Conv. (cfs)                         3147.9
  Length Wtd. (ft)            64.00    Wetted Per. (ft)                     18.33
  Min Ch El (ft)             2319.46   Shear (lb/sq ft)                      0.31
  Alpha                        1.00    Stream Power (lb/ft s)                1.43
  Frctn Loss (ft)              0.19    Cum Volume (acre-ft)         0.03     16.09      0.64
  C & E Loss (ft)              0.04    Cum SA (acres)               0.10     17.60      1.27


CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11897

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      38  2323.4      48    2322      63    2320      92    2322
     181  2323.1     251    2324

Manning's n Values        num=       3
```

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	38	.025	181	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
38	92	149	149	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2322.23	Element			
Vel Head (ft)	0.20	Wt. n-Val.		0.025	0.025
W.S. Elev (ft)	2322.03	Reach Len. (ft)	149.00	149.00	149.00
Crit W.S. (ft)		Flow Area (sq ft)		45.38	0.04
E.G. Slope (ft/ft)	0.003464	Area (sq ft)		45.38	0.04
Q Total (cfs)	161.00	Flow (cfs)		160.99	0.01
Top Width (ft)	46.75	Top Width (ft)		44.22	2.53
Vel Total (ft/s)	3.54	Avg. Vel. (ft/s)		3.55	0.22
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		1.03	0.02
Conv. Total (cfs)	2735.7	Conv. (cfs)		2735.5	0.1
Length Wtd. (ft)	149.00	Wetted Per. (ft)		44.43	2.53
Min Ch El (ft)	2320.00	Shear (lb/sq ft)		0.22	0.00
Alpha	1.00	Stream Power (lb/ft s)		0.78	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.03	16.03	0.64
C & E Loss (ft)	0.04	Cum SA (acres)	0.10	17.56	1.27

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11748

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	45	2323	51	2322	64	2320	75	2319.3
90	2320	104	2322	115	2322.1	226	2323.2	269	2324

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.025	115	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45	115	65	65	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2322.03	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.025	
W.S. Elev (ft)	2321.97	Reach Len. (ft)	65.00	65.00	65.00
Crit W.S. (ft)		Flow Area (sq ft)		86.62	
E.G. Slope (ft/ft)	0.000507	Area (sq ft)		86.62	
Q Total (cfs)	161.00	Flow (cfs)		161.00	
Top Width (ft)	52.62	Top Width (ft)		52.62	
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)		1.86	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	7147.3	Conv. (cfs)		7147.3	
Length Wtd. (ft)	65.00	Wetted Per. (ft)		52.95	
Min Ch El (ft)	2319.30	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.10	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.03	15.80	0.64
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	17.39	1.26

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11683

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.9	49	2322.9	54	2322	68	2320	81	2319
97	2320	112	2322	118	2322.1	249	2323.2	343	2324

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	49	.025	118	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
49	118	30	30	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2321.99	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.025	
W.S. Elev (ft)	2321.95	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)		Flow Area (sq ft)		98.69	
E.G. Slope (ft/ft)	0.000368	Area (sq ft)		98.69	
Q Total (cfs)	161.00	Flow (cfs)		161.00	
Top Width (ft)	57.29	Top Width (ft)		57.29	
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)		1.63	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	8395.5	Conv. (cfs)		8395.5	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		57.63	
Min Ch El (ft)	2319.00	Shear (lb/sq ft)		0.04	

Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.03	15.67	0.64
C & E Loss (ft)	0.03	Cum SA (acres)	0.10	17.31	1.26

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11653

INPUT
Description: Upstream Side of Dual 6' x 3' RCB's

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.8	48	2322.8	75	2322	75	2318.84	88	2318.84
88	2322	117	2322.1	258	2323.2	380	2324		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	48	.025	117	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48	117	63.01	63.01	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2321.94	Element			
Vel Head (ft)	0.31	Wt. n-Val.		0.025	
W.S. Elev (ft)	2321.63	Reach Len. (ft)	63.01	63.01	63.01
Crit W.S. (ft)	2320.52	Flow Area (sq ft)		36.27	
E.G. Slope (ft/ft)	0.002287	Area (sq ft)		36.27	
Q Total (cfs)	161.00	Flow (cfs)		161.00	
Top Width (ft)	13.00	Top Width (ft)		13.00	
Vel Total (ft/s)	4.44	Avg. Vel. (ft/s)		4.44	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	3366.9	Conv. (cfs)		3366.9	
Length Wtd. (ft)	63.01	Wetted Per. (ft)		18.58	
Min Ch El (ft)	2318.84	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		1.24	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	15.62	0.64
C & E Loss (ft)		Cum SA (acres)	0.10	17.28	1.26

CULVERT RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11621

INPUT
Description: Dual 6' x 3' RCB's in the Grass Lined Channel just south of the Rainbow and Rancho Intersection, Culvert 17
Distance from Upstream XS = .1
Deck/Roadway Width = 62.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
75	2322	88	2322	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.8	48	2322.8	75	2322	75	2318.84	88	2318.84
88	2322	117	2322.1	258	2323.2	380	2324		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	48	.025	117	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
48	117	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
75	2322	88	2322	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.6	48	2322.6	75	2322	75	2318.86	88	2318.86
88	2322	114	2322.1	277	2323	402	2324		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	48	.025	114	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
48	114	.1	.3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 2322
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	6

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
.1	62.9	.013	.5	1

Number of Barrels = 2
Upstream Elevation = 2318.84
Centerline Stations

Sta.	Sta.
78	85

Downstream Elevation = 2318.86
Centerline Stations

Sta.	Sta.
78	85

CULVERT OUTPUT Profile #PF#1
Culvert ID : Culvert #1

Culv Q (cfs)	161.00	Culv Ful Lngh (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.81
Q Barrel (cfs)	80.50	Culv Vel DS (ft/s)	7.08
E.G. US. (ft)	2321.94	Culv Inv El Up (ft)	2318.84
W.S. US. (ft)	2321.63	Culv Inv El Dn (ft)	2318.86
E.G. DS (ft)	2321.42	Culv Frctn Ls (ft)	0.14
W.S. DS (ft)	2320.76	Culv Ext Lss (ft)	0.12
Delta EG (ft)	0.52	Culv Ent Lss (ft)	0.26
Delta WS (ft)	0.88	Q Weir (cfs)	
E.G. IC (ft)	2321.88	Weir Sta Lft (ft)	
E.G. OC (ft)	2321.94	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2321.15	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2320.76	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Wr Flw Area (sq ft)	
Culv Crt Depth (ft)	1.77	Min El Weir Flow (ft)	2322.01

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11590

INPUT
Description: Downstream Side of Dual 6' x 3' RCB's
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.6	48	2322.6	75	2322	75	2318.86	88	2318.86
88	2322	114	2322.1	277	2323	402	2324		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	48	.025	114	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48	114	52	52	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2321.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.025	
W.S. Elev (ft)	2320.76	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)		Flow Area (sq ft)		24.63	
E.G. Slope (ft/ft)	0.007257	Area (sq ft)		24.63	
Q Total (cfs)	161.00	Flow (cfs)		161.00	
Top Width (ft)	13.00	Top Width (ft)		13.00	
Vel Total (ft/s)	6.54	Avg. Vel. (ft/s)		6.54	
Max Chl Dpth (ft)	1.89	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	1889.9	Conv. (cfs)		1889.9	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		16.79	
Min Ch El (ft)	2318.86	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		4.34	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.03	15.57	0.64
C & E Loss (ft)	0.18	Cum SA (acres)	0.10	17.27	1.26

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11538

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.5	47	2322.4	58	2322	69	2320	82	2318
93	2320	125	2320.5	215	2322	290	2322.7	397	2324

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
      0    .016      47    .025     125    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           47     125             100     100     100             .1       .3

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2321.15    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                         0.025     0.016
  W.S. Elev (ft)           2321.10    Reach Len. (ft)         100.00     100.00    100.00
  Crit W.S. (ft)                      Flow Area (sq ft)                   80.80     10.72
  E.G. Slope (ft/ft)       0.000686   Area (sq ft)                        80.80     10.72
  Q Total (cfs)             161.00    Flow (cfs)                         149.34     11.66
  Top Width (ft)             97.91    Top Width (ft)                      62.04     35.87
  Vel Total (ft/s)            1.76    Avg. Vel. (ft/s)                     1.85      1.09
  Max Chl Dpth (ft)           3.10    Hydr. Depth (ft)                     1.30      0.30
  Conv. Total (cfs)         6145.8    Conv. (cfs)                        5700.5     445.3
  Length Wtd. (ft)           100.00   Wetted Per. (ft)                    62.47     35.88
  Min Ch El (ft)           2318.00    Shear (lb/sq ft)                     0.06      0.01
  Alpha                       1.05    Stream Power (lb/ft s)               0.10      0.01
  Frctn Loss (ft)             0.08    Cum Volume (acre-ft)        0.03    15.51      0.64
  C & E Loss (ft)             0.00    Cum SA (acres)              0.10    17.22      1.24


CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11438

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.3      45  2322.2      55    2322      65    2320      80  2318.7
      91    2320      97  2320.1     240    2322     411  2323.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .025      97    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           45      97             271     271     271             .1       .3

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2321.07    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                         0.025     0.016
  W.S. Elev (ft)           2321.01    Reach Len. (ft)         271.00     271.00    271.00
  Crit W.S. (ft)                      Flow Area (sq ft)                   51.32     30.87
  E.G. Slope (ft/ft)       0.000867   Area (sq ft)                        51.32     30.87
  Q Total (cfs)             161.00    Flow (cfs)                         111.20     49.80
  Top Width (ft)            105.20    Top Width (ft)                      37.03     68.17
  Vel Total (ft/s)            1.96    Avg. Vel. (ft/s)                     2.17      1.61
  Max Chl Dpth (ft)           2.31    Hydr. Depth (ft)                     1.39      0.45
  Conv. Total (cfs)         5466.4    Conv. (cfs)                        3775.5    1690.9
  Length Wtd. (ft)           271.00   Wetted Per. (ft)                    37.26     68.18
  Min Ch El (ft)           2318.70    Shear (lb/sq ft)                     0.07      0.02
  Alpha                       1.05    Stream Power (lb/ft s)               0.16      0.04
  Frctn Loss (ft)             0.55    Cum Volume (acre-ft)        0.03    15.36      0.59
  C & E Loss (ft)             0.04    Cum SA (acres)              0.10    17.11      1.12


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11167

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2322.2      26    2322      56  2321.4      73    2320      88  2318.3
     107    2320     205  2321.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      56    .025     107    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           56     107             221     221     221             .1       .3

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2320.48    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.43    Wt. n-Val.                         0.025     0.016
  W.S. Elev (ft)           2320.05    Reach Len. (ft)         221.00     221.00    221.00
  Crit W.S. (ft)           2320.05    Flow Area (sq ft)                   30.53      0.07
  E.G. Slope (ft/ft)       0.009349   Area (sq ft)                        30.53      0.07
  Q Total (cfs)             161.00    Flow (cfs)                         160.95      0.05
  Top Width (ft)             37.32    Top Width (ft)                      34.58      2.74
  Vel Total (ft/s)            5.26    Avg. Vel. (ft/s)                     5.27      0.74
  Max Chl Dpth (ft)           1.75    Hydr. Depth (ft)                     0.88      0.02
  Conv. Total (cfs)         1665.1    Conv. (cfs)                        1664.6       0.5
  Length Wtd. (ft)           221.00   Wetted Per. (ft)                    34.75      2.74
  Min Ch El (ft)           2318.30    Shear (lb/sq ft)                     0.51      0.01
  Alpha                       1.00    Stream Power (lb/ft s)               2.70      0.01
```

Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.03	15.11	0.49
C & E Loss (ft)	0.07	Cum SA (acres)	0.10	16.88	0.90

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10946

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2321.6	58	2320.8	71	2320	90	2318	107	2318.4
180	2319.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	58	.025	71	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
58	107	139	139	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2319.52	Element			
Vel Head (ft)	0.20	Wt. n-Val.		0.015	0.015
W.S. Elev (ft)	2319.32	Reach Len. (ft)	139.00	139.00	139.00
Crit W.S. (ft)	2319.20	Flow Area (sq ft)		27.38	20.70
E.G. Slope (ft/ft)	0.001797	Area (sq ft)		27.38	20.70
Q Total (cfs)	161.00	Flow (cfs)		109.11	51.89
Top Width (ft)	74.45	Top Width (ft)		29.56	44.89
Vel Total (ft/s)	3.35	Avg. Vel. (ft/s)		3.98	2.51
Max Chl Dpth (ft)	1.32	Hydr. Depth (ft)		0.93	0.46
Conv. Total (cfs)	3797.5	Conv. (cfs)		2573.5	1223.9
Length Wtd. (ft)	139.00	Wetted Per. (ft)		29.64	44.90
Min Ch El (ft)	2318.00	Shear (lb/sq ft)		0.10	0.05
Alpha	1.14	Stream Power (lb/ft s)		0.41	0.13
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.03	14.96	0.44
C & E Loss (ft)	0.06	Cum SA (acres)	0.10	16.72	0.78

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10807

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2321.3	60	2320.4	72	2320	80	2318	88	2316.9
102	2318	196.6	2318.6	196.6	2318.1	270.28	2319.3	270.28	2319.8

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	60	.025	196.6	.013	196.6	.016	270.28	.013

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
60	102	49	49	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2319.41	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.025	0.022
W.S. Elev (ft)	2319.40	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)		Flow Area (sq ft)		46.80	155.53
E.G. Slope (ft/ft)	0.000140	Area (sq ft)		46.80	155.53
Q Total (cfs)	169.00	Flow (cfs)		46.55	122.45
Top Width (ft)	195.88	Top Width (ft)		27.60	168.28
Vel Total (ft/s)	0.84	Avg. Vel. (ft/s)		0.99	0.79
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		1.70	0.92
Conv. Total (cfs)	14262.7	Conv. (cfs)		3928.8	10334.0
Length Wtd. (ft)	49.00	Wetted Per. (ft)		27.89	168.89
Min Ch El (ft)	2316.90	Shear (lb/sq ft)		0.01	0.01
Alpha	1.03	Stream Power (lb/ft s)		0.01	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.03	14.84	0.16
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	16.63	0.44

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10758

```
INPUT
Description: Upstream SIde of Triple 6' x 2.5' RCB's
Station Elevation Data     num=       10
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2321.1       65  2320.2       74    2320       74  2316.5       97  2316.5
      97    2320   143.6  2319.1   143.6  2318.6   217.3  2319.9   217.3  2320.4

Manning's n Values         num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       65    .025   143.6    .013   143.6    .016   217.3    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            65      97           183.01  183.01  183.01             .1      .3

CROSS SECTION OUTPUT     Profile #PF#1

  E.G. Elev (ft)           2319.39    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.08     Wt. n-Val.                          0.025     0.016
  W.S. Elev (ft)           2319.31    Reach Len. (ft)          183.01     183.01    183.01
  Crit W.S. (ft)           2317.68    Flow Area (sq ft)                    64.65     15.48
  E.G. Slope (ft/ft)      0.000537    Area (sq ft)                         64.65     15.48
  Q Total (cfs)             169.00    Flow (cfs)                          153.30     15.70
  Top Width (ft)             74.23    Top Width (ft)                       23.00     51.23
  Vel Total (ft/s)            2.11    Avg. Vel. (ft/s)                     2.37      1.01
  Max Chl Dpth (ft)           2.81    Hydr. Depth (ft)                     2.81      0.30
  Conv. Total (cfs)         7293.3    Conv. (cfs)                         6615.7     677.5
  Length Wtd. (ft)           183.01   Wetted Per. (ft)                     28.62     51.74
  Min Ch El (ft)           2316.50    Shear (lb/sq ft)                     0.08      0.01
  Alpha                       1.17    Stream Power (lb/ft s)               0.18      0.01
  Frctn Loss (ft)                     Cum Volume (acre-ft)       0.03      14.78     0.06
  C & E Loss (ft)                     Cum SA (acres)             0.10      16.60     0.32


CULVERT                RIVER: RANCHO ROAD
REACH: 95 TO GOWAN     RS: 10667

INPUT
Description: Triple 6' x 2.5' RCB's at Lone Mt. Rd., One of the D.S. Culverts
             has 3 ft of horizontal blockage, Culvert 18.
Distance from Upstream XS =      .1
Deck/Roadway Width        =   182.9
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      74    2320              97    2320       0

Upstream Bridge Cross Section Data
Station Elevation Data     num=       10
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2321.1       65  2320.2       74    2320       74  2316.5       97  2316.5
      97    2320   143.6  2319.1   143.6  2318.6   217.3  2319.9   217.3  2320.4

Manning's n Values         num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       65    .025   143.6    .013   143.6    .016   217.3    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            65      97             .1      .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      77    2319              94    2319       0

Downstream Bridge Cross Section Data
Station Elevation Data     num=       13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2320.7       46    2320       67  2319.8       77    2319       77 2316.09
      94 2316.09        94    2319       95    2318      198    2320      238    2320
     279    2318      293    2318      309    2320

Manning's n Values         num=       4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       67    .03        77    .015       94    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     198             .1      .3
Right Levee     Station=     198      Elevation=    2320

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =    19.1
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     2.5        6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
```

Culvert Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
.1	182.9	.013	.5	1

Number of Barrels = 3
Upstream Elevation = 2316.5
Centerline Stations

Sta.	Sta.	Sta.
78.5	85.5	92.5

Downstream Elevation = 2316.09
Centerline Stations

Sta.	Sta.	Sta.
77	84	91

CULVERT OUTPUT Profile #PF#1
Culvert ID : Culvert #1

Culv Q (cfs)	137.93	Culv Ful Lngh (ft)	182.90
# Barrels	3	Culv Vel US (ft/s)	3.07
Q Barrel (cfs)	45.98	Culv Vel DS (ft/s)	3.07
E.G. US. (ft)	2319.39	Culv Inv El Up (ft)	2316.50
W.S. US. (ft)	2319.31	Culv Inv El Dn (ft)	2316.09
E.G. DS (ft)	2319.09	Culv Frctn Ls (ft)	0.16
W.S. DS (ft)	2319.02	Culv Ext Lss (ft)	0.07
Delta EG (ft)	0.30	Culv Ent Lss (ft)	0.07
Delta WS (ft)	0.29	Q Weir (cfs)	31.07
E.G. IC (ft)	2318.89	Weir Sta Lft (ft)	128.58
E.G. OC (ft)	2319.39	Weir Sta Rgt (ft)	188.40
Culvert Control	Outlet	Weir Submerg	0.06
Culv WS Inlet (ft)	2319.00	Weir Max Depth (ft)	0.79
Culv WS Outlet (ft)	2318.59	Weir Avg Depth (ft)	0.33
Culv Nml Depth (ft)		Wr Flw Area (sq ft)	19.87
Culv Crt Depth (ft)	1.22	Min El Weir Flow (ft)	2318.61

Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10575

INPUT
Description: Downstream Side of Triple 6' x 2.5' RCB's
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.7	46	2320	67	2319.8	77	2319	77	2316.09
94	2316.09	94	2319	95	2318	198	2320	238	2320
279	2318	293	2318	309	2320				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	67	.03	77	.015	94	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	198	28	28	.1	.3

Right Levee Station= 198 Elevation= 2320

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2319.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.016	
W.S. Elev (ft)	2319.02	Reach Len. (ft)	28.00	28.00	28.00
Crit W.S. (ft)	2317.54	Flow Area (sq ft)		77.12	
E.G. Slope (ft/ft)	0.000340	Area (sq ft)		77.12	
Q Total (cfs)	169.00	Flow (cfs)		169.00	
Top Width (ft)	70.78	Top Width (ft)		70.78	
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)		2.19	
Max Chl Dpth (ft)	2.93	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	9161.7	Conv. (cfs)		9161.7	
Length Wtd. (ft)	28.00	Wetted Per. (ft)		77.03	
Min Ch El (ft)	2316.09	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.03	14.48	0.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	16.40	0.21

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10547

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.6	43	2320	66	2319.7	78	2318	81	2316
113	2318	164	2320	258	2320	271	2318	297	2318
308	2320								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.015	66	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	164	29	29	.1	.3

Right Levee Station= 164 Elevation= 2320

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2319.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2319.02	Reach Len. (ft)	29.00	29.00	29.00
Crit W.S. (ft)	2317.86	Flow Area (sq ft)		87.34	
E.G. Slope (ft/ft)	0.001111	Area (sq ft)		87.34	
Q Total (cfs)	169.00	Flow (cfs)		169.00	
Top Width (ft)	68.07	Top Width (ft)		68.07	
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)		1.93	
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	5070.5	Conv. (cfs)		5070.5	
Length Wtd. (ft)	29.00	Wetted Per. (ft)		68.83	
Min Ch El (ft)	2316.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.03	14.43	0.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	16.36	0.21

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10518

INPUT
Description: Upstream Side of Dual 24" RCP's
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.6	40	2320	66	2319.7	77	2318	77	2315.96
84	2315.96	92	2318	131	2318	163	2320	258	2320
272	2318	298	2318	310	2320				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	66	.03	77	.015	84	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	163	68.01	68.01	.1	.3

Right Levee Station= 163 Elevation= 2320

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2319.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.028	
W.S. Elev (ft)	2318.98	Reach Len. (ft)	68.01	68.01	68.01
Crit W.S. (ft)	2318.26	Flow Area (sq ft)		86.17	
E.G. Slope (ft/ft)	0.001247	Area (sq ft)		86.17	
Q Total (cfs)	169.00	Flow (cfs)		169.00	
Top Width (ft)	76.03	Top Width (ft)		76.03	
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)		1.96	
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)		1.13	
Conv. Total (cfs)	4785.1	Conv. (cfs)		4785.1	
Length Wtd. (ft)	68.01	Wetted Per. (ft)		78.43	
Min Ch El (ft)	2315.96	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)		0.17	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	14.37	0.03
C & E Loss (ft)		Cum SA (acres)	0.10	16.31	0.21

CULVERT RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10485

INPUT
Description: Dual 24" RCP's, South of Lone Mt. Rd. Culvert 19
Distance from Upstream XS = .1
Deck/Roadway Width = 67.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
66	2319.7	92	2318	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.6	40	2320	66	2319.7	77	2318	77	2315.96
84	2315.96	92	2318	131	2318	163	2320	258	2320
272	2318	298	2318	310	2320				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	66	.03	77	.015	84	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	163	.1	.3

Right Levee Station= 163 Elevation= 2320

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
66	2319.5	89	2318	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.4	35	2320	66	2319.5	78	2318	78	2315.54

```
      85 2315.54      89    2318     135    2318     160    2320     242    2320
     262    2318     300    2318     312    2320

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      66    .03       78    .015      85    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     160            .1       .3
Right Levee     Station=     160      Elevation=    2320

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =    2318
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      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 .1    67.9       .013                  .5                1
Number of Barrels =  2
Upstream   Elevation =  2315.96
Centerline Stations
    Sta.    Sta.
      79      82
Downstream Elevation =  2315.54
Centerline Stations
    Sta.    Sta.
      80      83

CULVERT OUTPUT    Profile #PF#1
Culvert ID : Culvert #1

  Culv Q (cfs)              29.20    Culv Ful Lngh (ft)        67.90
  # Barrels                     2    Culv Vel US (ft/s)         4.65
  Q Barrel (cfs)            14.60    Culv Vel DS (ft/s)         4.65
  E.G. US. (ft)           2319.04    Culv Inv El Up (ft)     2315.96
  W.S. US. (ft)           2318.98    Culv Inv El Dn (ft)     2315.54
  E.G. DS (ft)            2318.57    Culv Frctn Ls (ft)         0.28
  W.S. DS (ft)            2318.26    Culv Ext Lss (ft)          0.02
  Delta EG (ft)              0.47    Culv Ent Lss (ft)          0.17
  Delta WS (ft)              0.72    Q Weir (cfs)             139.80
  E.G. IC (ft)            2318.98    Weir Sta Lft (ft)         76.16
  E.G. OC (ft)            2319.04    Weir Sta Rgt (ft)        147.57
  Culvert Control          Outlet    Weir Submerg               0.19
  Culv WS Inlet (ft)      2317.96    Weir Max Depth (ft)        1.04
  Culv WS Outlet (ft)     2317.54    Weir Avg Depth (ft)        0.80
  Culv Nml Depth (ft)                Wr Flw Area (sq ft)       57.16
  Culv Crt Depth (ft)        1.38    Min El Weir Flow (ft)   2318.01


CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10450

INPUT
Description: Downstream Side of Dual 24" RCP's
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.4      35    2320      66  2319.5      78    2318      78 2315.54
      85 2315.54      89    2318     135    2318     160    2320     242    2320
     262    2318     300    2318     312    2320

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      66    .03       78    .015      85    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     160             51      51      51            .1       .3
Right Levee     Station=     160      Elevation=    2320

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)          2318.57    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.32    Wt. n-Val.                         0.028
  W.S. Elev (ft)          2318.26    Reach Len. (ft)           51.00      51.00      51.00
  Crit W.S. (ft)          2318.26    Flow Area (sq ft)                    37.39
  E.G. Slope (ft/ft)     0.015400    Area (sq ft)                         37.39
  Q Total (cfs)            169.00    Flow (cfs)                          169.00
  Top Width (ft)            62.25    Top Width (ft)                       62.25
  Vel Total (ft/s)           4.52    Avg. Vel. (ft/s)                      4.52
  Max Chl Dpth (ft)          2.72    Hydr. Depth (ft)                      0.60
  Conv. Total (cfs)        1361.8    Conv. (cfs)                         1361.8
  Length Wtd. (ft)          51.00    Wetted Per. (ft)                     65.43
  Min Ch El (ft)          2315.54    Shear (lb/sq ft)                      0.55
  Alpha                      1.00    Stream Power (lb/ft s)                2.48
  Frctn Loss (ft)            0.02    Cum Volume (acre-ft)        0.03      14.27       0.03
  C & E Loss (ft)            0.09    Cum SA (acres)              0.10      16.20       0.21
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10399

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.3	32	2320	65	2319.4	71	2318	75	2316
132	2316	301	2318	312	2320				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	65	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	312	104	104	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2318.34	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2318.33	Reach Len. (ft)	104.00	104.00	104.00
Crit W.S. (ft)	2316.55	Flow Area (sq ft)		190.78	
E.G. Slope (ft/ft)	0.000112	Area (sq ft)		363.17	
Q Total (cfs)	169.00	Flow (cfs)		169.00	
Top Width (ft)	233.22	Top Width (ft)		233.22	
Vel Total (ft/s)	0.89	Avg. Vel. (ft/s)		0.89	
Max Chl Dpth (ft)	2.33	Hydr. Depth (ft)		2.21	
Conv. Total (cfs)	15958.9	Conv. (cfs)		15958.9	
Length Wtd. (ft)	104.00	Wetted Per. (ft)		86.92	
Min Ch El (ft)	2316.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)		0.01	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.03	14.04	0.03
C & E Loss (ft)	0.02	Cum SA (acres)	0.10	16.03	0.21

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10295

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320	59	2319.2	76	2318	81	2316	96	2316
106	2318	122	2320	209	2320	269	2318	299	2318
318	2320								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	59	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	122	265	220	188	.1	.3

Right Levee Station= 122 Elevation= 2320

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2318.29	Element			
Vel Head (ft)	0.19	Wt. n-Val.		0.030	
W.S. Elev (ft)	2318.10	Reach Len. (ft)	265.00	220.00	188.00
Crit W.S. (ft)	2317.40	Flow Area (sq ft)		48.07	
E.G. Slope (ft/ft)	0.003025	Area (sq ft)		48.07	
Q Total (cfs)	169.00	Flow (cfs)		169.00	
Top Width (ft)	32.19	Top Width (ft)		32.19	
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		3.52	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.49	
Conv. Total (cfs)	3072.9	Conv. (cfs)		3072.9	
Length Wtd. (ft)	220.00	Wetted Per. (ft)		32.78	
Min Ch El (ft)	2316.00	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		0.97	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.03	13.55	0.03
C & E Loss (ft)	0.05	Cum SA (acres)	0.10	15.71	0.21

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10075

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.65	21	2318.23	23	2318.19	38.7	2314.1	44	2314.1
55	2317.04	175.21	2317.95	179.5	2317.95	202.5	2317.53	211.3	2316.83
220.2	2315.02	226	2315.02	246.9	2317.95	280.33	2318.44	292.4	2319

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	21	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 246.9 164 157 148 .1 .3
Right Levee Station= 175.21 Elevation= 2317.95

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2317.82	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2317.78	Reach Len. (ft)	164.00	157.00	148.00
Crit W.S. (ft)	2316.12	Flow Area (sq ft)		105.35	
E.G. Slope (ft/ft)	0.001365	Area (sq ft)		105.35	
Q Total (cfs)	169.00	Flow (cfs)		169.00	
Top Width (ft)	127.52	Top Width (ft)		127.52	
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)		1.60	
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)		0.83	
Conv. Total (cfs)	4573.8	Conv. (cfs)		4573.8	
Length Wtd. (ft)	157.00	Wetted Per. (ft)		128.38	
Min Ch El (ft)	2314.10	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)		0.11	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.03	13.16	0.03
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	15.31	0.21

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9918

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.9	60	2318.3	71	2318	87	2316	107	2316
161	2317.7	203	2316	318	2316	395	2318		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	60	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 395 122 122 122 .1 .3
Right Levee Station= 161 Elevation= 2317.7

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2317.50	Element			
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2317.41	Reach Len. (ft)	122.00	122.00	122.00
Crit W.S. (ft)	2316.95	Flow Area (sq ft)		67.33	
E.G. Slope (ft/ft)	0.003016	Area (sq ft)		67.33	
Q Total (cfs)	169.00	Flow (cfs)		169.00	
Top Width (ft)	75.86	Top Width (ft)		75.86	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	3077.2	Conv. (cfs)		3077.2	
Length Wtd. (ft)	122.00	Wetted Per. (ft)		75.97	
Min Ch El (ft)	2316.00	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		0.42	
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.03	12.85	0.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	14.94	0.21

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9796

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
      0 2318.71      37 2317.56      52 2317.34      52 2317.84      58 2317.96
     64 2317.39      73 2313.67    84.5 2313.67    93.5 2317.39     170 2318.24
 326.42 2316.19  327.92 2316.13  329.42 2316.19     358 2316.47

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
 329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     358             230     230     230             .1      .3
Right Levee     Station=     170      Elevation= 2318.24

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2317.35    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                          0.030
  W.S. Elev (ft)           2317.26    Reach Len. (ft)          230.00     230.00    230.00
  Crit W.S. (ft)           2315.33    Flow Area (sq ft)                    72.57
  E.G. Slope (ft/ft)      0.000690    Area (sq ft)                         72.57
  Q Total (cfs)             169.00    Flow (cfs)                          169.00
  Top Width (ft)             28.89    Top Width (ft)                       28.89
  Vel Total (ft/s)            2.33    Avg. Vel. (ft/s)                     2.33
  Max Chl Dpth (ft)           3.59    Hydr. Depth (ft)                     2.51
  Conv. Total (cfs)         6432.8    Conv. (cfs)                         6432.8
  Length Wtd. (ft)          230.00    Wetted Per. (ft)                    30.32
  Min Ch El (ft)           2313.67    Shear (lb/sq ft)                     0.10
  Alpha                       1.00    Stream Power (lb/ft s)               0.24
  Frctn Loss (ft)             0.15    Cum Volume (acre-ft)        0.03     12.65     0.03
  C & E Loss (ft)             0.01    Cum SA (acres)              0.10     14.80     0.21


CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9566

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2318.02      37 2316.87      52 2316.65      52 2317.15      58 2317.27
      64  2316.7      73 2312.98    84.5 2312.98    93.5  2316.7     170 2317.55
 326.42  2315.5  327.92 2315.44  329.42  2315.5     358 2315.78

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
 329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     358              54      54      54             .1      .3
Right Levee     Station=     170      Elevation= 2317.55

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2317.20    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                          0.029
  W.S. Elev (ft)           2317.13    Reach Len. (ft)           54.00      54.00     54.00
  Crit W.S. (ft)           2314.90    Flow Area (sq ft)                   104.96
  E.G. Slope (ft/ft)      0.000595    Area (sq ft)                        104.96
  Q Total (cfs)             215.00    Flow (cfs)                          215.00
  Top Width (ft)             96.20    Top Width (ft)                       96.20
  Vel Total (ft/s)            2.05    Avg. Vel. (ft/s)                     2.05
  Max Chl Dpth (ft)           4.15    Hydr. Depth (ft)                     1.09
  Conv. Total (cfs)         8817.8    Conv. (cfs)                         8817.8
  Length Wtd. (ft)           54.00    Wetted Per. (ft)                    98.19
  Min Ch El (ft)           2312.98    Shear (lb/sq ft)                     0.04
  Alpha                       1.00    Stream Power (lb/ft s)               0.08
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.03     12.18     0.03
  C & E Loss (ft)                     Cum SA (acres)              0.10     14.47     0.21


CULVERT                RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9539

INPUT
Description:
Distance from Upstream XS =       .1
Deck/Roadway Width        =     53.8
Weir Coefficient          =      2.8
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      64  2316.7    2312     93.5  2316.7    2312

Upstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2318.02      37 2316.87      52 2316.65      52 2317.15      58 2317.27
      64  2316.7      73 2312.98    84.5 2312.98    93.5  2316.7     170 2317.55
 326.42  2315.5  327.92 2315.44  329.42  2315.5     358 2315.78

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
 329.42    .016
```

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
           0     358            .1       .3
Right Levee     Station=     170      Elevation= 2317.55

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      64 2316.54    2311    93.5 2316.54    2311

Downstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2317.86      37 2316.71      52 2316.49      52 2316.99      58 2317.11
      64 2316.54      73  2312.5    84.5  2312.5    93.5 2316.54     170 2317.39
  326.42 2315.34  327.92 2315.28  329.42 2315.34     358 2315.62

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Coeff Contr.   Expan.
           0     358            .1       .3
Right Levee     Station=     170      Elevation= 2317.39

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

Number of Culverts =  1

Culvert Name      Shape      Rise    Span
Culvert #1            Box       3       4
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 .1    53.8       .013                  .5                1
Number of Barrels =  3
Upstream   Elevation =  2312.98
Centerline Stations
    Sta.    Sta.    Sta.
   74.25   78.75      83
Downstream Elevation =  2312.82
Centerline Stations
    Sta.    Sta.    Sta.
   74.25   78.75      83

CULVERT OUTPUT    Profile #PF#1
Culvert ID : Culvert #1

  Culv Q (cfs)             155.91    Culv Ful Lngh (ft)        53.80
  # Barrels                     3    Culv Vel US (ft/s)         4.33
  Q Barrel (cfs)            51.97    Culv Vel DS (ft/s)         4.33
  E.G. US. (ft)           2317.20    Culv Inv El Up (ft)     2312.98
  W.S. US. (ft)           2317.13    Culv Inv El Dn (ft)     2312.82
  E.G. DS (ft)            2316.76    Culv Frctn Ls (ft)         0.09
  W.S. DS (ft)            2316.67    Culv Ext Lss (ft)          0.20
  Delta EG (ft)              0.44    Culv Ent Lss (ft)          0.15
  Delta WS (ft)              0.47    Q Weir (cfs)              59.09
  E.G. IC (ft)            2316.47    Weir Sta Lft (ft)         26.66
  E.G. OC (ft)            2317.20    Weir Sta Rgt (ft)        137.73
  Culvert Control          Outlet    Weir Submerg               0.00
  Culv WS Inlet (ft)      2315.98    Weir Max Depth (ft)        0.54
  Culv WS Outlet (ft)     2315.82    Weir Avg Depth (ft)        0.33
  Culv Nml Depth (ft)                Wr Flw Area (sq ft)       34.81
  Culv Crt Depth (ft)        1.74    Min El Weir Flow (ft)   2316.66


Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
         The reported inlet energy grade answer may not be valid.

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9512

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2317.86      37 2316.71      52 2316.49      52 2316.99      58 2317.11
      64 2316.54      73  2312.5    84.5  2312.5    93.5 2316.54     170 2317.39
  326.42 2315.34  327.92 2315.28  329.42 2315.34     358 2315.62

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           0     358               40      40      40             .1       .3
```

Right Levee Station= 170 Elevation= 2317.39

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2316.76	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.09	Wt. n-Val.		0.030		
W.S. Elev (ft)	2316.67	Reach Len. (ft)	40.00	40.00	40.00	
Crit W.S. (ft)	2314.44	Flow Area (sq ft)		88.38		
E.G. Slope (ft/ft)	0.000677	Area (sq ft)		88.38		
Q Total (cfs)	215.00	Flow (cfs)		215.00		
Top Width (ft)	54.13	Top Width (ft)		54.13		
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)		2.43		
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		1.63		
Conv. Total (cfs)	8265.8	Conv. (cfs)		8265.8		
Length Wtd. (ft)	40.00	Wetted Per. (ft)		56.04		
Min Ch El (ft)	2312.50	Shear (lb/sq ft)		0.07		
Alpha	1.00	Stream Power (lb/ft s)		0.16		
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.03	12.06	0.03	
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	14.37	0.21	

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9472

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2317.74	37	2316.59	52	2316.37	52	2316.87	58	2316.99
64	2316.42	73	2312.2	84.5	2312.2	93.5	2316.42	170	2317.27
326.42	2315.22	327.92	2315.16	329.42	2315.22	358	2315.5		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	52	.013	58	.03	93.5	.016	326.42	.013
329.42	.016								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	358	96	96	.1	.3

Right Levee Station= 170 Elevation= 2317.27

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2316.73	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.07	Wt. n-Val.		0.030		
W.S. Elev (ft)	2316.66	Reach Len. (ft)	96.00	96.00	96.00	
Crit W.S. (ft)	2314.15	Flow Area (sq ft)		99.04		
E.G. Slope (ft/ft)	0.000536	Area (sq ft)		99.04		
Q Total (cfs)	215.00	Flow (cfs)		215.00		
Top Width (ft)	70.45	Top Width (ft)		70.45		
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)		2.17		
Max Chl Dpth (ft)	4.46	Hydr. Depth (ft)		1.41		
Conv. Total (cfs)	9287.9	Conv. (cfs)		9287.9		
Length Wtd. (ft)	96.00	Wetted Per. (ft)		72.63		
Min Ch El (ft)	2312.20	Shear (lb/sq ft)		0.05		
Alpha	1.00	Stream Power (lb/ft s)		0.10		
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.03	11.98	0.03	
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	14.32	0.21	

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9376

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2317.23	52	2316.19	52	2316.69	58	2316.82	72	2316.54
72	2316.04	94.5	2315.59	96	2315.53	97.5	2315.59	234.5	2317
350	2314.81	355	2314.7	356.5	2314.64	358	2314.7		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	52	.013	58	.03	72	.016	94.5	.013
97.5	.016	350	.03	355	.013				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	234.5	52	52	.1	.3

Right Levee Station= 234.5 Elevation= 2317

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2316.61	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.22	Wt. n-Val.		0.016		
W.S. Elev (ft)	2316.40	Reach Len. (ft)	52.00	52.00	52.00	
Crit W.S. (ft)	2316.40	Flow Area (sq ft)		48.25		
E.G. Slope (ft/ft)	0.004397	Area (sq ft)		48.25		
Q Total (cfs)	180.00	Flow (cfs)		180.00		
Top Width (ft)	114.18	Top Width (ft)		114.18		

Vel Total (ft/s)	3.73	Avg. Vel. (ft/s)		3.73	
Max Chl Dpth (ft)	1.76	Hydr. Depth (ft)		0.42	
Conv. Total (cfs)	2714.7	Conv. (cfs)		2714.7	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		114.76	
Min Ch El (ft)	2315.53	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)		0.43	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.03	11.82	0.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	14.11	0.21

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9324

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2316.26	43	2315.4	68	2315.3	76	2315.4	102	2314.1
169	2315.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	43	.03	76	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	169	119	119	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2316.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.		0.016	
W.S. Elev (ft)	2314.81	Reach Len. (ft)	119.00	119.00	119.00
Crit W.S. (ft)	2315.14	Flow Area (sq ft)		20.48	
E.G. Slope (ft/ft)	0.035563	Area (sq ft)		20.48	
Q Total (cfs)	180.00	Flow (cfs)		180.00	
Top Width (ft)	57.57	Top Width (ft)		57.57	
Vel Total (ft/s)	8.79	Avg. Vel. (ft/s)		8.79	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.36	
Conv. Total (cfs)	954.5	Conv. (cfs)		954.5	
Length Wtd. (ft)	119.00	Wetted Per. (ft)		57.59	
Min Ch El (ft)	2314.10	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		6.94	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.03	11.77	0.03
C & E Loss (ft)	0.10	Cum SA (acres)	0.10	14.01	0.21

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9205

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2316.22	43	2315.36	55	2315.6	93.5	2313.9	211	2314.3
238	2314.6	308	2314.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	43	.03	93.5	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	211	91	91	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
231	279	2318

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2314.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.017	0.016
W.S. Elev (ft)	2314.50	Reach Len. (ft)	91.00	91.00	91.00
Crit W.S. (ft)	2314.50	Flow Area (sq ft)		51.50	1.86
E.G. Slope (ft/ft)	0.005060	Area (sq ft)		51.50	1.86
Q Total (cfs)	180.00	Flow (cfs)		177.33	2.67
Top Width (ft)	149.45	Top Width (ft)		131.16	18.29
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)		3.44	1.44
Max Chl Dpth (ft)	0.60	Hydr. Depth (ft)		0.39	0.10
Conv. Total (cfs)	2530.6	Conv. (cfs)		2493.0	37.5
Length Wtd. (ft)	91.00	Wetted Per. (ft)		131.17	18.29

Min Ch El (ft)	2313.90	Shear (lb/sq ft)		0.12	0.03
Alpha	1.03	Stream Power (lb/ft s)		0.43	0.05
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.03	11.68	0.03
C & E Loss (ft)	0.05	Cum SA (acres)	0.10	13.75	0.19

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9114

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2316	47	2315.1	63	2314	77	2313.2	150	2313.4
272	2314	326	2314	362	2314.6				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	47	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	362	54	54	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2314.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2314.20	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2313.79	Flow Area (sq ft)		147.12	
E.G. Slope (ft/ft)	0.001425	Area (sq ft)		147.12	
Q Total (cfs)	180.00	Flow (cfs)		180.00	
Top Width (ft)	277.83	Top Width (ft)		277.83	
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)		1.22	
Max Chl Dpth (ft)	1.00	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	4769.0	Conv. (cfs)		4769.0	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		277.86	
Min Ch El (ft)	2313.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.03	11.47	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	13.33	0.17

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9060

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2315.6	44	2314.8	54	2314	76	2312.9	345	2314
384	2314	556	2315.2	600	2316				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	44	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	345	110	110	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888		F	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
104	165	2316

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2314.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	0.030
W.S. Elev (ft)	2314.12	Reach Len. (ft)	110.00	110.00	110.00
Crit W.S. (ft)	2313.72	Flow Area (sq ft)		135.32	5.73
E.G. Slope (ft/ft)	0.001454	Area (sq ft)		135.32	5.73
Q Total (cfs)	180.00	Flow (cfs)		177.64	2.36
Top Width (ft)	287.76	Top Width (ft)		231.50	56.25
Vel Total (ft/s)	1.28	Avg. Vel. (ft/s)		1.31	0.41
Max Chl Dpth (ft)	1.22	Hydr. Depth (ft)		0.58	0.10
Conv. Total (cfs)	4721.0	Conv. (cfs)		4659.0	61.9
Length Wtd. (ft)	110.00	Wetted Per. (ft)		233.50	56.25
Min Ch El (ft)	2312.90	Shear (lb/sq ft)		0.05	0.01
Alpha	1.05	Stream Power (lb/ft s)		0.07	0.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.03	11.29	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	13.01	0.13

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8950

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2314.7	40	2314.1	48	2314	77	2312.4	265	2314

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	40	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	265	282	282	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
103	164	2316

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2313.85	Element			
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2313.74	Reach Len. (ft)	282.00	282.00	282.00
Crit W.S. (ft)	2313.50	Flow Area (sq ft)		69.81	
E.G. Slope (ft/ft)	0.005768	Area (sq ft)		69.81	
Q Total (cfs)	180.00	Flow (cfs)		180.00	
Top Width (ft)	121.23	Top Width (ft)		121.23	
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	1.34	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	2370.0	Conv. (cfs)		2370.0	
Length Wtd. (ft)	282.00	Wetted Per. (ft)		123.00	
Min Ch El (ft)	2312.40	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.53	
Frctn Loss (ft)	2.54	Cum Volume (acre-ft)	0.03	11.04	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.10	12.57	0.06

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8668

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2312	39	2310.9	55	2310	134	2311.2	242	2312
440	2312.4								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	39	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	242	192	192	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2311.28	Element			
Vel Head (ft)	0.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2311.03	Reach Len. (ft)	192.00	192.00	192.00
Crit W.S. (ft)	2311.03	Flow Area (sq ft)		44.23	
E.G. Slope (ft/ft)	0.016040	Area (sq ft)		44.23	
Q Total (cfs)	180.00	Flow (cfs)		180.00	
Top Width (ft)	88.10	Top Width (ft)		88.10	
Vel Total (ft/s)	4.07	Avg. Vel. (ft/s)		4.07	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	1421.3	Conv. (cfs)		1421.3	
Length Wtd. (ft)	192.00	Wetted Per. (ft)		88.14	
Min Ch El (ft)	2310.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		2.05	
Frctn Loss (ft)	1.71	Cum Volume (acre-ft)	0.03	10.67	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.10	11.89	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8476

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2310.3	21	2310	49	2309.1	75	2308.3	229	2310
338	2310.7	413	2312						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	49	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	229	66	66	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2309.47	Element			
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2309.37	Reach Len. (ft)	66.00	66.00	66.00
Crit W.S. (ft)	2309.18	Flow Area (sq ft)		70.87	
E.G. Slope (ft/ft)	0.005673	Area (sq ft)		70.87	
Q Total (cfs)	180.00	Flow (cfs)		180.00	
Top Width (ft)	131.76	Top Width (ft)		131.76	
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)		2.54	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	2389.7	Conv. (cfs)		2389.7	
Length Wtd. (ft)	66.00	Wetted Per. (ft)		131.78	
Min Ch El (ft)	2308.30	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.48	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.03	10.41	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	11.40	0.06

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8410

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2309.6	50	2308.5	74	2308	80	2307.7	95	2308
285	2310								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	50	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	285	133	133	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
125	217	2312

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2308.94	Element			
Vel Head (ft)	0.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2308.72	Reach Len. (ft)	133.00	133.00	133.00
Crit W.S. (ft)	2308.67	Flow Area (sq ft)		47.37	
E.G. Slope (ft/ft)	0.011500	Area (sq ft)		47.37	
Q Total (cfs)	180.00	Flow (cfs)		180.00	
Top Width (ft)	84.92	Top Width (ft)		84.92	
Vel Total (ft/s)	3.80	Avg. Vel. (ft/s)		3.80	
Max Chl Dpth (ft)	1.02	Hydr. Depth (ft)		0.56	
Conv. Total (cfs)	1678.5	Conv. (cfs)		1678.5	
Length Wtd. (ft)	133.00	Wetted Per. (ft)		85.34	
Min Ch El (ft)	2307.70	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)		1.51	
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	0.03	10.32	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.10	11.24	0.06

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8277

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2308.2	13	2308	50	2307.4	79	2306.5	190	2308
238	2308	262	2310						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	50	.03

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     262             122     122     122            .1       .3
Blocked Obstructions     num=        1
   Sta L   Sta R    Elev
     127     213    2311

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2307.74    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.16     Wt. n-Val.                         0.030
  W.S. Elev (ft)           2307.58    Reach Len. (ft)         122.00     122.00    122.00
  Crit W.S. (ft)                      Flow Area (sq ft)                   55.25
  E.G. Slope (ft/ft)      0.007078    Area (sq ft)                        55.25
  Q Total (cfs)              180.00   Flow (cfs)                         180.00
  Top Width (ft)              87.90   Top Width (ft)                      87.90
  Vel Total (ft/s)             3.26   Avg. Vel. (ft/s)                     3.26
  Max Chl Dpth (ft)            1.08   Hydr. Depth (ft)                     0.63
  Conv. Total (cfs)          2139.5   Conv. (cfs)                        2139.5
  Length Wtd. (ft)           122.00   Wetted Per. (ft)                    88.35
  Min Ch El (ft)           2306.50    Shear (lb/sq ft)                     0.28
  Alpha                        1.00   Stream Power (lb/ft s)               0.90
  Frctn Loss (ft)              0.95   Cum Volume (acre-ft)       0.03      10.17     0.01
  C & E Loss (ft)              0.00   Cum SA (acres)             0.10      10.98     0.06


CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8155

INPUT
Description:
Station Elevation Data    num=       9
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0  2306.9       48   2306.2       72     2306      83   2305.4      106     2306
     149     2308      187     2308      239     2308     260     2310

Manning's n Values        num=       2
     Sta    n Val      Sta    n Val
       0     .016       48      .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     260             216     216     216            .1       .3
Blocked Obstructions     num=        1
   Sta L   Sta R    Elev
     157     179    2311

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2306.79    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.18     Wt. n-Val.                         0.029
  W.S. Elev (ft)           2306.61    Reach Len. (ft)         216.00     216.00    216.00
  Crit W.S. (ft)           2306.52    Flow Area (sq ft)                   52.67
  E.G. Slope (ft/ft)      0.008536    Area (sq ft)                        52.67
  Q Total (cfs)              180.00   Flow (cfs)                         180.00
  Top Width (ft)              98.98   Top Width (ft)                      98.98
  Vel Total (ft/s)             3.42   Avg. Vel. (ft/s)                     3.42
  Max Chl Dpth (ft)            1.21   Hydr. Depth (ft)                     0.53
  Conv. Total (cfs)          1948.3   Conv. (cfs)                        1948.3
  Length Wtd. (ft)           216.00   Wetted Per. (ft)                    99.02
  Min Ch El (ft)           2305.40    Shear (lb/sq ft)                     0.28
  Alpha                        1.00   Stream Power (lb/ft s)               0.97
  Frctn Loss (ft)              2.37   Cum Volume (acre-ft)       0.03      10.01     0.01
  C & E Loss (ft)              0.01   Cum SA (acres)             0.10      10.71     0.06


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 7939

INPUT
Description:
Station Elevation Data    num=       7
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0  2304.8       45   2304.1       76     2304      93   2302.2      114     2304
     146     2306      255   2306.7

Manning's n Values        num=       2
     Sta    n Val      Sta    n Val
       0     .016       45      .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     255             361     361     361            .1       .3
Blocked Obstructions     num=        1
   Sta L   Sta R    Elev
     148     236    2308

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2304.42    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.28     Wt. n-Val.                         0.030
  W.S. Elev (ft)           2304.14    Reach Len. (ft)         361.00     361.00    361.00
  Crit W.S. (ft)           2304.12    Flow Area (sq ft)                   42.56
  E.G. Slope (ft/ft)      0.014590    Area (sq ft)                        42.56
  Q Total (cfs)              180.00   Flow (cfs)                         180.00
```

Top Width (ft)	73.86	Top Width (ft)		73.86	
Vel Total (ft/s)	4.23	Avg. Vel. (ft/s)		4.23	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	1490.2	Conv. (cfs)		1490.2	
Length Wtd. (ft)	361.00	Wetted Per. (ft)		74.03	
Min Ch El (ft)	2302.20	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)		2.21	
Frctn Loss (ft)	3.08	Cum Volume (acre-ft)	0.03	9.78	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.10	10.28	0.06

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7578

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2301.4	49	2300.8	91	2300	99	2299.9	105	2300
138	2302	350	2304						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	49	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	350	100	100	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
146	287	2304

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2301.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.029	
W.S. Elev (ft)	2301.14	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)		63.37	
E.G. Slope (ft/ft)	0.005794	Area (sq ft)		63.37	
Q Total (cfs)	198.00	Flow (cfs)		198.00	
Top Width (ft)	102.76	Top Width (ft)		102.76	
Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)		3.12	
Max Chl Dpth (ft)	1.24	Hydr. Depth (ft)		0.62	
Conv. Total (cfs)	2601.2	Conv. (cfs)		2601.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		102.81	
Min Ch El (ft)	2299.90	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	0.03	9.34	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	9.55	0.06

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7478

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2300.6	38	2300	45	2299.9	48	2300	57	2300
95	2298.9	116	2300	474	2302				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	38	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	474	105	105	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
138	370	2303

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2300.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2300.20	Reach Len. (ft)	105.00	105.00	105.00
Crit W.S. (ft)	2300.20	Flow Area (sq ft)		52.45	
E.G. Slope (ft/ft)	0.014444	Area (sq ft)		52.45	
Q Total (cfs)	198.00	Flow (cfs)		198.00	
Top Width (ft)	112.43	Top Width (ft)		112.43	
Vel Total (ft/s)	3.77	Avg. Vel. (ft/s)		3.77	
Max Chl Dpth (ft)	1.30	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	1647.5	Conv. (cfs)		1647.5	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		112.55	
Min Ch El (ft)	2298.90	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		1.59	
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)	0.03	9.21	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.10	9.31	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7373

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2299.7	45	2298.8	91	2298	99	2298	143	2300
186	2300.3								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	45	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	186	93	93	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2299.37	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.029	
W.S. Elev (ft)	2299.25	Reach Len. (ft)	93.00	93.00	93.00
Crit W.S. (ft)	2298.99	Flow Area (sq ft)		70.89	
E.G. Slope (ft/ft)	0.004339	Area (sq ft)		70.89	
Q Total (cfs)	198.00	Flow (cfs)		198.00	
Top Width (ft)	103.68	Top Width (ft)		103.68	
Vel Total (ft/s)	2.79	Avg. Vel. (ft/s)		2.79	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	3005.8	Conv. (cfs)		3005.8	
Length Wtd. (ft)	93.00	Wetted Per. (ft)		103.72	
Min Ch El (ft)	2298.00	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		0.52	
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.03	9.06	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	9.05	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7280

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2298.7	44	2298	54	2297.9	62	2298	123	2298
159	2300								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	54	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	159	264	264	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
160	220	2308

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2298.74	Element			
Vel Head (ft)	0.22	Wt. n-Val.		0.025	
W.S. Elev (ft)	2298.52	Reach Len. (ft)	264.00	264.00	264.00
Crit W.S. (ft)	2298.52	Flow Area (sq ft)		52.77	
E.G. Slope (ft/ft)	0.011789	Area (sq ft)		52.77	
Q Total (cfs)	198.00	Flow (cfs)		198.00	
Top Width (ft)	120.95	Top Width (ft)		120.95	
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)		3.75	
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)		0.44	
Conv. Total (cfs)	1823.6	Conv. (cfs)		1823.6	
Length Wtd. (ft)	264.00	Wetted Per. (ft)		120.97	
Min Ch El (ft)	2297.90	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		1.20	
Frctn Loss (ft)	2.11	Cum Volume (acre-ft)	0.03	8.93	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.10	8.81	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7016

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2296	53	2295.6	170	2295.5	195	2296	270	2298

Manning's n Values num= 1

Sta	n Val
0	.016

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

0	195		81	81	81	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2296.06	Element		0.016	
Vel Head (ft)	0.19	Wt. n-Val.			
W.S. Elev (ft)	2295.87	Reach Len. (ft)	81.00	81.00	81.00
Crit W.S. (ft)	2295.91	Flow Area (sq ft)		44.87	
E.G. Slope (ft/ft)	0.008518	Area (sq ft)		44.87	
Q Total (cfs)	158.00	Flow (cfs)		158.00	
Top Width (ft)	170.40	Top Width (ft)		170.40	
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		3.52	
Max Chl Dpth (ft)	0.37	Hydr. Depth (ft)		0.26	
Conv. Total (cfs)	1711.9	Conv. (cfs)		1711.9	
Length Wtd. (ft)	81.00	Wetted Per. (ft)		170.41	
Min Ch El (ft)	2295.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.49	
Frctn Loss (ft)	2.68	Cum Volume (acre-ft)	0.03	8.63	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	7.92	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6934

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2295.3	45	2294.7	73	2294.6	218	2296

Manning's n Values num= 1

Sta	n Val
0	.016

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

0	218		119	119	119	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2295.41	Element		0.016	
Vel Head (ft)	0.23	Wt. n-Val.			
W.S. Elev (ft)	2295.18	Reach Len. (ft)	119.00	119.00	119.00
Crit W.S. (ft)	2295.22	Flow Area (sq ft)		41.04	
E.G. Slope (ft/ft)	0.007529	Area (sq ft)		41.04	
Q Total (cfs)	158.00	Flow (cfs)		158.00	
Top Width (ft)	124.27	Top Width (ft)		124.27	
Vel Total (ft/s)	3.85	Avg. Vel. (ft/s)		3.85	
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)		0.33	
Conv. Total (cfs)	1820.9	Conv. (cfs)		1820.9	
Length Wtd. (ft)	119.00	Wetted Per. (ft)		124.28	
Min Ch El (ft)	2294.60	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.60	
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.03	8.55	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.10	7.65	0.06

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6815

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2294.8	26	2294	41	2293.6	60	2294	154	2296

Manning's n Values num= 1

Sta	n Val
0	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	154	52	52	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2294.82	Element			
Vel Head (ft)	0.25	Wt. n-Val.		0.016	
W.S. Elev (ft)	2294.57	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2294.57	Flow Area (sq ft)		39.06	
E.G. Slope (ft/ft)	0.004878	Area (sq ft)		39.06	
Q Total (cfs)	158.00	Flow (cfs)		158.00	
Top Width (ft)	79.28	Top Width (ft)		79.28	
Vel Total (ft/s)	4.05	Avg. Vel. (ft/s)		4.05	
Max Chl Dpth (ft)	0.97	Hydr. Depth (ft)		0.49	
Conv. Total (cfs)	2262.3	Conv. (cfs)		2262.3	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		79.30	
Min Ch El (ft)	2293.60	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)		0.61	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.03	8.44	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	7.37	0.06

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6763

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2294.5	14	2294	39	2293.2	46	2292	46	2288.87
61	2288.87	61	2292	67	2294	77	2296		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	39	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
46	61	72	72	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2293.56	Element			
Vel Head (ft)	3.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	2289.86	Reach Len. (ft)	72.00	72.00	72.00
Crit W.S. (ft)	2290.80	Flow Area (sq ft)		14.90	
E.G. Slope (ft/ft)	0.115735	Area (sq ft)		14.90	
Q Total (cfs)	230.00	Flow (cfs)		230.00	
Top Width (ft)	15.00	Top Width (ft)		15.00	
Vel Total (ft/s)	15.44	Avg. Vel. (ft/s)		15.44	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	676.1	Conv. (cfs)		676.1	
Length Wtd. (ft)	72.00	Wetted Per. (ft)		16.99	
Min Ch El (ft)	2288.87	Shear (lb/sq ft)		6.34	
Alpha	1.00	Stream Power (lb/ft s)		97.83	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.03	8.41	0.01
C & E Loss (ft)	0.34	Cum SA (acres)	0.10	7.31	0.06

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6691

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2294.1	2	2294	39	2292.7	49	2292	55	2290
60	2288.4	69	2290	69	2292	72	2294	86	2296

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	39	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
49	69	82	82	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2292.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.030	
W.S. Elev (ft)	2291.24	Reach Len. (ft)	82.00	82.00	82.00
Crit W.S. (ft)	2291.23	Flow Area (sq ft)		30.91	
E.G. Slope (ft/ft)	0.012263	Area (sq ft)		30.91	
Q Total (cfs)	230.00	Flow (cfs)		230.00	
Top Width (ft)	17.73	Top Width (ft)		17.73	
Vel Total (ft/s)	7.44	Avg. Vel. (ft/s)		7.44	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	2077.0	Conv. (cfs)		2077.0	
Length Wtd. (ft)	82.00	Wetted Per. (ft)		19.56	
Min Ch El (ft)	2288.40	Shear (lb/sq ft)		1.21	
Alpha	1.00	Stream Power (lb/ft s)		9.00	
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.03	8.37	0.01
C & E Loss (ft)	0.15	Cum SA (acres)	0.10	7.29	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6609

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2293.3	39	2292.1	47	2292	47	2287.91	62	2287.91
62	2292	114	2294	210	2296				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	39	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47	62	74.01	74.01	74.01	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2291.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.030	
W.S. Elev (ft)	2291.14	Reach Len. (ft)	74.01	74.01	74.01
Crit W.S. (ft)	2289.84	Flow Area (sq ft)		48.44	
E.G. Slope (ft/ft)	0.003103	Area (sq ft)		48.44	
Q Total (cfs)	230.00	Flow (cfs)		230.00	
Top Width (ft)	15.00	Top Width (ft)		15.00	
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)		4.75	
Max Chl Dpth (ft)	3.23	Hydr. Depth (ft)		3.23	
Conv. Total (cfs)	4129.0	Conv. (cfs)		4129.0	
Length Wtd. (ft)	74.01	Wetted Per. (ft)		21.46	
Min Ch El (ft)	2287.91	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)		2.08	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	8.30	0.01
C & E Loss (ft)		Cum SA (acres)	0.10	7.26	0.06

CULVERT RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6572

INPUT
Description: Culvert 24
Distance from Upstream XS = .1
Deck/Roadway Width = 73.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
47	2292	2290.91	62	2292	2290.91

Upstream Bridge Cross Section Data
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2293.3	39	2292.1	47	2292	47	2287.91	62	2287.91
62	2292	114	2294	210	2296				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	39	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
47	62	.1	.3

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
39	2291.5	2291.5	47	2291.7	2290	47	2291.7	2290.21
62	2292	2290.21	62	2292	2290	63	2292	2292

Downstream Bridge Cross Section Data

```
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2292.4      10    2292      39  2291.5      47    2290      47 2287.21
      62 2287.21       62    2290      63    2292      74    2294     179    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      10    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
           47      62            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
888       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    2292
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       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                .1    73.9       .013                  .4                1
Number of Barrels =  2
Upstream   Elevation =  2287.91
Centerline Stations
    Sta.    Sta.
    50.5    58.5
Downstream Elevation =  2287.21
Centerline Stations
    Sta.    Sta.
    50.5    58.5

CULVERT OUTPUT    Profile #PF#1
Culvert ID : Culvert #1

  Culv Q (cfs)             230.00    Culv Ful Lngh (ft)        73.90
  # Barrels                     2    Culv Vel US (ft/s)         5.48
  Q Barrel (cfs)           115.00    Culv Vel DS (ft/s)         5.48
  E.G. US. (ft)           2291.49    Culv Inv El Up (ft)     2287.91
  W.S. US. (ft)           2291.14    Culv Inv El Dn (ft)     2287.21
  E.G. DS (ft)            2290.98    Culv Frctn Ls (ft)         0.23
  W.S. DS (ft)            2290.68    Culv Ext Lss (ft)          0.17
  Delta EG (ft)              0.51    Culv Ent Lss (ft)          0.19
  Delta WS (ft)              0.46    Q Weir (cfs)
  E.G. IC (ft)            2291.19    Weir Sta Lft (ft)
  E.G. OC (ft)            2291.49    Weir Sta Rgt (ft)
  Culvert Control          Outlet    Weir Submerg
  Culv WS Inlet (ft)      2290.91    Weir Max Depth (ft)
  Culv WS Outlet (ft)     2290.21    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                Wr Flw Area (sq ft)
  Culv Crt Depth (ft)        2.03    Min El Weir Flow (ft)   2292.01


CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6535

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2292.4      10    2292      39  2291.5      47    2290      47 2287.21
      62 2287.21       62    2290      63    2292      74    2294     179    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      10    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           47      62              67      67      67             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
888       F

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2290.98    Element                Left OB    Channel   Right OB
  Vel Head (ft)               0.30    Wt. n-Val.               0.030      0.030      0.030
  W.S. Elev (ft)           2290.68    Reach Len. (ft)          67.00      67.00      67.00
  Crit W.S. (ft)           2289.14    Flow Area (sq ft)         1.23      52.03       0.12
  E.G. Slope (ft/ft)      0.002282    Area (sq ft)              1.23      52.03       0.12
  Q Total (cfs)             230.00    Flow (cfs)                1.40     228.52       0.08
  Top Width (ft)             18.96    Top Width (ft)            3.62      15.00       0.34
  Vel Total (ft/s)            4.31    Avg. Vel. (ft/s)          1.14       4.39       0.67
  Max Chl Dpth (ft)           3.47    Hydr. Depth (ft)          0.34       3.47       0.34
  Conv. Total (cfs)         4814.3    Conv. (cfs)               29.3     4783.4        1.6
```

Length Wtd. (ft)	67.00	Wetted Per. (ft)	3.68	20.58	0.76
Min Ch El (ft)	2287.21	Shear (lb/sq ft)	0.05	0.36	0.02
Alpha	1.03	Stream Power (lb/ft s)	0.05	1.58	0.01
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.03	8.21	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	7.23	0.06

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6468

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2291.7	41	2291	50	2290	56	2288	60	2286.7
71	2288	71	2292	75	2294				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	41	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
50	71	64	64	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2290.82	Element			
Vel Head (ft)	0.24	Wt. n-Val.	0.030	0.030	
W.S. Elev (ft)	2290.58	Reach Len. (ft)	64.00	64.00	64.00
Crit W.S. (ft)		Flow Area (sq ft)	1.49	57.84	
E.G. Slope (ft/ft)	0.001990	Area (sq ft)	1.49	57.84	
Q Total (cfs)	230.00	Flow (cfs)	1.43	228.57	
Top Width (ft)	26.18	Top Width (ft)	5.18	21.00	
Vel Total (ft/s)	3.88	Avg. Vel. (ft/s)	0.96	3.95	
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)	0.29	2.75	
Conv. Total (cfs)	5156.5	Conv. (cfs)	32.1	5124.4	
Length Wtd. (ft)	64.00	Wetted Per. (ft)	5.22	24.18	
Min Ch El (ft)	2286.70	Shear (lb/sq ft)	0.04	0.30	
Alpha	1.03	Stream Power (lb/ft s)	0.03	1.17	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.03	8.13	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	7.20	0.06

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6404

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2291.2	46	2290.4	55	2290	55	2286.17	70	2286.17
70	2290	75	2292	85	2294				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	46	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55	70	83.01	83.01	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2290.70	Element			
Vel Head (ft)	0.19	Wt. n-Val.	0.029	0.030	0.030
W.S. Elev (ft)	2290.52	Reach Len. (ft)	83.01	83.01	83.01
Crit W.S. (ft)	2288.10	Flow Area (sq ft)	3.21	65.17	0.33
E.G. Slope (ft/ft)	0.001212	Area (sq ft)	3.21	65.17	0.33
Q Total (cfs)	230.00	Flow (cfs)	2.44	227.34	0.22
Top Width (ft)	31.90	Top Width (ft)	15.61	15.00	1.29
Vel Total (ft/s)	3.35	Avg. Vel. (ft/s)	0.76	3.49	0.66
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)	0.21	4.34	0.26
Conv. Total (cfs)	6605.3	Conv. (cfs)	70.2	6528.7	6.3
Length Wtd. (ft)	83.01	Wetted Per. (ft)	15.62	22.66	1.39
Min Ch El (ft)	2286.17	Shear (lb/sq ft)	0.02	0.22	0.02
Alpha	1.07	Stream Power (lb/ft s)	0.01	0.76	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	8.04	0.01
C & E Loss (ft)		Cum SA (acres)	0.07	7.18	0.06

CULVERT RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6362

INPUT
Description: Culvert 25
Distance from Upstream XS = .1
Deck/Roadway Width = 82.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
55	2290	2289.17	70	2290	2289.17

Upstream Bridge Cross Section Data
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
      0  2291.2       46  2290.4       55    2290       55 2286.17       70 2286.17
     70    2290       75    2292       85    2294

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       46    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            55      70             .1       .3

Downstream  Deck/Roadway Coordinates
    num=        6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      54  2289.7  2289.7      61  2289.7    2288      61  2289.7 2288.53
      76  2289.7 2288.53      76  2289.7    2288      77  2289.7  2289.7

Downstream Bridge Cross Section Data
Station Elevation Data    num=       12
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2290.5       36    2290       54  2289.7       61    2288       61 2285.53
      76 2285.53        76    2288       77    2290       87  2291.9       92    2290
     409    2290      487    2292

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       54    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            61      76             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
888        F
Right Levee     Station=       87      Elevation=  2291.9

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins           =    2290
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       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 .1    82.9       .013                  .4                1
Number of Barrels =  2
Upstream   Elevation =  2286.17
Centerline Stations
    Sta.    Sta.
    58.5    66.5
Downstream Elevation =  2285.53
Centerline Stations
    Sta.    Sta.
    64.5    72.5

CULVERT OUTPUT    Profile #PF#1
Culvert ID : Culvert #1

  Culv Q (cfs)              194.37    Culv Ful Lngh (ft)         82.90
  # Barrels                      2    Culv Vel US (ft/s)          4.63
  Q Barrel (cfs)             97.18    Culv Vel DS (ft/s)          4.63
  E.G. US. (ft)           2290.71    Culv Inv El Up (ft)      2286.17
  W.S. US. (ft)           2290.52    Culv Inv El Dn (ft)      2285.53
  E.G. DS (ft)            2290.25    Culv Frctn Ls (ft)          0.13
  W.S. DS (ft)            2290.12    Culv Ext Lss (ft)           0.20
  Delta EG (ft)              0.46    Culv Ent Lss (ft)           0.13
  Delta WS (ft)              0.40    Q Weir (cfs)               35.63
  E.G. IC (ft)            2289.45    Weir Sta Lft (ft)          28.19
  E.G. OC (ft)            2290.71    Weir Sta Rgt (ft)          71.77
  Culvert Control          Outlet    Weir Submerg                0.11
  Culv WS Inlet (ft)      2289.17    Weir Max Depth (ft)         0.71
  Culv WS Outlet (ft)     2288.53    Weir Avg Depth (ft)         0.43
  Culv Nml Depth (ft)                Wr Flw Area (sq ft)        18.62
  Culv Crt Depth (ft)         1.82   Min El Weir Flow (ft)   2290.01


Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
         The reported inlet energy grade answer may not be valid.

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6321

INPUT
Description:
Station Elevation Data    num=       12
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2290.5       36    2290       54  2289.7       61    2288       61 2285.53
      76 2285.53        76    2288       77    2290       87  2291.9       92    2290
     409    2290      487    2292
```

```
Manning's n Values         num=       2
     Sta   n Val      Sta   n Val
       0    .016       54    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            61      76              61      61      61             .1       .3
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
888        F
Right Levee     Station=       87      Elevation=  2291.9

CROSS SECTION OUTPUT     Profile #PF#1

  E.G. Elev (ft)           2290.25    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.14    Wt. n-Val.                0.027      0.030      0.030
  W.S. Elev (ft)           2290.12    Reach Len. (ft)           61.00      61.00      61.00
  Crit W.S. (ft)           2287.46    Flow Area (sq ft)         14.11      68.78       1.12
  E.G. Slope (ft/ft)      0.000735    Area (sq ft)              14.11      68.78       1.15
  Q Total (cfs)             230.00    Flow (cfs)                18.17     210.89       0.94
  Top Width (ft)             49.90    Top Width (ft)            33.30      15.00       1.61
  Vel Total (ft/s)            2.74    Avg. Vel. (ft/s)           1.29       3.07       0.84
  Max Chl Dpth (ft)           4.59    Hydr. Depth (ft)           0.42       4.59       1.12
  Conv. Total (cfs)         8481.8    Conv. (cfs)               670.1     7776.9       34.7
  Length Wtd. (ft)           61.00    Wetted Per. (ft)          33.50      19.94       2.24
  Min Ch El (ft)           2285.53    Shear (lb/sq ft)           0.02       0.16       0.02
  Alpha                       1.17    Stream Power (lb/ft s)     0.02       0.49       0.02
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)       0.01       7.91       0.01
  C & E Loss (ft)             0.02    Cum SA (acres)             0.02       7.15       0.06


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6260

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2290      61  2289.2      74    2288      82    2288      90    2290
      95    2291     100    2290     390    2290     574    2292

Manning's n Values         num=       2
     Sta   n Val      Sta   n Val
       0    .016       61    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      90              99      99      99             .1       .3
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
888        F
Right Levee     Station=       95      Elevation=    2291

CROSS SECTION OUTPUT     Profile #PF#1

  E.G. Elev (ft)           2290.13    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               0.34    Wt. n-Val.                           0.027
  W.S. Elev (ft)           2289.78    Reach Len. (ft)           99.00      99.00      99.00
  Crit W.S. (ft)           2289.78    Flow Area (sq ft)                    48.87
  E.G. Slope (ft/ft)      0.007758    Area (sq ft)                         48.87
  Q Total (cfs)             230.00    Flow (cfs)                          230.00
  Top Width (ft)             72.49    Top Width (ft)                       72.49
  Vel Total (ft/s)            4.71    Avg. Vel. (ft/s)                     4.71
  Max Chl Dpth (ft)           1.78    Hydr. Depth (ft)                     0.67
  Conv. Total (cfs)         2611.2    Conv. (cfs)                         2611.2
  Length Wtd. (ft)           99.00    Wetted Per. (ft)                     72.76
  Min Ch El (ft)           2288.00    Shear (lb/sq ft)                     0.33
  Alpha                       1.00    Stream Power (lb/ft s)               1.53
  Frctn Loss (ft)             0.77    Cum Volume (acre-ft)                 7.83       0.01
  C & E Loss (ft)             0.04    Cum SA (acres)                       7.09       0.05


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6161

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2289.1      60  2288.4      66    2288      77  2287.3     125    2288
     135    2288     203    2290     285    2290     435    2290

Manning's n Values         num=       2
```

```
     Sta   n Val      Sta   n Val
       0    .016       60    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     125              149     149     149            .1       .3
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
888        F

CROSS SECTION OUTPUT     Profile #PF#1

  E.G. Elev (ft)           2288.79    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.51     Wt. n-Val.                         0.030     0.030
  W.S. Elev (ft)           2288.27    Reach Len. (ft)         149.00     149.00    149.00
  Crit W.S. (ft)           2288.41    Flow Area (sq ft)                   37.28      3.41
  E.G. Slope (ft/ft)      0.028225    Area (sq ft)                        37.28      3.99
  Q Total (cfs)             230.00    Flow (cfs)                         218.37     11.63
  Top Width (ft)             82.35    Top Width (ft)                      63.09     19.26
  Vel Total (ft/s)            5.65    Avg. Vel. (ft/s)                     5.86      3.41
  Max Chl Dpth (ft)           0.97    Hydr. Depth (ft)                     0.59      0.26
  Conv. Total (cfs)         1369.0    Conv. (cfs)                       1299.8      69.2
  Length Wtd. (ft)           149.00   Wetted Per. (ft)                    63.12     13.00
  Min Ch El (ft)           2287.30    Shear (lb/sq ft)                     1.04      0.46
  Alpha                       1.04    Stream Power (lb/ft s)               6.10      1.58
  Frctn Loss (ft)             1.32    Cum Volume (acre-ft)                 7.73      0.01
  C & E Loss (ft)             0.02    Cum SA (acres)                       6.93      0.03


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6012

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2287.9      60  2286.8      82    2286     410    2288

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016       60    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     410              204     204     204            .1       .3
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
888        F

CROSS SECTION OUTPUT     Profile #PF#1

  E.G. Elev (ft)           2287.19    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.31     Wt. n-Val.                         0.030
  W.S. Elev (ft)           2286.88    Reach Len. (ft)         204.00     204.00    204.00
  Crit W.S. (ft)           2286.88    Flow Area (sq ft)                   51.48
  E.G. Slope (ft/ft)      0.014781    Area (sq ft)                        74.17
  Q Total (cfs)             230.00    Flow (cfs)                         230.00
  Top Width (ft)             170.60   Top Width (ft)                     170.60
  Vel Total (ft/s)            4.47    Avg. Vel. (ft/s)                     4.47
  Max Chl Dpth (ft)           0.88    Hydr. Depth (ft)                     0.61
  Conv. Total (cfs)         1891.8    Conv. (cfs)                       1891.8
  Length Wtd. (ft)           204.00   Wetted Per. (ft)                    84.36
  Min Ch El (ft)           2286.00    Shear (lb/sq ft)                     0.56
  Alpha                       1.00    Stream Power (lb/ft s)               2.52
  Frctn Loss (ft)             0.84    Cum Volume (acre-ft)                 7.54
  C & E Loss (ft)             0.08    Cum SA (acres)                       6.53


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 5808

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2285.8      60  2285.1      77    2284     173  2282.2     232    2284
     508    2286     552    2288

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
```

```
      0    .016      60     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     552             290     290     290            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
888       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     239     420    2289

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2283.93    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.06     Wt. n-Val.                         0.030
  W.S. Elev (ft)           2283.87    Reach Len. (ft)         290.00     290.00    290.00
  Crit W.S. (ft)           2283.32    Flow Area (sq ft)                  119.85
  E.G. Slope (ft/ft)      0.001912    Area (sq ft)                       119.85
  Q Total (cfs)             230.00    Flow (cfs)                         230.00
  Top Width (ft)            143.67    Top Width (ft)                     143.67
  Vel Total (ft/s)            1.92    Avg. Vel. (ft/s)                     1.92
  Max Chl Dpth (ft)           1.67    Hydr. Depth (ft)                     0.83
  Conv. Total (cfs)         5259.7    Conv. (cfs)                       5259.7
  Length Wtd. (ft)          290.00    Wetted Per. (ft)                   143.71
  Min Ch El (ft)           2282.20    Shear (lb/sq ft)                     0.10
  Alpha                       1.00    Stream Power (lb/ft s)               0.19
  Frctn Loss (ft)             1.24    Cum Volume (acre-ft)                 7.08
  C & E Loss (ft)             0.01    Cum SA (acres)                       5.80


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 5518

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2283      58  2282.4     114    2282     215    2282     225    2284
     287    2284     348    2282     588    2282     593    2284

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      58    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     593             136     136     136            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
888       F
Right Levee     Station=     227      Elevation=    2284
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     225     287    2285

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2282.67    Element                 Left OB    Channel   Right OB
  Vel Head (ft)              0.19     Wt. n-Val.                         0.030
  W.S. Elev (ft)           2282.48    Reach Len. (ft)         136.00     136.00    136.00
  Crit W.S. (ft)           2282.48    Flow Area (sq ft)                   65.62
  E.G. Slope (ft/ft)      0.016576    Area (sq ft)                        65.62
  Q Total (cfs)             230.00    Flow (cfs)                         230.00
  Top Width (ft)            167.49    Top Width (ft)                     167.49
  Vel Total (ft/s)            3.51    Avg. Vel. (ft/s)                     3.51
  Max Chl Dpth (ft)           0.48    Hydr. Depth (ft)                     0.39
  Conv. Total (cfs)         1786.4    Conv. (cfs)                       1786.4
  Length Wtd. (ft)          136.00    Wetted Per. (ft)                   167.54
  Min Ch El (ft)           2282.00    Shear (lb/sq ft)                     0.41
  Alpha                       1.00    Stream Power (lb/ft s)               1.42
  Frctn Loss (ft)             2.38    Cum Volume (acre-ft)                 6.47
  C & E Loss (ft)             0.01    Cum SA (acres)                       4.76


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 5382

INPUT
```

```
Description:
Station Elevation Data    num=       8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2281.5       56    2281       69    2280       71    2278      206    2278
     246    2280      428  2281.4      587    2282

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016       56    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     587             118     118     118             .1       .3

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2278.66    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.46    Wt. n-Val.                          0.030
  W.S. Elev (ft)           2278.20    Reach Len. (ft)          118.00     118.00    118.00
  Crit W.S. (ft)           2278.33    Flow Area (sq ft)                    26.84
  E.G. Slope (ft/ft)      0.108333    Area (sq ft)                         26.84
  Q Total (cfs)             146.00    Flow (cfs)                          146.00
  Top Width (ft)            139.11    Top Width (ft)                      139.11
  Vel Total (ft/s)            5.44    Avg. Vel. (ft/s)                      5.44
  Max Chl Dpth (ft)           0.20    Hydr. Depth (ft)                      0.19
  Conv. Total (cfs)          443.6    Conv. (cfs)                          443.6
  Length Wtd. (ft)          118.00    Wetted Per. (ft)                    139.20
  Min Ch El (ft)           2278.00    Shear (lb/sq ft)                      1.30
  Alpha                       1.00    Stream Power (lb/ft s)                7.09
  Frctn Loss (ft)             3.99    Cum Volume (acre-ft)                  6.32
  C & E Loss (ft)             0.03    Cum SA (acres)                        4.28


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

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 5264

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2280.5       45    2280       53  2279.8       84    2278       88 2273.01
      95 2273.01      210    2278      415    2280      581    2280      588    2282

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016       53    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     588          1428.01 1428.01 1428.01             .1       .3

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2277.12    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                          0.030
  W.S. Elev (ft)           2277.11    Reach Len. (ft)         1428.01    1428.01   1428.01
  Crit W.S. (ft)           2274.30    Flow Area (sq ft)                   229.00
  E.G. Slope (ft/ft)      0.000060    Area (sq ft)                        229.00
  Q Total (cfs)             146.00    Flow (cfs)                          146.00
  Top Width (ft)            104.74    Top Width (ft)                      104.74
  Vel Total (ft/s)            0.64    Avg. Vel. (ft/s)                      0.64
  Max Chl Dpth (ft)           4.10    Hydr. Depth (ft)                      2.19
  Conv. Total (cfs)        18860.1    Conv. (cfs)                        18860.1
  Length Wtd. (ft)          1428.01    Wetted Per. (ft)                    106.80
  Min Ch El (ft)           2273.01    Shear (lb/sq ft)                      0.01
  Alpha                       1.00    Stream Power (lb/ft s)                0.01
  Frctn Loss (ft)                     Cum Volume (acre-ft)                  5.98
  C & E Loss (ft)                     Cum SA (acres)                        3.95


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

CULVERT                RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 4550

INPUT
Description: Culvert 27
Distance from Upstream XS =       .1
Deck/Roadway Width        =    1427.9
Weir Coefficient          =       2.6
Upstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      84    2278 2273.01     175 2276.84 2273.01     210    2278 2273.01

Upstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2280.5       45    2280       53  2279.8       84    2278       88 2273.01
      95 2273.01      210    2278      415    2280      581    2280      588    2282

Manning's n Values        num=       2
```

```
     Sta   n Val      Sta   n Val
       0    .016       53    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     588             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      69    2268 2264.48       80    2268 2264.48

Downstream Bridge Cross Section Data
Station Elevation Data    num=      16
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2272.1       43  2271.3       61    2270       69    2268       71 2264.48
      78 2264.48       80    2268       87    2270      116    2270      223    2272
     381    2272      439    2274      446    2274      506    2272      517    2272
     598    2274

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016       43    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     598             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =  2276.9
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       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                .1  1427.9       .013                  .5                1
Upstream   Elevation =  2273.01
           Centerline Station =  91.5
Downstream Elevation =  2264.48
           Centerline Station =  74.5

CULVERT OUTPUT    Profile #PF#1
Culvert ID : Culvert #1

  Culv Q (cfs)             142.38    Culv Ful Lngh (ft)      1092.07
  # Barrels                     1    Culv Vel US (ft/s)         8.68
  Q Barrel (cfs)           142.38    Culv Vel DS (ft/s)         6.78
  E.G. US. (ft)           2277.12    Culv Inv El Up (ft)     2273.01
  W.S. US. (ft)           2277.11    Culv Inv El Dn (ft)     2264.48
  E.G. DS (ft)            2270.44    Culv Frctn Ls (ft)         5.41
  W.S. DS (ft)            2270.40    Culv Ext Lss (ft)          0.68
  Delta EG (ft)              6.68    Culv Ent Lss (ft)          0.59
  Delta WS (ft)              6.71    Q Weir (cfs)               3.62
  E.G. IC (ft)            2277.12    Weir Sta Lft (ft)        154.18
  E.G. OC (ft)            2277.11    Weir Sta Rgt (ft)        183.01
  Culvert Control           Inlet    Weir Submerg               0.00
  Culv WS Inlet (ft)      2275.35    Weir Max Depth (ft)        0.27
  Culv WS Outlet (ft)     2267.48    Weir Avg Depth (ft)        0.13
  Culv Nml Depth (ft)        1.97    Wr Flw Area (sq ft)        3.83
  Culv Crt Depth (ft)        2.34    Min El Weir Flow (ft)   2276.90


Note:    During supercritical analysis, the culvert direct step method went to normal depth.  The
         program then assumed normal depth at the outlet.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION          RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 3836

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2272.1       43  2271.3       61    2270       69    2268       71 2264.48
      78 2264.48       80    2268       87    2270      116    2270      223    2272
     381    2272      439    2274      446    2274      506    2272      517    2272
     598    2274

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016       43    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     598                  80      80      80             .1       .3

CROSS SECTION OUTPUT    Profile #PF#1

  E.G. Elev (ft)           2270.44    Element                 Left OB    Channel   Right OB
```

Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2270.40	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)		Flow Area (sq ft)		96.36	
E.G. Slope (ft/ft)	0.000814	Area (sq ft)		96.36	
Q Total (cfs)	146.00	Flow (cfs)		146.00	
Top Width (ft)	82.18	Top Width (ft)		82.18	
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)		1.52	
Max Chl Dpth (ft)	5.92	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	5116.3	Conv. (cfs)		5116.3	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		86.82	
Min Ch El (ft)	2264.48	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		0.64	
C & E Loss (ft)	0.00	Cum SA (acres)		0.89	

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3756

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2271.7	44	2270.9	65	2270	85	2268	159	2270
171	2272	232	2272	241	2274	382	2274	442	2272
471	2272	572	2274						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	44	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	572	90	90	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2270.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2270.37	Reach Len. (ft)	90.00	90.00	90.00
Crit W.S. (ft)		Flow Area (sq ft)		131.01	
E.G. Slope (ft/ft)	0.000377	Area (sq ft)		131.01	
Q Total (cfs)	146.00	Flow (cfs)		146.00	
Top Width (ft)	104.92	Top Width (ft)		104.92	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)		1.11	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)		1.25	
Conv. Total (cfs)	7516.3	Conv. (cfs)		7516.3	
Length Wtd. (ft)	90.00	Wetted Per. (ft)		105.08	
Min Ch El (ft)	2268.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.03	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		0.43	
C & E Loss (ft)	0.01	Cum SA (acres)		0.72	

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3666

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2271.3	46	2270.5	59	2270	130	2269.5	183	2270
202	2272	353	2272	390	2274	415	2272	447	2272
496	2274	508	2272	521	2272	530	2274		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	46	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	530	187	187	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

E.G. Elev (ft)	2270.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	2270.14	Reach Len. (ft)	187.00	187.00	187.00
Crit W.S. (ft)	2270.10	Flow Area (sq ft)		48.51	
E.G. Slope (ft/ft)	0.013598	Area (sq ft)		48.51	
Q Total (cfs)	146.00	Flow (cfs)		146.00	
Top Width (ft)	128.91	Top Width (ft)		128.91	
Vel Total (ft/s)	3.01	Avg. Vel. (ft/s)		3.01	
Max Chl Dpth (ft)	0.64	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	1252.1	Conv. (cfs)		1252.1	
Length Wtd. (ft)	187.00	Wetted Per. (ft)		128.93	
Min Ch El (ft)	2269.50	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		0.96	
Frctn Loss (ft)	1.04	Cum Volume (acre-ft)		0.25	
C & E Loss (ft)	0.02	Cum SA (acres)		0.48	

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

CROSS SECTION RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3479

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2270.5	29	2270	54	2269.8	126	2268	150	2268
190	2270	212	2272	245	2272	256	2270	294	2270
333	2272	341	2270	399	2270	479	2270.3	685	2272

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	54	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	685	334	334	.1	.3

CROSS SECTION OUTPUT Profile #PF#1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2269.22	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2269.15	Reach Len. (ft)			
Crit W.S. (ft)	2268.76	Flow Area (sq ft)		66.93	
E.G. Slope (ft/ft)	0.003000	Area (sq ft)		66.93	
Q Total (cfs)	146.00	Flow (cfs)		146.00	
Top Width (ft)	92.77	Top Width (ft)		92.77	
Vel Total (ft/s)	2.18	Avg. Vel. (ft/s)		2.18	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	2665.5	Conv. (cfs)		2665.5	
Length Wtd. (ft)		Wetted Per. (ft)		92.82	
Min Ch El (ft)	2268.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)		0.29	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:RANCHO ROAD

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8
95 TO GOWAN	13266	.03	.016						
95 TO GOWAN	13036	.03	.016						
95 TO GOWAN	12852	.025	.016						
95 TO GOWAN	12677	.016	.025	.016					
95 TO GOWAN	12430	.025	.016						
95 TO GOWAN	12355	.025	.016						
95 TO GOWAN	12295	.025	.016						
95 TO GOWAN	12280	.03	.016						
95 TO GOWAN	12264	.025	.016						
95 TO GOWAN	12145	.025	.016						
95 TO GOWAN	12111	.025	.015						
95 TO GOWAN	12036	Culvert							
95 TO GOWAN	11961	.016	.025						
95 TO GOWAN	11897	.016	.025	.016					
95 TO GOWAN	11748	.016	.025	.016					
95 TO GOWAN	11683	.016	.025	.016					
95 TO GOWAN	11653	.015	.025	.015					
95 TO GOWAN	11621	Culvert							
95 TO GOWAN	11590	.015	.025	.015					
95 TO GOWAN	11538	.016	.025	.016					
95 TO GOWAN	11438	.016	.025	.016					
95 TO GOWAN	11167	.016	.025	.016					
95 TO GOWAN	10946	.016	.025	.015					
95 TO GOWAN	10807	.016	.025	.013	.016	.013			
95 TO GOWAN	10758	.015	.025	.013	.016	.013			
95 TO GOWAN	10667	Culvert							
95 TO GOWAN	10575	.015	.03	.015	.03				
95 TO GOWAN	10547	.015	.03						
95 TO GOWAN	10518	.015	.03	.015	.03				
95 TO GOWAN	10485	Culvert							
95 TO GOWAN	10450	.015	.03	.015	.03				
95 TO GOWAN	10399	.016	.03						
95 TO GOWAN	10295	.016	.03						
95 TO GOWAN	10075	.016	.03						
95 TO GOWAN	9918	.016	.03						
95 TO GOWAN	9796	.016	.013	.03	.016	.013	.016		
95 TO GOWAN	9566	.016	.013	.03	.016	.013	.016		
95 TO GOWAN	9539	Culvert							
95 TO GOWAN	9512	.016	.013	.03	.016	.013	.016		
95 TO GOWAN	9472	.016	.013	.03	.016	.013	.016		
95 TO GOWAN	9376	.016	.013	.03	.016	.013	.016	.03	.013
95 TO GOWAN	9324	.016	.03	.016					
95 TO GOWAN	9205	.016	.03	.016					
95 TO GOWAN	9114	.016	.03						

95 TO GOWAN	9060	.016	.03
95 TO GOWAN	8950	.016	.03
95 TO GOWAN	8668	.016	.03
95 TO GOWAN	8476	.016	.03
95 TO GOWAN	8410	.016	.03
95 TO GOWAN	8277	.016	.03
95 TO GOWAN	8155	.016	.03
95 TO GOWAN	7939	.016	.03
95 TO GOWAN	7578	.016	.03
95 TO GOWAN	7478	.016	.03
95 TO GOWAN	7373	.016	.03
95 TO GOWAN	7280	.016	.03
95 TO GOWAN	7016	.016	
95 TO GOWAN	6934	.016	
95 TO GOWAN	6815	.016	
95 TO GOWAN	6763	.016	.03
95 TO GOWAN	6691	.016	.03
95 TO GOWAN	6609	.016	.03
95 TO GOWAN	6572	Culvert	
95 TO GOWAN	6535	.016	.03
95 TO GOWAN	6468	.016	.03
95 TO GOWAN	6404	.016	.03
95 TO GOWAN	6362	Culvert	
95 TO GOWAN	6321	.016	.03
95 TO GOWAN	6260	.016	.03
95 TO GOWAN	6161	.016	.03
95 TO GOWAN	6012	.016	.03
95 TO GOWAN	5808	.016	.03
95 TO GOWAN	5518	.016	.03
95 TO GOWAN	5382	.016	.03
95 TO GOWAN	5264	.016	.03
95 TO GOWAN	4550	Culvert	
95 TO GOWAN	3836	.016	.03
95 TO GOWAN	3756	.016	.03
95 TO GOWAN	3666	.016	.03
95 TO GOWAN	3479	.016	.03

SUMMARY OF REACH LENGTHS

River: RANCHO ROAD

Reach	River Sta.	Left	Channel	Right
95 TO GOWAN	13266	275	230	.001
95 TO GOWAN	13036	229	184	.001
95 TO GOWAN	12852	175	175	175
95 TO GOWAN	12677	247	247	247
95 TO GOWAN	12430	75	75	75
95 TO GOWAN	12355	60	60	60
95 TO GOWAN	12295	15	15	15
95 TO GOWAN	12280	16	16	16
95 TO GOWAN	12264	119	119	119
95 TO GOWAN	12145	34	34	34
95 TO GOWAN	12111	150.01	150.01	150.01
95 TO GOWAN	12036	Culvert		
95 TO GOWAN	11961	64	64	64
95 TO GOWAN	11897	149	149	149
95 TO GOWAN	11748	65	65	65
95 TO GOWAN	11683	30	30	30
95 TO GOWAN	11653	63.01	63.01	63.01
95 TO GOWAN	11621	Culvert		
95 TO GOWAN	11590	52	52	52
95 TO GOWAN	11538	100	100	100
95 TO GOWAN	11438	271	271	271
95 TO GOWAN	11167	221	221	221
95 TO GOWAN	10946	139	139	139
95 TO GOWAN	10807	49	49	49
95 TO GOWAN	10758	183.01	183.01	183.01
95 TO GOWAN	10667	Culvert		
95 TO GOWAN	10575	28	28	28
95 TO GOWAN	10547	29	29	29
95 TO GOWAN	10518	68.01	68.01	68.01
95 TO GOWAN	10485	Culvert		
95 TO GOWAN	10450	51	51	51
95 TO GOWAN	10399	104	104	104
95 TO GOWAN	10295	265	220	188
95 TO GOWAN	10075	164	157	148
95 TO GOWAN	9918	122	122	122
95 TO GOWAN	9796	230	230	230
95 TO GOWAN	9566	54	54	54
95 TO GOWAN	9539	Culvert		
95 TO GOWAN	9512	40	40	40
95 TO GOWAN	9472	96	96	96
95 TO GOWAN	9376	52	52	52
95 TO GOWAN	9324	119	119	119
95 TO GOWAN	9205	91	91	91
95 TO GOWAN	9114	54	54	54
95 TO GOWAN	9060	110	110	110
95 TO GOWAN	8950	282	282	282
95 TO GOWAN	8668	192	192	192
95 TO GOWAN	8476	66	66	66
95 TO GOWAN	8410	133	133	133

95 TO GOWAN	8277	122	122	122
95 TO GOWAN	8155	216	216	216
95 TO GOWAN	7939	361	361	361
95 TO GOWAN	7578	100	100	100
95 TO GOWAN	7478	105	105	105
95 TO GOWAN	7373	93	93	93
95 TO GOWAN	7280	264	264	264
95 TO GOWAN	7016	81	81	81
95 TO GOWAN	6934	119	119	119
95 TO GOWAN	6815	52	52	52
95 TO GOWAN	6763	72	72	72
95 TO GOWAN	6691	82	82	82
95 TO GOWAN	6609	74.01	74.01	74.01
95 TO GOWAN	6572	Culvert		
95 TO GOWAN	6535	67	67	67
95 TO GOWAN	6468	64	64	64
95 TO GOWAN	6404	83.01	83.01	83.01
95 TO GOWAN	6362	Culvert		
95 TO GOWAN	6321	61	61	61
95 TO GOWAN	6260	99	99	99
95 TO GOWAN	6161	149	149	149
95 TO GOWAN	6012	204	204	204
95 TO GOWAN	5808	290	290	290
95 TO GOWAN	5518	136	136	136
95 TO GOWAN	5382	118	118	118
95 TO GOWAN	5264	1428.01	1428.01	1428.01
95 TO GOWAN	4550	Culvert		
95 TO GOWAN	3836	80	80	80
95 TO GOWAN	3756	90	90	90
95 TO GOWAN	3666	187	187	187
95 TO GOWAN	3479	334	334	334

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RANCHO ROAD

Reach	River Sta.	Contr.	Expan.
95 TO GOWAN	13266	.1	.3
95 TO GOWAN	13036	.1	.3
95 TO GOWAN	12852	.1	.3
95 TO GOWAN	12677	.1	.3
95 TO GOWAN	12430	.1	.3
95 TO GOWAN	12355	.1	.3
95 TO GOWAN	12295	.1	.3
95 TO GOWAN	12280	.1	.3
95 TO GOWAN	12264	.1	.3
95 TO GOWAN	12145	.1	.3
95 TO GOWAN	12111	.1	.3
95 TO GOWAN	12036	Culvert	
95 TO GOWAN	11961	.1	.3
95 TO GOWAN	11897	.1	.3
95 TO GOWAN	11748	.1	.3
95 TO GOWAN	11683	.1	.3
95 TO GOWAN	11653	.1	.3
95 TO GOWAN	11621	Culvert	
95 TO GOWAN	11590	.1	.3
95 TO GOWAN	11538	.1	.3
95 TO GOWAN	11438	.1	.3
95 TO GOWAN	11167	.1	.3
95 TO GOWAN	10946	.1	.3
95 TO GOWAN	10807	.1	.3
95 TO GOWAN	10758	.1	.3
95 TO GOWAN	10667	Culvert	
95 TO GOWAN	10575	.1	.3
95 TO GOWAN	10547	.1	.3
95 TO GOWAN	10518	.1	.3
95 TO GOWAN	10485	Culvert	
95 TO GOWAN	10450	.1	.3
95 TO GOWAN	10399	.1	.3
95 TO GOWAN	10295	.1	.3
95 TO GOWAN	10075	.1	.3
95 TO GOWAN	9918	.1	.3
95 TO GOWAN	9796	.1	.3
95 TO GOWAN	9566	.1	.3
95 TO GOWAN	9539	Culvert	
95 TO GOWAN	9512	.1	.3
95 TO GOWAN	9472	.1	.3
95 TO GOWAN	9376	.1	.3
95 TO GOWAN	9324	.1	.3
95 TO GOWAN	9205	.1	.3
95 TO GOWAN	9114	.1	.3
95 TO GOWAN	9060	.1	.3
95 TO GOWAN	8950	.1	.3
95 TO GOWAN	8668	.1	.3
95 TO GOWAN	8476	.1	.3
95 TO GOWAN	8410	.1	.3
95 TO GOWAN	8277	.1	.3
95 TO GOWAN	8155	.1	.3
95 TO GOWAN	7939	.1	.3
95 TO GOWAN	7578	.1	.3
95 TO GOWAN	7478	.1	.3

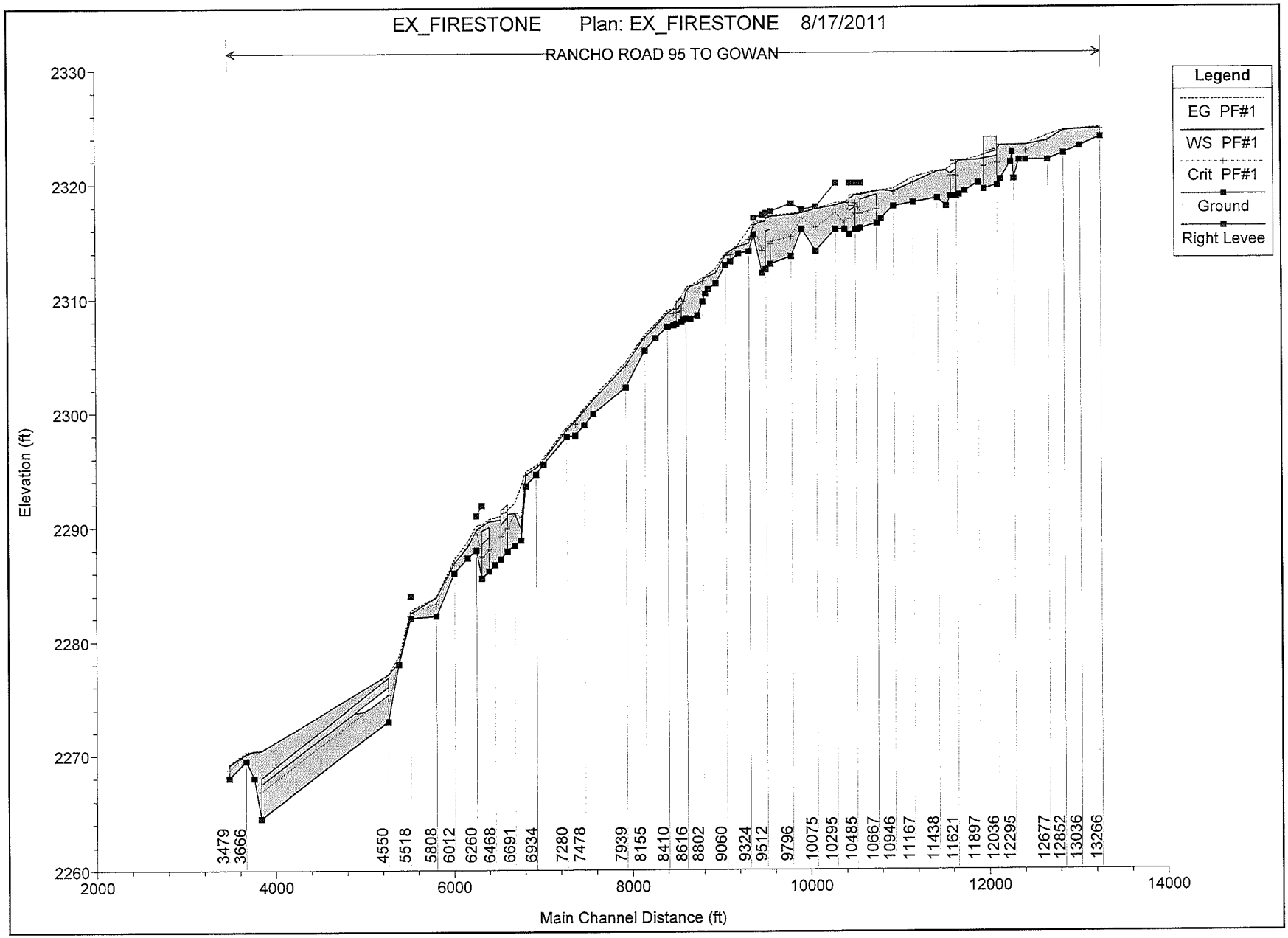
95 TO GOWAN	7373		.1	.3
95 TO GOWAN	7280		.1	.3
95 TO GOWAN	7016		.1	.3
95 TO GOWAN	6934		.1	.3
95 TO GOWAN	6815		.1	.3
95 TO GOWAN	6763		.1	.3
95 TO GOWAN	6691		.1	.3
95 TO GOWAN	6609		.1	.3
95 TO GOWAN	6572	Culvert		
95 TO GOWAN	6535		.1	.3
95 TO GOWAN	6468		.1	.3
95 TO GOWAN	6404		.1	.3
95 TO GOWAN	6362	Culvert		
95 TO GOWAN	6321		.1	.3
95 TO GOWAN	6260		.1	.3
95 TO GOWAN	6161		.1	.3
95 TO GOWAN	6012		.1	.3
95 TO GOWAN	5808		.1	.3
95 TO GOWAN	5518		.1	.3
95 TO GOWAN	5382		.1	.3
95 TO GOWAN	5264		.1	.3
95 TO GOWAN	4550	Culvert		
95 TO GOWAN	3836		.1	.3
95 TO GOWAN	3756		.1	.3
95 TO GOWAN	3666		.1	.3
95 TO GOWAN	3479		.1	.3

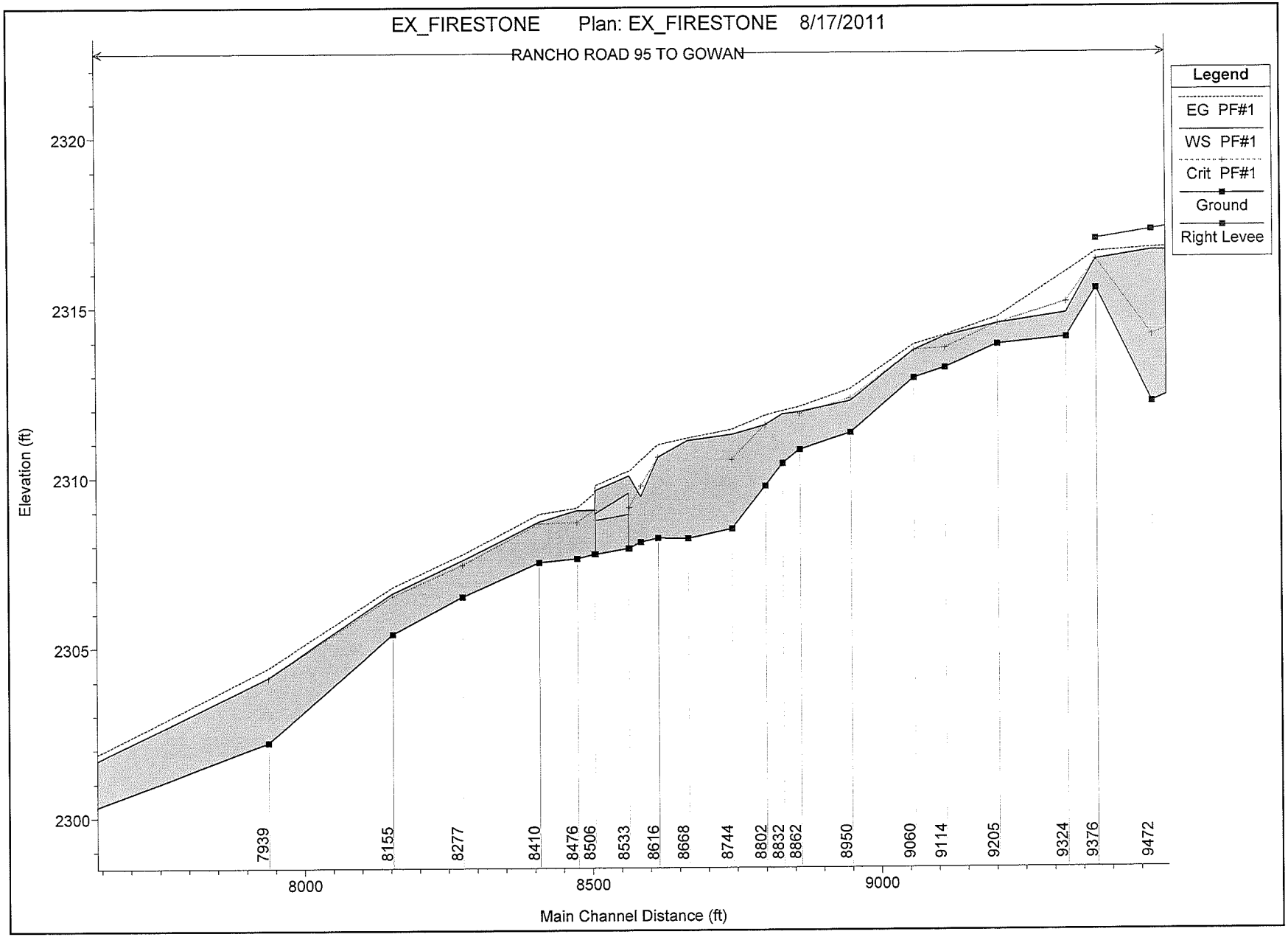
Profile Output Table - CHECKRAS

Reach	River Sta	Froude # Chl	Top Wdth Act	Conv. Total	Prof Delta WS	Left Sta Eff	Enc Sta L	Center Station	Enc Sta R	Rght Sta Eff	Min Ch El	Left Stagn	Right Stagn
			(ft)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
95 TO GOWAN	13266		0.62	211.98	2466.3		62.64		84.00	274.61	2324.00		
95 TO GOWAN	13036		0.19	261.28	8754.7		37.52		51.00	298.80	2323.20		
95 TO GOWAN	12852		0.37	182.40	5594.8		19.25		34.00	201.65	2322.60		
95 TO GOWAN	12677		1.02	42.49	1921.1		40.40		60.00	82.90	2322.00		
95 TO GOWAN	12430		0.26	163.30	7855.8		5.95		32.00	169.25	2322.00		
95 TO GOWAN	12355		0.17	352.47	12333.7		3.69		28.50	356.17	2322.00		
95 TO GOWAN	12295		0.10	268.73	17245.1		0.68		28.00	269.42	2320.35		
95 TO GOWAN	12280		0.13	246.97	9098.6		4.08		18.50	251.05	2322.68		
95 TO GOWAN	12264		0.13	227.20	12544.4		2.79		13.50	230.00	2321.80		
95 TO GOWAN	12145		0.13	182.48	17603.1		2.87		34.00	185.35	2320.30		
95 TO GOWAN	12111		0.47	13.00	3920.2		19.00		25.50	32.00	2319.81		
95 TO GOWAN	12036	Culvert #1											
95 TO GOWAN	11961		0.50	13.00	3147.9		62.00		68.50	75.00	2319.46		
95 TO GOWAN	11897		0.62	46.75	2735.7		47.78		65.00	94.53	2320.00		
95 TO GOWAN	11748		0.26	52.62	7147.3		51.18		80.00	103.80	2319.30		
95 TO GOWAN	11683		0.22	57.29	8395.5		54.34		83.50	111.63	2319.00		
95 TO GOWAN	11653		0.47	13.00	3366.9		75.00		82.50	88.00	2318.84		
95 TO GOWAN	11621	Culvert #1											
95 TO GOWAN	11590		0.84	13.00	1889.9		75.00		81.00	88.00	2318.86		
95 TO GOWAN	11538		0.29	97.91	6145.8		62.96		86.00	160.87	2318.00		
95 TO GOWAN	11438		0.32	105.20	5466.4		59.97		71.00	165.17	2318.70		
95 TO GOWAN	11167		0.99	37.32	1665.1		72.42		81.50	109.74	2318.30		
95 TO GOWAN	10946		0.73	74.45	3797.5		77.44		82.50	151.89	2318.00		
95 TO GOWAN	10807		0.13	195.88	14262.7		74.40		81.00	270.28	2316.90		
95 TO GOWAN	10758		0.25	74.23	7293.3		74.00		81.00	183.91	2316.50		
95 TO GOWAN	10667	Culvert #1											
95 TO GOWAN	10575		0.37	70.78	9161.7		76.75		99.00	147.53	2316.09		
95 TO GOWAN	10547		0.30	68.07	5070.5		70.83		82.00	138.90	2316.00		
95 TO GOWAN	10518		0.32	76.03	4785.1		70.66		81.50	146.68	2315.96		
95 TO GOWAN	10485	Culvert #1											
95 TO GOWAN	10450		1.03	62.25	1361.8		75.95		80.00	138.20	2315.54		
95 TO GOWAN	10399		0.11	86.41	15958.9		69.59		156.00	156.00	2316.00		

95 TO GOWAN 10295		0.51	32.19	3072.9	74.60	61.00
106.79 2316.00						
95 TO GOWAN 10075		0.31	127.52	4573.8	24.59	123.45
152.12 2314.10						
95 TO GOWAN 9918		0.47	75.86	3077.2	75.76	197.50
151.62 2316.00						
95 TO GOWAN 9796		0.26	28.89	6432.8	64.31	179.00
93.19 2313.67						
95 TO GOWAN 9566		0.35	96.20	8817.8	28.61	179.00
132.28 2312.98						
95 TO GOWAN 9539	Culvert #1					
95 TO GOWAN 9512		0.34	54.13	8265.8	40.01	179.00
104.82 2312.50						
95 TO GOWAN 9472		0.32	70.45	9287.9	34.86	179.00
114.81 2312.20						
95 TO GOWAN 9376		1.01	114.18	2714.7	41.67	117.25
175.86 2315.53						
95 TO GOWAN 9324		2.60	57.57	954.5	87.77	84.50
145.34 2314.10						
95 TO GOWAN 9205		0.97	149.45	2530.6	79.84	105.50
229.29 2313.90						
95 TO GOWAN 9114		0.30	277.83	4769.0	60.11	181.00
337.94 2313.20						
95 TO GOWAN 9060		0.30	287.76	4721.0	52.50	172.50
401.25 2312.90						
95 TO GOWAN 8950		0.60	121.23	2370.0	52.65	132.50
234.88 2312.40						
95 TO GOWAN 8668		1.01	88.10	1421.3	34.50	121.00
122.60 2310.00						
95 TO GOWAN 8476		0.61	131.76	2389.7	40.49	114.50
172.25 2308.30						
95 TO GOWAN 8410		0.90	84.92	1678.5	40.08	142.50
125.00 2307.70						
95 TO GOWAN 8277		0.72	87.90	2139.5	39.10	131.00
127.00 2306.50						
95 TO GOWAN 8155		0.83	98.98	1948.3	20.07	130.00
119.05 2305.40						
95 TO GOWAN 7939		0.98	73.86	1490.2	42.39	127.50
116.25 2302.20						
95 TO GOWAN 7578		0.70	102.76	2601.2	21.08	175.00
123.84 2299.90						
95 TO GOWAN 7478		0.97	112.43	1647.5	25.57	237.00
138.00 2298.90						
95 TO GOWAN 7373		0.60	103.68	3005.8	22.72	93.00
126.40 2298.00						
95 TO GOWAN 7280		1.00	120.95	1823.6	11.39	79.50
132.34 2297.90						
95 TO GOWAN 7016		1.21	170.40	1711.9	17.86	97.50
188.26 2295.50						
95 TO GOWAN 6934		1.18	124.27	1820.9	8.92	109.00
133.18 2294.60						
95 TO GOWAN 6815		1.02	79.28	2262.3	7.49	77.00
86.77 2293.60						
95 TO GOWAN 6763		2.73	15.00	676.1	46.00	53.50
61.00 2288.87						
95 TO GOWAN 6691		0.99	17.73	2077.0	51.27	59.00
69.00 2288.40						
95 TO GOWAN 6609		0.47	15.00	4129.0	47.00	54.50
62.00 2287.91						
95 TO GOWAN 6572	Culvert #1					
95 TO GOWAN 6535		0.42	18.96	4814.3	43.38	54.50
62.34 2287.21						
95 TO GOWAN 6468		0.42	26.18	5156.5	44.82	60.50
71.00 2286.70						
95 TO GOWAN 6404		0.29	31.90	6605.3	39.39	62.50
71.29 2286.17						
95 TO GOWAN 6362	Culvert #1					
95 TO GOWAN 6321		0.25	49.30	8481.8	27.70	68.50
77.00 2285.53						
95 TO GOWAN 6260		1.01	72.49	2611.2	16.64	45.00
89.13 2288.00						
95 TO GOWAN 6161		1.34	76.09	1369.0	61.91	62.50
138.00 2287.30						
95 TO GOWAN 6012		1.01	84.34	1891.8	55.66	205.00
140.00 2286.00						
95 TO GOWAN 5808		0.37	143.67	5259.7	84.02	276.00
227.69 2282.20						
95 TO GOWAN 5518		0.99	167.49	1786.4	49.93	296.50
217.42 2282.00						
95 TO GOWAN 5382		2.18	139.11	443.6	70.80	293.50
209.92 2278.00						
95 TO GOWAN 5264		0.08	104.74	18860.1	84.71	294.00
189.46 2273.01						
95 TO GOWAN 4550	Culvert #1					
95 TO GOWAN 3836		0.25	82.18	5116.3	55.41	299.00
137.59 2264.48						
95 TO GOWAN 3756		0.18	104.92	7516.3	56.32	286.00
161.23 2268.00						
95 TO GOWAN 3666		0.86	128.91	1252.1	55.40	265.00
184.32 2269.50						
95 TO GOWAN 3479		0.45	92.77	2665.5	80.15	342.50
172.92 2268.00						

Existing Condition Model


EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
RANCHO ROAD 95 TO GOWAN
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Right Levee
Elevation (ft)
2330
2320
2310
2300
2290
2280
2270
2260
2000
4000
6000
8000
10000
12000
14000
Main Channel Distance (ft)
3479
3666
4550
5518
5808
6012
6260
6468
6691
6934
7280
7478
7939
8155
8410
8616
8802
9060
9324
9512
9796
10075
10295
10485
10667
10946
11167
11438
11621
11897
12036
12295
12677
12852
13036
13266

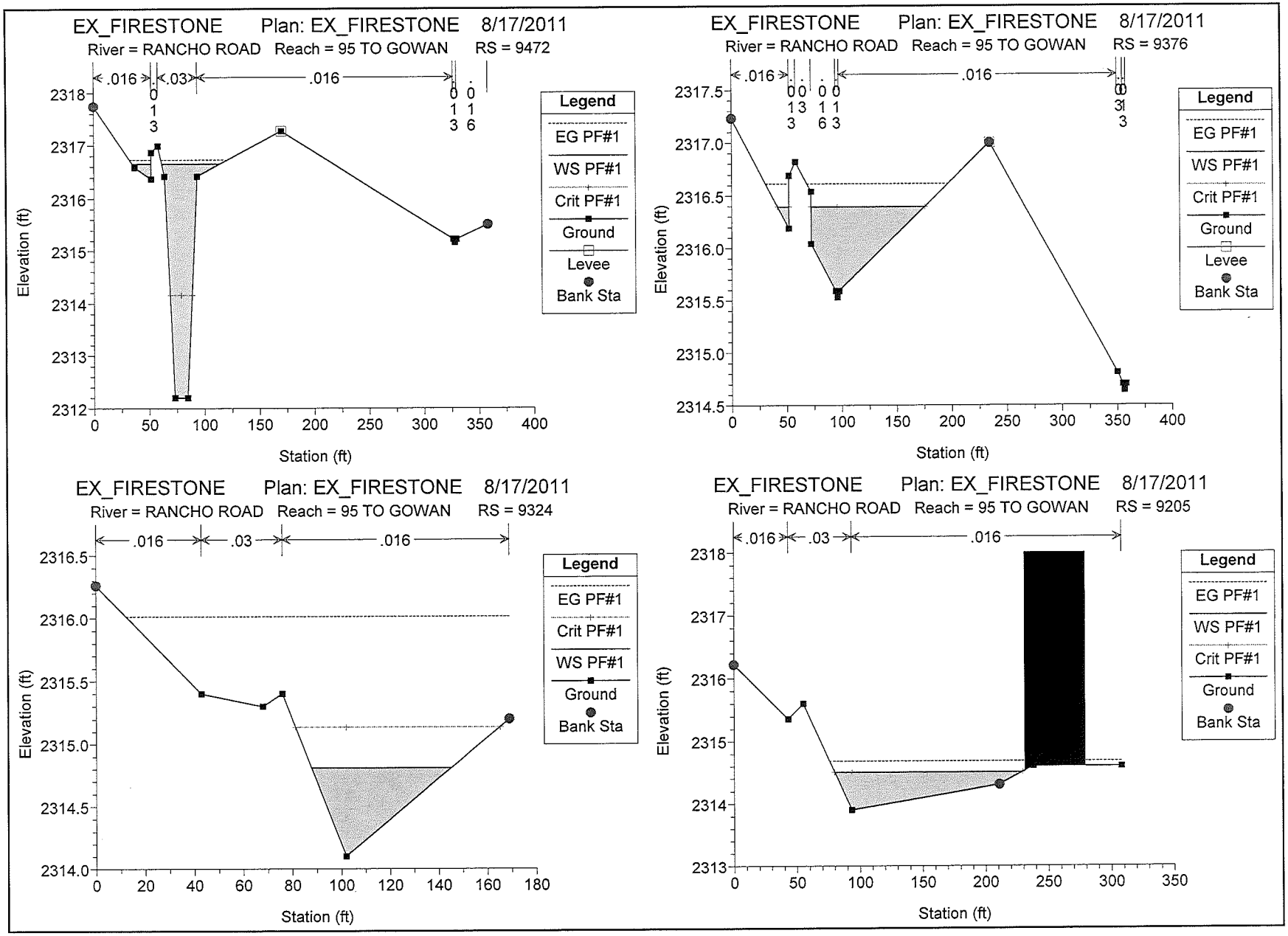

EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
RANCHO ROAD 95 TO GOWAN
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Right Levee
Elevation (ft)
2320
2315
2310
2305
2300
7939
8155
8277
8410
8476
8506
8533
8616
8668
8744
8802
8832
8862
8950
9060
9114
9205
9324
9376
9472
8000
8500
9000
Main Channel Distance (ft)

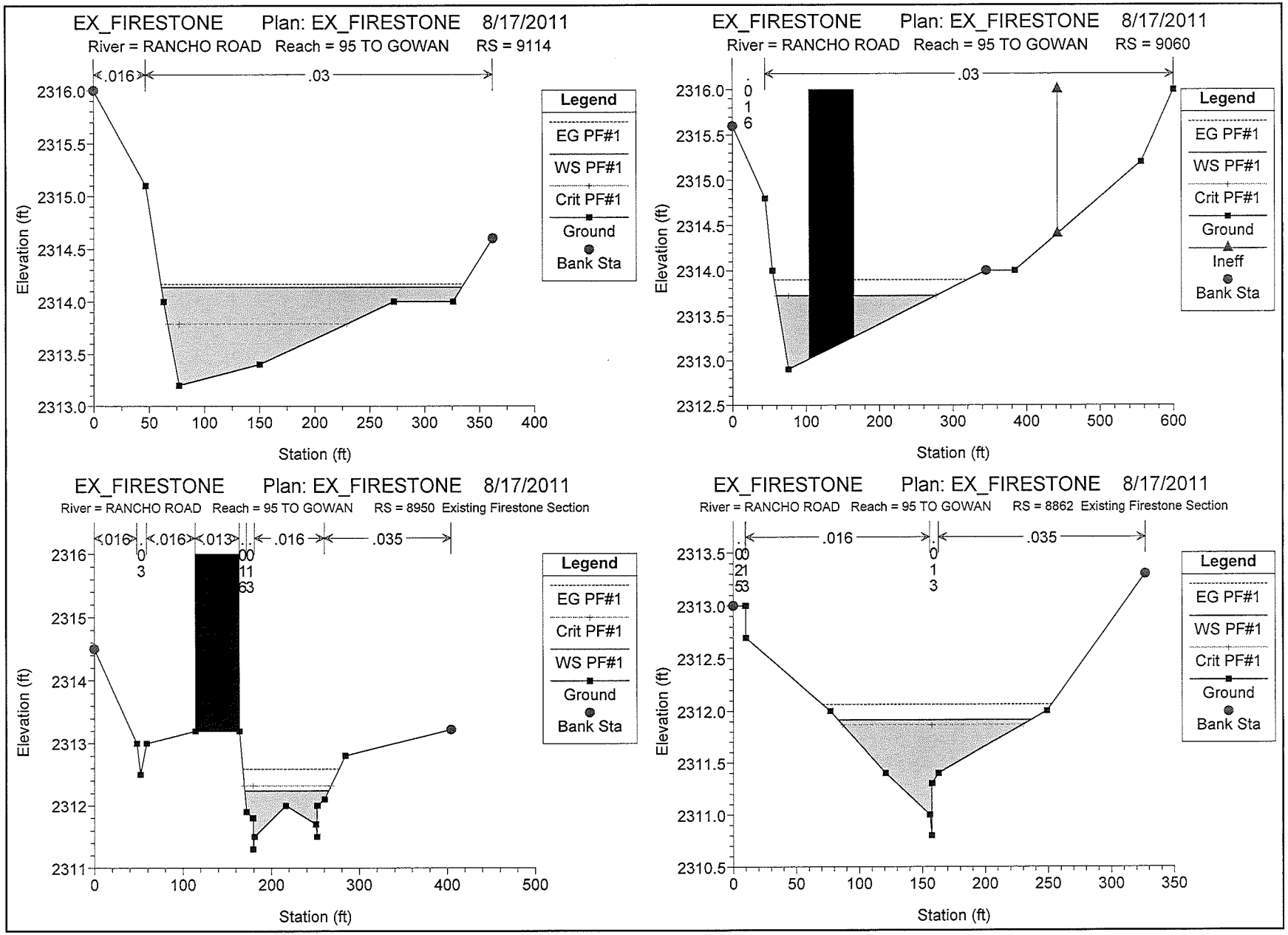
HEC-RAS Plan: EX River: RANCHO ROAD Reach: 95 TO GOWAN Profile: PF#1

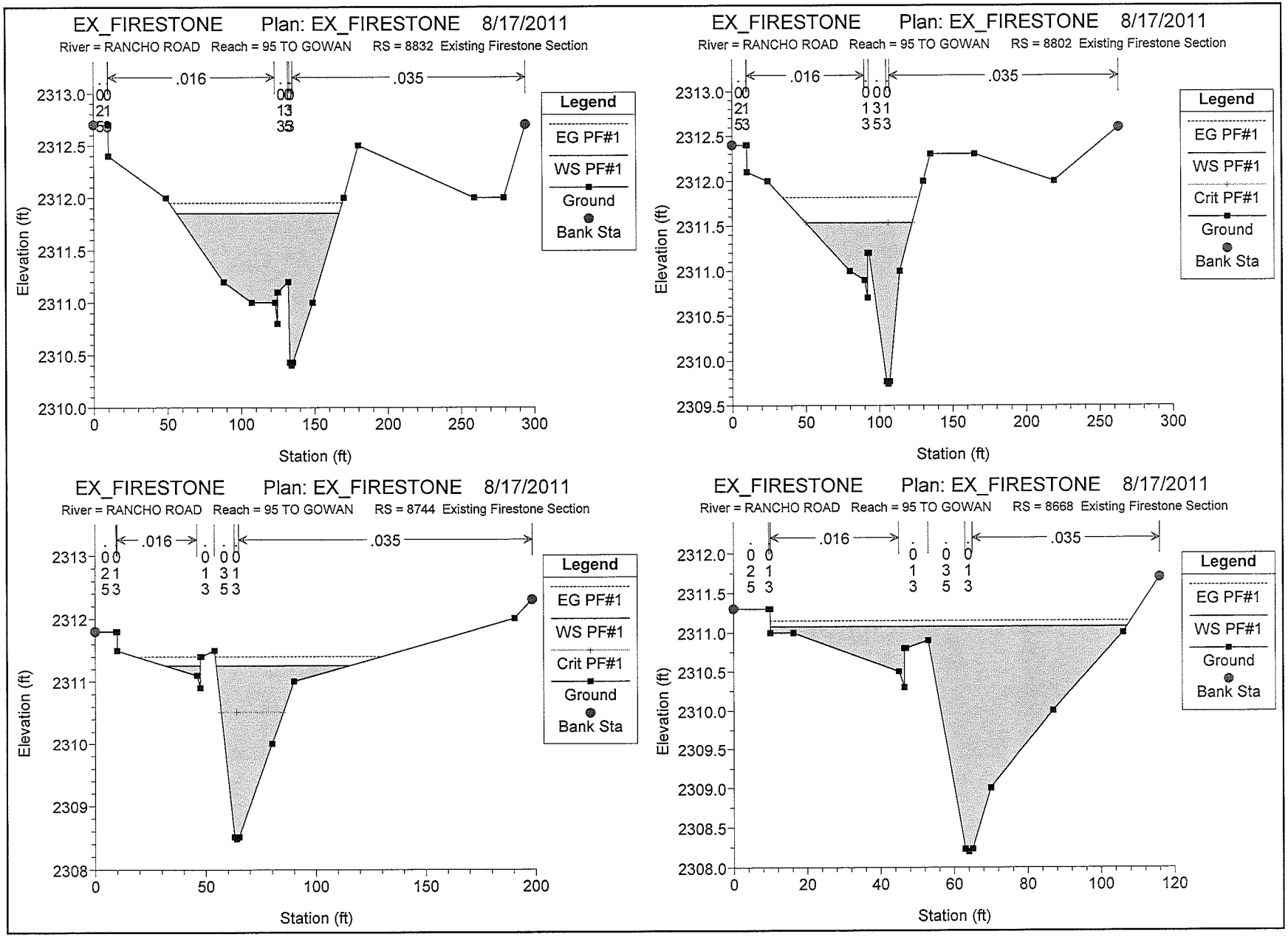
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Sta W.S. Lft	Sta W.S. Rgt
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)
95 TO GOWAN	13266	PF#1	192.00	2324.00	2324.78	2324.70	2324.89	0.006439	2.65	74.89	209.13	0.63	62.85	271.97
95 TO GOWAN	13036	PF#1	192.00	2323.20	2324.68		2324.70	0.000481	1.09	166.31	261.28	0.19	37.52	298.80
95 TO GOWAN	12852	PF#1	192.00	2322.60	2324.57		2324.63	0.001184	2.20	102.35	182.17	0.37	19.27	201.44
95 TO GOWAN	12677	PF#1	192.00	2322.00	2323.70	2323.70	2324.14	0.009989	5.32	36.11	42.49	1.02	40.40	82.90
95 TO GOWAN	12430	PF#1	192.00	2322.00	2323.33	2322.76	2323.37	0.000623	1.63	121.67	161.76	0.27	6.05	167.81
95 TO GOWAN	12355	PF#1	192.00	2322.00	2323.32		2323.33	0.000256	1.08	201.74	347.83	0.17	3.76	351.59
95 TO GOWAN	12295	PF#1	155.00	2320.35	2323.31		2323.32	0.000082	0.79	227.06	267.79	0.10	0.69	268.48
95 TO GOWAN	12280	PF#1	155.00	2322.68	2323.30		2323.32	0.000301	0.51	147.60	245.50	0.13	4.13	249.63
95 TO GOWAN	12264	PF#1	155.00	2321.80	2323.30		2323.31	0.000153	0.85	179.26	226.97	0.13	2.80	229.77
95 TO GOWAN	12145	PF#1	190.00	2320.30	2323.28		2323.30	0.000117	1.02	206.30	182.38	0.13	2.87	185.26
95 TO GOWAN	12111	PF#1	190.00	2319.81	2322.91	2321.69	2323.25	0.002352	4.72	40.24	13.00	0.47	19.00	32.00
95 TO GOWAN	12036		Culvert											
95 TO GOWAN	11961	PF#1	161.00	2319.46	2322.12		2322.46	0.002629	4.66	34.59	13.00	0.50	62.00	75.00
95 TO GOWAN	11897	PF#1	161.00	2320.00	2322.02		2322.22	0.003555	3.58	45.02	46.00	0.62	47.84	93.84
95 TO GOWAN	11748	PF#1	161.00	2319.30	2321.96		2322.02	0.000515	1.87	86.13	52.50	0.26	51.24	103.74
95 TO GOWAN	11683	PF#1	161.00	2319.00	2321.94		2321.99	0.000373	1.64	98.22	57.18	0.22	54.40	111.57
95 TO GOWAN	11653	PF#1	161.00	2318.84	2321.63	2320.52	2321.94	0.002287	4.44	36.26	13.00	0.47	75.00	88.00
95 TO GOWAN	11621		Culvert											
95 TO GOWAN	11590	PF#1	161.00	2318.86	2320.75		2321.42	0.007334	6.56	24.54	13.00	0.84	75.00	88.00
95 TO GOWAN	11538	PF#1	161.00	2318.00	2321.10		2321.15	0.000691	1.85	91.31	97.77	0.29	62.97	160.74
95 TO GOWAN	11438	PF#1	161.00	2318.70	2321.01		2321.07	0.000870	2.17	82.09	105.12	0.32	59.98	165.10
95 TO GOWAN	11167	PF#1	161.00	2318.30	2320.05	2320.05	2320.48	0.009349	5.27	30.60	37.32	0.99	72.42	109.74
95 TO GOWAN	10946	PF#1	161.00	2318.00	2319.30	2319.20	2319.51	0.001961	4.12	46.50	73.20	0.76	77.64	150.84
95 TO GOWAN	10807	PF#1	169.00	2316.90	2319.39		2319.41	0.000143	1.00	201.09	195.85	0.14	74.43	270.28
95 TO GOWAN	10758	PF#1	169.00	2316.50	2319.30	2317.69	2319.39	0.000544	2.38	79.58	73.41	0.25	74.00	183.48
95 TO GOWAN	10667		Culvert											
95 TO GOWAN	10575	PF#1	169.00	2316.09	2319.01	2317.54	2319.09	0.000346	2.21	76.38	70.11	0.37	76.88	146.99
95 TO GOWAN	10547	PF#1	169.00	2316.00	2319.01	2317.88	2319.06	0.001134	1.95	86.64	67.73	0.30	70.90	138.64
95 TO GOWAN	10518	PF#1	169.00	2315.96	2318.97	2318.27	2319.03	0.001287	1.98	85.24	75.75	0.33	70.74	146.49
95 TO GOWAN	10485		Culvert											
95 TO GOWAN	10450	PF#1	169.00	2315.54	2318.28	2318.28	2318.57	0.013946	4.37	38.63	62.65	0.98	75.79	138.45
95 TO GOWAN	10399	PF#1	169.00	2316.00	2318.33	2316.54	2318.34	0.000112	0.89	190.82	233.22	0.11	69.59	302.81
95 TO GOWAN	10295	PF#1	169.00	2316.00	2318.10	2317.41	2318.29	0.003025	3.52	48.07	32.19	0.51	74.60	106.79
95 TO GOWAN	10075	PF#1	169.00	2314.10	2317.78	2316.13	2317.82	0.001364	1.60	105.38	127.56	0.31	24.59	152.15
95 TO GOWAN	9918	PF#1	169.00	2316.00	2317.41	2316.96	2317.50	0.002998	2.50	67.48	75.94	0.47	75.75	151.69
95 TO GOWAN	9796	PF#1	169.00	2313.67	2317.26	2315.35	2317.35	0.000692	2.33	72.53	28.88	0.26	64.31	93.19
95 TO GOWAN	9566	PF#1	215.00	2312.98	2317.13	2314.91	2317.19	0.000596	2.05	104.77	95.94	0.35	28.67	132.10
95 TO GOWAN	9539		Culvert											
95 TO GOWAN	9512	PF#1	215.00	2312.50	2316.67	2314.44	2316.76	0.000675	2.43	88.52	54.58	0.34	39.83	105.06
95 TO GOWAN	9472	PF#1	215.00	2312.20	2316.66	2314.16	2316.73	0.000535	2.17	99.10	70.58	0.32	34.82	114.90
95 TO GOWAN	9376	PF#1	180.00	2315.53	2316.40	2316.40	2316.61	0.004397	3.73	48.25	114.18	1.01	41.67	175.86
95 TO GOWAN	9324	PF#1	180.00	2314.10	2314.81	2315.14	2316.01	0.035628	8.80	20.46	57.55	2.60	87.77	145.32
95 TO GOWAN	9205	PF#1	180.00	2313.90	2314.50	2314.50	2314.69	0.005060	3.44	53.35	149.45	0.97	79.84	229.29
95 TO GOWAN	9114	PF#1	180.00	2313.20	2314.14	2313.79	2314.17	0.002126	1.39	129.57	273.08	0.36	61.03	334.11
95 TO GOWAN	9060	PF#1	180.00	2312.90	2313.72	2313.72	2313.90	0.018935	3.33	54.01	156.76	1.00	59.54	277.30
95 TO GOWAN	8950	PF#1	180.00	2311.30	2312.24	2312.32	2312.59	0.008052	4.73	38.08	95.26	1.32	169.91	265.17
95 TO GOWAN	8862	PF#1	180.00	2310.80	2311.92	2311.87	2312.06	0.004452	3.07	58.65	153.91	0.88	83.12	237.03

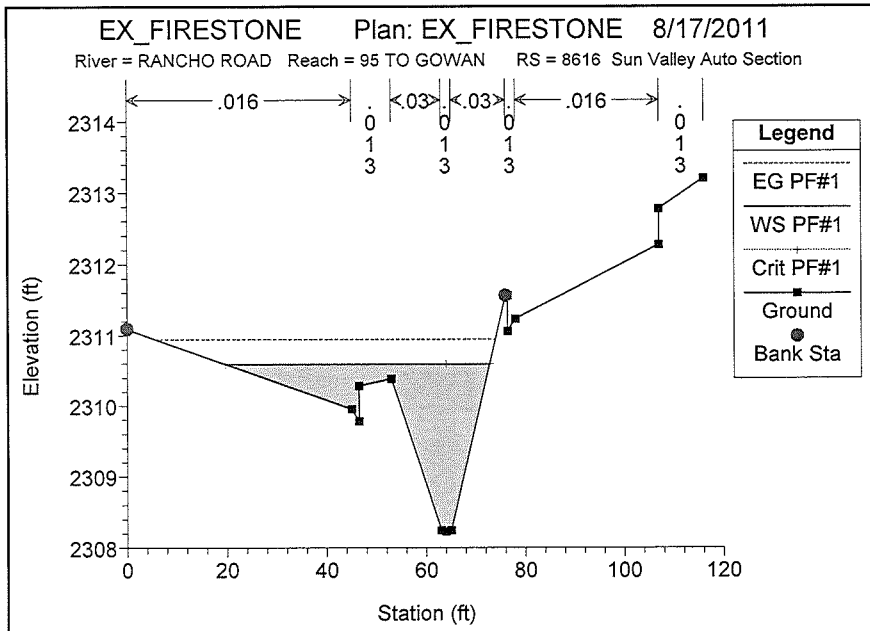
HEC-RAS Plan: EX River: RANCHO ROAD Reach: 95 TO GOWAN Profile: PF#1 (Continued)

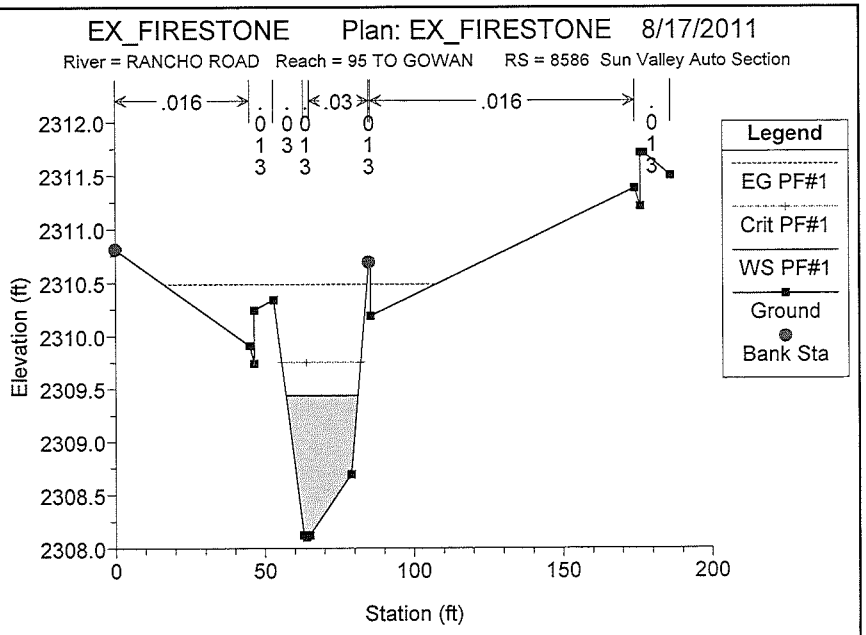
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Sta W.S. Lft	Sta W.S. Rgt
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)
95 TO GOWAN	8832	PF#1	180.00	2310.40	2311.85		2311.95	0.002476	2.49	72.23	110.71	0.54	56.14	166.85
95 TO GOWAN	8802	PF#1	180.00	2309.74	2311.53	2311.53	2311.82	0.006440	4.28	42.09	72.44	0.99	50.10	122.54
95 TO GOWAN	8744	PF#1	180.00	2308.48	2311.26	2310.51	2311.40	0.005743	3.02	59.51	77.26	0.61	31.63	116.11
95 TO GOWAN	8668	PF#1	180.00	2308.20	2311.08		2311.15	0.001894	2.16	83.25	97.08	0.41	10.00	107.08
95 TO GOWAN	8616	PF#1	180.00	2308.22	2310.59	2310.59	2310.95	0.007305	4.79	37.58	53.08	1.00	19.71	72.79
95 TO GOWAN	8586	PF#1	180.00	2308.10	2309.44	2309.75	2310.49	0.029378	8.21	21.92	24.20	1.52	57.05	81.25
95 TO GOWAN	8566	PF#1	180.00	2307.91	2310.04	2309.11	2310.17	0.001849	2.94	62.56	63.61	0.47	28.46	100.48
95 TO GOWAN	8533		Culvert											
95 TO GOWAN	8506	PF#1	180.00	2307.74	2309.04	2309.04	2309.54	0.010194	5.66	31.81	32.06	1.00	43.38	84.94
95 TO GOWAN	8476	PF#1	180.00	2307.61	2309.04	2308.67	2309.10	0.001122	2.12	85.10	139.06	0.48	27.55	166.61
95 TO GOWAN	8410	PF#1	180.00	2307.50	2308.70	2308.64	2308.92	0.010767	3.73	48.23	84.25	0.87	40.75	125.00
95 TO GOWAN	8277	PF#1	180.00	2306.50	2307.57	2307.43	2307.74	0.007234	3.28	54.86	87.63	0.73	39.37	127.00
95 TO GOWAN	8155	PF#1	180.00	2305.40	2306.61	2306.52	2306.79	0.008324	3.39	53.13	99.40	0.82	19.76	119.15
95 TO GOWAN	7939	PF#1	180.00	2302.20	2304.14	2304.12	2304.42	0.014898	4.26	42.28	73.54	0.99	42.65	116.19
95 TO GOWAN	7578	PF#1	198.00	2299.90	2301.14		2301.29	0.005749	3.12	63.55	102.93	0.70	20.94	123.87
95 TO GOWAN	7478	PF#1	198.00	2298.90	2300.20	2300.20	2300.42	0.014444	3.77	52.45	112.43	0.97	25.57	138.00
95 TO GOWAN	7373	PF#1	198.00	2298.00	2299.25	2298.99	2299.37	0.004295	2.78	71.15	103.86	0.59	22.60	126.46
95 TO GOWAN	7280	PF#1	198.00	2297.90	2298.52	2298.52	2298.74	0.011789	3.75	52.77	120.95	1.00	11.39	132.34
95 TO GOWAN	7016	PF#1	158.00	2295.50	2295.87	2295.91	2296.06	0.008495	3.52	44.91	170.45	1.21	17.83	188.27
95 TO GOWAN	6934	PF#1	158.00	2294.60	2295.18	2295.23	2295.41	0.007499	3.84	41.10	124.36	1.18	8.88	133.24
95 TO GOWAN	6815	PF#1	158.00	2293.60	2294.57	2294.57	2294.82	0.004878	4.05	39.06	79.28	1.02	7.49	86.77
95 TO GOWAN	6763	PF#1	230.00	2288.87	2289.86	2290.80	2293.57	0.116280	15.46	14.88	15.00	2.74	46.00	61.00
95 TO GOWAN	6691	PF#1	230.00	2288.40	2291.24	2291.23	2292.10	0.012268	7.44	30.91	17.73	0.99	51.27	69.00
95 TO GOWAN	6609	PF#1	230.00	2287.91	2291.14	2289.84	2291.49	0.003102	4.75	48.45	15.00	0.47	47.00	62.00
95 TO GOWAN	6572		Culvert											
95 TO GOWAN	6535	PF#1	230.00	2287.21	2290.68	2289.17	2290.98	0.002283	4.39	53.37	18.96	0.42	43.38	62.34
95 TO GOWAN	6468	PF#1	230.00	2286.70	2290.58		2290.82	0.001990	3.95	59.34	26.18	0.42	44.82	71.00
95 TO GOWAN	6404	PF#1	230.00	2286.17	2290.52	2288.11	2290.70	0.001211	3.49	68.76	31.97	0.29	39.32	71.29
95 TO GOWAN	6362		Culvert											
95 TO GOWAN	6321	PF#1	230.00	2285.53	2290.12	2287.47	2290.25	0.000735	3.07	84.01	49.92	0.25	27.69	77.61
95 TO GOWAN	6260	PF#1	230.00	2288.00	2289.78	2289.78	2290.13	0.007758	4.71	48.87	72.49	1.01	16.64	89.13
95 TO GOWAN	6161	PF#1	230.00	2287.30	2288.27	2288.41	2288.79	0.028069	5.85	40.76	82.40	1.34	61.90	144.30
95 TO GOWAN	6012	PF#1	230.00	2286.00	2286.88	2286.88	2287.19	0.014781	4.47	51.48	170.60	1.01	55.66	226.26
95 TO GOWAN	5808	PF#1	230.00	2282.20	2283.87	2283.33	2283.92	0.001924	1.92	119.57	143.50	0.37	84.12	227.62
95 TO GOWAN	5518	PF#1	230.00	2282.00	2282.48	2282.48	2282.67	0.016576	3.51	65.62	167.49	0.99	49.93	217.42
95 TO GOWAN	5382	PF#1	146.00	2278.00	2278.19	2278.33	2278.68	0.122527	5.65	25.85	138.96	2.31	70.81	209.77
95 TO GOWAN	5264	PF#1	146.00	2273.01	2277.11	2274.30	2277.12	0.000060	0.64	229.00	104.74	0.08	84.71	189.46
95 TO GOWAN	4550		Culvert											
95 TO GOWAN	3836	PF#1	146.00	2264.48	2270.40		2270.44	0.000814	1.52	96.36	82.18	0.25	55.41	137.59
95 TO GOWAN	3756	PF#1	146.00	2268.00	2270.37		2270.39	0.000377	1.11	131.03	104.92	0.18	56.31	161.23
95 TO GOWAN	3666	PF#1	146.00	2269.50	2270.14	2270.10	2270.28	0.013292	2.99	48.85	129.01	0.86	55.33	184.34
95 TO GOWAN	3479	PF#1	146.00	2268.00	2269.15	2268.76	2269.22	0.003000	2.18	66.93	92.77	0.45	80.15	172.92

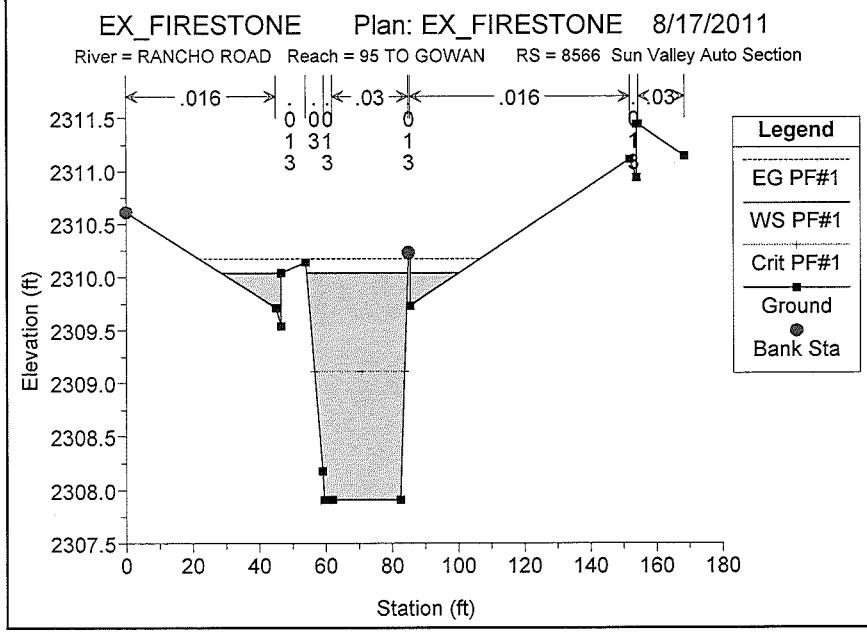

EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9472
.016
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9376
.016
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9324
.016
.03
.016
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9205
.016
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

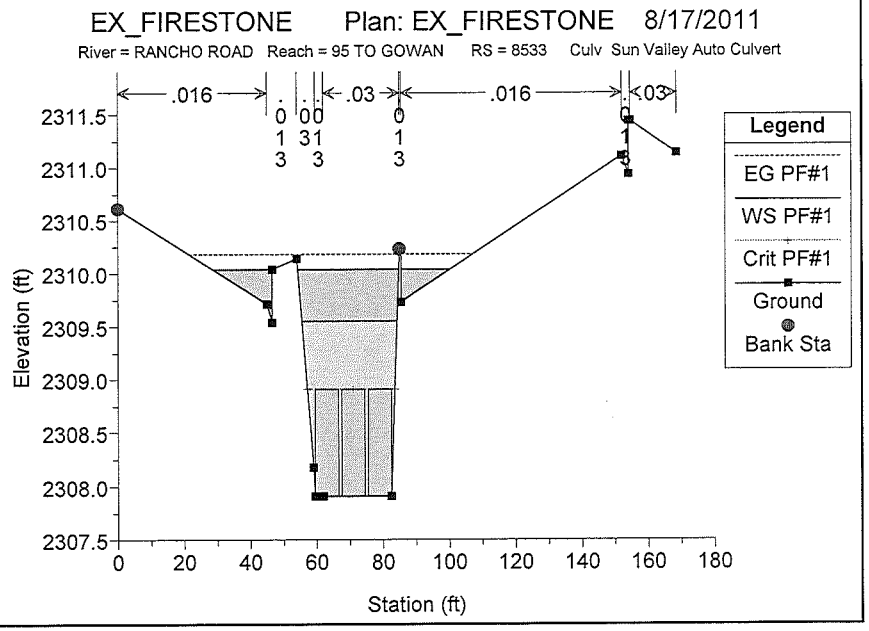

EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9114
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9060
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8950 Existing Firestone Section
.016
.016
.013
.016
.035
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8862 Existing Firestone Section
.016
.035
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

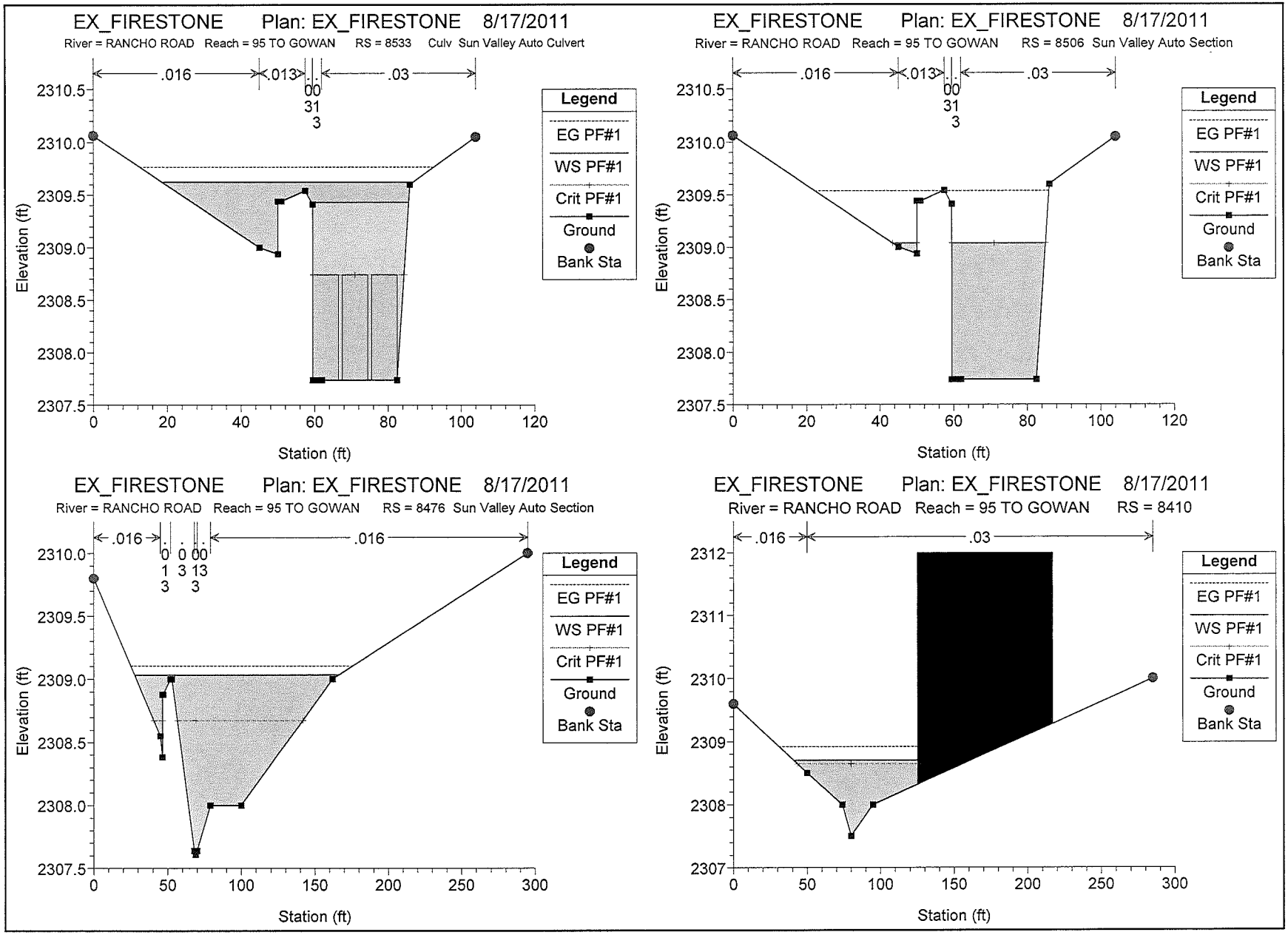

EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8832 Existing Firestone Section
.016
.035
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8802 Existing Firestone Section
.016
.035
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8744 Existing Firestone Section
.016
.035
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8668 Existing Firestone Section
.016
.035
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

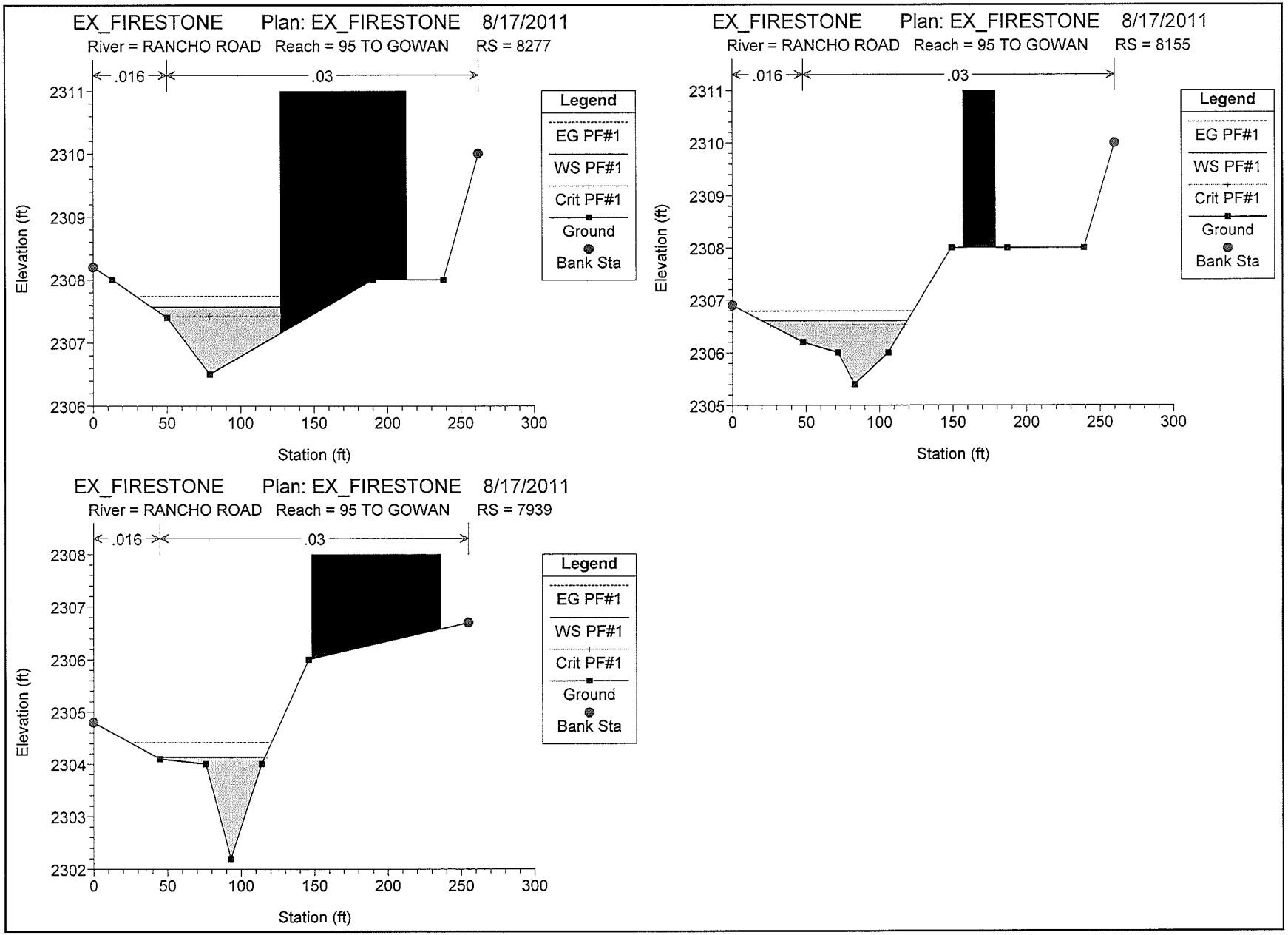

EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8616 Sun Valley Auto Section
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8586 Sun Valley Auto Section
Elevation (ft)
Station (ft)
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta


EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8566 Sun Valley Auto Section
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8533 Culv Sun Valley Auto Culvert
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8533 Culv Sun Valley Auto Culvert
.016
.013
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8506 Sun Valley Auto Section
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8476 Sun Valley Auto Section
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8410


EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8277
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8155
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
EX_FIRESTONE Plan: EX_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7939
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: EX_FIRESTONE
Project File : EX_FIRESTONE.prj
Run Date and Time: 8/17/2011 2:55:07 PM

Project in English units

Project Description:
Slater Hanifan Group - JOB#RCI1104.000 - August 17, 2011
FIRESTONE AT RANCHO &
RED COACH
Rancho Drive Conveyance - Existing Condition

Base model
referenced from the approved Rainbow/Lone Mountain LOMR (05-09-0073P)

STA
84+76 thru 86+16 geometric sections modified to reflect Sun Valley Auto
improvements per approved CLOMR (07-09-1025R)

STA 86+68 thru 89+50 geometric
sections modified to reflect more current existing topography for the Firestone
site

This model represents the current existing condition for the area and
will be used as the basis of comparison for the proposed Firestone
improvements

PLAN DATA

Plan Title: EX_FIRESTONE
Plan File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\EX_FIRESTONE.p04

Geometry Title: EX_FIRESTONE
Geometry File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\EX_FIRESTONE.g01

Flow Title : EX_FIRESTONE
Flow File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\EX_FIRESTONE.f02

Plan Summary Information:
Number of: Cross Sections = 80 Multiple Openings = 0
Culverts = 9 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: EX_FIRESTONE
Flow File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\EX_FIRESTONE.f02

Flow Data (cfs)

River	Reach	RS	PF#1
RANCHO ROAD	95 TO GOWAN	13266	192
RANCHO ROAD	95 TO GOWAN	12295	155
RANCHO ROAD	95 TO GOWAN	12145	190
RANCHO ROAD	95 TO GOWAN	11961	161

RANCHO ROAD	95 TO GOWAN	10807	169
RANCHO ROAD	95 TO GOWAN	10399	169
RANCHO ROAD	95 TO GOWAN	9566	215
RANCHO ROAD	95 TO GOWAN	9376	180
RANCHO ROAD	95 TO GOWAN	7578	198
RANCHO ROAD	95 TO GOWAN	7016	158
RANCHO ROAD	95 TO GOWAN	6763	230
RANCHO ROAD	95 TO GOWAN	5382	146

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RANCHO ROAD	95 TO GOWAN	PF#1	Normal S = 0.0022	Normal S = 0.003

GEOMETRY DATA

Geometry Title: EX_FIRESTONE
Geometry File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\EX_FIRESTONE.g01

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 13266

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2328	30	2326	84	2324	168	2324.4	210	2324.6
379	2325.1								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	168	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	168	275	230	.001	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 13036

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2328	25	2326	44	2324	72	2323.2	102	2324
127	2324	202	2324	358	2325.1				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	127	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	102	229	184	.001	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12852

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2326	27	2324	47	2322.6	68	2324	83	2324
102	2324	293	2325.1						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	83	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	68	175	175	175	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12677

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2326	32	2324.3	38	2324	54	2322	88	2324

```
     101    2324     164    2324     315  2324.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      32    .025     101    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            32      88             247     247     247             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12430

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      18    2322      44    2322      64  2322.2     140  2323.1
     250    2324     401    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      64    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       64              75      75      75             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12355

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      11    2322      37    2322      57  2322.1     158  2322.8
     383  2323.4     484    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      57    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       57              60      60      60             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12295

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324       2    2322       5 2320.35      38    2322      56  2322.1
     175  2322.8     394    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      56    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       56              15      15      15             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12280

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324       7 2322.81      22 2322.68      37 2323.11      56    2322
     179  2322.9     374    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0     .03      56    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       37              16      16      16             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12264
```

```
INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324       8    2322      20  2321.8      27    2322      53    2322
      62    2322     183    2323     339    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      53    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      27              119     119     119             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12145

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324       8    2322      22  2320.3      68    2322     251    2324
     323    2326

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      68    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      68               34      34      34             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12111

INPUT
Description: Upsteam Side of Dual 6' x 3' RCB's at Rainbow
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      19    2324      19 2319.81      32 2319.81      32    2324
     202    2324     259    2325     318    2326

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025     259    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            19      32           150.01  150.01  150.01             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 12036

INPUT
Description: Dual 6' x 3' RCB's at the Rainbow and Rancho Intersection Culvert
            16
Distance from Upstream XS =       .1
Deck/Roadway Width        =    149.9
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      19    2324              32    2324       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      19    2324      19 2319.81      32 2319.81      32    2324
     202    2324     259    2325     318    2326

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025     259    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
            19      32             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      62    2324              75    2324       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      41    2324      62    2324      62 2319.46      75 2319.46
      75    2324     123    2324     229  2324.3     326    2326
```

```
Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      41    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
            62      75             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    2324
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       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .1   149.9     .013     .013        0                  .5                1
Number of Barrels =  2
Upstream   Elevation =  2319.81
Centerline Stations
    Sta.    Sta.
      22      29
Downstream Elevation =  2319.46
Centerline Stations
    Sta.    Sta.
      65      72

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

  Q Culv Group (cfs)         190.00    Culv Full Len (ft)
  # Barrels                       2    Culv Vel US (ft/s)          6.26
  Q Barrel (cfs)              95.00    Culv Vel DS (ft/s)          5.95
  E.G. US. (ft)             2323.25    Culv Inv El Up (ft)      2319.81
  W.S. US. (ft)             2322.91    Culv Inv El Dn (ft)      2319.46
  E.G. DS (ft)              2322.46    Culv Frctn Ls (ft)          0.28
  W.S. DS (ft)              2322.12    Culv Exit Loss (ft)         0.21
  Delta EG (ft)                0.79    Culv Entr Loss (ft)         0.30
  Delta WS (ft)                0.78    Q Weir (cfs)
  E.G. IC (ft)              2323.20    Weir Sta Lft (ft)
  E.G. OC (ft)              2323.25    Weir Sta Rgt (ft)
  Culvert Control            Outlet    Weir Submerg
  Culv WS Inlet (ft)        2322.34    Weir Max Depth (ft)
  Culv WS Outlet (ft)       2322.12    Weir Avg Depth (ft)
  Culv Nml Depth (ft)          2.37    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          1.98    Min El Weir Flow (ft)    2324.01


CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11961

INPUT
Description: Downstream Side of Dual 6' x 3' RCB's at Rainbow
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      41    2324      62    2324      62 2319.46      75 2319.46
      75    2324     123    2324     229  2324.3     326    2326

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      41    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            62      75              64      64      64             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11897

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      38  2323.4      48    2322      63    2320      92    2322
     181  2323.1     251    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      38    .025     181    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            38      92             149     149     149             .1       .3

CROSS SECTION
```

```
RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11748

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      45    2323      51    2322      64    2320      75  2319.3
      90    2320     104    2322     115  2322.1     226  2323.2     269    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .025     115    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           45     115               65      65      65             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11683

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.9      49  2322.9      54    2322      68    2320      81    2319
      97    2320     112    2322     118  2322.1     249  2323.2     343    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      49    .025     118    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           49     118               30      30      30             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11653

INPUT
Description: Upstream Side of Dual 6' x 3' RCB's
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.8      48  2322.8      75    2322      75 2318.84      88 2318.84
      88    2322     117  2322.1     258  2323.2     380    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      48    .025     117    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           48     117             63.01   63.01   63.01             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11621

INPUT
Description: Dual 6' x 3' RCB's in the Grass Lined Channel just south of the
             Rainbow and Rancho Intersection, Culvert 17
Distance from Upstream XS =      .1
Deck/Roadway Width        =    62.9
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      75    2322               88    2322       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.8      48  2322.8      75    2322      75 2318.84      88 2318.84
      88    2322     117  2322.1     258  2323.2     380    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      48    .025     117    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
           48     117             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      75    2322               88    2322       0

Downstream Bridge Cross Section Data
```

```
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.6      48  2322.6      75    2322      75 2318.86      88 2318.86
      88    2322     114  2322.1     277    2323     402    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      48    .025     114    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
            48     114             .1       .3

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =    2322
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       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .1    62.9     .013     .013        0                  .5               1
Number of Barrels =  2
Upstream   Elevation =  2318.84
Centerline Stations
    Sta.    Sta.
      78      85
Downstream Elevation =  2318.86
Centerline Stations
    Sta.    Sta.
      78      85

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

  Q Culv Group (cfs)         161.00    Culv Full Len (ft)
  # Barrels                       2    Culv Vel US (ft/s)          5.81
  Q Barrel (cfs)              80.50    Culv Vel DS (ft/s)          7.11
  E.G. US. (ft)             2321.94    Culv Inv El Up (ft)      2318.84
  W.S. US. (ft)             2321.63    Culv Inv El Dn (ft)      2318.86
  E.G. DS (ft)              2321.42    Culv Frctn Ls (ft)          0.14
  W.S. DS (ft)              2320.75    Culv Exit Loss (ft)         0.12
  Delta EG (ft)                0.52    Culv Entr Loss (ft)         0.26
  Delta WS (ft)                0.88    Q Weir (cfs)
  E.G. IC (ft)              2321.88    Weir Sta Lft (ft)
  E.G. OC (ft)              2321.94    Weir Sta Rgt (ft)
  Culvert Control            Outlet    Weir Submerg
  Culv WS Inlet (ft)        2321.15    Weir Max Depth (ft)
  Culv WS Outlet (ft)       2320.75    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          1.77    Min El Weir Flow (ft)    2322.01


CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11590

INPUT
Description: Downstream Side of Dual 6' x 3' RCB's
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.6      48  2322.6      75    2322      75 2318.86      88 2318.86
      88    2322     114  2322.1     277    2323     402    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      48    .025     114    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            48     114               52      52      52             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11538

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.5      47  2322.4      58    2322      69    2320      82    2318
      93    2320     125  2320.5     215    2322     290  2322.7     397    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      47    .025     125    .016
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            47     125             100     100     100             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 11438

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2323.3       45  2322.2       55    2322       65    2320       80  2318.7
      91    2320       97  2320.1      240    2322      411  2323.5

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       45    .025       97    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            45      97             271     271     271             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 11167

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2322.2       26    2322       56  2321.4       73    2320       88  2318.3
     107    2320      205  2321.7

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       56    .025      107    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            56     107             221     221     221             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 10946

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2321.6       58  2320.8       71    2320       90    2318      107  2318.4
     180  2319.9

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       58    .025       71    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            58     107             139     139     139             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 10807

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2321.3       60  2320.4       72    2320       80    2318       88  2316.9
     102    2318    196.6  2318.6    196.6  2318.1   270.28  2319.3   270.28  2319.8

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       60    .025    196.6    .013    196.6    .016   270.28    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            60     102              49      49      49             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 10758

INPUT
Description: Upstream SIde of Triple 6' x 2.5' RCB's
Station Elevation Data    num=      10
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2321.1       65  2320.2       74    2320       74  2316.5       97  2316.5
```

```
      97    2320   143.6  2319.1   143.6  2318.6   217.3  2319.9   217.3  2320.4

Manning's n Values         num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      65    .025   143.6    .013   143.6    .016   217.3    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            65      97           183.01  183.01  183.01             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 10667

INPUT
Description: Triple 6' x 2.5' RCB's at Lone Mt. Rd., One of the D.S. Culverts
             has 3 ft of horizontal blockage, Culvert 18.
Distance from Upstream XS =       .1
Deck/Roadway Width        =    182.9
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      74    2320              97    2320       0

Upstream Bridge Cross Section Data
Station Elevation Data     num=       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2321.1      65  2320.2      74    2320      74  2316.5      97  2316.5
      97    2320   143.6  2319.1   143.6  2318.6   217.3  2319.9   217.3  2320.4

Manning's n Values         num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      65    .025   143.6    .013   143.6    .016   217.3    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            65      97             .1       .3

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      77    2319              94    2319       0

Downstream Bridge Cross Section Data
Station Elevation Data     num=       13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.7      46    2320      67  2319.8      77    2319      77 2316.09
      94 2316.09      94    2319      95    2318     198    2320     238    2320
     279    2318     293    2318     309    2320

Manning's n Values         num=        4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      67    .03       77    .015      94    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     198             .1       .3
Right Levee     Station=     198      Elevation=    2320

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    19.1
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      2.5       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1   182.9     .013     .013          0                  .5                1
Number of Barrels =  3
Upstream   Elevation =  2316.5
Centerline Stations
    Sta.    Sta.    Sta.
    78.5    85.5    92.5
Downstream Elevation =  2316.09
Centerline Stations
    Sta.    Sta.    Sta.
      77      84      91

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

  Q Culv Group (cfs)         138.67    Culv Full Len (ft)         182.90
  # Barrels                       3    Culv Vel US (ft/s)           3.08
  Q Barrel (cfs)              46.22    Culv Vel DS (ft/s)           3.08
  E.G. US. (ft)             2319.39    Culv Inv El Up (ft)       2316.50
  W.S. US. (ft)             2319.30    Culv Inv El Dn (ft)       2316.09
  E.G. DS (ft)              2319.09    Culv Frctn Ls (ft)           0.16
  W.S. DS (ft)              2319.01    Culv Exit Loss (ft)          0.07
```

Delta EG (ft)	0.30	Culv Entr Loss (ft)	0.07
Delta WS (ft)	0.29	Q Weir (cfs)	30.33
E.G. IC (ft)	2318.89	Weir Sta Lft (ft)	128.93
E.G. OC (ft)	2319.39	Weir Sta Rgt (ft)	188.01
Culvert Control	Outlet	Weir Submerg	0.04
Culv WS Inlet (ft)	2319.00	Weir Max Depth (ft)	0.78
Culv WS Outlet (ft)	2318.59	Weir Avg Depth (ft)	0.33
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	19.47
Culv Crt Depth (ft)	1.23	Min El Weir Flow (ft)	2318.61

Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
The reported inlet energy grade answer may not be valid.

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10575

INPUT
Description: Downstream Side of Triple 6' x 2.5' RCB's
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.7	46	2320	67	2319.8	77	2319	77	2316.09
94	2316.09	94	2319	95	2318	198	2320	238	2320
279	2318	293	2318	309	2320				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	67	.03	77	.015	94	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	198	28	28	.1	.3

Right Levee Station= 198 Elevation= 2320

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10547

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.6	43	2320	66	2319.7	78	2318	81	2316
113	2318	164	2320	258	2320	271	2318	297	2318
308	2320								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.015	66	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	164	29	29	.1	.3

Right Levee Station= 164 Elevation= 2320

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10518

INPUT
Description: Upstream Side of Dual 24" RCP's
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.6	40	2320	66	2319.7	77	2318	77	2315.96
84	2315.96	92	2318	131	2318	163	2320	258	2320
272	2318	298	2318	310	2320				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	66	.03	77	.015	84	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	163	68.01	68.01	.1	.3

Right Levee Station= 163 Elevation= 2320

CULVERT

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10485

INPUT
Description: Dual 24" RCP's, South of Lone Mt. Rd. Culvert 19
Distance from Upstream XS = .1
Deck/Roadway Width = 67.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
66	2319.7	92	2318	0

```
Upstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.6      40    2320      66  2319.7      77    2318      77 2315.96
      84 2315.96      92    2318     131    2318     163    2320     258    2320
     272    2318     298    2318     310    2320

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      66    .03       77    .015      84    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     163            .1       .3
Right Levee     Station=     163      Elevation=    2320

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      66  2319.5              89    2318       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.4      35    2320      66  2319.5      78    2318      78 2315.54
      85 2315.54      89    2318     135    2318     160    2320     242    2320
     262    2318     300    2318     312    2320

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      66    .03       78    .015      85    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     160            .1       .3
Right Levee     Station=     160      Elevation=    2320

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    2318
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       Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .1    67.9     .013     .013        0                  .5               1
Number of Barrels =  2
Upstream   Elevation =  2315.96
Centerline Stations
    Sta.    Sta.
      79      82
Downstream Elevation =  2315.54
Centerline Stations
    Sta.    Sta.
      80      83

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

  Q Culv Group (cfs)          28.63    Culv Full Len (ft)          67.90
  # Barrels                      2     Culv Vel US (ft/s)          4.56
  Q Barrel (cfs)             14.31     Culv Vel DS (ft/s)          4.56
  E.G. US. (ft)            2319.03     Culv Inv El Up (ft)      2315.96
  W.S. US. (ft)            2318.97     Culv Inv El Dn (ft)      2315.54
  E.G. DS (ft)             2318.57     Culv Frctn Ls (ft)          0.27
  W.S. DS (ft)             2318.28     Culv Exit Loss (ft)         0.03
  Delta EG (ft)               0.46     Culv Entr Loss (ft)         0.16
  Delta WS (ft)               0.69     Q Weir (cfs)              140.37
  E.G. IC (ft)             2319.03     Weir Sta Lft (ft)           76.13
  E.G. OC (ft)             2319.03     Weir Sta Rgt (ft)          147.61
  Culvert Control           Outlet     Weir Submerg                0.20
  Culv WS Inlet (ft)       2317.96     Weir Max Depth (ft)         1.04
  Culv WS Outlet (ft)      2317.54     Weir Avg Depth (ft)         0.80
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)     57.33
  Culv Crt Depth (ft)         1.36     Min El Weir Flow (ft)    2318.01


CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10450

INPUT
Description: Downstream Side of Dual 24" RCP's
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.4      35    2320      66  2319.5      78    2318      78 2315.54
      85 2315.54      89    2318     135    2318     160    2320     242    2320
```

```
     262    2318     300    2318     312    2320

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      66     .03      78    .015      85     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     160              51      51      51             .1       .3
Right Levee     Station=     160      Elevation=    2320

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10399

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.3      32    2320      65  2319.4      71    2318      75    2316
     132    2316     301    2318     312    2320

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      65     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     312             104     104     104             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     156     312    2320       F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10295

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2320      59  2319.2      76    2318      81    2316      96    2316
     106    2318     122    2320     209    2320     269    2318     299    2318
     318    2320

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      59     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     122             265     220     188             .1       .3
Right Levee     Station=     122      Elevation=    2320

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10075

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2318.65      21 2318.23      23 2318.19    38.7  2314.1      44  2314.1
      55 2317.04  175.21 2317.95   179.5 2317.95   202.5 2317.53   211.3 2316.83
   220.2 2315.02     226 2315.02   246.9 2317.95  280.33 2318.44   292.4    2319

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      21     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0   246.9             164     157     148             .1       .3
Right Levee     Station=  175.21      Elevation= 2317.95

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9918

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2318.9      60  2318.3      71    2318      87    2316     107    2316
     161  2317.7     203    2316     318    2316     395    2318

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      60     .03

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

```
            0     395              122     122     122              .1       .3
Right Levee     Station=     161      Elevation=  2317.7

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 9796

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2318.71      37 2317.56      52 2317.34      52 2317.84      58 2317.96
      64 2317.39      73 2313.67    84.5 2313.67    93.5 2317.39     170 2318.24
  326.42 2316.19  327.92 2316.13  329.42 2316.19     358 2316.47

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     358              230     230     230              .1       .3
Right Levee     Station=     170      Elevation= 2318.24

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 9566

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2318.02      37 2316.87      52 2316.65      52 2317.15      58 2317.27
      64  2316.7      73 2312.98    84.5 2312.98    93.5  2316.7     170 2317.55
  326.42  2315.5  327.92 2315.44  329.42  2315.5     358 2315.78

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     358               54      54      54              .1       .3
Right Levee     Station=     170      Elevation= 2317.55

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 9539

INPUT
Description:
Distance from Upstream XS =       .1
Deck/Roadway Width        =    53.8
Weir Coefficient          =     2.8
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      64  2316.7    2312    93.5  2316.7    2312

Upstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2318.02      37 2316.87      52 2316.65      52 2317.15      58 2317.27
      64  2316.7      73 2312.98    84.5 2312.98    93.5  2316.7     170 2317.55
  326.42  2315.5  327.92 2315.44  329.42  2315.5     358 2315.78

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     358              .1       .3
Right Levee     Station=     170      Elevation= 2317.55

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      64 2316.54    2311    93.5 2316.54    2311

Downstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2317.86      37 2316.71      52 2316.49      52 2316.99      58 2317.11
      64 2316.54      73  2312.5    84.5  2312.5    93.5 2316.54     170 2317.39
  326.42 2315.34  327.92 2315.28  329.42 2315.34     358 2315.62

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
```

```
      0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     358            .1       .3
Right Levee     Station=     170      Elevation= 2317.39

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

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1          Box        3       4
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    53.8     .013     .013        0                  .5                1
Number of Barrels =  3
Upstream   Elevation =  2312.98
Centerline Stations
    Sta.    Sta.    Sta.
   74.25   78.75      83
Downstream Elevation =  2312.82
Centerline Stations
    Sta.    Sta.    Sta.
   74.25   78.75      83

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

  Q Culv Group (cfs)        155.29    Culv Full Len (ft)         53.80
  # Barrels                      3    Culv Vel US (ft/s)          4.31
  Q Barrel (cfs)             51.76    Culv Vel DS (ft/s)          4.31
  E.G. US. (ft)            2317.20    Culv Inv El Up (ft)      2312.98
  W.S. US. (ft)            2317.13    Culv Inv El Dn (ft)      2312.82
  E.G. DS (ft)             2316.76    Culv Frctn Ls (ft)          0.09
  W.S. DS (ft)             2316.67    Culv Exit Loss (ft)         0.20
  Delta EG (ft)               0.44    Culv Entr Loss (ft)         0.14
  Delta WS (ft)               0.46    Q Weir (cfs)               59.71
  E.G. IC (ft)             2316.47    Weir Sta Lft (ft)          26.58
  E.G. OC (ft)             2317.20    Weir Sta Rgt (ft)         137.97
  Culvert Control           Outlet    Weir Submerg                0.00
  Culv WS Inlet (ft)       2315.98    Weir Max Depth (ft)         0.54
  Culv WS Outlet (ft)      2315.82    Weir Avg Depth (ft)         0.33
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)     35.10
  Culv Crt Depth (ft)         1.73    Min El Weir Flow (ft)    2316.66


Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
         The reported inlet energy grade answer may not be valid.

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9512

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2317.86      37 2316.71      52 2316.49      52 2316.99      58 2317.11
      64 2316.54      73  2312.5    84.5  2312.5    93.5 2316.54     170 2317.39
  326.42 2315.34  327.92 2315.28  329.42 2315.34     358 2315.62

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     358              40      40      40             .1       .3
Right Levee     Station=     170      Elevation= 2317.39

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9472

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2317.74      37 2316.59      52 2316.37      52 2316.87      58 2316.99
      64 2316.42      73  2312.2    84.5  2312.2    93.5 2316.42     170 2317.27
  326.42 2315.22  327.92 2315.16  329.42 2315.22     358  2315.5

Manning's n Values        num=       6
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     358              96      96      96             .1       .3
Right Levee     Station=     170      Elevation= 2317.27

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9376

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2317.23       52 2316.19       52 2316.69       58 2316.82       72 2316.54
      72 2316.04     94.5 2315.59       96 2315.53     97.5 2315.59    234.5     2317
     350 2314.81      355  2314.7    356.5 2314.64      358  2314.7

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03      72    .016     94.5    .013
    97.5    .016     350     .03     355    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   234.5              52      52      52             .1       .3
Right Levee     Station=   234.5      Elevation=    2317

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9324

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2316.26       43  2315.4       68  2315.3       76  2315.4     102  2314.1
     169  2315.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      43     .03      76    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     169             119     119     119             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9205

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2316.22       43 2315.36       55  2315.6    93.5  2313.9     211  2314.3
     238  2314.6     308  2314.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      43     .03    93.5    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     211              91      91      91             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     231     279    2318

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9114

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2316       47  2315.1       63    2314       77  2313.2     150  2313.4
     272    2314      326    2314      362  2314.6

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      47     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     362              54      54      54             .1       .3

CROSS SECTION
```

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9060

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2315.6	44	2314.8	54	2314	76	2312.9	345	2314
384	2314	556	2315.2	600	2316				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	44	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	345	110	110	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442	600	2316	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
104	165	2316

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8950

INPUT
Description: Existing Firestone Section
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2314.5	48	2313	52	2312.5	59	2313	114	2313.2
164	2313.2	172	2311.9	179	2311.8	179.5	2311.8	179.5	2311.3
181	2311.5	216.5	2312	250.5	2311.7	252	2311.5	252	2312
252.5	2312	260.5	2312.1	284	2312.8	404.51	2313.22		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	48	.03	59	.016	114	.013	164	.016
172	.013	181	.016	260.5	.035				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	404.51	88	88	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
114	164	2316

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8862

INPUT
Description: Existing Firestone Section
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2313	9.5	2313	10	2313	10	2312.7	77	2312
121	2311.4	156	2311	157.5	2310.8	157.5	2311.3	158	2311.3
163	2311.4	249	2312	327	2313.3				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	156	.013	163	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	327	30	30	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8832

INPUT
Description: Existing Firestone Section
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2312.7	9.5	2312.7	10	2312.7	10	2312.4	49	2312
88	2311.2	107	2311	123	2311	124.5	2310.8	124.5	2311.1
125	2311.1	132	2311.2	133	2310.43	134	2310.4	135	2310.43
148.5	2311	170	2312	180	2312.5	259	2312	279	2312
294	2312.7								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	123	.013	132	.035
133	.013	135	.035						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	294	30	30	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8802

INPUT
Description: Existing Firestone Section
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2312.4	9.5	2312.4	10	2312.4	10	2312.1	24	2312
80	2311	90	2310.9	92	2310.7	92	2311.2	93	2311.2
105	2309.77	106	2309.74	107	2309.77	114	2311	130	2312
135	2312.3	165	2312.3	219	2312	263	2312.6		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	90	.013	93	.035
105	.013	107	.035						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	263	58	58	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8744

INPUT
Description: Existing Firestone Section
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.8	9.5	2311.8	10	2311.8	10	2311.5	46	2311.1
47.5	2310.9	47.5	2311.4	48	2311.4	54	2311.5	63	2308.51
64	2308.48	65	2308.51	80	2310	90	2311	190.5	2312
198.5	2312.3								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	46	.013	54	.035
63	.013	65	.035						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	198.5	76	76	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8668

INPUT
Description: Existing Firestone Section
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.3	9.5	2311.3	10	2311.3	10	2311	16.3	2311
45	2310.5	46.5	2310.3	46.5	2310.8	47	2310.8	53	2310.9
63	2308.23	64	2308.2	65	2308.23	70	2309	87	2310
106	2311	116	2311.7						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	45	.013	53	.035
63	.013	65	.035						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	116	52	52	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8616

INPUT
Description: Sun Valley Auto Section
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.09	45	2309.95	46.5	2309.78	46.5	2310.28	53	2310.38
63	2308.24	64	2308.22	65	2308.24	76	2311.56	76.5	2311.56
76.5	2311.06	78	2311.23	107	2312.27	107	2312.77	116	2313.2

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.013	53	.03	63	.013	65	.03
76	.013	78	.016	107	.013				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	76	30	30	31	.1	.3

CROSS SECTION

```
RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8586

INPUT
Description: Sun Valley Auto Section
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2310.81      45 2309.91    46.5 2309.74    46.5 2310.24      53 2310.34
      63 2308.12      64  2308.1      65 2308.12      79 2308.69      85 2310.69
    85.5 2310.69    85.5 2310.19     174 2311.38     176 2311.21     176 2311.71
     177 2311.71     186  2311.5

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      53     .03      63    .013      65     .03
      85    .013    85.5    .016     174    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      85               20      20      20             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8566

INPUT
Description: Sun Valley Auto Section
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2310.61      45 2309.71    46.5 2309.54    46.5 2310.04      54 2310.14
      59 2308.18    59.5 2307.91      61 2307.91      62 2307.91    82.5 2307.91
      85 2310.23    85.5 2310.23    85.5 2309.73     152 2311.11     154 2310.94
     154 2311.44   154.5 2311.44   168.5 2311.14

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      54     .03    59.5    .013      62     .03
      85    .013    85.5    .016     152    .013   154.5     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      85               60      60      60             .1      .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8533

INPUT
Description: Sun Valley Auto Culvert
Distance from Upstream XS =       1
Deck/Roadway Width        =   57.25
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    55.5 2309.55           84.27 2309.55

Upstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2310.61      45 2309.71    46.5 2309.54    46.5 2310.04      54 2310.14
      59 2308.18    59.5 2307.91      61 2307.91      62 2307.91    82.5 2307.91
      85 2310.23    85.5 2310.23    85.5 2309.73     152 2311.11     154 2310.94
     154 2311.44   154.5 2311.44   168.5 2311.14

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      54     .03    59.5    .013      62     .03
      85    .013    85.5    .016     152    .013   154.5     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0      85             .1      .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
   59.19 2309.43           85.68 2309.43

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2310.06      45    2309      50 2308.94      50 2309.44      51 2309.44
    57.5 2309.54    59.5 2309.41    59.5 2307.74      61 2307.74      62 2307.74
    82.5 2307.74      86  2309.6     104 2310.05

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013    57.5     .03    59.5    .013      62     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     104             .1      .3

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
```

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

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       1       7
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   57.25     .013     .013        0                  .2                1
Number of Barrels =  3
Upstream   Elevation =  2307.91
Centerline Stations
    Sta.    Sta.    Sta.
      63      71      79
Downstream Elevation =  2307.74
Centerline Stations
    Sta.    Sta.    Sta.
      63      71      79

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

  Q Culv Group (cfs)        125.91    Culv Full Len (ft)         57.25
  # Barrels                      3    Culv Vel US (ft/s)          6.00
  Q Barrel (cfs)             41.97    Culv Vel DS (ft/s)          6.00
  E.G. US. (ft)            2310.18    Culv Inv El Up (ft)      2307.91
  W.S. US. (ft)            2310.04    Culv Inv El Dn (ft)      2307.74
  E.G. DS (ft)             2309.54    Culv Frctn Ls (ft)          0.47
  W.S. DS (ft)             2309.04    Culv Exit Loss (ft)         0.06
  Delta EG (ft)               0.65    Culv Entr Loss (ft)         0.11
  Delta WS (ft)               1.00    Q Weir (cfs)               54.09
  E.G. IC (ft)             2310.22    Weir Sta Lft (ft)          21.36
  E.G. OC (ft)             2310.18    Weir Sta Rgt (ft)         107.32
  Culvert Control            Inlet    Weir Submerg                0.00
  Culv WS Inlet (ft)       2308.91    Weir Max Depth (ft)         0.64
  Culv WS Outlet (ft)      2308.74    Weir Avg Depth (ft)         0.36
  Culv Nml Depth (ft)         1.00    Weir Flow Area (sq ft)     30.99
  Culv Crt Depth (ft)         1.00    Min El Weir Flow (ft)    2309.55


Note:    The normal depth exceeds the height of the culvert.  The program assumes that the normal
         depth is equal to the height of the culvert.
Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8506

INPUT
Description: Sun Valley Auto Section
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2310.06      45    2309      50 2308.94      50 2309.44      51 2309.44
    57.5 2309.54    59.5 2309.41    59.5 2307.74      61 2307.74      62 2307.74
    82.5 2307.74      86  2309.6     104 2310.05

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013    57.5     .03    59.5    .013      62     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     104               30      30      45             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8476

INPUT
Description: Sun Valley Auto Section
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2309.8      45 2308.55    46.5 2308.38    46.5 2308.88      47 2308.88
      52    2309      53    2309      68 2307.64      69 2307.61      70 2307.64
      79    2308     100    2308     162    2309     295    2310

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      52     .03      68    .013      70     .03
      79    .016

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

```
            0     295              66      66      66             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8410

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2309.6      50  2308.5      74    2308      80  2307.5      95    2308
     285    2310

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      50     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     285             133     133     133             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     125     217    2312

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8277

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2308.2      13    2308      50  2307.4      79  2306.5     190    2308
     238    2308     262    2310

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      50     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     262             122     122     122             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     127     213    2311

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8155

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2306.9      48  2306.2      72    2306      83  2305.4     106    2306
     149    2308     187    2308     239    2308     260    2310

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      48     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     260             216     216     216             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     157     179    2311

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 7939

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2304.8      45  2304.1      76    2304      93  2302.2     114    2304
     146    2306     255  2306.7

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      45     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     255             361     361     361             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     148     236    2308

CROSS SECTION
```

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7578

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2301.4	49	2300.8	91	2300	99	2299.9	105	2300
138	2302	350	2304						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	49	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	350	100	100	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
146	287	2304

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7478

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2300.6	38	2300	45	2299.9	48	2300	57	2300
95	2298.9	116	2300	474	2302				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	38	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	474	105	105	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
138	370	2303

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7373

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2299.7	45	2298.8	91	2298	99	2298	143	2300
186	2300.3								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	45	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	186	93	93	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7280

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2298.7	44	2298	54	2297.9	62	2298	123	2298
159	2300								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	54	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	159	264	264	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
160	220	2308

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 7016

INPUT

```
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2296      53  2295.6     170  2295.5     195    2296     270    2298

Manning's n Values        num=       1
     Sta   n Val
       0    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     195              81      81      81             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     250     270    2298       F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6934

INPUT
Description:
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2295.3      45  2294.7      73  2294.6     218    2296

Manning's n Values        num=       1
     Sta   n Val
       0    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     218              119     119     119             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     179     218    2305       F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6815

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2294.8      26    2294      41  2293.6      60    2294     154    2296

Manning's n Values        num=       1
     Sta   n Val
       0    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     154              52      52      52             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6763

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2294.5      14    2294      39  2293.2      46    2292      46 2288.87
      61 2288.87      61    2292      67    2294      77    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      39     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            46      61              72      72      72             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6691

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2294.1       2    2294      39  2292.7      49    2292      55    2290
      60  2288.4      69    2290      69    2292      72    2294      86    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      39     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            49      69              82      82      82             .1       .3
```

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6609

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2293.3	39	2292.1	47	2292	47	2287.91	62	2287.91
62	2292	114	2294	210	2296				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	39	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47	62	74.01	74.01	.1	.3

CULVERT

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6572

INPUT
Description: Culvert 24
Distance from Upstream XS = .1
Deck/Roadway Width = 73.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
47	2292 2290.91	62	2292 2290.91

Upstream Bridge Cross Section Data
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2293.3	39	2292.1	47	2292	47	2287.91	62	2287.91
62	2292	114	2294	210	2296				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	39	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
47	62	.1	.3

Downstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
39 2291.5	2291.5	47 2291.7	2290	47 2291.7	2290.21
62 2292	2290.21	62 2292	2290	63 2292	2292

Downstream Bridge Cross Section Data
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2292.4	10	2292	39	2291.5	47	2290	47	2287.21
62	2287.21	62	2290	63	2292	74	2294	179	2296

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	10	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
47	62	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
72	143	2304	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 2292
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	7

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
.1	73.9	.013	.013	0	.4	1

Number of Barrels = 2
Upstream Elevation = 2287.91
Centerline Stations

Sta.	Sta.
50.5	58.5

Downstream Elevation = 2287.21

Centerline Stations

Sta.	Sta.
50.5	58.5

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

Q Culv Group (cfs)	230.00	Culv Full Len (ft)	73.90
# Barrels	2	Culv Vel US (ft/s)	5.48
Q Barrel (cfs)	115.00	Culv Vel DS (ft/s)	5.48
E.G. US. (ft)	2291.49	Culv Inv El Up (ft)	2287.91
W.S. US. (ft)	2291.14	Culv Inv El Dn (ft)	2287.21
E.G. DS (ft)	2290.98	Culv Frctn Ls (ft)	0.23
W.S. DS (ft)	2290.68	Culv Exit Loss (ft)	0.17
Delta EG (ft)	0.51	Culv Entr Loss (ft)	0.19
Delta WS (ft)	0.46	Q Weir (cfs)	
E.G. IC (ft)	2291.19	Weir Sta Lft (ft)	
E.G. OC (ft)	2291.49	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2290.91	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2290.21	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.03	Min El Weir Flow (ft)	2292.01

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6535

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2292.4	10	2292	39	2291.5	47	2290	47	2287.21
62	2287.21	62	2290	63	2292	74	2294	179	2296

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	10	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47	62	67	67	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
72	143	2304	F

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6468

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2291.7	41	2291	50	2290	56	2288	60	2286.7
71	2288	71	2292	75	2294				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	41	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
50	71	64	64	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6404

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2291.2	46	2290.4	55	2290	55	2286.17	70	2286.17
70	2290	75	2292	85	2294				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	46	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55	70	83.01	83.01	.1	.3

CULVERT

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6362

INPUT
Description: Culvert 25

```
Distance from Upstream XS =       .1
Deck/Roadway Width        =     82.9
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      55    2290 2289.17       70    2290 2289.17

Upstream Bridge Cross Section Data
Station Elevation Data    num=        8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2291.2       46  2290.4       55    2290       55 2286.17       70 2286.17
      70    2290       75    2292       85    2294

Manning's n Values        num=        2
     Sta   n Val      Sta   n Val
       0    .016       46    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            55      70             .1       .3

Downstream  Deck/Roadway Coordinates
    num=        6
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      54  2289.7  2289.7       61  2289.7    2288       61  2289.7 2288.53
      76  2289.7 2288.53       76  2289.7    2288       77  2289.7  2289.7

Downstream Bridge Cross Section Data
Station Elevation Data    num=       12
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2290.5       36    2290       54  2289.7       61    2288       61 2285.53
      76 2285.53        76    2288       77    2290       87  2291.9       92    2290
     409    2290      487    2292

Manning's n Values        num=        2
     Sta   n Val      Sta   n Val
       0    .016       54    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            61      76             .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
      77     487    2292          F
Right Levee     Station=       87      Elevation=  2291.9

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    2290
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        7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length     Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .1    82.9      .013     .013        0                    .4                1
Number of Barrels =  2
Upstream   Elevation =  2286.17
Centerline Stations
    Sta.    Sta.
    58.5    66.5
Downstream Elevation =  2285.53
Centerline Stations
    Sta.    Sta.
    64.5    72.5

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

  Q Culv Group (cfs)         194.44    Culv Full Len (ft)          82.90
  # Barrels                       2    Culv Vel US (ft/s)           4.63
  Q Barrel (cfs)              97.22    Culv Vel DS (ft/s)           4.63
  E.G. US. (ft)             2290.71    Culv Inv El Up (ft)       2286.17
  W.S. US. (ft)             2290.52    Culv Inv El Dn (ft)       2285.53
  E.G. DS (ft)              2290.25    Culv Frctn Ls (ft)           0.13
  W.S. DS (ft)              2290.12    Culv Exit Loss (ft)          0.20
  Delta EG (ft)                0.46    Culv Entr Loss (ft)          0.13
  Delta WS (ft)                0.40    Q Weir (cfs)                35.56
  E.G. IC (ft)              2289.45    Weir Sta Lft (ft)           28.23
  E.G. OC (ft)              2290.71    Weir Sta Rgt (ft)           71.77
  Culvert Control            Outlet    Weir Submerg                 0.11
  Culv WS Inlet (ft)        2289.17    Weir Max Depth (ft)          0.71
  Culv WS Outlet (ft)       2288.53    Weir Avg Depth (ft)          0.43
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)      18.59
  Culv Crt Depth (ft)          1.82    Min El Weir Flow (ft)     2290.01


Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
         The reported inlet energy grade answer may not be valid.
```

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6321

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2290.5	36	2290	54	2289.7	61	2288	61	2285.53
76	2285.53	76	2288	77	2290	87	2291.9	92	2290
409	2290	487	2292						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	54	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
61	76	61	61	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
77	487	2292	F

Right Levee Station= 87 Elevation= 2291.9

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6260

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2290	61	2289.2	74	2288	82	2288	90	2290
95	2291	100	2290	390	2290	574	2292		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	61	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	90	99	99	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100	574	2292	F

Right Levee Station= 95 Elevation= 2291

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6161

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2289.1	60	2288.4	66	2288	77	2287.3	125	2288
135	2288	203	2290	285	2290	435	2290		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	60	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	125	149	149	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
138	435	2290	F

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6012

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2287.9	60	2286.8	82	2286	410	2288

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	60	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	410	204	204	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
140	410	2288	F

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 5808

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2285.8	60	2285.1	77	2284	173	2282.2	232	2284
508	2286	552	2288						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	60	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	552	290	290	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
420	552	2288	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
239	420	2289

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 5518

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2283	58	2282.4	114	2282	215	2282	225	2284
287	2284	348	2282	588	2282	593	2284		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	58	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	593	136	136	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
287	593	2284	F

Right Levee Station= 227 Elevation= 2284
Blocked Obstructions num= 1

Sta L	Sta R	Elev
225	287	2285

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 5382

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2281.5	56	2281	69	2280	71	2278	206	2278
246	2280	428	2281.4	587	2282				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	56	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	587	118	118	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 5264

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2280.5	45	2280	53	2279.8	84	2278	88	2273.01
95	2273.01	210	2278	415	2280	581	2280	588	2282

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	53	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	588	1428.01 1428.01	1428.01	.1	.3

CULVERT

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 4550

INPUT
Description: Culvert 27
Distance from Upstream XS = .1
Deck/Roadway Width = 1427.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
84	2278 2273.01	175 2276.84	2273.01	210	2278 2273.01

Upstream Bridge Cross Section Data
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2280.5	45	2280	53	2279.8	84	2278	88	2273.01
95	2273.01	210	2278	415	2280	581	2280	588	2282

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	53	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	588	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
69	2268 2264.48	80	2268 2264.48

Downstream Bridge Cross Section Data
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2272.1	43	2271.3	61	2270	69	2268	71	2264.48
78	2264.48	80	2268	87	2270	116	2270	223	2272
381	2272	439	2274	446	2274	506	2272	517	2272
598	2274								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	43	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	598	.1	.3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 2276.9
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	7

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
.1	1427.9	.013	.013	0	.5	1

Upstream Elevation = 2273.01
Centerline Station = 91.5
Downstream Elevation = 2264.48
Centerline Station = 74.5

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

Q Culv Group (cfs)	142.38	Culv Full Len (ft)	1092.07
# Barrels	1	Culv Vel US (ft/s)	8.68
Q Barrel (cfs)	142.38	Culv Vel DS (ft/s)	6.78
E.G. US. (ft)	2277.12	Culv Inv El Up (ft)	2273.01
W.S. US. (ft)	2277.11	Culv Inv El Dn (ft)	2264.48
E.G. DS (ft)	2270.44	Culv Frctn Ls (ft)	5.41
W.S. DS (ft)	2270.40	Culv Exit Loss (ft)	0.68
Delta EG (ft)	6.68	Culv Entr Loss (ft)	0.59
Delta WS (ft)	6.71	Q Weir (cfs)	3.62
E.G. IC (ft)	2277.12	Weir Sta Lft (ft)	154.18
E.G. OC (ft)	2277.11	Weir Sta Rgt (ft)	183.01
Culvert Control	Inlet	Weir Submerg	0.00
Culv WS Inlet (ft)	2275.35	Weir Max Depth (ft)	0.27
Culv WS Outlet (ft)	2267.48	Weir Avg Depth (ft)	0.13
Culv Nml Depth (ft)	1.97	Weir Flow Area (sq ft)	3.83
Culv Crt Depth (ft)	2.34	Min El Weir Flow (ft)	2276.90

Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3836

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2272.1	43	2271.3	61	2270	69	2268	71	2264.48
78	2264.48	80	2268	87	2270	116	2270	223	2272
381	2272	439	2274	446	2274	506	2272	517	2272
598	2274								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	43	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	598	80	80	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3756

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2271.7	44	2270.9	65	2270	85	2268	159	2270
171	2272	232	2272	241	2274	382	2274	442	2272
471	2272	572	2274						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	44	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	572	90	90	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3666

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2271.3	46	2270.5	59	2270	130	2269.5	183	2270
202	2272	353	2272	390	2274	415	2272	447	2272
496	2274	508	2272	521	2272	530	2274		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	46	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	530	187	187	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3479

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2270.5	29	2270	54	2269.8	126	2268	150	2268
190	2270	212	2272	245	2272	256	2270	294	2270
333	2272	341	2270	399	2270	479	2270.3	685	2272

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	54	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	685	334	334	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RANCHO ROAD

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
95 TO GOWAN	13266	.03	.016							
95 TO GOWAN	13036	.03	.016							
95 TO GOWAN	12852	.025	.016							
95 TO GOWAN	12677	.016	.025	.016						
95 TO GOWAN	12430	.025	.016							

95 TO GOWAN	12355	.025	.016							
95 TO GOWAN	12295	.025	.016							
95 TO GOWAN	12280	.03	.016							
95 TO GOWAN	12264	.025	.016							
95 TO GOWAN	12145	.025	.016							
95 TO GOWAN	12111	.025	.015							
95 TO GOWAN	12036	Culvert								
95 TO GOWAN	11961	.016	.025							
95 TO GOWAN	11897	.016	.025	.016						
95 TO GOWAN	11748	.016	.025	.016						
95 TO GOWAN	11683	.016	.025	.016						
95 TO GOWAN	11653	.015	.025	.015						
95 TO GOWAN	11621	Culvert								
95 TO GOWAN	11590	.015	.025	.015						
95 TO GOWAN	11538	.016	.025	.016						
95 TO GOWAN	11438	.016	.025	.016						
95 TO GOWAN	11167	.016	.025	.016						
95 TO GOWAN	10946	.016	.025	.015						
95 TO GOWAN	10807	.016	.025	.013	.016	.013				
95 TO GOWAN	10758	.015	.025	.013	.016	.013				
95 TO GOWAN	10667	Culvert								
95 TO GOWAN	10575	.015	.03	.015	.03					
95 TO GOWAN	10547	.015	.03							
95 TO GOWAN	10518	.015	.03	.015	.03					
95 TO GOWAN	10485	Culvert								
95 TO GOWAN	10450	.015	.03	.015	.03					
95 TO GOWAN	10399	.016	.03							
95 TO GOWAN	10295	.016	.03							
95 TO GOWAN	10075	.016	.03							
95 TO GOWAN	9918	.016	.03							
95 TO GOWAN	9796	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9566	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9539	Culvert								
95 TO GOWAN	9512	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9472	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9376	.016	.013	.03	.016	.013	.016	.03	.013	
95 TO GOWAN	9324	.016	.03	.016						
95 TO GOWAN	9205	.016	.03	.016						
95 TO GOWAN	9114	.016	.03							
95 TO GOWAN	9060	.016	.03							
95 TO GOWAN	8950	.016	.03	.016	.013	.016	.013	.016	.035	
95 TO GOWAN	8862	.025	.013	.016	.013	.035				
95 TO GOWAN	8832	.025	.013	.016	.013	.035	.013	.035		
95 TO GOWAN	8802	.025	.013	.016	.013	.035	.013	.035		
95 TO GOWAN	8744	.025	.013	.016	.013	.035	.013	.035		
95 TO GOWAN	8668	.025	.013	.016	.013	.035	.013	.035		
95 TO GOWAN	8616	.016	.013	.03	.013	.03	.013	.016	.013	
95 TO GOWAN	8586	.016	.013	.03	.013	.03	.013	.016	.013	
95 TO GOWAN	8566	.016	.013	.03	.013	.03	.013	.016	.013	.03
95 TO GOWAN	8533	Culvert								
95 TO GOWAN	8506	.016	.013	.03	.013	.03				
95 TO GOWAN	8476	.016	.013	.03	.013	.03	.016			
95 TO GOWAN	8410	.016	.03							
95 TO GOWAN	8277	.016	.03							
95 TO GOWAN	8155	.016	.03							
95 TO GOWAN	7939	.016	.03							
95 TO GOWAN	7578	.016	.03							
95 TO GOWAN	7478	.016	.03							
95 TO GOWAN	7373	.016	.03							
95 TO GOWAN	7280	.016	.03							
95 TO GOWAN	7016	.016								
95 TO GOWAN	6934	.016								
95 TO GOWAN	6815	.016								
95 TO GOWAN	6763	.016	.03							
95 TO GOWAN	6691	.016	.03							
95 TO GOWAN	6609	.016	.03							
95 TO GOWAN	6572	Culvert								
95 TO GOWAN	6535	.016	.03							
95 TO GOWAN	6468	.016	.03							
95 TO GOWAN	6404	.016	.03							
95 TO GOWAN	6362	Culvert								
95 TO GOWAN	6321	.016	.03							
95 TO GOWAN	6260	.016	.03							
95 TO GOWAN	6161	.016	.03							
95 TO GOWAN	6012	.016	.03							
95 TO GOWAN	5808	.016	.03							
95 TO GOWAN	5518	.016	.03							
95 TO GOWAN	5382	.016	.03							
95 TO GOWAN	5264	.016	.03							
95 TO GOWAN	4550	Culvert								
95 TO GOWAN	3836	.016	.03							
95 TO GOWAN	3756	.016	.03							
95 TO GOWAN	3666	.016	.03							
95 TO GOWAN	3479	.016	.03							

SUMMARY OF REACH LENGTHS

River: RANCHO ROAD

Reach	River Sta.	Left	Channel	Right
95 TO GOWAN	13266	275	230	.001

95 TO GOWAN	13036	229	184	.001
95 TO GOWAN	12852	175	175	175
95 TO GOWAN	12677	247	247	247
95 TO GOWAN	12430	75	75	75
95 TO GOWAN	12355	60	60	60
95 TO GOWAN	12295	15	15	15
95 TO GOWAN	12280	16	16	16
95 TO GOWAN	12264	119	119	119
95 TO GOWAN	12145	34	34	34
95 TO GOWAN	12111	150.01	150.01	150.01
95 TO GOWAN	12036	Culvert		
95 TO GOWAN	11961	64	64	64
95 TO GOWAN	11897	149	149	149
95 TO GOWAN	11748	65	65	65
95 TO GOWAN	11683	30	30	30
95 TO GOWAN	11653	63.01	63.01	63.01
95 TO GOWAN	11621	Culvert		
95 TO GOWAN	11590	52	52	52
95 TO GOWAN	11538	100	100	100
95 TO GOWAN	11438	271	271	271
95 TO GOWAN	11167	221	221	221
95 TO GOWAN	10946	139	139	139
95 TO GOWAN	10807	49	49	49
95 TO GOWAN	10758	183.01	183.01	183.01
95 TO GOWAN	10667	Culvert		
95 TO GOWAN	10575	28	28	28
95 TO GOWAN	10547	29	29	29
95 TO GOWAN	10518	68.01	68.01	68.01
95 TO GOWAN	10485	Culvert		
95 TO GOWAN	10450	51	51	51
95 TO GOWAN	10399	104	104	104
95 TO GOWAN	10295	265	220	188
95 TO GOWAN	10075	164	157	148
95 TO GOWAN	9918	122	122	122
95 TO GOWAN	9796	230	230	230
95 TO GOWAN	9566	54	54	54
95 TO GOWAN	9539	Culvert		
95 TO GOWAN	9512	40	40	40
95 TO GOWAN	9472	96	96	96
95 TO GOWAN	9376	52	52	52
95 TO GOWAN	9324	119	119	119
95 TO GOWAN	9205	91	91	91
95 TO GOWAN	9114	54	54	54
95 TO GOWAN	9060	110	110	110
95 TO GOWAN	8950	88	88	88
95 TO GOWAN	8862	30	30	30
95 TO GOWAN	8832	30	30	30
95 TO GOWAN	8802	58	58	58
95 TO GOWAN	8744	76	76	76
95 TO GOWAN	8668	52	52	52
95 TO GOWAN	8616	30	30	31
95 TO GOWAN	8586	20	20	20
95 TO GOWAN	8566	60	60	60
95 TO GOWAN	8533	Culvert		
95 TO GOWAN	8506	30	30	45
95 TO GOWAN	8476	66	66	66
95 TO GOWAN	8410	133	133	133
95 TO GOWAN	8277	122	122	122
95 TO GOWAN	8155	216	216	216
95 TO GOWAN	7939	361	361	361
95 TO GOWAN	7578	100	100	100
95 TO GOWAN	7478	105	105	105
95 TO GOWAN	7373	93	93	93
95 TO GOWAN	7280	264	264	264
95 TO GOWAN	7016	81	81	81
95 TO GOWAN	6934	119	119	119
95 TO GOWAN	6815	52	52	52
95 TO GOWAN	6763	72	72	72
95 TO GOWAN	6691	82	82	82
95 TO GOWAN	6609	74.01	74.01	74.01
95 TO GOWAN	6572	Culvert		
95 TO GOWAN	6535	67	67	67
95 TO GOWAN	6468	64	64	64
95 TO GOWAN	6404	83.01	83.01	83.01
95 TO GOWAN	6362	Culvert		
95 TO GOWAN	6321	61	61	61
95 TO GOWAN	6260	99	99	99
95 TO GOWAN	6161	149	149	149
95 TO GOWAN	6012	204	204	204
95 TO GOWAN	5808	290	290	290
95 TO GOWAN	5518	136	136	136
95 TO GOWAN	5382	118	118	118
95 TO GOWAN	5264	1428.01	1428.01	1428.01
95 TO GOWAN	4550	Culvert		
95 TO GOWAN	3836	80	80	80
95 TO GOWAN	3756	90	90	90
95 TO GOWAN	3666	187	187	187
95 TO GOWAN	3479	334	334	334

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RANCHO ROAD

Reach	River Sta.	Contr.	Expan.
95 TO GOWAN	13266	.1	.3
95 TO GOWAN	13036	.1	.3
95 TO GOWAN	12852	.1	.3
95 TO GOWAN	12677	.1	.3
95 TO GOWAN	12430	.1	.3
95 TO GOWAN	12355	.1	.3
95 TO GOWAN	12295	.1	.3
95 TO GOWAN	12280	.1	.3
95 TO GOWAN	12264	.1	.3
95 TO GOWAN	12145	.1	.3
95 TO GOWAN	12111	.1	.3
95 TO GOWAN	12036	Culvert	
95 TO GOWAN	11961	.1	.3
95 TO GOWAN	11897	.1	.3
95 TO GOWAN	11748	.1	.3
95 TO GOWAN	11683	.1	.3
95 TO GOWAN	11653	.1	.3
95 TO GOWAN	11621	Culvert	
95 TO GOWAN	11590	.1	.3
95 TO GOWAN	11538	.1	.3
95 TO GOWAN	11438	.1	.3
95 TO GOWAN	11167	.1	.3
95 TO GOWAN	10946	.1	.3
95 TO GOWAN	10807	.1	.3
95 TO GOWAN	10758	.1	.3
95 TO GOWAN	10667	Culvert	
95 TO GOWAN	10575	.1	.3
95 TO GOWAN	10547	.1	.3
95 TO GOWAN	10518	.1	.3
95 TO GOWAN	10485	Culvert	
95 TO GOWAN	10450	.1	.3
95 TO GOWAN	10399	.1	.3
95 TO GOWAN	10295	.1	.3
95 TO GOWAN	10075	.1	.3
95 TO GOWAN	9918	.1	.3
95 TO GOWAN	9796	.1	.3
95 TO GOWAN	9566	.1	.3
95 TO GOWAN	9539	Culvert	
95 TO GOWAN	9512	.1	.3
95 TO GOWAN	9472	.1	.3
95 TO GOWAN	9376	.1	.3
95 TO GOWAN	9324	.1	.3
95 TO GOWAN	9205	.1	.3
95 TO GOWAN	9114	.1	.3
95 TO GOWAN	9060	.1	.3
95 TO GOWAN	8950	.1	.3
95 TO GOWAN	8862	.1	.3
95 TO GOWAN	8832	.1	.3
95 TO GOWAN	8802	.1	.3
95 TO GOWAN	8744	.1	.3
95 TO GOWAN	8668	.1	.3
95 TO GOWAN	8616	.1	.3
95 TO GOWAN	8586	.1	.3
95 TO GOWAN	8566	.1	.3
95 TO GOWAN	8533	Culvert	
95 TO GOWAN	8506	.1	.3
95 TO GOWAN	8476	.1	.3
95 TO GOWAN	8410	.1	.3
95 TO GOWAN	8277	.1	.3
95 TO GOWAN	8155	.1	.3
95 TO GOWAN	7939	.1	.3
95 TO GOWAN	7578	.1	.3
95 TO GOWAN	7478	.1	.3
95 TO GOWAN	7373	.1	.3
95 TO GOWAN	7280	.1	.3
95 TO GOWAN	7016	.1	.3
95 TO GOWAN	6934	.1	.3
95 TO GOWAN	6815	.1	.3
95 TO GOWAN	6763	.1	.3
95 TO GOWAN	6691	.1	.3
95 TO GOWAN	6609	.1	.3
95 TO GOWAN	6572	Culvert	
95 TO GOWAN	6535	.1	.3
95 TO GOWAN	6468	.1	.3
95 TO GOWAN	6404	.1	.3
95 TO GOWAN	6362	Culvert	
95 TO GOWAN	6321	.1	.3
95 TO GOWAN	6260	.1	.3
95 TO GOWAN	6161	.1	.3
95 TO GOWAN	6012	.1	.3
95 TO GOWAN	5808	.1	.3
95 TO GOWAN	5518	.1	.3
95 TO GOWAN	5382	.1	.3
95 TO GOWAN	5264	.1	.3
95 TO GOWAN	4550	Culvert	
95 TO GOWAN	3836	.1	.3
95 TO GOWAN	3756	.1	.3
95 TO GOWAN	3666	.1	.3
95 TO GOWAN	3479	.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : EX

River: RANCHO ROAD Reach: 95 TO GOWAN RS: 13266 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 13036 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12852 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12677 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12430 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12295 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12145 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11897 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11683 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11590 Profile: PF#1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11438 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11167 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10946 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10807 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10667 Profile: PF#1 Culv: Culvert #1
Warning:During the culvert inlet computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10575 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10547 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10518 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10450 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10399 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10295 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10075 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9918 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9796 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9566 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9539 Profile: PF#1 Culv: Culvert #1
Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9512 Profile: PF#1
Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9472 Profile: PF#1
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9376 Profile: PF#1
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9324 Profile: PF#1
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9205 Profile: PF#1
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9114 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9060 Profile: PF#1
Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8950 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8862 Profile: PF#1
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8832 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8802 Profile: PF#1
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8744 Profile: PF#1
Warning: Divided flow computed for this cross-section.

```
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8668     Profile: PF#1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8616     Profile: PF#1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical
depth
             for the water surface and continued on with the calculations.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8586     Profile: PF#1
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross
sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8566     Profile: PF#1
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8533     Profile: PF#1     Culv: Culvert #1
     Note:   The normal depth exceeds the height of the culvert.  The program assumes that the normal depth is equal to the
height
             of the culvert.
     Note:   Culvert critical depth exceeds the height of the culvert.
     Note:   During the supercritical calculations a hydraulic jump occurred inside of the culvert.
     Note:   The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore, the culvert
             inlet equations are not valid and the supercritical result has been discarded.  The outlet answer will be used.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8506     Profile: PF#1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the
water
             surface that had the least amount of error between computed and assumed values.
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8476     Profile: PF#1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8410     Profile: PF#1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 8155     Profile: PF#1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 7939     Profile: PF#1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 7578     Profile: PF#1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 7478     Profile: PF#1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the
water
             surface that had the least amount of error between computed and assumed values.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 7373     Profile: PF#1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 7280     Profile: PF#1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical
depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 7016     Profile: PF#1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 6934     Profile: PF#1
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RANCHO ROAD  Reach: 95 TO GOWAN     RS: 6815     Profile: PF#1
```

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6763 Profile: PF#1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6691 Profile: PF#1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6535 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6362 Profile: PF#1 Culv: Culvert #1
Warning:During the culvert inlet computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6321 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6260 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6161 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6012 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5808 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5518 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5382 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5264 Profile: PF#1
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 4550 Profile: PF#1 Culv: Culvert #1

Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

River: RANCHO ROAD Reach: 95 TO GOWAN RS: 3836 Profile: PF#1

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

River: RANCHO ROAD Reach: 95 TO GOWAN RS: 3756 Profile: PF#1

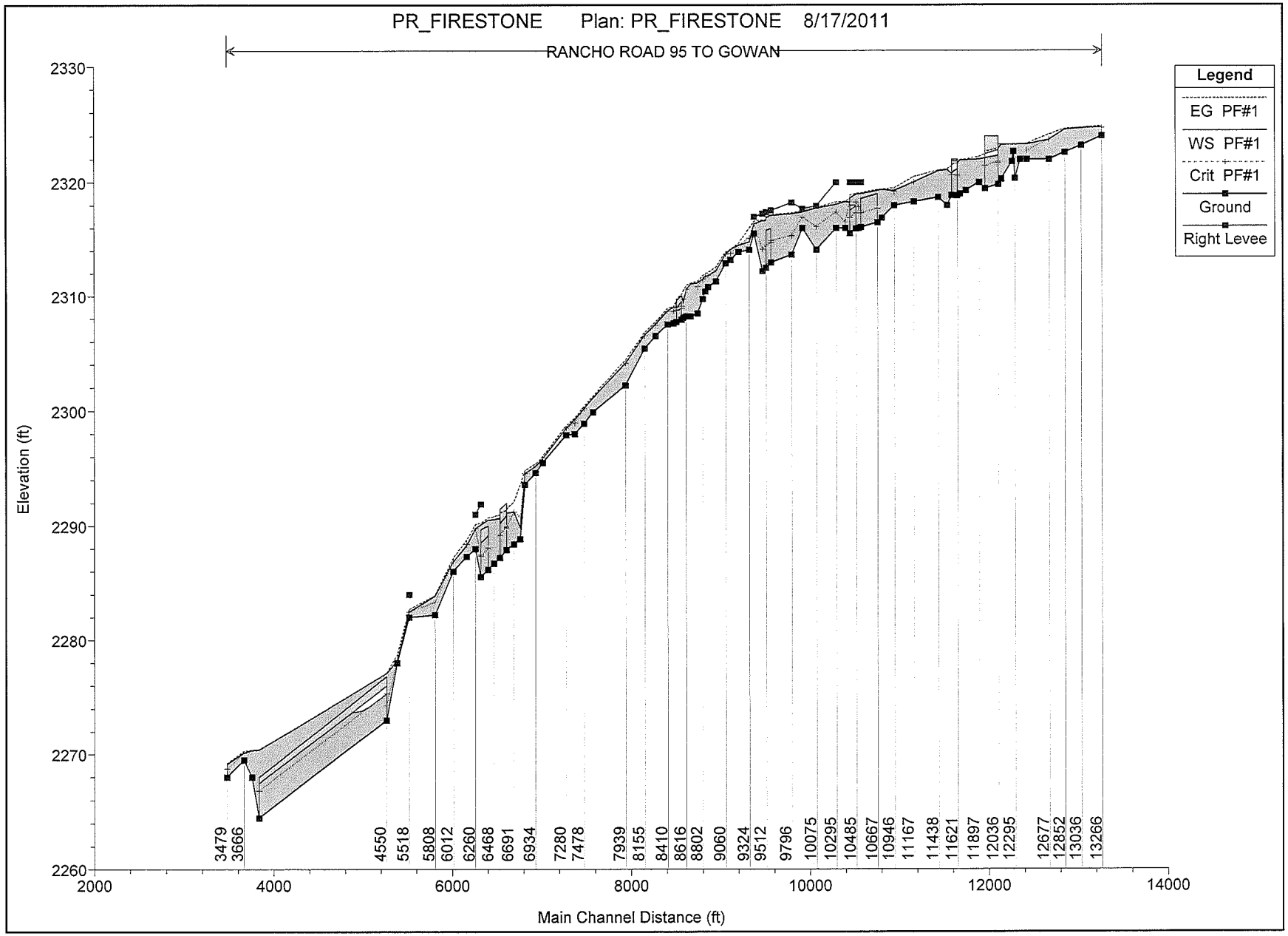
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

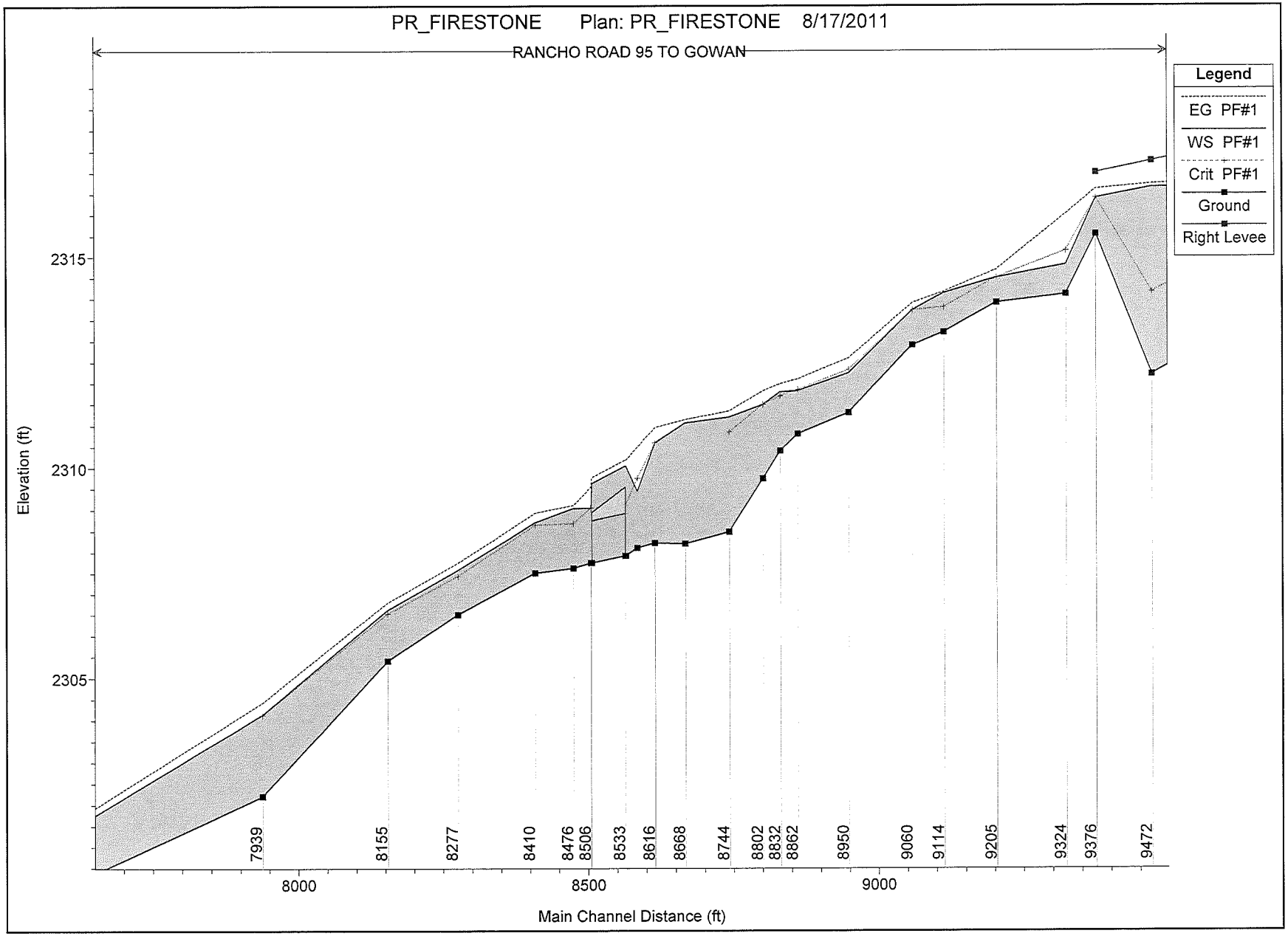
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 3666 Profile: PF#1

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

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

Proposed Condition Model


PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
RANCHO ROAD 95 TO GOWAN
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Right Levee
Elevation (ft)
2330
2320
2310
2300
2290
2280
2270
2260
2000
4000
6000
8000
10000
12000
14000
Main Channel Distance (ft)
3479
3666
4550
5518
5808
6012
6260
6468
6691
6934
7280
7478
7939
8155
8410
8616
8802
9060
9324
9512
9796
10075
10295
10485
10667
10946
11167
11438
11621
11897
12036
12295
12677
12852
13036
13266

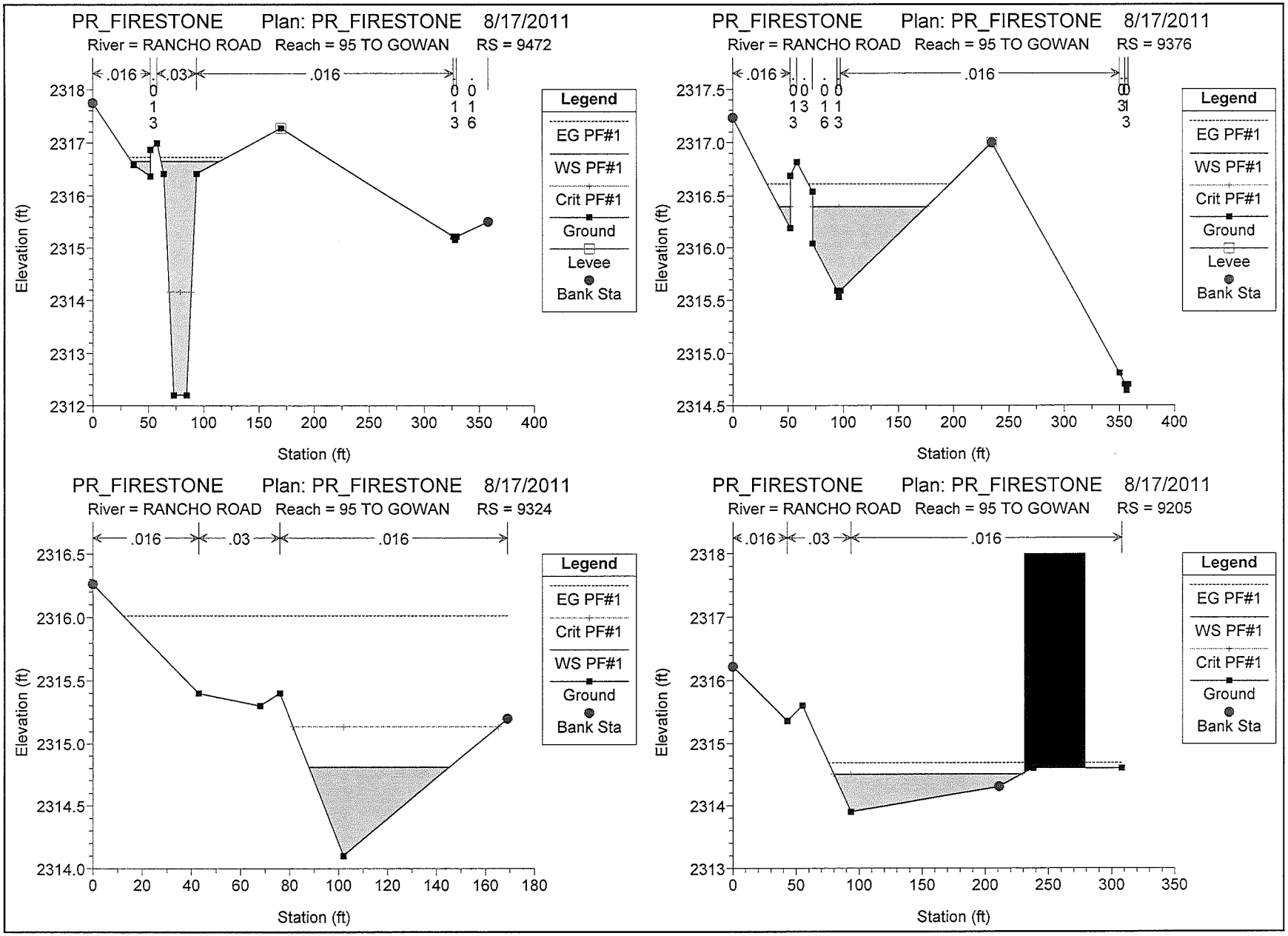

PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
RANCHO ROAD 95 TO GOWAN
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Right Levee
Elevation (ft)
2315
2310
2305
7939
8155
8277
8410
8476
8506
8533
8616
8668
8744
8802
8832
8862
8950
9060
9114
9205
9324
9376
9472
8000
8500
9000
Main Channel Distance (ft)

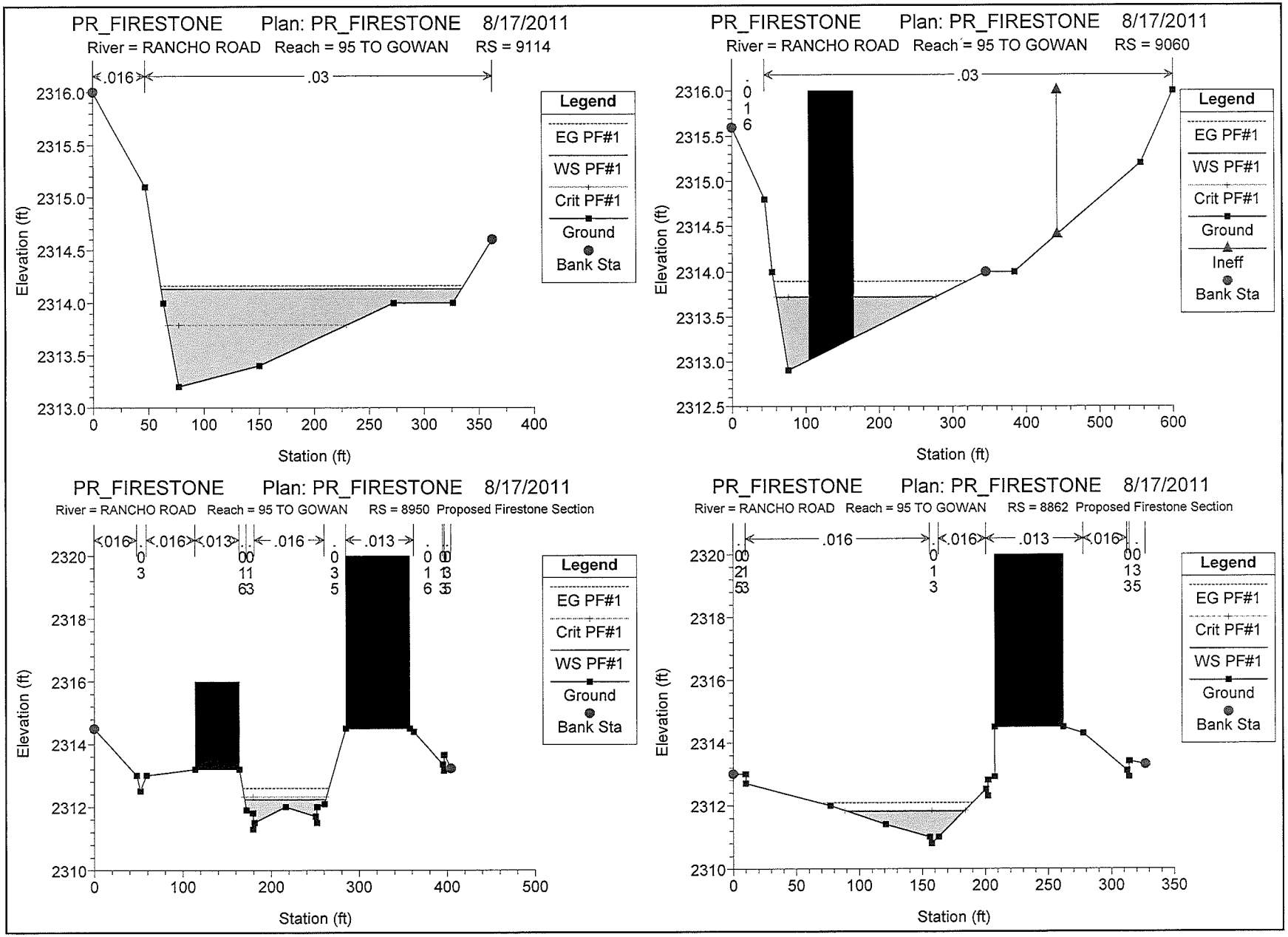
HEC-RAS Plan: PR River: RANCHO ROAD Reach: 95 TO GOWAN Profile: PF#1

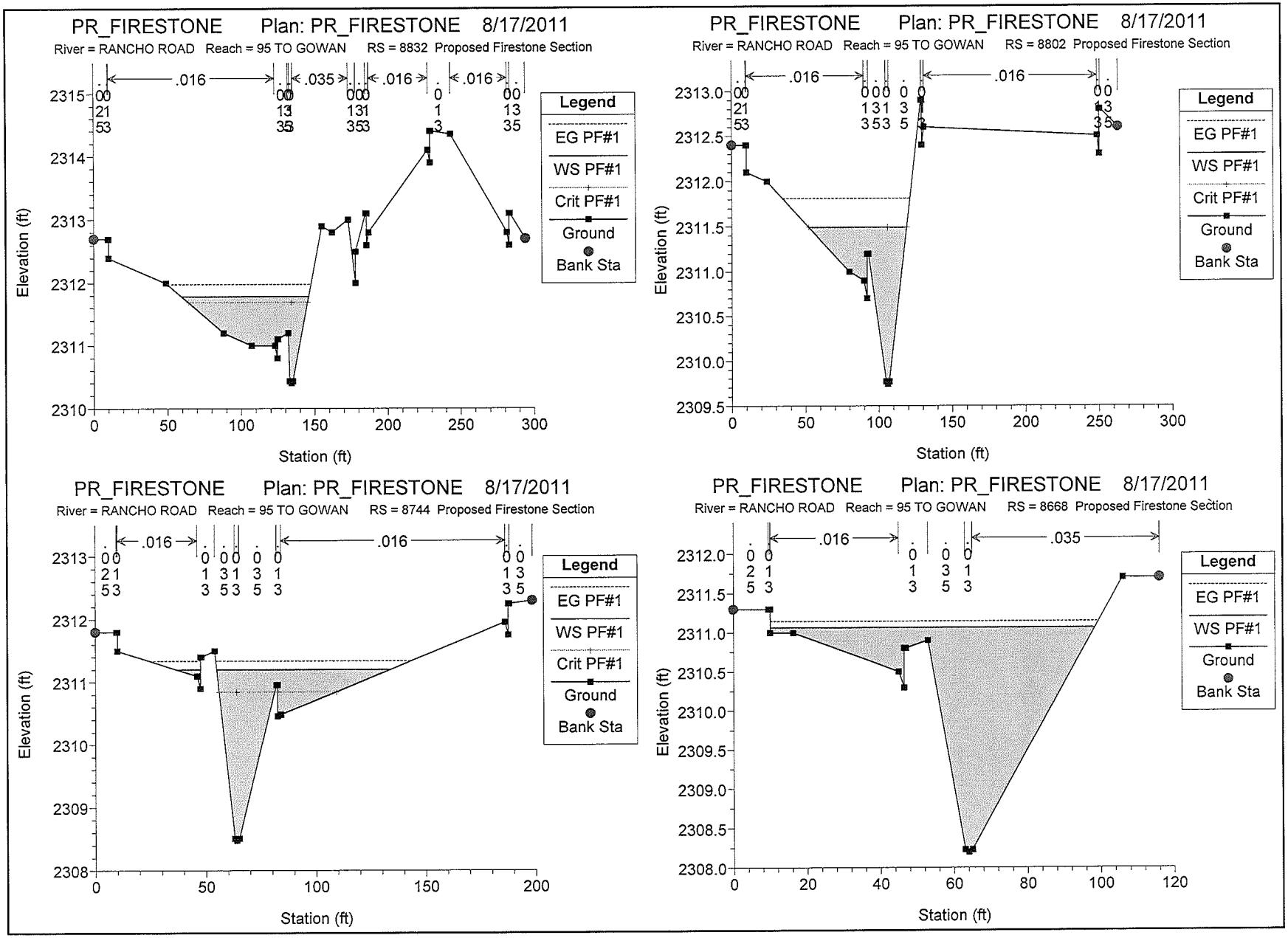
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Sta W.S. Lft	Sta W.S. Rgt
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)
95 TO GOWAN	13266	PF#1	192.00	2324.00	2324.78	2324.70	2324.89	0.006439	2.65	74.89	209.13	0.63	62.85	271.97
95 TO GOWAN	13036	PF#1	192.00	2323.20	2324.68		2324.70	0.000481	1.09	166.31	261.28	0.19	37.52	298.80
95 TO GOWAN	12852	PF#1	192.00	2322.60	2324.57		2324.63	0.001184	2.20	102.35	182.17	0.37	19.27	201.44
95 TO GOWAN	12677	PF#1	192.00	2322.00	2323.70	2323.70	2324.14	0.009989	5.32	36.11	42.49	1.02	40.40	82.90
95 TO GOWAN	12430	PF#1	192.00	2322.00	2323.33	2322.76	2323.37	0.000623	1.63	121.67	161.76	0.27	6.05	167.81
95 TO GOWAN	12355	PF#1	192.00	2322.00	2323.32		2323.33	0.000256	1.08	201.74	347.83	0.17	3.76	351.59
95 TO GOWAN	12295	PF#1	155.00	2320.35	2323.31		2323.32	0.000082	0.79	227.06	267.79	0.10	0.69	268.48
95 TO GOWAN	12280	PF#1	155.00	2322.68	2323.30		2323.32	0.000301	0.51	147.60	245.50	0.13	4.13	249.63
95 TO GOWAN	12264	PF#1	155.00	2321.80	2323.30		2323.31	0.000153	0.85	179.26	226.97	0.13	2.80	229.77
95 TO GOWAN	12145	PF#1	190.00	2320.30	2323.28		2323.30	0.000117	1.02	206.30	182.38	0.13	2.87	185.26
95 TO GOWAN	12111	PF#1	190.00	2319.81	2322.91	2321.69	2323.25	0.002352	4.72	40.24	13.00	0.47	19.00	32.00
95 TO GOWAN	12036		Culvert											
95 TO GOWAN	11961	PF#1	161.00	2319.46	2322.12		2322.46	0.002629	4.66	34.59	13.00	0.50	62.00	75.00
95 TO GOWAN	11897	PF#1	161.00	2320.00	2322.02		2322.22	0.003555	3.58	45.02	46.00	0.62	47.84	93.84
95 TO GOWAN	11748	PF#1	161.00	2319.30	2321.96		2322.02	0.000515	1.87	86.13	52.50	0.26	51.24	103.74
95 TO GOWAN	11683	PF#1	161.00	2319.00	2321.94		2321.99	0.000373	1.64	98.22	57.18	0.22	54.40	111.57
95 TO GOWAN	11653	PF#1	161.00	2318.84	2321.63	2320.52	2321.94	0.002287	4.44	36.26	13.00	0.47	75.00	88.00
95 TO GOWAN	11621		Culvert											
95 TO GOWAN	11590	PF#1	161.00	2318.86	2320.75		2321.42	0.007334	6.56	24.54	13.00	0.84	75.00	88.00
95 TO GOWAN	11538	PF#1	161.00	2318.00	2321.10		2321.15	0.000691	1.85	91.31	97.77	0.29	62.97	160.74
95 TO GOWAN	11438	PF#1	161.00	2318.70	2321.01		2321.07	0.000870	2.17	82.09	105.12	0.32	59.98	165.10
95 TO GOWAN	11167	PF#1	161.00	2318.30	2320.05	2320.05	2320.48	0.009349	5.27	30.60	37.32	0.99	72.42	109.74
95 TO GOWAN	10946	PF#1	161.00	2318.00	2319.30	2319.20	2319.51	0.001961	4.12	46.50	73.20	0.76	77.64	150.84
95 TO GOWAN	10807	PF#1	169.00	2316.90	2319.39		2319.41	0.000143	1.00	201.09	195.85	0.14	74.43	270.28
95 TO GOWAN	10758	PF#1	169.00	2316.50	2319.30	2317.69	2319.39	0.000544	2.38	79.58	73.41	0.25	74.00	183.48
95 TO GOWAN	10667		Culvert											
95 TO GOWAN	10575	PF#1	169.00	2316.09	2319.01	2317.54	2319.09	0.000346	2.21	76.38	70.11	0.37	76.88	146.99
95 TO GOWAN	10547	PF#1	169.00	2316.00	2319.01	2317.88	2319.06	0.001134	1.95	86.64	67.73	0.30	70.90	138.64
95 TO GOWAN	10518	PF#1	169.00	2315.96	2318.97	2318.27	2319.03	0.001287	1.98	85.24	75.75	0.33	70.74	146.49
95 TO GOWAN	10485		Culvert											
95 TO GOWAN	10450	PF#1	169.00	2315.54	2318.28	2318.28	2318.57	0.013946	4.37	38.63	62.65	0.98	75.79	138.45
95 TO GOWAN	10399	PF#1	169.00	2316.00	2318.33	2316.54	2318.34	0.000112	0.89	190.82	233.22	0.11	69.59	302.81
95 TO GOWAN	10295	PF#1	169.00	2316.00	2318.10	2317.41	2318.29	0.003025	3.52	48.07	32.19	0.51	74.60	106.79
95 TO GOWAN	10075	PF#1	169.00	2314.10	2317.78	2316.13	2317.82	0.001364	1.60	105.38	127.56	0.31	24.59	152.15
95 TO GOWAN	9918	PF#1	169.00	2316.00	2317.41	2316.96	2317.50	0.002998	2.50	67.48	75.94	0.47	75.75	151.69
95 TO GOWAN	9796	PF#1	169.00	2313.67	2317.26	2315.35	2317.35	0.000692	2.33	72.53	28.88	0.26	64.31	93.19
95 TO GOWAN	9566	PF#1	215.00	2312.98	2317.13	2314.91	2317.19	0.000596	2.05	104.77	95.94	0.35	28.67	132.10
95 TO GOWAN	9539		Culvert											
95 TO GOWAN	9512	PF#1	215.00	2312.50	2316.67	2314.44	2316.76	0.000675	2.43	88.52	54.58	0.34	39.83	105.06
95 TO GOWAN	9472	PF#1	215.00	2312.20	2316.66	2314.16	2316.73	0.000535	2.17	99.10	70.58	0.32	34.82	114.90
95 TO GOWAN	9376	PF#1	180.00	2315.53	2316.40	2316.40	2316.61	0.004397	3.73	48.25	114.18	1.01	41.67	175.86
95 TO GOWAN	9324	PF#1	180.00	2314.10	2314.81	2315.14	2316.01	0.035628	8.80	20.46	57.55	2.60	87.77	145.32
95 TO GOWAN	9205	PF#1	180.00	2313.90	2314.50	2314.50	2314.69	0.005060	3.44	53.35	149.45	0.97	79.84	229.29
95 TO GOWAN	9114	PF#1	180.00	2313.20	2314.14	2313.79	2314.17	0.002126	1.39	129.57	273.08	0.36	61.03	334.11
95 TO GOWAN	9060	PF#1	180.00	2312.90	2313.72	2313.72	2313.90	0.018935	3.33	54.01	156.76	1.00	59.54	277.30
95 TO GOWAN	8950	PF#1	180.00	2311.30	2312.24	2312.31	2312.59	0.008019	4.75	37.92	92.02	1.30	169.91	261.93
95 TO GOWAN	8862	PF#1	180.00	2310.80	2311.82	2311.84	2312.09	0.004853	4.22	42.66	92.92	1.10	90.48	183.40

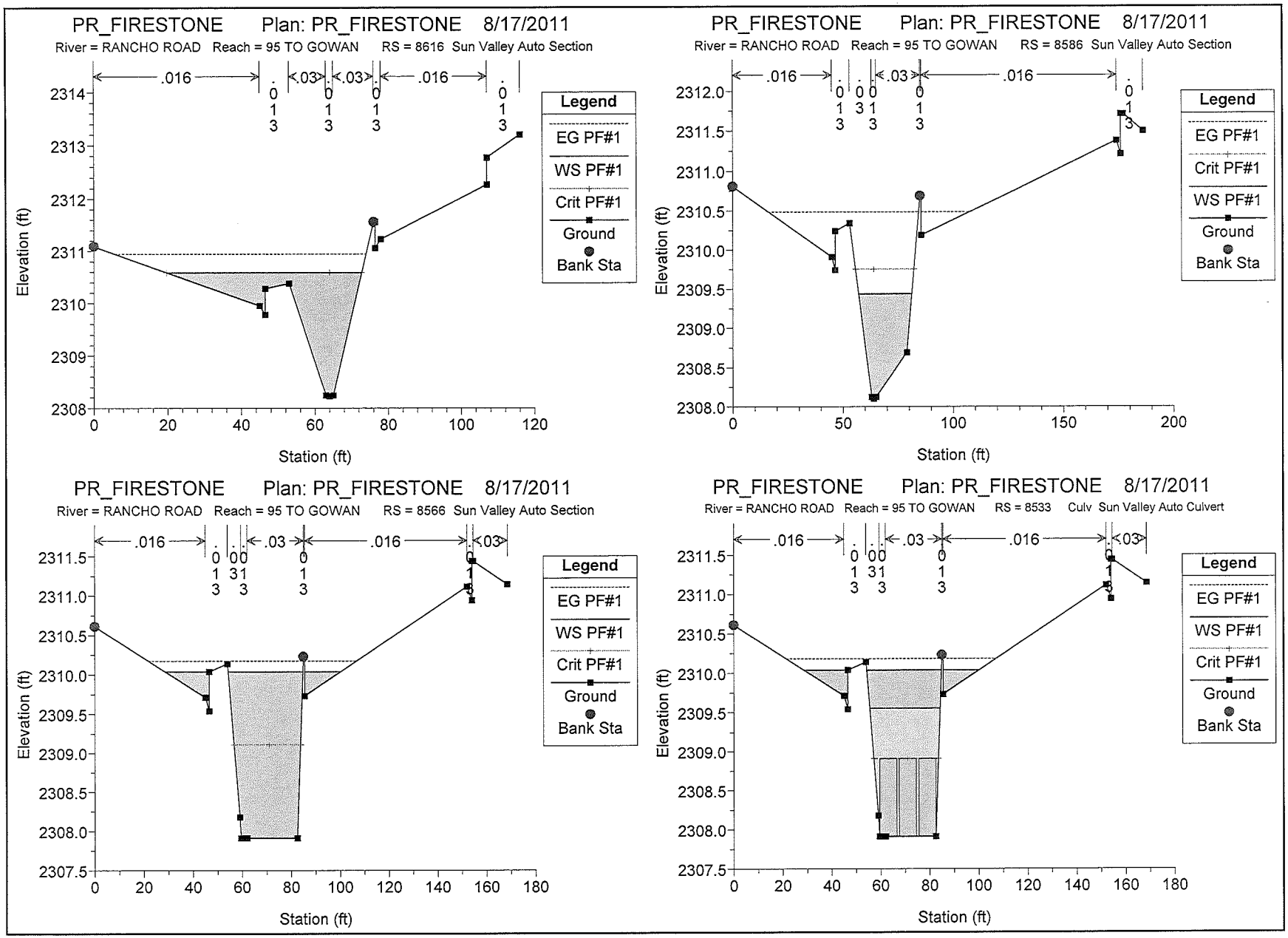
HEC-RAS Plan: PR River: RANCHO ROAD Reach: 95 TO GOWAN Profile: PF#1 (Continued)

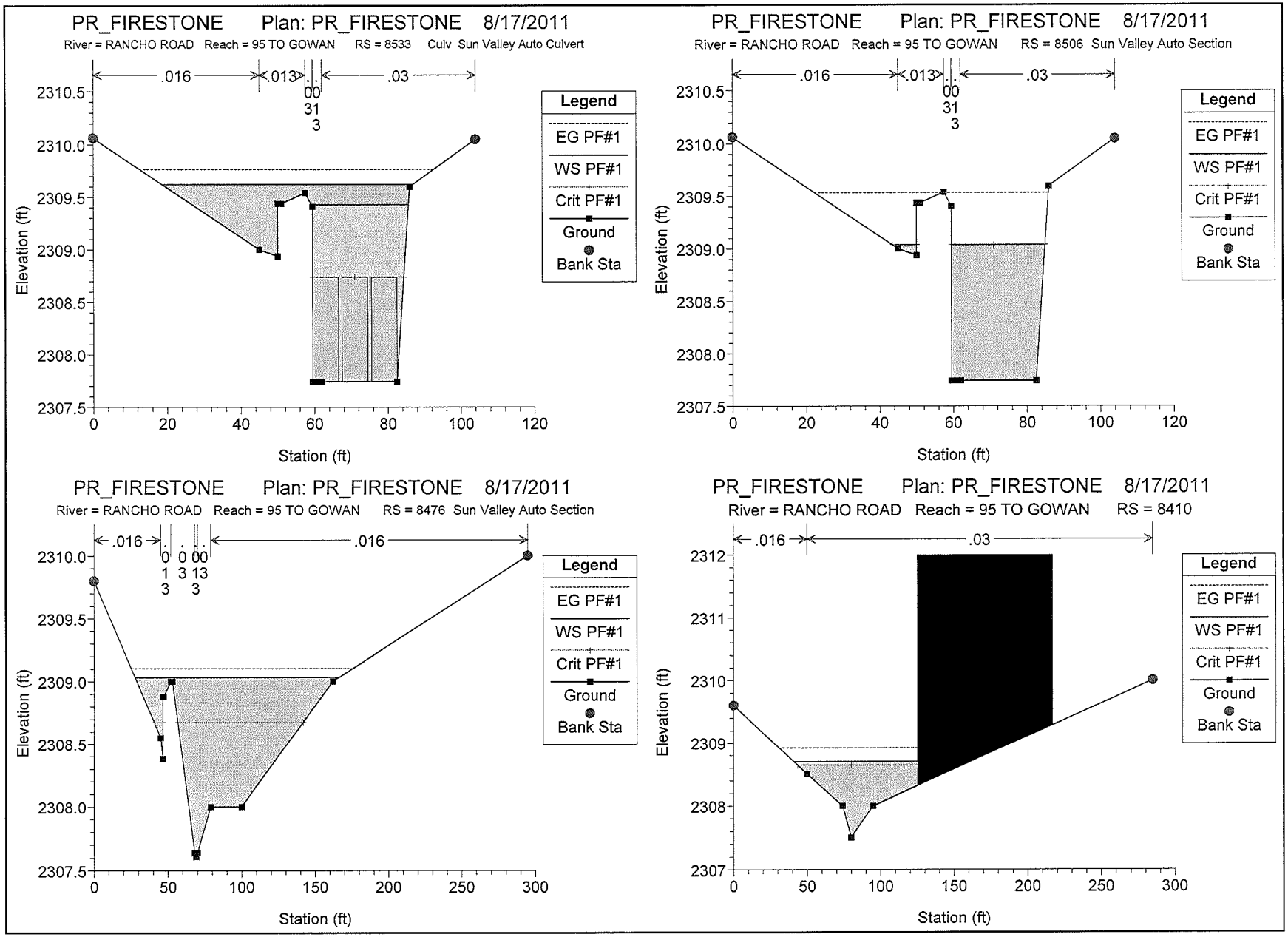
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Sta W.S. Lft	Sta W.S. Rgt
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)
95 TO GOWAN	8832	PF#1	180.00	2310.40	2311.79	2311.69	2311.98	0.003991	3.50	51.49	86.69	0.80	59.31	146.00
95 TO GOWAN	8802	PF#1	180.00	2309.74	2311.49	2311.49	2311.81	0.007106	4.52	39.83	66.64	1.03	52.46	119.10
95 TO GOWAN	8744	PF#1	180.00	2308.48	2311.20	2310.85	2311.34	0.003186	2.93	61.50	90.18	0.62	36.66	134.23
95 TO GOWAN	8668	PF#1	180.00	2308.20	2311.06		2311.14	0.001801	2.25	79.92	88.48	0.42	10.00	98.48
95 TO GOWAN	8616	PF#1	180.00	2308.22	2310.59	2310.59	2310.95	0.007305	4.79	37.58	53.08	1.00	19.71	72.79
95 TO GOWAN	8586	PF#1	180.00	2308.10	2309.44	2309.75	2310.49	0.029378	8.21	21.92	24.20	1.52	57.05	81.25
95 TO GOWAN	8566	PF#1	180.00	2307.91	2310.04	2309.11	2310.17	0.001849	2.94	62.56	63.61	0.47	28.46	100.48
95 TO GOWAN	8533		Culvert											
95 TO GOWAN	8506	PF#1	180.00	2307.74	2309.04	2309.04	2309.54	0.010194	5.66	31.81	32.06	1.00	43.38	84.94
95 TO GOWAN	8476	PF#1	180.00	2307.61	2309.04	2308.67	2309.10	0.001122	2.12	85.10	139.06	0.48	27.55	166.61
95 TO GOWAN	8410	PF#1	180.00	2307.50	2308.70	2308.64	2308.92	0.010767	3.73	48.23	84.25	0.87	40.75	125.00
95 TO GOWAN	8277	PF#1	180.00	2306.50	2307.57	2307.43	2307.74	0.007234	3.28	54.86	87.63	0.73	39.37	127.00
95 TO GOWAN	8155	PF#1	180.00	2305.40	2306.61	2306.52	2306.79	0.008324	3.39	53.13	99.40	0.82	19.76	119.15
95 TO GOWAN	7939	PF#1	180.00	2302.20	2304.14	2304.12	2304.42	0.014898	4.26	42.28	73.54	0.99	42.65	116.19
95 TO GOWAN	7578	PF#1	198.00	2299.90	2301.14		2301.29	0.005749	3.12	63.55	102.93	0.70	20.94	123.87
95 TO GOWAN	7478	PF#1	198.00	2298.90	2300.20	2300.20	2300.42	0.014444	3.77	52.45	112.43	0.97	25.57	138.00
95 TO GOWAN	7373	PF#1	198.00	2298.00	2299.25	2298.99	2299.37	0.004295	2.78	71.15	103.86	0.59	22.60	126.46
95 TO GOWAN	7280	PF#1	198.00	2297.90	2298.52	2298.52	2298.74	0.011789	3.75	52.77	120.95	1.00	11.39	132.34
95 TO GOWAN	7016	PF#1	158.00	2295.50	2295.87	2295.91	2296.06	0.008495	3.52	44.91	170.45	1.21	17.83	188.27
95 TO GOWAN	6934	PF#1	158.00	2294.60	2295.18	2295.23	2295.41	0.007499	3.84	41.10	124.36	1.18	8.88	133.24
95 TO GOWAN	6815	PF#1	158.00	2293.60	2294.57	2294.57	2294.82	0.004878	4.05	39.06	79.28	1.02	7.49	86.77
95 TO GOWAN	6763	PF#1	230.00	2288.87	2289.86	2290.80	2293.57	0.116280	15.46	14.88	15.00	2.74	46.00	61.00
95 TO GOWAN	6691	PF#1	230.00	2288.40	2291.24	2291.23	2292.10	0.012268	7.44	30.91	17.73	0.99	51.27	69.00
95 TO GOWAN	6609	PF#1	230.00	2287.91	2291.14	2289.84	2291.49	0.003102	4.75	48.45	15.00	0.47	47.00	62.00
95 TO GOWAN	6572		Culvert											
95 TO GOWAN	6535	PF#1	230.00	2287.21	2290.68	2289.17	2290.98	0.002283	4.39	53.37	18.96	0.42	43.38	62.34
95 TO GOWAN	6468	PF#1	230.00	2286.70	2290.58		2290.82	0.001990	3.95	59.34	26.18	0.42	44.82	71.00
95 TO GOWAN	6404	PF#1	230.00	2286.17	2290.52	2288.11	2290.70	0.001211	3.49	68.76	31.97	0.29	39.32	71.29
95 TO GOWAN	6362		Culvert											
95 TO GOWAN	6321	PF#1	230.00	2285.53	2290.12	2287.47	2290.25	0.000735	3.07	84.01	49.92	0.25	27.69	77.61
95 TO GOWAN	6260	PF#1	230.00	2288.00	2289.78	2289.78	2290.13	0.007758	4.71	48.87	72.49	1.01	16.64	89.13
95 TO GOWAN	6161	PF#1	230.00	2287.30	2288.27	2288.41	2288.79	0.028069	5.85	40.76	82.40	1.34	61.90	144.30
95 TO GOWAN	6012	PF#1	230.00	2286.00	2286.88	2286.88	2287.19	0.014781	4.47	51.48	170.60	1.01	55.66	226.26
95 TO GOWAN	5808	PF#1	230.00	2282.20	2283.87	2283.33	2283.92	0.001924	1.92	119.57	143.50	0.37	84.12	227.62
95 TO GOWAN	5518	PF#1	230.00	2282.00	2282.48	2282.48	2282.67	0.016576	3.51	65.62	167.49	0.99	49.93	217.42
95 TO GOWAN	5382	PF#1	146.00	2278.00	2278.19	2278.33	2278.68	0.122527	5.65	25.85	138.96	2.31	70.81	209.77
95 TO GOWAN	5264	PF#1	146.00	2273.01	2277.11	2274.30	2277.12	0.000060	0.64	229.00	104.74	0.08	84.71	189.46
95 TO GOWAN	4550		Culvert											
95 TO GOWAN	3836	PF#1	146.00	2264.48	2270.40		2270.44	0.000814	1.52	96.36	82.18	0.25	55.41	137.59
95 TO GOWAN	3756	PF#1	146.00	2268.00	2270.37		2270.39	0.000377	1.11	131.03	104.92	0.18	56.31	161.23
95 TO GOWAN	3666	PF#1	146.00	2269.50	2270.14	2270.10	2270.28	0.013292	2.99	48.85	129.01	0.86	55.33	184.34
95 TO GOWAN	3479	PF#1	146.00	2268.00	2269.15	2268.76	2269.22	0.003000	2.18	66.93	92.77	0.45	80.15	172.92

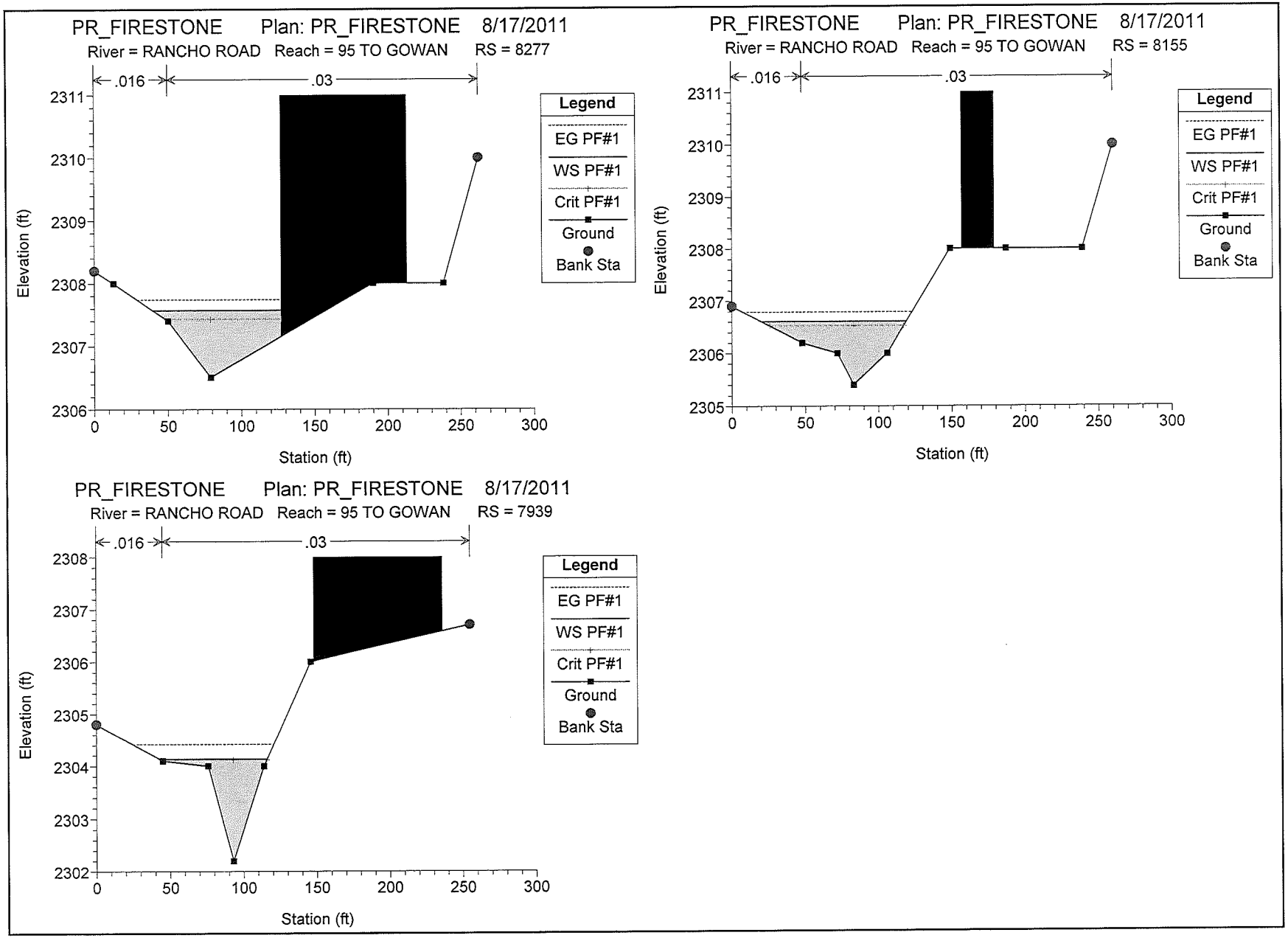

PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9472
.016 .03 .016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9376
.016 .016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9324
.016 .03 .016
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9205
.016 .03 .016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9114
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9060
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8950 Proposed Firestone Section
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8862 Proposed Firestone Section
.016
.013
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8832 Proposed Firestone Section
.016
.035
.016
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8802 Proposed Firestone Section
.016
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8744 Proposed Firestone Section
.016
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8668 Proposed Firestone Section
.016
.035
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8616 Sun Valley Auto Section
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8586 Sun Valley Auto Section
Elevation (ft)
Station (ft)
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8566 Sun Valley Auto Section
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8533 Culv Sun Valley Auto Culvert
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta


PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8533 Culv Sun Valley Auto Culvert
.016
.013
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8506 Sun Valley Auto Section
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8476 Sun Valley Auto Section
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8410


PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8277
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8155
PR_FIRESTONE Plan: PR_FIRESTONE 8/17/2011
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7939

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: PR_FIRESTONE
Project File : PR_FIRESTONE.prj
Run Date and Time: 8/17/2011 3:59:35 PM

Project in English units

Project Description:
Slater Hanifan Group - JOB#RCI1104.000 - August 17, 2011
FIRESTONE AT RANCHO &
RED COACH
Rancho Drive Conveyance - Proposed Condition

Base model
referenced from the approved Rainbow/Lone Mountain LOMR (05-09-0073P)

STA
84+76 thru 86+16 geometric sections modified to reflect Sun Valley Auto
improvements per approved CLOMR (07-09-1025R)

STA 86+68 thru 89+50 geometric
sections modified to reflect proposed grading and improvements on the Firestone
site

This model represents the proposed condition for the area

PLAN DATA

Plan Title: PR_FIRESTONE
Plan File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\PR_FIRESTONE.p05

Geometry Title: PR_FIRESTONE
Geometry File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\PR_FIRESTONE.g02

Flow Title : PR_FIRESTONE
Flow File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\PR_FIRESTONE.f03

Plan Summary Information:
Number of: Cross Sections = 80 Multiple Openings = 0
Culverts = 9 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: PR_FIRESTONE
Flow File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\PR_FIRESTONE.f03

Flow Data (cfs)

River	Reach	RS	PF#1
RANCHO ROAD	95 TO GOWAN	13266	192
RANCHO ROAD	95 TO GOWAN	12295	155
RANCHO ROAD	95 TO GOWAN	12145	190
RANCHO ROAD	95 TO GOWAN	11961	161
RANCHO ROAD	95 TO GOWAN	10807	169
RANCHO ROAD	95 TO GOWAN	10399	169
RANCHO ROAD	95 TO GOWAN	9566	215

RANCHO ROAD	95 TO GOWAN	9376	180
RANCHO ROAD	95 TO GOWAN	7578	198
RANCHO ROAD	95 TO GOWAN	7016	158
RANCHO ROAD	95 TO GOWAN	6763	230
RANCHO ROAD	95 TO GOWAN	5382	146

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RANCHO ROAD	95 TO GOWAN	PF#1	Normal S = 0.0022	Normal S = 0.003

GEOMETRY DATA

Geometry Title: PR_FIRESTONE
Geometry File : j:\RCI1104.000 Firestone Rancho-Red Coach\Drainage\Technical Study\Addendum\HEC-RAS\PR_FIRESTONE.g02

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 13266

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2328	30	2326	84	2324	168	2324.4	210	2324.6
379	2325.1								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	168	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	168	275	230	.001	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 13036

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2328	25	2326	44	2324	72	2323.2	102	2324
127	2324	202	2324	358	2325.1				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.03	127	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	102	229	184	.001	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12852

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2326	27	2324	47	2322.6	68	2324	83	2324
102	2324	293	2325.1						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.025	83	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	68	175	175	175	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 12677

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2326	32	2324.3	38	2324	54	2322	88	2324
101	2324	164	2324	315	2324.7				

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      32    .025     101    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            32      88             247     247     247             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12430

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      18    2322      44    2322      64  2322.2     140  2323.1
     250    2324     401    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      64    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       64              75      75      75             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12355

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      11    2322      37    2322      57  2322.1     158  2322.8
     383  2323.4     484    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      57    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       57              60      60      60             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12295

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324       2    2322       5 2320.35      38    2322      56  2322.1
     175  2322.8     394    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .025      56    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       56              15      15      15             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12280

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324       7 2322.81      22 2322.68      37 2323.11      56    2322
     179  2322.9     374    2324

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0     .03      56    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0       37              16      16      16             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12264

INPUT
Description:
Station Elevation Data    num=       8
```

```
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2324        8    2322       20  2321.8       27    2322       53    2322
      62    2322      183    2323      339    2324

Manning's n Values         num=       2
     Sta   n Val      Sta   n Val
       0    .025       53    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0      27              119     119     119             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12145

INPUT
Description:
Station Elevation Data     num=       6
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2324        8    2322       22  2320.3       68    2322      251    2324
     323    2326

Manning's n Values         num=       2
     Sta   n Val      Sta   n Val
       0    .025       68    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0      68                34      34      34             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12111

INPUT
Description: Upsteam Side of Dual 6' x 3' RCB's at Rainbow
Station Elevation Data     num=       8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2324       19    2324       19 2319.81       32 2319.81       32    2324
     202    2324      259    2325      318    2326

Manning's n Values         num=       2
     Sta   n Val      Sta   n Val
       0    .025      259    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           19      32           150.01  150.01  150.01             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 12036

INPUT
Description: Dual 6' x 3' RCB's at the Rainbow and Rancho Intersection Culvert
             16
Distance from Upstream XS =       .1
Deck/Roadway Width        =    149.9
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      19    2324               32    2324        0

Upstream Bridge Cross Section Data
Station Elevation Data     num=       8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2324       19    2324       19 2319.81       32 2319.81       32    2324
     202    2324      259    2325      318    2326

Manning's n Values         num=       2
     Sta   n Val      Sta   n Val
       0    .025      259    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
           19      32             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      62    2324               75    2324        0

Downstream Bridge Cross Section Data
Station Elevation Data     num=       9
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2324       41    2324       62    2324       62 2319.46       75 2319.46
      75    2324      123    2324      229  2324.3      326    2326

Manning's n Values         num=       2
     Sta   n Val      Sta   n Val
       0    .016       41    .025
```

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
           62      75            .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    2324
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       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1   149.9     .013     .013        0                  .5                1
Number of Barrels =  2
Upstream   Elevation =  2319.81
Centerline Stations
    Sta.    Sta.
      22      29
Downstream Elevation =  2319.46
Centerline Stations
    Sta.    Sta.
      65      72

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

  Q Culv Group (cfs)         190.00    Culv Full Len (ft)
  # Barrels                       2    Culv Vel US (ft/s)          6.26
  Q Barrel (cfs)              95.00    Culv Vel DS (ft/s)          5.95
  E.G. US. (ft)             2323.25    Culv Inv El Up (ft)      2319.81
  W.S. US. (ft)             2322.91    Culv Inv El Dn (ft)      2319.46
  E.G. DS (ft)              2322.46    Culv Frctn Ls (ft)          0.28
  W.S. DS (ft)              2322.12    Culv Exit Loss (ft)         0.21
  Delta EG (ft)                0.79    Culv Entr Loss (ft)         0.30
  Delta WS (ft)                0.78    Q Weir (cfs)
  E.G. IC (ft)              2323.20    Weir Sta Lft (ft)
  E.G. OC (ft)              2323.25    Weir Sta Rgt (ft)
  Culvert Control            Outlet    Weir Submerg
  Culv WS Inlet (ft)        2322.34    Weir Max Depth (ft)
  Culv WS Outlet (ft)       2322.12    Weir Avg Depth (ft)
  Culv Nml Depth (ft)          2.37    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          1.98    Min El Weir Flow (ft)    2324.01


CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11961

INPUT
Description: Downstream Side of Dual 6' x 3' RCB's at Rainbow
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      41    2324      62    2324      62 2319.46      75 2319.46
      75    2324     123    2324     229  2324.3     326    2326

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      41    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           62      75               64      64      64             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11897

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2324      38  2323.4      48    2322      63    2320      92    2322
     181  2323.1     251    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      38    .025     181    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           38      92              149     149     149             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
```

REACH: 95 TO GOWAN RS: 11748

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2324	45	2323	51	2322	64	2320	75	2319.3
90	2320	104	2322	115	2322.1	226	2323.2	269	2324

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.025	115	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45	115	65	65	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11683

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.9	49	2322.9	54	2322	68	2320	81	2319
97	2320	112	2322	118	2322.1	249	2323.2	343	2324

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	49	.025	118	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
49	118	30	30	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11653

INPUT
Description: Upstream Side of Dual 6' x 3' RCB's
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.8	48	2322.8	75	2322	75	2318.84	88	2318.84
88	2322	117	2322.1	258	2323.2	380	2324		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	48	.025	117	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48	117	63.01	63.01	.1	.3

CULVERT

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11621

INPUT
Description: Dual 6' x 3' RCB's in the Grass Lined Channel just south of the
Rainbow and Rancho Intersection, Culvert 17
Distance from Upstream XS = .1
Deck/Roadway Width = 62.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
75	2322	88	2322	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.8	48	2322.8	75	2322	75	2318.84	88	2318.84
88	2322	117	2322.1	258	2323.2	380	2324		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	48	.025	117	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
48	117	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
75	2322	88	2322	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.6	48	2322.6	75	2322	75	2318.86	88	2318.86

```
      88    2322     114  2322.1     277    2323     402    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      48    .025     114    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
            48     114            .1       .3

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =    2322
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       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    62.9     .013     .013        0                  .5                1
Number of Barrels =  2
Upstream   Elevation =  2318.84
Centerline Stations
    Sta.    Sta.
      78      85
Downstream Elevation =  2318.86
Centerline Stations
    Sta.    Sta.
      78      85

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

  Q Culv Group (cfs)        161.00    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          5.81
  Q Barrel (cfs)             80.50    Culv Vel DS (ft/s)          7.11
  E.G. US. (ft)            2321.94    Culv Inv El Up (ft)      2318.84
  W.S. US. (ft)            2321.63    Culv Inv El Dn (ft)      2318.86
  E.G. DS (ft)             2321.42    Culv Frctn Ls (ft)          0.14
  W.S. DS (ft)             2320.75    Culv Exit Loss (ft)         0.12
  Delta EG (ft)               0.52    Culv Entr Loss (ft)         0.26
  Delta WS (ft)               0.88    Q Weir (cfs)
  E.G. IC (ft)             2321.88    Weir Sta Lft (ft)
  E.G. OC (ft)             2321.94    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2321.15    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2320.75    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.77    Min El Weir Flow (ft)    2322.01


CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11590

INPUT
Description: Downstream Side of Dual 6' x 3' RCB's
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.6      48  2322.6      75    2322      75 2318.86      88 2318.86
      88    2322     114  2322.1     277    2323     402    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      48    .025     114    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            48     114               52      52      52             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 11538

INPUT
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2323.5      47  2322.4      58    2322      69    2320      82    2318
      93    2320     125  2320.5     215    2322     290  2322.7     397    2324

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      47    .025     125    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            47     125              100     100     100             .1       .3
```

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11438

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2323.3	45	2322.2	55	2322	65	2320	80	2318.7
91	2320	97	2320.1	240	2322	411	2323.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.025	97	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45	97	271	271	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 11167

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2322.2	26	2322	56	2321.4	73	2320	88	2318.3
107	2320	205	2321.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	56	.025	107	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
56	107	221	221	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10946

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2321.6	58	2320.8	71	2320	90	2318	107	2318.4
180	2319.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.016	58	.025	71	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
58	107	139	139	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10807

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2321.3	60	2320.4	72	2320	80	2318	88	2316.9
102	2318	196.6	2318.6	196.6	2318.1	270.28	2319.3	270.28	2319.8

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	60	.025	196.6	.013	196.6	.016	270.28	.013

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
60	102	49	49	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10758

INPUT
Description: Upstream SIde of Triple 6' x 2.5' RCB's
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2321.1	65	2320.2	74	2320	74	2316.5	97	2316.5
97	2320	143.6	2319.1	143.6	2318.6	217.3	2319.9	217.3	2320.4

Manning's n Values num= 5

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      65    .025   143.6    .013   143.6    .016   217.3    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            65      97           183.01  183.01  183.01             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10667

INPUT
Description: Triple 6' x 2.5' RCB's at Lone Mt. Rd., One of the D.S. Culverts
             has 3 ft of horizontal blockage, Culvert 18.
Distance from Upstream XS =      .1
Deck/Roadway Width        =   182.9
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      74    2320              97    2320       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2321.1      65  2320.2      74    2320      74  2316.5      97  2316.5
      97    2320  143.6  2319.1  143.6  2318.6  217.3  2319.9  217.3  2320.4

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      65    .025   143.6    .013   143.6    .016   217.3    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            65      97             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      77    2319              94    2319       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.7      46    2320      67  2319.8      77    2319      77 2316.09
      94 2316.09      94    2319      95    2318     198    2320     238    2320
     279    2318     293    2318     309    2320

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      67     .03      77    .015      94     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     198             .1       .3
Right Levee     Station=     198      Elevation=    2320

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    19.1
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     2.5       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1   182.9     .013     .013        0                    .5                1
Number of Barrels =  3
Upstream   Elevation =  2316.5
Centerline Stations
    Sta.    Sta.    Sta.
    78.5    85.5    92.5
Downstream Elevation =  2316.09
Centerline Stations
    Sta.    Sta.    Sta.
      77      84      91

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

  Q Culv Group (cfs)        138.67    Culv Full Len (ft)        182.90
  # Barrels                      3    Culv Vel US (ft/s)          3.08
  Q Barrel (cfs)             46.22    Culv Vel DS (ft/s)          3.08
  E.G. US. (ft)            2319.39    Culv Inv El Up (ft)      2316.50
  W.S. US. (ft)            2319.30    Culv Inv El Dn (ft)      2316.09
  E.G. DS (ft)             2319.09    Culv Frctn Ls (ft)          0.16
  W.S. DS (ft)             2319.01    Culv Exit Loss (ft)         0.07
  Delta EG (ft)               0.30    Culv Entr Loss (ft)         0.07
  Delta WS (ft)               0.29    Q Weir (cfs)               30.33
  E.G. IC (ft)             2318.89    Weir Sta Lft (ft)         128.93
```

E.G. OC (ft)	2319.39	Weir Sta Rgt (ft)	188.01
Culvert Control	Outlet	Weir Submerg	0.04
Culv WS Inlet (ft)	2319.00	Weir Max Depth (ft)	0.78
Culv WS Outlet (ft)	2318.59	Weir Avg Depth (ft)	0.33
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	19.47
Culv Crt Depth (ft)	1.23	Min El Weir Flow (ft)	2318.61

Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
The reported inlet energy grade answer may not be valid.

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10575

INPUT
Description: Downstream Side of Triple 6' x 2.5' RCB's
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.7	46	2320	67	2319.8	77	2319	77	2316.09
94	2316.09	94	2319	95	2318	198	2320	238	2320
279	2318	293	2318	309	2320				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	67	.03	77	.015	94	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	198	28	28	.1	.3

Right Levee Station= 198 Elevation= 2320

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10547

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.6	43	2320	66	2319.7	78	2318	81	2316
113	2318	164	2320	258	2320	271	2318	297	2318
308	2320								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.015	66	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	164	29	29	.1	.3

Right Levee Station= 164 Elevation= 2320

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10518

INPUT
Description: Upstream Side of Dual 24" RCP's
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2320.6	40	2320	66	2319.7	77	2318	77	2315.96
84	2315.96	92	2318	131	2318	163	2320	258	2320
272	2318	298	2318	310	2320				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.015	66	.03	77	.015	84	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	163	68.01	68.01	.1	.3

Right Levee Station= 163 Elevation= 2320

CULVERT

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10485

INPUT
Description: Dual 24" RCP's, South of Lone Mt. Rd. Culvert 19
Distance from Upstream XS = .1
Deck/Roadway Width = 67.9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
66	2319.7	92	2318	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 13

```
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2320.6       40    2320       66  2319.7       77    2318       77 2315.96
      84 2315.96       92    2318      131    2318      163    2320      258    2320
     272    2318      298    2318      310    2320

Manning's n Values         num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       66    .03        77    .015       84    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     163             .1       .3
Right Levee     Station=     163      Elevation=    2320

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      66  2319.5              89    2318       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=       13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2320.4       35    2320       66  2319.5       78    2318       78 2315.54
      85 2315.54       89    2318      135    2318      160    2320      242    2320
     262    2318      300    2318      312    2320

Manning's n Values         num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .015       66    .03        78    .015       85    .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     160             .1       .3
Right Levee     Station=     160      Elevation=    2320

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins           =    2318
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       Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    67.9     .013     .013        0                    .5                1
Number of Barrels =  2
Upstream   Elevation =  2315.96
Centerline Stations
    Sta.    Sta.
      79      82
Downstream Elevation =  2315.54
Centerline Stations
    Sta.    Sta.
      80      83

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

  Q Culv Group (cfs)          28.63    Culv Full Len (ft)          67.90
  # Barrels                      2     Culv Vel US (ft/s)          4.56
  Q Barrel (cfs)              14.31    Culv Vel DS (ft/s)          4.56
  E.G. US. (ft)             2319.03    Culv Inv El Up (ft)      2315.96
  W.S. US. (ft)             2318.97    Culv Inv El Dn (ft)      2315.54
  E.G. DS (ft)              2318.57    Culv Frctn Ls (ft)          0.27
  W.S. DS (ft)              2318.28    Culv Exit Loss (ft)         0.03
  Delta EG (ft)                0.46    Culv Entr Loss (ft)         0.16
  Delta WS (ft)                0.69    Q Weir (cfs)              140.37
  E.G. IC (ft)              2319.03    Weir Sta Lft (ft)           76.13
  E.G. OC (ft)              2319.03    Weir Sta Rgt (ft)          147.61
  Culvert Control            Outlet    Weir Submerg                0.20
  Culv WS Inlet (ft)        2317.96    Weir Max Depth (ft)         1.04
  Culv WS Outlet (ft)       2317.54    Weir Avg Depth (ft)         0.80
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)     57.33
  Culv Crt Depth (ft)          1.36    Min El Weir Flow (ft)    2318.01


CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 10450

INPUT
Description: Downstream Side of Dual 24" RCP's
Station Elevation Data    num=       13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2320.4       35    2320       66  2319.5       78    2318       78 2315.54
      85 2315.54       89    2318      135    2318      160    2320      242    2320
     262    2318      300    2318      312    2320

Manning's n Values         num=        4
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .015      66     .03      78    .015      85     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     160              51      51      51             .1       .3
Right Levee     Station=     160      Elevation=    2320

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10399

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2320.3      32    2320      65  2319.4      71    2318      75    2316
     132    2316     301    2318     312    2320

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      65     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     312             104     104     104             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     156     312    2320       F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10295

INPUT
Description:
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    2320      59  2319.2      76    2318      81    2316      96    2316
     106    2318     122    2320     209    2320     269    2318     299    2318
     318    2320

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      59     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     122             265     220     188             .1       .3
Right Levee     Station=     122      Elevation=    2320

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 10075

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2318.65      21 2318.23      23 2318.19    38.7  2314.1      44  2314.1
      55 2317.04  175.21 2317.95   179.5 2317.95   202.5 2317.53   211.3 2316.83
   220.2 2315.02     226 2315.02   246.9 2317.95  280.33 2318.44   292.4    2319

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      21     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0   246.9             164     157     148             .1       .3
Right Levee     Station=  175.21      Elevation= 2317.95

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9918

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2318.9      60  2318.3      71    2318      87    2316     107    2316
     161  2317.7     203    2316     318    2316     395    2318

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      60     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     395             122     122     122             .1       .3
Right Levee     Station=     161      Elevation=  2317.7
```

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9796

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.71	37	2317.56	52	2317.34	52	2317.84	58	2317.96
64	2317.39	73	2313.67	84.5	2313.67	93.5	2317.39	170	2318.24
326.42	2316.19	327.92	2316.13	329.42	2316.19	358	2316.47		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	52	.013	58	.03	93.5	.016	326.42	.013
329.42	.016								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	358	230	230	.1	.3

Right Levee Station= 170 Elevation= 2318.24

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9566

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.02	37	2316.87	52	2316.65	52	2317.15	58	2317.27
64	2316.7	73	2312.98	84.5	2312.98	93.5	2316.7	170	2317.55
326.42	2315.5	327.92	2315.44	329.42	2315.5	358	2315.78		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	52	.013	58	.03	93.5	.016	326.42	.013
329.42	.016								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	358	54	54	.1	.3

Right Levee Station= 170 Elevation= 2317.55

CULVERT

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9539

INPUT
Description:
Distance from Upstream XS = .1
Deck/Roadway Width = 53.8
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
64	2316.7	2312	93.5	2316.7	2312

Upstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.02	37	2316.87	52	2316.65	52	2317.15	58	2317.27
64	2316.7	73	2312.98	84.5	2312.98	93.5	2316.7	170	2317.55
326.42	2315.5	327.92	2315.44	329.42	2315.5	358	2315.78		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	52	.013	58	.03	93.5	.016	326.42	.013
329.42	.016								

Bank Sta: Left	Right	Coeff Contr.	Expan.
0	358	.1	.3

Right Levee Station= 170 Elevation= 2317.55

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
64	2316.54	2311	93.5	2316.54	2311

Downstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2317.86	37	2316.71	52	2316.49	52	2316.99	58	2317.11
64	2316.54	73	2312.5	84.5	2312.5	93.5	2316.54	170	2317.39
326.42	2315.34	327.92	2315.28	329.42	2315.34	358	2315.62		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	52	.013	58	.03	93.5	.016	326.42	.013
329.42	.016								

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
          0     358            .1       .3
Right Levee     Station=     170      Elevation= 2317.39

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

Number of Culverts = 1

Culvert Name      Shape      Rise    Span
Culvert #1            Box       3       4
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    53.8     .013     .013        0                  .5                1
Number of Barrels = 3
Upstream   Elevation = 2312.98
Centerline Stations
    Sta.    Sta.    Sta.
   74.25   78.75      83
Downstream Elevation = 2312.82
Centerline Stations
    Sta.    Sta.    Sta.
   74.25   78.75      83

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

  Q Culv Group (cfs)         155.29    Culv Full Len (ft)          53.80
  # Barrels                       3    Culv Vel US (ft/s)          4.31
  Q Barrel (cfs)              51.76    Culv Vel DS (ft/s)          4.31
  E.G. US. (ft)             2317.20    Culv Inv El Up (ft)      2312.98
  W.S. US. (ft)             2317.13    Culv Inv El Dn (ft)      2312.82
  E.G. DS (ft)              2316.76    Culv Frctn Ls (ft)          0.09
  W.S. DS (ft)              2316.67    Culv Exit Loss (ft)         0.20
  Delta EG (ft)                0.44    Culv Entr Loss (ft)         0.14
  Delta WS (ft)                0.46    Q Weir (cfs)               59.71
  E.G. IC (ft)              2316.47    Weir Sta Lft (ft)          26.58
  E.G. OC (ft)              2317.20    Weir Sta Rgt (ft)         137.97
  Culvert Control            Outlet    Weir Submerg                0.00
  Culv WS Inlet (ft)        2315.98    Weir Max Depth (ft)         0.54
  Culv WS Outlet (ft)       2315.82    Weir Avg Depth (ft)         0.33
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)     35.10
  Culv Crt Depth (ft)          1.73    Min El Weir Flow (ft)     2316.66


Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
         The reported inlet energy grade answer may not be valid.

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9512

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2317.86      37 2316.71      52 2316.49      52 2316.99      58 2317.11
      64 2316.54      73  2312.5    84.5  2312.5    93.5 2316.54     170 2317.39
  326.42 2315.34  327.92 2315.28  329.42 2315.34     358 2315.62

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          0     358              40      40       40            .1       .3
Right Levee     Station=     170      Elevation= 2317.39

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9472

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2317.74      37 2316.59      52 2316.37      52 2316.87      58 2316.99
      64 2316.42      73  2312.2    84.5  2312.2    93.5 2316.42     170 2317.27
  326.42 2315.22  327.92 2315.16  329.42 2315.22     358  2315.5

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      52    .013      58     .03    93.5    .016  326.42    .013
  329.42    .016
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           0     358               96      96      96            .1       .3
Right Levee     Station=     170      Elevation= 2317.27

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 9376

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2317.23       52 2316.19       52 2316.69       58 2316.82       72 2316.54
      72 2316.04     94.5 2315.59       96 2315.53     97.5 2315.59    234.5    2317
     350 2314.81      355  2314.7    356.5 2314.64      358  2314.7

Manning's n Values        num=       8
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       52    .013       58     .03       72    .016     94.5    .013
    97.5    .016      350     .03      355    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           0   234.5               52      52      52            .1       .3
Right Levee     Station=   234.5      Elevation=    2317

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 9324

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2316.26       43  2315.4       68  2315.3       76  2315.4       102  2314.1
     169  2315.2

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       43     .03       76    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           0     169              119     119     119            .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 9205

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2316.22       43 2315.36       55  2315.6    93.5  2313.9      211  2314.3
     238  2314.6      308  2314.6

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       43     .03     93.5    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           0     211               91      91      91            .1       .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     231     279    2318

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 9114

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2316       47  2315.1       63    2314       77  2313.2      150  2313.4
     272    2314      326    2314      362  2314.6

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016       47     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           0     362               54      54      54            .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
```

REACH: 95 TO GOWAN RS: 9060

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2315.6	44	2314.8	54	2314	76	2312.9	345	2314
384	2314	556	2315.2	600	2316				

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	44	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	345	110	110	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442	600	2316	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
104	165	2316

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8950

INPUT
Description: Proposed Firestone Section
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2314.5	48	2313	52	2312.5	59	2313	114	2313.2
164	2313.2	172	2311.9	179	2311.8	179.5	2311.8	179.5	2311.3
181	2311.5	216.5	2312	250.5	2311.7	252	2311.5	252	2312
252.5	2312	260.5	2312.1	285	2314.5	357.5	2314.5	362	2314.4
395	2313.35	396.5	2313.15	396.5	2313.65	397	2313.65	404	2313.25
404.51	2313.22								

Manning's n Values num= 12

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	48	.03	59	.016	114	.013	164	.016
172	.013	181	.016	260.5	.035	285	.013	362	.016
395	.013	397	.035						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	404.51	88	88	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
114	164	2316	285	357.5	2320

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8862

INPUT
Description: Proposed Firestone Section
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2313	9.5	2313	10	2313	10	2312.7	77	2312
121	2311.4	156	2311	157.5	2310.8	163	2311	200.5	2312.5
202	2312.3	202	2312.8	202.5	2312.8	207.5	2312.9	207.5	2314.5
262	2314.5	277.8	2314.3	312.5	2313.1	314	2312.9	314	2313.4
314.5	2313.4	327	2313.3						

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	156	.013	163	.016
200.5	.013	277.8	.016	312.5	.013	314.5	.035		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	327	30	30	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
207.5	262	2320

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8832

INPUT
Description: Proposed Firestone Section
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2312.7	9.5	2312.7	10	2312.7	10	2312.4	49	2312
88	2311.2	107	2311	123	2311	124.5	2310.8	124.5	2311.1
125	2311.1	132	2311.2	133	2310.43	134	2310.4	135	2310.43
155	2312.9	162	2312.8	173	2313	178	2312	178	2312.5
185	2313.1	185.5	2313.1	185.5	2312.6	187	2312.8	227.5	2314.1
229	2313.9	229	2314.4	229.5	2314.4	243	2314.35	281.5	2312.8
283	2312.6	283	2313.1	283.5	2313.1	294	2312.7		

Manning's n Values num= 15

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	123	.013	132	.035
133	.013	135	.035	173	.013	178	.035	185	.013
187	.016	227.5	.013	243	.016	281.5	.013	283.5	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	294	30	30	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8802

INPUT
Description: Proposed Firestone Section
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2312.4	9.5	2312.4	10	2312.4	10	2312.1	24	2312
80	2311	90	2310.9	92	2310.7	92	2311.2	93	2311.2
105	2309.77	106	2309.74	107	2309.77	129	2312.9	129.5	2312.9
129.5	2312.4	131	2312.6	248.8	2312.5	250.3	2312.3	250.3	2312.8
250.8	2312.8	263	2312.6						

Manning's n Values num= 11

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	90	.013	93	.035
105	.013	107	.035	129	.013	131	.016	248.8	.013
250.8	.035								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	263	58	58	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8744

INPUT
Description: Proposed Firestone Section
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.8	9.5	2311.8	10	2311.8	10	2311.5	46	2311.1
47.5	2310.9	47.5	2311.4	48	2311.4	54	2311.5	63	2308.51
64	2308.48	65	2308.51	82	2310.96	82.5	2310.96	82.5	2310.46
84	2310.48	186	2311.95	187.5	2311.75	187.5	2312.25	188	2312.25
198.5	2312.3								

Manning's n Values num= 11

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	46	.013	54	.035
63	.013	65	.035	82	.013	84	.016	186	.013
188	.035								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	198.5	76	76	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8668

INPUT
Description: Proposed Firestone Section
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.3	9.5	2311.3	10	2311.3	10	2311	16.3	2311
45	2310.5	46.5	2310.3	46.5	2310.8	47	2310.8	53	2310.9
63	2308.23	64	2308.2	65	2308.23	106	2311.7	116	2311.7

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	9.5	.013	10	.016	45	.013	53	.035
63	.013	65	.035						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	116	52	52	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8616

INPUT
Description: Sun Valley Auto Section
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.09	45	2309.95	46.5	2309.78	46.5	2310.28	53	2310.38
63	2308.24	64	2308.22	65	2308.24	76	2311.56	76.5	2311.56
76.5	2311.06	78	2311.23	107	2312.27	107	2312.77	116	2313.2

```
Manning's n Values          num=        8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      53     .03      63    .013      65     .03
      76    .013      78    .016     107    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      76               30      30      31             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8586

INPUT
Description: Sun Valley Auto Section
Station Elevation Data     num=      17
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2310.81       45 2309.91     46.5 2309.74     46.5 2310.24      53 2310.34
      63 2308.12       64  2308.1       65 2308.12       79 2308.69      85 2310.69
    85.5 2310.69     85.5 2310.19      174 2311.38      176 2311.21     176 2311.71
     177 2311.71      186  2311.5

Manning's n Values          num=        8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      53     .03      63    .013      65     .03
      85    .013    85.5    .016     174    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      85               20      20      20             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8566

INPUT
Description: Sun Valley Auto Section
Station Elevation Data     num=      18
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2310.61       45 2309.71     46.5 2309.54     46.5 2310.04      54 2310.14
      59 2308.18     59.5 2307.91       61 2307.91       62 2307.91    82.5 2307.91
      85 2310.23     85.5 2310.23     85.5 2309.73      152 2311.11     154 2310.94
     154 2311.44    154.5 2311.44    168.5 2311.14

Manning's n Values          num=        9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      54     .03    59.5    .013      62     .03
      85    .013    85.5    .016     152    .013   154.5     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      85               60      60      60             .1      .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8533

INPUT
Description: Sun Valley Auto Culvert
Distance from Upstream XS =        1
Deck/Roadway Width        =    57.25
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
    55.5 2309.55            84.27 2309.55

Upstream Bridge Cross Section Data
Station Elevation Data     num=      18
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2310.61       45 2309.71     46.5 2309.54     46.5 2310.04      54 2310.14
      59 2308.18     59.5 2307.91       61 2307.91       62 2307.91    82.5 2307.91
      85 2310.23     85.5 2310.23     85.5 2309.73      152 2311.11     154 2310.94
     154 2311.44    154.5 2311.44    168.5 2311.14

Manning's n Values          num=        9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      54     .03    59.5    .013      62     .03
      85    .013    85.5    .016     152    .013   154.5     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0      85             .1      .3

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
   59.19 2309.43            85.68 2309.43

Downstream Bridge Cross Section Data
Station Elevation Data     num=      13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
```

```
      0 2310.06      45    2309      50 2308.94      50 2309.44      51 2309.44
   57.5 2309.54    59.5 2309.41    59.5 2307.74      61 2307.74      62 2307.74
   82.5 2307.74      86  2309.6     104 2310.05

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013    57.5     .03    59.5    .013      62     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     104             .1       .3

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

Number of Culverts =  1

Culvert Name      Shape      Rise    Span
Culvert #1            Box       1       7
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   57.25     .013     .013        0                  .2              1
Number of Barrels =  3
Upstream   Elevation =  2307.91
Centerline Stations
    Sta.    Sta.    Sta.
      63      71      79
Downstream Elevation =  2307.74
Centerline Stations
    Sta.    Sta.    Sta.
      63      71      79

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

  Q Culv Group (cfs)         125.91    Culv Full Len (ft)          57.25
  # Barrels                       3    Culv Vel US (ft/s)           6.00
  Q Barrel (cfs)              41.97    Culv Vel DS (ft/s)           6.00
  E.G. US. (ft)             2310.18    Culv Inv El Up (ft)       2307.91
  W.S. US. (ft)             2310.04    Culv Inv El Dn (ft)       2307.74
  E.G. DS (ft)              2309.54    Culv Frctn Ls (ft)           0.47
  W.S. DS (ft)              2309.04    Culv Exit Loss (ft)          0.06
  Delta EG (ft)                0.65    Culv Entr Loss (ft)          0.11
  Delta WS (ft)                1.00    Q Weir (cfs)                54.09
  E.G. IC (ft)              2310.22    Weir Sta Lft (ft)           21.36
  E.G. OC (ft)              2310.18    Weir Sta Rgt (ft)          107.32
  Culvert Control             Inlet    Weir Submerg                 0.00
  Culv WS Inlet (ft)        2308.91    Weir Max Depth (ft)          0.64
  Culv WS Outlet (ft)       2308.74    Weir Avg Depth (ft)          0.36
  Culv Nml Depth (ft)          1.00    Weir Flow Area (sq ft)      30.99
  Culv Crt Depth (ft)          1.00    Min El Weir Flow (ft)     2309.55


Note:    The normal depth exceeds the height of the culvert.  The program assumes that the normal
         depth is equal to the height of the culvert.
Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8506

INPUT
Description: Sun Valley Auto Section
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2310.06      45    2309      50 2308.94      50 2309.44      51 2309.44
    57.5 2309.54    59.5 2309.41    59.5 2307.74      61 2307.74      62 2307.74
    82.5 2307.74      86  2309.6     104 2310.05

Manning's n Values         num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013    57.5     .03    59.5    .013      62     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     104               30      30      45             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8476

INPUT
Description: Sun Valley Auto Section
```

```
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2309.8      45 2308.55    46.5 2308.38    46.5 2308.88      47 2308.88
      52    2309      53    2309      68 2307.64      69 2307.61      70 2307.64
      79    2308     100    2308     162    2309     295    2310

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .016      45    .013      52     .03      68    .013      70     .03
      79    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     295               66      66      66             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8410

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2309.6      50  2308.5      74    2308      80  2307.5      95    2308
     285    2310

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      50     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     285              133     133     133             .1      .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     125     217    2312

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8277

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2308.2      13    2308      50  2307.4      79  2306.5     190    2308
     238    2308     262    2310

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      50     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     262              122     122     122             .1      .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     127     213    2311

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8155

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2306.9      48  2306.2      72    2306      83  2305.4     106    2306
     149    2308     187    2308     239    2308     260    2310

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      48     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     260              216     216     216             .1      .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     157     179    2311

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 7939

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2304.8      45  2304.1      76    2304      93  2302.2     114    2304
     146    2306     255  2306.7
```

```
Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       45    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     255              361     361     361             .1       .3
Blocked Obstructions      num=        1
   Sta L   Sta R    Elev
     148     236    2308

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 7578

INPUT
Description:
Station Elevation Data      num=        7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2301.4       49  2300.8       91    2300       99  2299.9      105    2300
     138    2302      350    2304

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       49    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     350              100     100     100             .1       .3
Blocked Obstructions      num=        1
   Sta L   Sta R    Elev
     146     287    2304

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 7478

INPUT
Description:
Station Elevation Data      num=        8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2300.6       38    2300       45  2299.9       48    2300       57    2300
      95  2298.9      116    2300      474    2302

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       38    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     474              105     105     105             .1       .3
Blocked Obstructions      num=        1
   Sta L   Sta R    Elev
     138     370    2303

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 7373

INPUT
Description:
Station Elevation Data      num=        6
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2299.7       45  2298.8       91    2298       99    2298      143    2300
     186  2300.3

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       45    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     186               93      93      93             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 7280

INPUT
Description:
Station Elevation Data      num=        6
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2298.7       44    2298       54  2297.9       62    2298      123    2298
     159    2300

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       54    .03

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

```
            0     159              264     264     264             .1       .3
Blocked Obstructions      num=        1
   Sta L   Sta R    Elev
     160     220    2308

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 7016

INPUT
Description:
Station Elevation Data    num=        5
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2296       53  2295.6      170  2295.5      195    2296      270    2298

Manning's n Values        num=        1
     Sta   n Val
       0    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     195               81      81      81             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     250     270    2298       F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6934

INPUT
Description:
Station Elevation Data    num=        4
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2295.3       45  2294.7       73  2294.6      218    2296

Manning's n Values        num=        1
     Sta   n Val
       0    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     218               119     119     119             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     179     218    2305       F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6815

INPUT
Description:
Station Elevation Data    num=        5
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2294.8       26    2294       41  2293.6       60    2294      154    2296

Manning's n Values        num=        1
     Sta   n Val
       0    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     154               52      52      52             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6763

INPUT
Description:
Station Elevation Data    num=        9
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2294.5       14    2294       39  2293.2       46    2292       46 2288.87
      61 2288.87        61    2292       67    2294       77    2296

Manning's n Values        num=        2
     Sta   n Val      Sta   n Val
       0    .016       39     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           46      61               72      72      72             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6691

INPUT
```

```
Description:
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2294.1       2    2294      39  2292.7      49    2292      55    2290
      60  2288.4      69    2290      69    2292      72    2294      86    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      39     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           49      69               82      82      82             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6609

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2293.3      39  2292.1      47    2292      47 2287.91      62 2287.91
      62    2292     114    2294     210    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      39     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           47      62            74.01   74.01   74.01             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 6572

INPUT
Description: Culvert 24
Distance from Upstream XS =       .1
Deck/Roadway Width        =     73.9
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      47    2292 2290.91      62    2292 2290.91

Upstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2293.3      39  2292.1      47    2292      47 2287.91      62 2287.91
      62    2292     114    2294     210    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      39     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
           47      62             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      39  2291.5  2291.5      47  2291.7    2290      47  2291.7 2290.21
      62    2292 2290.21      62    2292    2290      63    2292    2292

Downstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2292.4      10    2292      39  2291.5      47    2290      47 2287.21
      62 2287.21      62    2290      63    2292      74    2294     179    2296

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      10     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
           47      62             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      72     143    2304          F

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =    2292
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       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .1    73.9     .013     .013        0                .4                 1
Number of Barrels =  2
Upstream   Elevation =  2287.91
Centerline Stations
    Sta.    Sta.
    50.5    58.5
Downstream Elevation =  2287.21
Centerline Stations
    Sta.    Sta.
    50.5    58.5

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

  Q Culv Group (cfs)         230.00    Culv Full Len (ft)          73.90
  # Barrels                       2    Culv Vel US (ft/s)           5.48
  Q Barrel (cfs)             115.00    Culv Vel DS (ft/s)           5.48
  E.G. US. (ft)             2291.49    Culv Inv El Up (ft)       2287.91
  W.S. US. (ft)             2291.14    Culv Inv El Dn (ft)       2287.21
  E.G. DS (ft)              2290.98    Culv Frctn Ls (ft)           0.23
  W.S. DS (ft)              2290.68    Culv Exit Loss (ft)          0.17
  Delta EG (ft)                0.51    Culv Entr Loss (ft)          0.19
  Delta WS (ft)                0.46    Q Weir (cfs)
  E.G. IC (ft)              2291.19    Weir Sta Lft (ft)
  E.G. OC (ft)              2291.49    Weir Sta Rgt (ft)
  Culvert Control            Outlet    Weir Submerg
  Culv WS Inlet (ft)        2290.91    Weir Max Depth (ft)
  Culv WS Outlet (ft)       2290.21    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          2.03    Min El Weir Flow (ft)     2292.01


CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6535

INPUT
Description:
Station Elevation Data     num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2292.4       10    2292      39  2291.5      47    2290      47 2287.21
      62 2287.21      62    2290      63    2292      74    2294     179    2296

Manning's n Values         num=       2
     Sta   n Val     Sta   n Val
       0    .016      10    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            47      62                 67      67      67             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      72     143    2304       F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6468

INPUT
Description:
Station Elevation Data     num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2291.7       41    2291      50    2290      56    2288      60  2286.7
      71    2288      71    2292      75    2294

Manning's n Values         num=       2
     Sta   n Val     Sta   n Val
       0    .016      41    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            50      71                 64      64      64             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6404

INPUT
Description:
Station Elevation Data     num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2291.2       46  2290.4      55    2290      55 2286.17      70 2286.17
      70    2290      75    2292      85    2294

Manning's n Values         num=       2
     Sta   n Val     Sta   n Val
       0    .016      46    .03
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           55      70             83.01   83.01   83.01            .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 6362

INPUT
Description: Culvert 25
Distance from Upstream XS =       .1
Deck/Roadway Width        =     82.9
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      55    2290 2289.17       70    2290 2289.17

Upstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2291.2      46  2290.4      55    2290      55 2286.17      70 2286.17
      70    2290      75    2292      85    2294

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      46     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
           55      70             .1       .3

Downstream  Deck/Roadway Coordinates
    num=        6
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      54  2289.7  2289.7       61  2289.7    2288       61  2289.7 2288.53
      76  2289.7 2288.53       76  2289.7    2288       77  2289.7  2289.7

Downstream Bridge Cross Section Data
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2290.5      36    2290      54  2289.7      61    2288      61 2285.53
      76 2285.53       76    2288      77    2290      87  2291.9      92    2290
     409    2290     487    2292

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
       0    .016      54     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
           61      76             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      77     487    2292        F
Right Levee     Station=      87      Elevation=  2291.9

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =    2290
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       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    82.9     .013     .013        0                  .4               1
Number of Barrels =  2
Upstream   Elevation =  2286.17
Centerline Stations
    Sta.    Sta.
    58.5    66.5
Downstream Elevation =  2285.53
Centerline Stations
    Sta.    Sta.
    64.5    72.5

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

  Q Culv Group (cfs)        194.44    Culv Full Len (ft)         82.90
  # Barrels                      2    Culv Vel US (ft/s)         4.63
  Q Barrel (cfs)             97.22    Culv Vel DS (ft/s)         4.63
  E.G. US. (ft)            2290.71    Culv Inv El Up (ft)     2286.17
  W.S. US. (ft)            2290.52    Culv Inv El Dn (ft)     2285.53
  E.G. DS (ft)             2290.25    Culv Frctn Ls (ft)         0.13
  W.S. DS (ft)             2290.12    Culv Exit Loss (ft)        0.20
  Delta EG (ft)               0.46    Culv Entr Loss (ft)        0.13
  Delta WS (ft)               0.40    Q Weir (cfs)              35.56
```

E.G. IC (ft)	2289.45	Weir Sta Lft (ft)	28.23
E.G. OC (ft)	2290.71	Weir Sta Rgt (ft)	71.77
Culvert Control	Outlet	Weir Submerg	0.11
Culv WS Inlet (ft)	2289.17	Weir Max Depth (ft)	0.71
Culv WS Outlet (ft)	2288.53	Weir Avg Depth (ft)	0.43
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	18.59
Culv Crt Depth (ft)	1.82	Min El Weir Flow (ft)	2290.01

Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
The reported inlet energy grade answer may not be valid.

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6321

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2290.5	36	2290	54	2289.7	61	2288	61	2285.53
76	2285.53	76	2288	77	2290	87	2291.9	92	2290
409	2290	487	2292						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	54	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
61	76	61	61	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
77	487	2292	F

Right Levee Station= 87 Elevation= 2291.9

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6260

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2290	61	2289.2	74	2288	82	2288	90	2290
95	2291	100	2290	390	2290	574	2292		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	61	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	90	99	99	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100	574	2292	F

Right Levee Station= 95 Elevation= 2291

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6161

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2289.1	60	2288.4	66	2288	77	2287.3	125	2288
135	2288	203	2290	285	2290	435	2290		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	60	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	125	149	149	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
138	435	2290	F

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 6012

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2287.9	60	2286.8	82	2286	410	2288

```
Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       60     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     410               204     204     204             .1      .3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
     140     410    2288        F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 5808

INPUT
Description:
Station Elevation Data      num=        7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2285.8       60  2285.1       77    2284      173  2282.2      232    2284
     508    2286      552    2288

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       60     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     552               290     290     290             .1      .3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
     420     552    2288        F
Blocked Obstructions      num=        1
   Sta L   Sta R    Elev
     239     420    2289

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 5518

INPUT
Description:
Station Elevation Data      num=        9
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0    2283       58  2282.4      114    2282      215    2282      225    2284
     287    2284      348    2282      588    2282      593    2284

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       58     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     593               136     136     136             .1      .3
Ineffective Flow      num=        1
   Sta L   Sta R    Elev  Permanent
     287     593    2284        F
Right Levee     Station=      227      Elevation=     2284
Blocked Obstructions      num=        1
   Sta L   Sta R    Elev
     225     287    2285

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 5382

INPUT
Description:
Station Elevation Data      num=        8
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2281.5       56    2281       69    2280       71    2278      206    2278
     246    2280      428  2281.4      587    2282

Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       56     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     587               118     118     118             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 5264

INPUT
Description:
Station Elevation Data      num=       10
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2280.5       45    2280       53  2279.8       84    2278       88 2273.01
```

```
     95 2273.01     210    2278     415    2280     581    2280     588    2282

Manning's n Values         num=        2
     Sta   n Val     Sta   n Val
       0    .016      53     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     588          1428.01 1428.01 1428.01             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 4550

INPUT
Description: Culvert 27
Distance from Upstream XS =       .1
Deck/Roadway Width        =  1427.9
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      84    2278 2273.01     175 2276.84 2273.01     210    2278 2273.01

Upstream Bridge Cross Section Data
Station Elevation Data    num=       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2280.5      45    2280      53  2279.8      84    2278      88 2273.01
      95 2273.01     210    2278     415    2280     581    2280     588    2282

Manning's n Values         num=        2
     Sta   n Val     Sta   n Val
       0    .016      53     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     588             .1       .3

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      69    2268 2264.48      80    2268 2264.48

Downstream Bridge Cross Section Data
Station Elevation Data    num=       16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2272.1      43  2271.3      61    2270      69    2268      71 2264.48
      78 2264.48      80    2268      87    2270     116    2270     223    2272
     381    2272     439    2274     446    2274     506    2272     517    2272
     598    2274

Manning's n Values         num=        2
     Sta   n Val     Sta   n Val
       0    .016      43     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0     598             .1       .3

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =  2276.9
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       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               .1  1427.9     .013     .013        0                  .5                1
Upstream   Elevation =  2273.01
           Centerline Station =  91.5
Downstream Elevation =  2264.48
           Centerline Station =  74.5

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

  Q Culv Group (cfs)        142.38    Culv Full Len (ft)       1092.07
  # Barrels                      1    Culv Vel US (ft/s)          8.68
  Q Barrel (cfs)            142.38    Culv Vel DS (ft/s)          6.78
  E.G. US. (ft)            2277.12    Culv Inv El Up (ft)      2273.01
  W.S. US. (ft)            2277.11    Culv Inv El Dn (ft)      2264.48
  E.G. DS (ft)             2270.44    Culv Frctn Ls (ft)          5.41
  W.S. DS (ft)             2270.40    Culv Exit Loss (ft)         0.68
  Delta EG (ft)               6.68    Culv Entr Loss (ft)         0.59
  Delta WS (ft)               6.71    Q Weir (cfs)                3.62
  E.G. IC (ft)             2277.12    Weir Sta Lft (ft)         154.18
  E.G. OC (ft)             2277.11    Weir Sta Rgt (ft)         183.01
  Culvert Control            Inlet    Weir Submerg                0.00
  Culv WS Inlet (ft)       2275.35    Weir Max Depth (ft)         0.27
```

Culv WS Outlet (ft)	2267.48	Weir Avg Depth (ft)	0.13
Culv Nml Depth (ft)	1.97	Weir Flow Area (sq ft)	3.83
Culv Crt Depth (ft)	2.34	Min El Weir Flow (ft)	2276.90

Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3836

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2272.1	43	2271.3	61	2270	69	2268	71	2264.48
78	2264.48	80	2268	87	2270	116	2270	223	2272
381	2272	439	2274	446	2274	506	2272	517	2272
598	2274								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	43	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	598	80	80	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3756

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2271.7	44	2270.9	65	2270	85	2268	159	2270
171	2272	232	2272	241	2274	382	2274	442	2272
471	2272	572	2274						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	44	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	572	90	90	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3666

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2271.3	46	2270.5	59	2270	130	2269.5	183	2270
202	2272	353	2272	390	2274	415	2272	447	2272
496	2274	508	2272	521	2272	530	2274		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	46	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	530	187	187	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 3479

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2270.5	29	2270	54	2269.8	126	2268	150	2268
190	2270	212	2272	245	2272	256	2270	294	2270
333	2272	341	2270	399	2270	479	2270.3	685	2272

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	54	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	685	334	334	.1	.3

SUMMARY OF MANNING'S N VALUES

River:RANCHO ROAD

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
n10	n11	n12	n13	n14	n15					
95 TO GOWAN	13266	.03	.016							
95 TO GOWAN	13036	.03	.016							
95 TO GOWAN	12852	.025	.016							
95 TO GOWAN	12677	.016	.025	.016						
95 TO GOWAN	12430	.025	.016							
95 TO GOWAN	12355	.025	.016							
95 TO GOWAN	12295	.025	.016							
95 TO GOWAN	12280	.03	.016							
95 TO GOWAN	12264	.025	.016							
95 TO GOWAN	12145	.025	.016							
95 TO GOWAN	12111	.025	.015							
95 TO GOWAN	12036	Culvert								
95 TO GOWAN	11961	.016	.025							
95 TO GOWAN	11897	.016	.025	.016						
95 TO GOWAN	11748	.016	.025	.016						
95 TO GOWAN	11683	.016	.025	.016						
95 TO GOWAN	11653	.015	.025	.015						
95 TO GOWAN	11621	Culvert								
95 TO GOWAN	11590	.015	.025	.015						
95 TO GOWAN	11538	.016	.025	.016						
95 TO GOWAN	11438	.016	.025	.016						
95 TO GOWAN	11167	.016	.025	.016						
95 TO GOWAN	10946	.016	.025	.015						
95 TO GOWAN	10807	.016	.025	.013	.016	.013				
95 TO GOWAN	10758	.015	.025	.013	.016	.013				
95 TO GOWAN	10667	Culvert								
95 TO GOWAN	10575	.015	.03	.015	.03					
95 TO GOWAN	10547	.015	.03							
95 TO GOWAN	10518	.015	.03	.015	.03					
95 TO GOWAN	10485	Culvert								
95 TO GOWAN	10450	.015	.03	.015	.03					
95 TO GOWAN	10399	.016	.03							
95 TO GOWAN	10295	.016	.03							
95 TO GOWAN	10075	.016	.03							
95 TO GOWAN	9918	.016	.03							
95 TO GOWAN	9796	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9566	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9539	Culvert								
95 TO GOWAN	9512	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9472	.016	.013	.03	.016	.013	.016			
95 TO GOWAN	9376	.016	.013	.03	.016	.013	.016	.03	.013	
95 TO GOWAN	9324	.016	.03	.016						
95 TO GOWAN	9205	.016	.03	.016						
95 TO GOWAN	9114	.016	.03							
95 TO GOWAN	9060	.016	.03							
95 TO GOWAN	8950	.016	.03	.016	.013	.016	.013	.016	.035	.013
.016 .013	.035									
95 TO GOWAN	8862	.025	.013	.016	.013	.016	.013	.016	.013	.035
95 TO GOWAN	8832	.025	.013	.016	.013	.035	.013	.035	.013	.035
.013 .016	.013	.016	.013	.035						
95 TO GOWAN	8802	.025	.013	.016	.013	.035	.013	.035	.013	.016
.013 .035										
95 TO GOWAN	8744	.025	.013	.016	.013	.035	.013	.035	.013	.016
.013 .035										
95 TO GOWAN	8668	.025	.013	.016	.013	.035	.013	.035		
95 TO GOWAN	8616	.016	.013	.03	.013	.03	.013	.016	.013	
95 TO GOWAN	8586	.016	.013	.03	.013	.03	.013	.016	.013	
95 TO GOWAN	8566	.016	.013	.03	.013	.03	.013	.016	.013	.03
95 TO GOWAN	8533	Culvert								
95 TO GOWAN	8506	.016	.013	.03	.013	.03				
95 TO GOWAN	8476	.016	.013	.03	.013	.03	.016			
95 TO GOWAN	8410	.016	.03							
95 TO GOWAN	8277	.016	.03							
95 TO GOWAN	8155	.016	.03							
95 TO GOWAN	7939	.016	.03							
95 TO GOWAN	7578	.016	.03							
95 TO GOWAN	7478	.016	.03							
95 TO GOWAN	7373	.016	.03							
95 TO GOWAN	7280	.016	.03							
95 TO GOWAN	7016	.016								
95 TO GOWAN	6934	.016								
95 TO GOWAN	6815	.016								
95 TO GOWAN	6763	.016	.03							
95 TO GOWAN	6691	.016	.03							
95 TO GOWAN	6609	.016	.03							
95 TO GOWAN	6572	Culvert								
95 TO GOWAN	6535	.016	.03							
95 TO GOWAN	6468	.016	.03							
95 TO GOWAN	6404	.016	.03							
95 TO GOWAN	6362	Culvert								
95 TO GOWAN	6321	.016	.03							
95 TO GOWAN	6260	.016	.03							
95 TO GOWAN	6161	.016	.03							
95 TO GOWAN	6012	.016	.03							
95 TO GOWAN	5808	.016	.03							
95 TO GOWAN	5518	.016	.03							
95 TO GOWAN	5382	.016	.03							

95 TO GOWAN	5264	.016	.03
95 TO GOWAN	4550	Culvert	
95 TO GOWAN	3836	.016	.03
95 TO GOWAN	3756	.016	.03
95 TO GOWAN	3666	.016	.03
95 TO GOWAN	3479	.016	.03

SUMMARY OF REACH LENGTHS

River: RANCHO ROAD

Reach	River Sta.	Left	Channel	Right
95 TO GOWAN	13266	275	230	.001
95 TO GOWAN	13036	229	184	.001
95 TO GOWAN	12852	175	175	175
95 TO GOWAN	12677	247	247	247
95 TO GOWAN	12430	75	75	75
95 TO GOWAN	12355	60	60	60
95 TO GOWAN	12295	15	15	15
95 TO GOWAN	12280	16	16	16
95 TO GOWAN	12264	119	119	119
95 TO GOWAN	12145	34	34	34
95 TO GOWAN	12111	150.01	150.01	150.01
95 TO GOWAN	12036	Culvert		
95 TO GOWAN	11961	64	64	64
95 TO GOWAN	11897	149	149	149
95 TO GOWAN	11748	65	65	65
95 TO GOWAN	11683	30	30	30
95 TO GOWAN	11653	63.01	63.01	63.01
95 TO GOWAN	11621	Culvert		
95 TO GOWAN	11590	52	52	52
95 TO GOWAN	11538	100	100	100
95 TO GOWAN	11438	271	271	271
95 TO GOWAN	11167	221	221	221
95 TO GOWAN	10946	139	139	139
95 TO GOWAN	10807	49	49	49
95 TO GOWAN	10758	183.01	183.01	183.01
95 TO GOWAN	10667	Culvert		
95 TO GOWAN	10575	28	28	28
95 TO GOWAN	10547	29	29	29
95 TO GOWAN	10518	68.01	68.01	68.01
95 TO GOWAN	10485	Culvert		
95 TO GOWAN	10450	51	51	51
95 TO GOWAN	10399	104	104	104
95 TO GOWAN	10295	265	220	188
95 TO GOWAN	10075	164	157	148
95 TO GOWAN	9918	122	122	122
95 TO GOWAN	9796	230	230	230
95 TO GOWAN	9566	54	54	54
95 TO GOWAN	9539	Culvert		
95 TO GOWAN	9512	40	40	40
95 TO GOWAN	9472	96	96	96
95 TO GOWAN	9376	52	52	52
95 TO GOWAN	9324	119	119	119
95 TO GOWAN	9205	91	91	91
95 TO GOWAN	9114	54	54	54
95 TO GOWAN	9060	110	110	110
95 TO GOWAN	8950	88	88	88
95 TO GOWAN	8862	30	30	30
95 TO GOWAN	8832	30	30	30
95 TO GOWAN	8802	58	58	58
95 TO GOWAN	8744	76	76	76
95 TO GOWAN	8668	52	52	52
95 TO GOWAN	8616	30	30	31
95 TO GOWAN	8586	20	20	20
95 TO GOWAN	8566	60	60	60
95 TO GOWAN	8533	Culvert		
95 TO GOWAN	8506	30	30	45
95 TO GOWAN	8476	66	66	66
95 TO GOWAN	8410	133	133	133
95 TO GOWAN	8277	122	122	122
95 TO GOWAN	8155	216	216	216
95 TO GOWAN	7939	361	361	361
95 TO GOWAN	7578	100	100	100
95 TO GOWAN	7478	105	105	105
95 TO GOWAN	7373	93	93	93
95 TO GOWAN	7280	264	264	264
95 TO GOWAN	7016	81	81	81
95 TO GOWAN	6934	119	119	119
95 TO GOWAN	6815	52	52	52
95 TO GOWAN	6763	72	72	72
95 TO GOWAN	6691	82	82	82
95 TO GOWAN	6609	74.01	74.01	74.01
95 TO GOWAN	6572	Culvert		
95 TO GOWAN	6535	67	67	67
95 TO GOWAN	6468	64	64	64
95 TO GOWAN	6404	83.01	83.01	83.01
95 TO GOWAN	6362	Culvert		
95 TO GOWAN	6321	61	61	61
95 TO GOWAN	6260	99	99	99
95 TO GOWAN	6161	149	149	149

95 TO GOWAN	6012	204	204	204
95 TO GOWAN	5808	290	290	290
95 TO GOWAN	5518	136	136	136
95 TO GOWAN	5382	118	118	118
95 TO GOWAN	5264	1428.01	1428.01	1428.01
95 TO GOWAN	4550	Culvert		
95 TO GOWAN	3836	80	80	80
95 TO GOWAN	3756	90	90	90
95 TO GOWAN	3666	187	187	187
95 TO GOWAN	3479	334	334	334

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RANCHO ROAD

Reach	River Sta.	Contr.	Expan.
95 TO GOWAN	13266	.1	.3
95 TO GOWAN	13036	.1	.3
95 TO GOWAN	12852	.1	.3
95 TO GOWAN	12677	.1	.3
95 TO GOWAN	12430	.1	.3
95 TO GOWAN	12355	.1	.3
95 TO GOWAN	12295	.1	.3
95 TO GOWAN	12280	.1	.3
95 TO GOWAN	12264	.1	.3
95 TO GOWAN	12145	.1	.3
95 TO GOWAN	12111	.1	.3
95 TO GOWAN	12036	Culvert	
95 TO GOWAN	11961	.1	.3
95 TO GOWAN	11897	.1	.3
95 TO GOWAN	11748	.1	.3
95 TO GOWAN	11683	.1	.3
95 TO GOWAN	11653	.1	.3
95 TO GOWAN	11621	Culvert	
95 TO GOWAN	11590	.1	.3
95 TO GOWAN	11538	.1	.3
95 TO GOWAN	11438	.1	.3
95 TO GOWAN	11167	.1	.3
95 TO GOWAN	10946	.1	.3
95 TO GOWAN	10807	.1	.3
95 TO GOWAN	10758	.1	.3
95 TO GOWAN	10667	Culvert	
95 TO GOWAN	10575	.1	.3
95 TO GOWAN	10547	.1	.3
95 TO GOWAN	10518	.1	.3
95 TO GOWAN	10485	Culvert	
95 TO GOWAN	10450	.1	.3
95 TO GOWAN	10399	.1	.3
95 TO GOWAN	10295	.1	.3
95 TO GOWAN	10075	.1	.3
95 TO GOWAN	9918	.1	.3
95 TO GOWAN	9796	.1	.3
95 TO GOWAN	9566	.1	.3
95 TO GOWAN	9539	Culvert	
95 TO GOWAN	9512	.1	.3
95 TO GOWAN	9472	.1	.3
95 TO GOWAN	9376	.1	.3
95 TO GOWAN	9324	.1	.3
95 TO GOWAN	9205	.1	.3
95 TO GOWAN	9114	.1	.3
95 TO GOWAN	9060	.1	.3
95 TO GOWAN	8950	.1	.3
95 TO GOWAN	8862	.1	.3
95 TO GOWAN	8832	.1	.3
95 TO GOWAN	8802	.1	.3
95 TO GOWAN	8744	.1	.3
95 TO GOWAN	8668	.1	.3
95 TO GOWAN	8616	.1	.3
95 TO GOWAN	8586	.1	.3
95 TO GOWAN	8566	.1	.3
95 TO GOWAN	8533	Culvert	
95 TO GOWAN	8506	.1	.3
95 TO GOWAN	8476	.1	.3
95 TO GOWAN	8410	.1	.3
95 TO GOWAN	8277	.1	.3
95 TO GOWAN	8155	.1	.3
95 TO GOWAN	7939	.1	.3
95 TO GOWAN	7578	.1	.3
95 TO GOWAN	7478	.1	.3
95 TO GOWAN	7373	.1	.3
95 TO GOWAN	7280	.1	.3
95 TO GOWAN	7016	.1	.3
95 TO GOWAN	6934	.1	.3
95 TO GOWAN	6815	.1	.3
95 TO GOWAN	6763	.1	.3
95 TO GOWAN	6691	.1	.3
95 TO GOWAN	6609	.1	.3
95 TO GOWAN	6572	Culvert	
95 TO GOWAN	6535	.1	.3
95 TO GOWAN	6468	.1	.3
95 TO GOWAN	6404	.1	.3

95 TO GOWAN	6362	Culvert		
95 TO GOWAN	6321		.1	.3
95 TO GOWAN	6260		.1	.3
95 TO GOWAN	6161		.1	.3
95 TO GOWAN	6012		.1	.3
95 TO GOWAN	5808		.1	.3
95 TO GOWAN	5518		.1	.3
95 TO GOWAN	5382		.1	.3
95 TO GOWAN	5264		.1	.3
95 TO GOWAN	4550	Culvert		
95 TO GOWAN	3836		.1	.3
95 TO GOWAN	3756		.1	.3
95 TO GOWAN	3666		.1	.3
95 TO GOWAN	3479		.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : PR

River: RANCHO ROAD Reach: 95 TO GOWAN RS: 13266 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 13036 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12852 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12677 Profile: PF#1
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12430 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12295 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 12145 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11897 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11683 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11590 Profile: PF#1
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11438 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 11167 Profile: PF#1
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10946 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10807 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10667 Profile: PF#1 Culv: Culvert #1
Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10575 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10547 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10518 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10450 Profile: PF#1
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

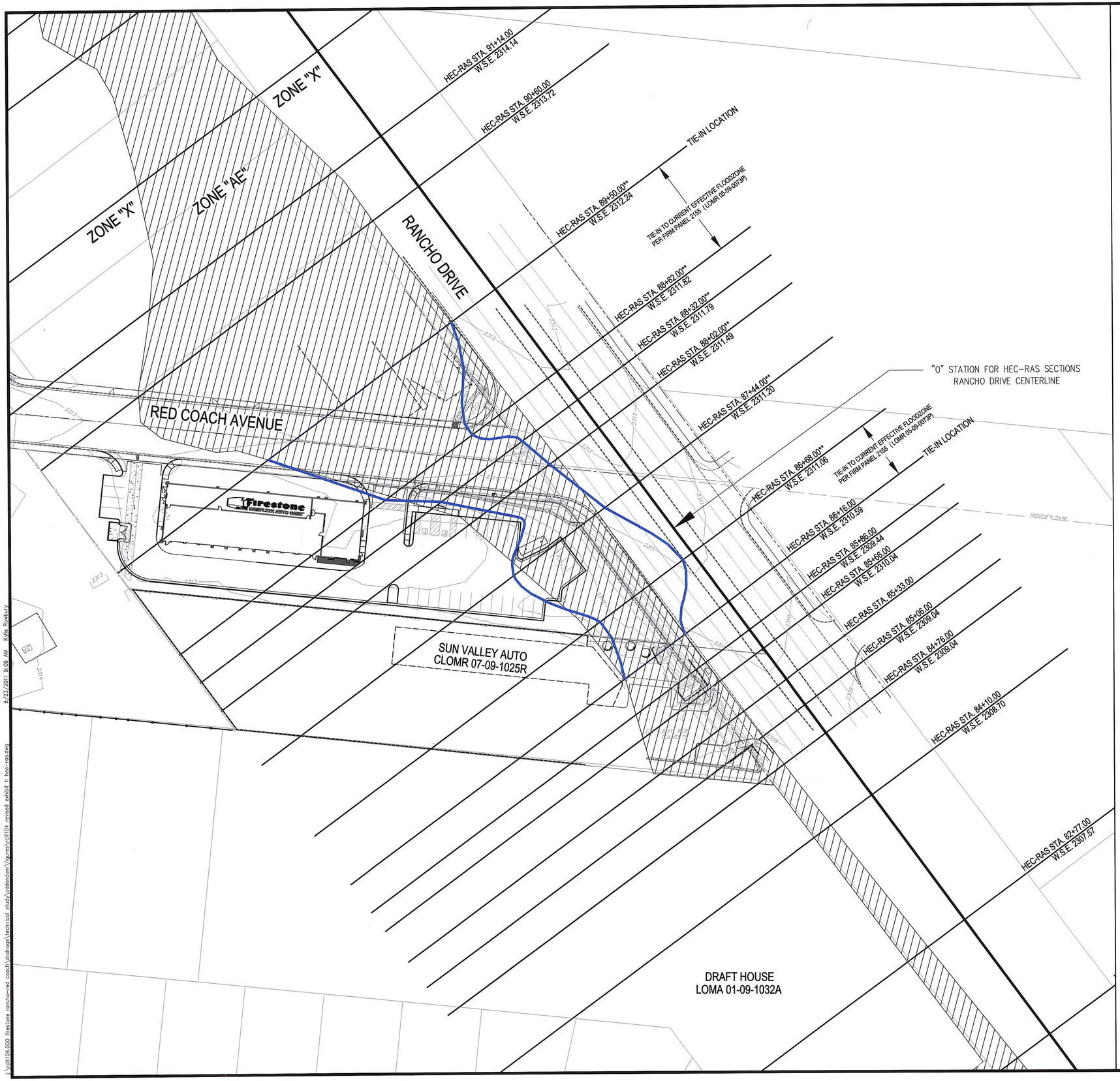
This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10399 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10295 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10075 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9918 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9796 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9566 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9539 Profile: PF#1 Culv: Culvert #1
Warning:During the culvert inlet computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9512 Profile: PF#1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9472 Profile: PF#1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9376 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9324 Profile: PF#1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9205 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9114 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9060 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8950 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

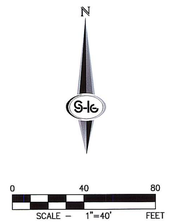
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8862 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8832 Profile: PF#1
Note: Manning's n values were composited to a single value in the main channel.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8802 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8744 Profile: PF#1
Warning:Divided flow computed for this cross-section.
Note: Manning's n values were composited to a single value in the main channel.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8668 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8616 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8586 Profile: PF#1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8566 Profile: PF#1
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8533 Profile: PF#1 Culv: Culvert #1
Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.
Note: Culvert critical depth exceeds the height of the culvert.
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note: The culvert inlet is submerged and the culvert flows full over part or all of its length. Therefore, the culvert inlet equations are not valid and the supercritical result has been discarded. The outlet answer will be used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8506 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8476 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8410 Profile: PF#1
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8155 Profile: PF#1
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7939 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7578 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7478 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7373 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7280 Profile: PF#1

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7016 Profile: PF#1
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6934 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6815 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6763 Profile: PF#1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6691 Profile: PF#1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6535 Profile: PF#1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6362 Profile: PF#1 Culv: Culvert #1
Warning:During the culvert inlet computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6321 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6260 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6161 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 6012 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5808 Profile: PF#1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5518 Profile: PF#1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5382 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 5264 Profile: PF#1
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 4550 Profile: PF#1 Culv: Culvert #1
Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal depth at the outlet.
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 3836 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 3756 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: RANCHO ROAD Reach: 95 TO GOWAN RS: 3666 Profile: PF#1
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Exhibit H





LEGEND

HEC-RAS STA. 87+44.00 / W.S.E. 2310.72	**HEC-RAS SECTION**
**	**SECTION GEOMETRY PER FIRESTONE PROPOSED GRADING**
	PROPOSED FLOODZONE
	CURRENT EFFECTIVE FLOODZONE

HEC-RAS Analysis Comparison
FEMA Effective vs. Existing vs. Proposed

HEC-RAS Station	Sun Valley Auto[2] *CLOMR 07-09-1025R* WSE (ft)	FEMA Effective[1] *LOMR 05-09-0073P* WSE (ft)	Existing Condition WSE (ft)	Proposed Condition WSE (ft)	Δ WSE (ft) Proposed - Existing
94+72.00	--	2316.66	**2316.66**	**2316.66**	**0.00**
93+76.00	--	2316.40	**2316.40**	**2316.40**	**0.00**
93+24.00	--	2314.81	**2314.81**	**2314.81**	**0.00**
92+05.00	--	2314.50	**2314.50**	**2314.50**	**0.00**
91+14.00	--	2314.20	**2314.14**	**2314.14**	**0.00**
90+60.00	--	2314.12	**2313.72**	**2313.72**	**0.00**
89+50.00	2312.84	2313.74	**2312.24**	**2312.24**	**0.00**
88+62.00	2312.08	N/A	**2311.92**	**2311.82**	**-0.10**
88+32.00	2311.70	N/A	**2311.85**	**2311.79**	**-0.06**
88+02.00	2311.40	N/A	**2311.53**	**2311.49**	**-0.04**
87+44.00	2311.11	N/A	**2311.26**	**2311.20**	**-0.06**
86+68.00	2311.02	2311.03	**2311.08**	**2311.06**	**-0.02**
86+16.00	2310.60	N/A	**2310.59**	**2310.59**	**0.00**
85+86.00	2310.31	N/A	**2309.44**	**2309.44**	**0.00**
85+66.00	2310.36	N/A	**2310.04**	**2310.04**	**0.00**
85+06.00	2309.08	N/A	**2309.04**	**2309.04**	**0.00**
84+76.00	2309.06	2309.37	**2309.04**	**2309.04**	**0.00**
84+10.00	--	2308.72	**2308.70**	**2308.70**	**0.00**
82+77.00	--	2307.57	**2307.57**	**2307.57**	**0.00**
81+55.00	--	2306.61	**2306.61**	**2306.61**	**0.00**
79+39.00	--	2304.14	**2304.14**	**2304.14**	**0.00**

1 - Referenced from the Lone Mountain Apartments Study and associated LOMR 05-09-0073P.
2 - For informational purposes only.

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

FIRESTONE

FIRESTONE AT RANCHO & RED COACH
HEC-RAS EXHIBIT

DATE: 08/23/11
DRAFTER: KCR
DESIGNER: KCR
CHECKED: MJF

PROJECT NO.
RCI1104.000

EXHIBIT H
ADD1

8/23/2011 9:09 AM Kylie Bowbury
J:\rci1104-009 firestone rancho-red coach\drainage\technical study\addendum\figures\rci1104 revised exhibit h hec-ras.dwg

Sun Valley Auto Reference Material

HEC-RAS RESULTS SUMMARY TABLE

HEC-RAS Results Summary for the Technical Drainage Study for Sun Valley Auto

	Existing Condition (FIS Restudy)		Interim Condition		Developed Condition		
Riv.Sta.	W.S.E.	Velocity (fps)	W.S.E.	Velocity (fps)	W.S.E.	Velocity (fps)	
95+12	2316.22	1.77	2316.22	1.77	2316.22	1.77	
94+72	2316.14	1.61	2316.14	1.61	2316.14	1.61	<<<<<
93+76	2315.63	2.49	2315.64	2.47	2315.64	2.47	tie-in point
93+24	2315.39	1.80	2315.37	1.90	2315.37	1.90	
92+05	2314.42	2.96	2314.45	2.72	2314.45	2.71	
91+14	2314.20	1.22	2314.13	1.41	2314.13	1.40	
90+60	2314.12	1.32	2313.91	2.07	2313.93	1.96	
89+50	2313.74	2.58	2312.88	3.14	2312.84	3.53	
88+62	N/A	N/A	N/A	N/A	2312.07	3.94	
88+32	N/A	N/A	N/A	N/A	2311.70	5.33	
88+02	N/A	N/A	2311.54	2.79	2311.40	5.10	
87+44	N/A	N/A	N/A	N/A	2311.11	1.25	
86+68	2311.03	4.07	2309.99	5.10	2311.02	1.82	
86+16	N/A	N/A	N/A	N/A	2310.60	4.76	
85+86	N/A	N/A	N/A	N/A	2310.31	3.53	
85+66	N/A	N/A	N/A	N/A	2310.36	2.24	
85+33	N/A	N/A	N/A	N/A	2310.07	3.98	
85+06	N/A	N/A	N/A	N/A	2309.08	5.59	
84+76	2309.37	2.55	2309.06	2.05	2309.06	2.04	
84+10	2308.72	3.80	2308.72	3.80	2308.72	3.80	<<<<<
82+77	2307.58	3.27	2307.58	3.27	2307.58	3.27	tie-in point
81+55	2306.61	3.41	2306.61	3.41	2306.61	3.41	

HEC-RAS Plan: Plan 1 River: RANCHO-ROAD Reach: 95 TO GOWAN Profile: PF#1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
95 TO GOWAN	10075	PF#1	169.00	2316.00	2317.23	2317.17	2317.61	0.011868	4.96	34.06	38.49	0.93
95 TO GOWAN	9918	PF#1	169.00	2316.00	2316.58		2316.63	0.003253	1.76	95.97	194.91	0.44
95 TO GOWAN	9796	PF#1	169.00	2314.00	2316.46		2316.47	0.000646	0.85	199.56	361.36	0.20
95 TO GOWAN	9566	PF#1	215.00	2314.00	2316.31		2316.33	0.000570	1.05	220.58	344.48	0.20
95 TO GOWAN	9512	PF#1	215.00	2314.00	2316.22		2316.27	0.002320	1.77	125.70	238.81	0.39
95 TO GOWAN	9472	PF#1	215.00	2314.00	2316.14		2316.18	0.001929	1.61	153.85	422.74	0.35
95 TO GOWAN	9376	PF#1	180.00	2314.00	2315.64		2315.73	0.005930	2.47	72.97	139.86	0.60
95 TO GOWAN	9324	PF#1	180.00	2314.00	2315.37	2315.21	2315.43	0.005356	1.90	94.64	248.81	0.54
95 TO GOWAN	9205	PF#1	180.00	2313.70	2314.45		2314.57	0.010338	2.71	66.44	168.31	0.76
95 TO GOWAN	9114	PF#1	180.00	2313.20	2314.13	2313.80	2314.16	0.002184	1.40	128.41	272.45	0.36
95 TO GOWAN	9060	PF#1	180.00	2312.90	2313.93	2313.72	2313.99	0.004837	1.97	91.57	210.82	0.53
95 TO GOWAN	8950	PF#1	180.00	2312.00	2312.84	2312.84	2313.03	0.018869	3.52	51.16	136.53	1.01
95 TO GOWAN	8862	PF#1	180.00	2310.93	2312.08	2312.08	2312.31	0.004534	3.92	45.88	101.28	1.03
95 TO GOWAN	8832	PF#1	180.00	2310.47	2311.70	2311.82	2312.14	0.006472	5.32	33.85	79.23	1.43
95 TO GOWAN	8802	PF#1	180.00	2310.76	2311.40	2311.52	2311.80	0.020108	5.09	35.33	103.33	1.54
95 TO GOWAN	8744	PF#1	180.00	2308.74	2311.11	2309.97	2311.13	0.000660	1.25	144.09	120.41	0.20
95 TO GOWAN	8668	PF#1	180.00	2308.44	2311.02		2311.07	0.000826	1.82	99.17	90.08	0.30
95 TO GOWAN	8616	PF#1	180.00	2308.22	2310.60	2310.60	2310.95	0.007195	4.76	37.78	53.25	1.00
95 TO GOWAN	8586	PF#1	180.00	2308.10	2310.31	2309.75	2310.51	0.003639	3.53	51.41	66.24	0.66
95 TO GOWAN	8566	PF#1	180.00	2307.94	2310.36	2309.32	2310.43	0.001078	2.24	83.87	103.15	0.39
95 TO GOWAN	8565		Culvert									
95 TO GOWAN	8533	PF#1	180.00	2309.02	2310.07	2310.07	2310.32	0.003465	3.98	45.17	95.02	1.02
95 TO GOWAN	8532		Culvert									
95 TO GOWAN	8506	PF#1	180.00	2307.72	2309.08	2309.08	2309.57	0.010061	5.59	32.19	33.38	1.00
95 TO GOWAN	8476	PF#1	180.00	2307.61	2309.06	2308.68	2309.12	0.001037	2.04	88.12	142.69	0.46
95 TO GOWAN	8410	PF#1	180.00	2307.70	2308.72	2308.67	2308.94	0.011531	3.80	47.33	84.90	0.90
95 TO GOWAN	8277	PF#1	180.00	2306.50	2307.58	2307.43	2307.74	0.007147	3.27	55.08	87.78	0.73
95 TO GOWAN	8155	PF#1	180.00	2305.40	2306.61	2306.52	2306.79	0.008457	3.41	52.84	99.13	0.82
95 TO GOWAN	7939	PF#1	180.00	2302.20	2304.14	2304.12	2304.42	0.014647	4.23	42.51	73.80	0.98
95 TO GOWAN	7578	PF#1	198.00	2299.90	2301.14		2301.29	0.005820	3.13	63.27	102.66	0.70
95 TO GOWAN	7478	PF#1	198.00	2298.90	2300.20	2300.20	2300.42	0.014444	3.77	52.45	112.43	0.97
95 TO GOWAN	7373	PF#1	198.00	2298.00	2299.11	2298.99	2299.29	0.008014	3.45	57.34	93.80	0.78
95 TO GOWAN	7280	PF#1	198.00	2297.90	2298.75	2298.52	2298.84	0.003003	2.41	82.11	136.41	0.55

HEC-RAS REPORT

HEC-RAS Version 3.1.1 May 2003
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X     X
X     X  X        X            X   X     X   X    X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X      X    X        X
X     X  X        X    X       X   X     X    X        X
X     X  XXXXXX    XXXX        X    X    X    X   XXXXX
```

(100-YR)

PROJECT DATA
Project Title: Sun Valley Auto (Developed)
Project File : svadevb.prj
Run Date and Time: 1/26/2007 11:28:07 AM

Project in English units

PLAN DATA

Plan Title: Critical
Plan File : W:\Active\188100290\land_development\drainage\Technical Drainage Study\Calculations\HEC-RAS\svadevb.p01

Geometry Title: Cross-sections
Geometry File : w:\Active\188100290\land_development\drainage\Technical Drainage Study\Calculations\HEC-RAS\svadevb.g01

Flow Title : flow 1
Flow File : w:\Active\188100290\land_development\drainage\Technical Drainage Study\Calculations\HEC-RAS\svadevb.f01

Plan Summary Information:

Number of:	Cross Sections	= 31	Mulitple Openings	=	0
	Culverts	= 2	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

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

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 1
Flow File : w:\Active\188100290\land_development\drainage\Technical Drainage Study\Calculations\HEC-RAS\svadevb.f01

Flow Data (cfs)

River	Reach	RS	PF#1
RANCHO ROAD	95 TO GOWAN	10075	169
RANCHO ROAD	95 TO GOWAN	9566	215
RANCHO ROAD	95 TO GOWAN	9376	180
RANCHO ROAD	95 TO GOWAN	7578	198

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RANCHO ROAD	95 TO GOWAN	PF#1	Normal S = 0.0022	Normal S = 0.003

GEOMETRY DATA

Geometry Title: Cross-sections
Geometry File : w:\Active\188100290\land_development\drainage\Technical Drainage Study\Calculations\HEC-RAS\svadevb.g01

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 10075

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2319.3	63	2318.7	103	2318	117	2316	134	2316
155	2318	237	2318.9	284	2318	320	2318	379	2320

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	63	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	237	164	157	148	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9918

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.9	60	2318.3	71	2318	87	2316	107	2316
161	2317.7	203	2316	318	2316	395	2318		

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	60	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	395	78	122	169	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9796

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.7	56	2318	74	2316	80	2314	95	2314
105	2316	278	2316	385	2316	466	2316.8	658	2318

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	56	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	466	175	230	355	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9566

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.3	22	2318	47	2317.2	66	2316	73	2314
89	2314	105	2316	126	2316	145	2318	150	2320
153	2318	211	2316	292	2315.1	364	2316	430	2316
618	2317.2	670	2318						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	47	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	364	54	54	54	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9512

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318.1	18	2318	46	2317	66	2316	72	2314
90	2314	96	2316	293	2316	309	2315.1	362	2316
664	2317.3	839	2318						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	46	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	362	40	40	40	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
114	227	2320

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 9472

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2318	11	2318	45	2316.8	61	2316	68	2314
91	2314	96	2316	279	2316	321	2315.1	360	2316
576	2316	824	2318						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.016	45	.03

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     360             148     148     148             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     114     227    2320

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9376

INPUT
Description:
Station Elevation Data    num=      14
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0  2317.5       45  2316.5       47     2316       51     2314       61     2314
       94     2316      190     2316      236  2315.9      273     2316      318     2316
      352     2315      474     2316      588     2316      693     2318

Manning's n Values        num=       2
      Sta   n Val       Sta   n Val
        0    .016        45    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     474             52      52      52             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9324

INPUT
Description:
Station Elevation Data    num=      10
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0  2317.2       45  2316.2       60     2316       70     2314       93     2316
      179     2316      255  2314.8      367     2315      436  2315.3      521     2316

Manning's n Values        num=       2
      Sta   n Val       Sta   n Val
        0    .016        45    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     521             119     119     119             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9205

INPUT
Description:
Station Elevation Data    num=       9
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0  2316.5       28     2316       48  2315.7       68     2314       73  2313.7
      100  2313.8      130     2314      402     2315      477     2316

Manning's n Values        num=       2
      Sta   n Val       Sta   n Val
        0    .016        48    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     477              91      91      91             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
     231     279    2318

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9114

INPUT
Description:
Station Elevation Data    num=      10
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0     2316       47  2315.1       63     2314       77  2313.2      150  2313.4
      272     2314      326     2314      441     2316      568  2315.4      614     2316

Manning's n Values        num=       2
      Sta   n Val       Sta   n Val
        0    .016        47    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     441              54      54      54             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     441     614    2316          F

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 9060

INPUT
Description:
Station Elevation Data    num=       8
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0  2315.6       44  2314.8       54     2314       76  2312.9      345     2314
      384     2314      556  2315.2      600     2316
```

```
Manning's n Values          num=        2
     Sta   n Val      Sta   n Val
       0    .016       44     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     345              110     110     110             .1      .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
     442     600    2316          F
Blocked Obstructions     num=        1
   Sta L   Sta R    Elev
     104     165    2316

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 8950

INPUT
Description:
Station Elevation Data      num=        6
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0  2314.5       48     2313       52  2312.5       59     2313      179     2312
      272     2313

Manning's n Values          num=        2
      Sta   n Val      Sta   n Val
        0    .016       48     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     272              88      88      88             .1      .3
Blocked Obstructions     num=        1
   Sta L   Sta R    Elev
     114     164 2313.52

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 8862

INPUT
Description:
Station Elevation Data      num=       10
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2313.31       10     2313       83     2312      121 2311.63      155 2311.06
      158 2310.93      158 2311.43      166 2311.53      175     2312      180  2312.1

Manning's n Values          num=        3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .016      155     .013      166    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     180              30      30      30             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 8832

INPUT
Description:
Station Elevation Data      num=       13
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0 2313.04        9     2313       39     2312       61 2311.72       88 2311.43
      122 2311.18      125 2310.91      130 2310.56      133 2310.49      134 2310.47
      135 2310.49      144     2312   295.65 2312.75

Manning's n Values          num=        3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .016      122     .013      135    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0  295.65              30      30      44             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 8802

INPUT
Description:
Station Elevation Data      num=       11
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
        0  2312.8       23     2312       61     2311       93  2310.9       93  2311.4
      100 2311.47      100 2310.79    101.5 2310.76      103 2310.79      121     2311
   263.08 2312.61

Manning's n Values          num=        3
      Sta   n Val      Sta   n Val      Sta   n Val
        0    .016       93     .013      103    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0  263.08              58      58      86             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN          RS: 8744

INPUT
```

Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2312.24	10	2312	45	2311.1	47	2310.93	47	2311.43
54	2311.53	63	2308.76	64	2308.74	65	2308.76	171	2311
200.12	2312.25								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.013	54	.035	63	.013	65	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	200.12	76	76	112	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8668

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.6	45	2310.37	46.5	2310.2	46.5	2310.7	47	2310.7
53	2310.82	54	2310.82	63	2308.47	64	2308.44	65	2308.47
102	2310	117.62	2311.73						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.013	53	.03	63	.013	65	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	117.62	52	52	52	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8616

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2311.09	45	2309.95	46.5	2309.78	46.5	2310.28	53	2310.38
63	2308.24	64	2308.22	65	2308.24	76	2311.56	76.5	2311.56
76.5	2311.06	78	2311.23	107	2312.27	107	2312.77	116	2313.2

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.013	53	.03	63	.013	65	.03
76	.013	78	.016	107	.013				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	76	30	30	31	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8586

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2310.81	45	2309.91	46.5	2309.74	46.5	2310.24	53	2310.34
63	2308.12	64	2308.1	65	2308.12	79	2308.69	85	2310.69
85.5	2310.69	85.5	2310.19	174	2311.38	176	2311.21	176	2311.71
177	2311.71	186	2311.5						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.013	53	.03	63	.013	65	.03
85	.013	85.5	.016	174	.013				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	85	20	20	20	.1	.3

CROSS SECTION

RIVER: RANCHO ROAD
REACH: 95 TO GOWAN RS: 8566

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2310.61	45	2309.71	46.5	2309.54	46.5	2310.04	54	2310.14
59	2308.18	60	2307.96	61	2307.94	62	2307.96	82	2308.32
85	2310.23	85.5	2310.23	85.5	2309.73	152	2311.11	154	2310.94
154	2311.44	154.5	2311.44	168.5	2311.14				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.016	45	.013	54	.03	60	.013	62	.03
85	.013	85.5	.016	152	.013	154.5	.03		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	85	33	33	33	.1	.3

CULVERT

```
RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8565

INPUT
Description: RCB Culvert
Distance from Upstream XS =       1
Deck/Roadway Width        =      24
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      56 2309.58               83 2309.59

Upstream Bridge Cross Section Data
Station Elevation Data    num=      18
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
        0 2310.61       45 2309.71     46.5 2309.54     46.5 2310.04       54 2310.14
       59 2308.18       60 2307.96       61 2307.94       62 2307.96       82 2308.32
       85 2310.23     85.5 2310.23     85.5 2309.73      152 2311.11      154 2310.94
      154 2311.44    154.5 2311.44    168.5 2311.14

Manning's n Values        num=       9
      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
        0    .016       45    .013       54     .03       60    .013       62     .03
       85    .013     85.5    .016      152    .013    154.5     .03

Bank Sta: Left   Right    Coeff Contr.    Expan.
             0      85             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      59 2309.41               81 2309.41

Downstream Bridge Cross Section Data
Station Elevation Data    num=      12
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
        0 2310.31       45 2309.41       46 2309.02       52 2309.22       59  2309.5
       81  2309.5       86  2309.4      116 2310.36    117.5 2310.19    117.5 2310.69
      118 2310.69      133 2310.53

Manning's n Values        num=       7
      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
        0    .016       45    .013       52    .016       59    .013       81    .016
      116    .013      118     .03

Bank Sta: Left   Right    Coeff Contr.    Expan.
             0     118             .1       .3

Upstream Embankment side slope             =       3 horiz. to 1.0 vertical
Downstream Embankment side slope           =       3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Culverts =  1

Culvert Name      Shape      Rise    Span
Culvert #1          Box         1       7
FHWA Chart # 58- Rectangular concrete
FHWA Scale # 2 - Side tapered; More 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      32     .013      .013          0                  .2                 1
Number of Barrels =  3
Upstream   Elevation =  2307.91
Centerline Stations
    Sta,     Sta,     Sta,
      63       71       79
Downstream Elevation =  2307.82
Centerline Stations
    Sta,     Sta,     Sta,
      63       71       79

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8533

INPUT
Description:
Station Elevation Data    num=      12
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
        0 2310.31       45 2309.41       46 2309.02       52 2309.22       59  2309.5
       81  2309.5       86  2309.4      116 2310.36    117.5 2310.19    117.5 2310.69
      118 2310.69      133 2310.53

Manning's n Values        num=       7
      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
        0    .016       45    .013       52    .016       59    .013       81    .016
      116    .013      118     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
             0     118                 27      27      49             .1       .3

CULVERT


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8532

INPUT
Description: RCB Culvert
```

```
Distance from Upstream XS =       1
Deck/Roadway Width        =      24
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      59 2309.58               81 2309.58

Upstream Bridge Cross Section Data
Station Elevation Data    num=      12
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2310.31       45 2309.41       46 2309.02       52 2309.22       59  2309.5
      81  2309.5       86  2309.4      116 2310.36    117.5 2310.19    117.5 2310.69
     118 2310.69      133 2310.53

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       45    .013       52    .016       59    .013       81    .016
     116    .013      118     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     118             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      59 2309.41               85 2309.41

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2310.06       45    2309       50 2308.94       50 2309.44       51 2309.44
    57.5 2309.54       60 2309.41       60 2307.74       61 2307.72       62 2307.74
      82 2307.74       86  2309.6      104 2310.05

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       45    .013     57.5     .03       60    .013       62     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
            0     104             .1       .3

Upstream Embankment side slope             =       3 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Culverts =  1

Culvert Name      Shape      Rise    Span
Culvert #1            Box       1       7
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
                  0      27     .013     .013        0                  .2                1
Number of Barrels =  3
Upstream   Elevation =  2307.82
Centerline Stations
    Sta.    Sta.    Sta.
      63      71      79
Downstream Elevation =  2307.74
Centerline Stations
    Sta.    Sta.    Sta.
      63      71      79

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8506

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0 2310.06       45    2309       50 2308.94       50 2309.44       51 2309.44
    57.5 2309.54       60 2309.41       60 2307.74       61 2307.72       62 2307.74
      82 2307.74       86  2309.6      104 2310.05

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0    .016       45    .013     57.5     .03       60    .013       62     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     104                  30       30      45             .1       .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 8476

INPUT
Description:
Station Elevation Data    num=      14
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
       0  2309.8       45 2308.55     46.5 2308.38     46.5 2308.88       47 2308.88
      52    2309       53    2309       68 2307.64       69 2307.61       70 2307.64
      79    2308      100    2308      162    2309      295    2310

Manning's n Values        num=       6
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
```

```
      0    .016      45    .013      52     .03      68    .013      70     .03
     79    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     295              66      66      66             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8410

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2309.6       50  2308.5      74    2308      80  2307.7      95    2308
     285    2310

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016      50     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     285             133     133     133             .1      .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     125     217    2312

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8277

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2308.2       13    2308      50  2307.4      79  2306.5     190    2308
     238    2308      262    2310

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016      50     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     262             122     122     122             .1      .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     127     213    2311

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 8155

INPUT
Description:
Station Elevation Data    num=       9
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2306.9       48  2306.2      72    2306      83  2305.4     106    2306
     149    2308      187    2308     239    2308     260    2310

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016      48     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     260             216     216     216             .1      .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     157     179    2311

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 7939

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2304.8       45  2304.1      76    2304      93  2302.2     114    2304
     146    2306      255  2306.7

Manning's n Values        num=       2
     Sta   n Val      Sta   n Val
       0    .016      45     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     255             361     361     361             .1      .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     148     236    2308

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN         RS: 7578

INPUT
Description:
```

```
Station Elevation Data    num=       7
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
        0  2301.4       49  2300.8       91    2300       99  2299.9      105    2300
      138    2302      350    2304

Manning's n Values        num=       2
      Sta   n Val      Sta   n Val
        0    .016       49     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     350               100     100     100             .1      .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     146     287    2304

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 7478

INPUT
Description:
Station Elevation Data    num=       8
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
        0  2300.6       38    2300       45  2299.9       48    2300       57    2300
       95  2298.9      116    2300      474    2302

Manning's n Values        num=       2
      Sta   n Val      Sta   n Val
        0    .016       38     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     474               105     105     105             .1      .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     138     370    2303

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 7373

INPUT
Description:
Station Elevation Data    num=       6
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
        0  2299.7       45  2298.8       91    2298       99    2298      143    2300
      186  2300.3

Manning's n Values        num=       2
      Sta   n Val      Sta   n Val
        0    .016       45     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     186                93      93      93             .1      .3

CROSS SECTION


RIVER: RANCHO ROAD
REACH: 95 TO GOWAN        RS: 7280

INPUT
Description:
Station Elevation Data    num=       6
      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
        0  2298.7       44    2298       54  2297.9       62    2298      123    2298
      159    2300

Manning's n Values        num=       2
      Sta   n Val      Sta   n Val
        0    .016       54     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            0     159               7279    7279    7279             .1      .3
Blocked Obstructions      num=       1
   Sta L   Sta R    Elev
     160     220    2308


SUMMARY OF MANNING'S N VALUES

River:RANCHO ROAD

      Reach          River Sta.       n1        n2        n3        n4        n5        n6        n7        n8        n9
 95 TO GOWAN          10075          .016      .03
 95 TO GOWAN          9918           .016      .03
 95 TO GOWAN          9796           .016      .03
 95 TO GOWAN          9566           .016      .03
 95 TO GOWAN          9512           .016      .03
 95 TO GOWAN          9472           .016      .03
 95 TO GOWAN          9376           .016      .03
 95 TO GOWAN          9324           .016      .03
 95 TO GOWAN          9205           .016      .03
 95 TO GOWAN          9114           .016      .03
 95 TO GOWAN          9060           .016      .03
 95 TO GOWAN          8950           .016      .03
 95 TO GOWAN          8862           .016      .013      .035
 95 TO GOWAN          8832           .016      .013      .035
 95 TO GOWAN          8802           .016      .013      .035
 95 TO GOWAN          8744           .016      .013      .035      .013      .035
 95 TO GOWAN          8668           .016      .013       .03      .013       .03
```

95 TO GOWAN	8616	.016	.013	.03	.013	.03	.013	.016	.013	
95 TO GOWAN	8586	.016	.013	.03	.013	.03	.013	.016	.013	
95 TO GOWAN	8566	.016	.013	.03	.013	.03	.013	.016	.013	.03
95 TO GOWAN	8565	Culvert								
95 TO GOWAN	8533	.016	.013	.016	.013	.016	.013	.03		
95 TO GOWAN	8532	Culvert								
95 TO GOWAN	8506	.016	.013	.03	.013	.03				
95 TO GOWAN	8476	.016	.013	.03	.013	.03	.016			
95 TO GOWAN	8410	.016	.03							
95 TO GOWAN	8277	.016	.03							
95 TO GOWAN	8155	.016	.03							
95 TO GOWAN	7939	.016	.03							
95 TO GOWAN	7578	.016	.03							
95 TO GOWAN	7478	.016	.03							
95 TO GOWAN	7373	.016	.03							
95 TO GOWAN	7280	.016	.03							

SUMMARY OF REACH LENGTHS

River: RANCHO ROAD

Reach	River Sta.	Left	Channel	Right
95 TO GOWAN	10075	164	157	148
95 TO GOWAN	9918	78	122	169
95 TO GOWAN	9796	175	230	355
95 TO GOWAN	9566	54	54	54
95 TO GOWAN	9512	40	40	40
95 TO GOWAN	9472	148	148	148
95 TO GOWAN	9376	52	52	52
95 TO GOWAN	9324	119	119	119
95 TO GOWAN	9205	91	91	91
95 TO GOWAN	9114	54	54	54
95 TO GOWAN	9060	110	110	110
95 TO GOWAN	8950	88	88	88
95 TO GOWAN	8862	30	30	30
95 TO GOWAN	8832	30	30	44
95 TO GOWAN	8802	58	58	86
95 TO GOWAN	8744	76	76	112
95 TO GOWAN	8668	52	52	52
95 TO GOWAN	8616	30	30	31
95 TO GOWAN	8586	20	20	20
95 TO GOWAN	8566	33	33	33
95 TO GOWAN	8565	Culvert		
95 TO GOWAN	8533	27	27	49
95 TO GOWAN	8532	Culvert		
95 TO GOWAN	8506	30	30	45
95 TO GOWAN	8476	66	66	66
95 TO GOWAN	8410	133	133	133
95 TO GOWAN	8277	122	122	122
95 TO GOWAN	8155	216	216	216
95 TO GOWAN	7939	361	361	361
95 TO GOWAN	7578	100	100	100
95 TO GOWAN	7478	105	105	105
95 TO GOWAN	7373	93	93	93
95 TO GOWAN	7280	7279	7279	7279

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RANCHO ROAD

Reach	River Sta.	Contr.	Expan.
95 TO GOWAN	10075	.1	.3
95 TO GOWAN	9918	.1	.3
95 TO GOWAN	9796	.1	.3
95 TO GOWAN	9566	.1	.3
95 TO GOWAN	9512	.1	.3
95 TO GOWAN	9472	.1	.3
95 TO GOWAN	9376	.1	.3
95 TO GOWAN	9324	.1	.3
95 TO GOWAN	9205	.1	.3
95 TO GOWAN	9114	.1	.3
95 TO GOWAN	9060	.1	.3
95 TO GOWAN	8950	.1	.3
95 TO GOWAN	8862	.1	.3
95 TO GOWAN	8832	.1	.3
95 TO GOWAN	8802	.1	.3
95 TO GOWAN	8744	.1	.3
95 TO GOWAN	8668	.1	.3
95 TO GOWAN	8616	.1	.3
95 TO GOWAN	8586	.1	.3
95 TO GOWAN	8566	.1	.3
95 TO GOWAN	8565	Culvert	
95 TO GOWAN	8533	.1	.3
95 TO GOWAN	8532	Culvert	
95 TO GOWAN	8506	.1	.3
95 TO GOWAN	8476	.1	.3
95 TO GOWAN	8410	.1	.3
95 TO GOWAN	8277	.1	.3
95 TO GOWAN	8155	.1	.3
95 TO GOWAN	7939	.1	.3
95 TO GOWAN	7578	.1	.3
95 TO GOWAN	7478	.1	.3
95 TO GOWAN	7373	.1	.3
95 TO GOWAN	7280	.1	.3

Errors Warnings and Notes for Plan : Plan 1

Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 10075 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9918 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9566 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9512 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9472 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9376 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9324 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9205 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9114 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water
	surface was used.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 9060 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Multiple critical depths were found at this location. The critical depth with the lowest, valid, water
	surface was used.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8950 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7

Errors Warnings and Notes for Plan : Plan 1 (Continued)

	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8862 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Program found supercritical flow starting at this cross section.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8802 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8744 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Note:	Manning's n values were composited to a single value in the main channel.
Note:	Hydraulic jump has occurred between this cross section and the previous upstream section.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8668 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Manning's n values were composited to a single value in the main channel.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8616 Profile: PF#1
Warning:	The energy equation could not be balanced within the specified number of iterations. The program
	selected the water surface that had the least amount of error between computed and assumed
	values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Note:	Manning's n values were composited to a single value in the main channel.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8586 Profile: PF#1
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Manning's n values were composited to a single value in the main channel.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8533 Profile: PF#1
Warning:	During subcritical analysis, the water surface upstream of culvert went to critical depth.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8532 Profile: PF#1
Warning:	During subcritical analysis, the water surface upstream of culvert went to critical depth.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8532 Profile: PF#1 Culv: Culvert #1

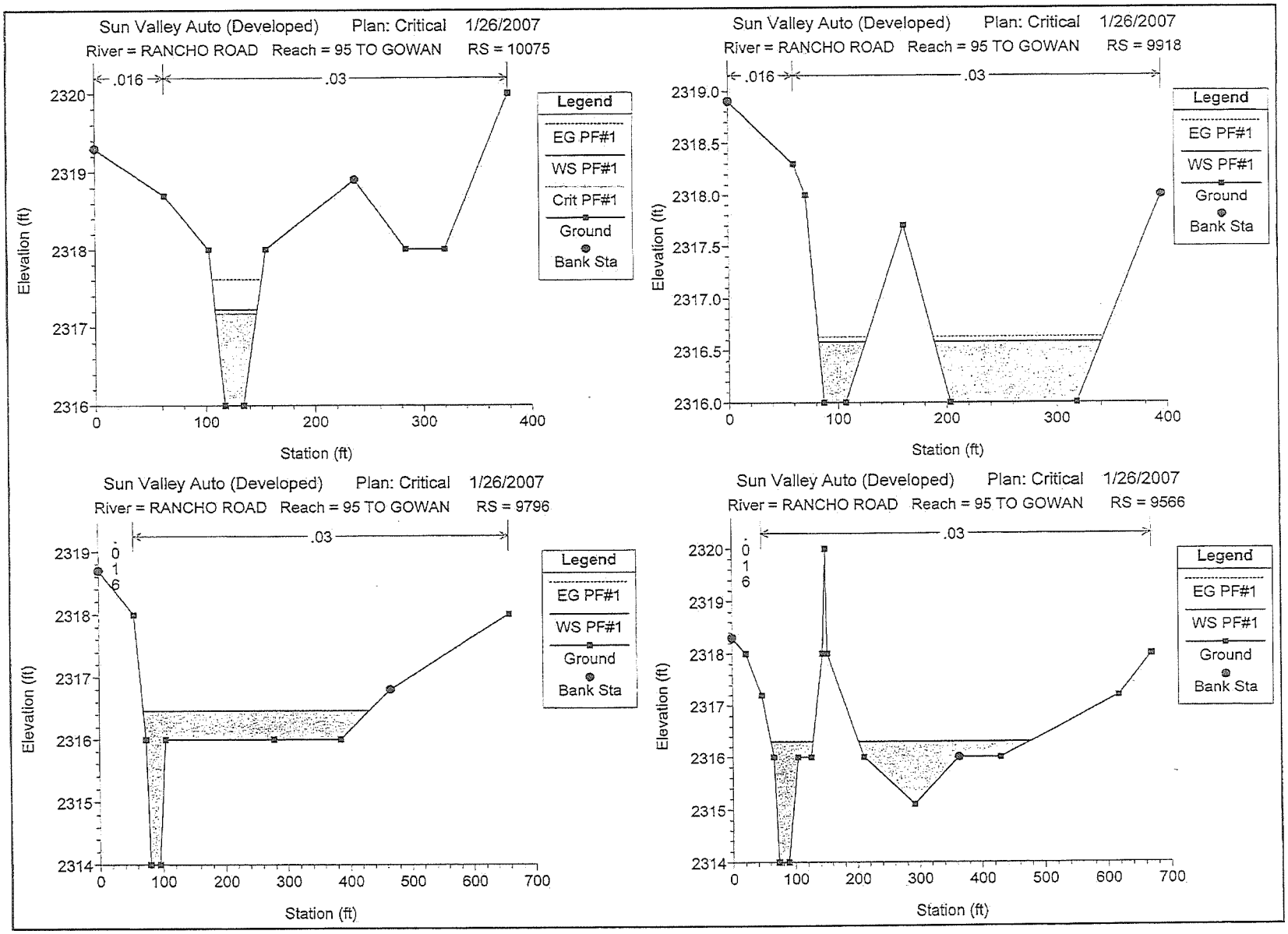
Errors Warnings and Notes for Plan : Plan 1 (Continued)

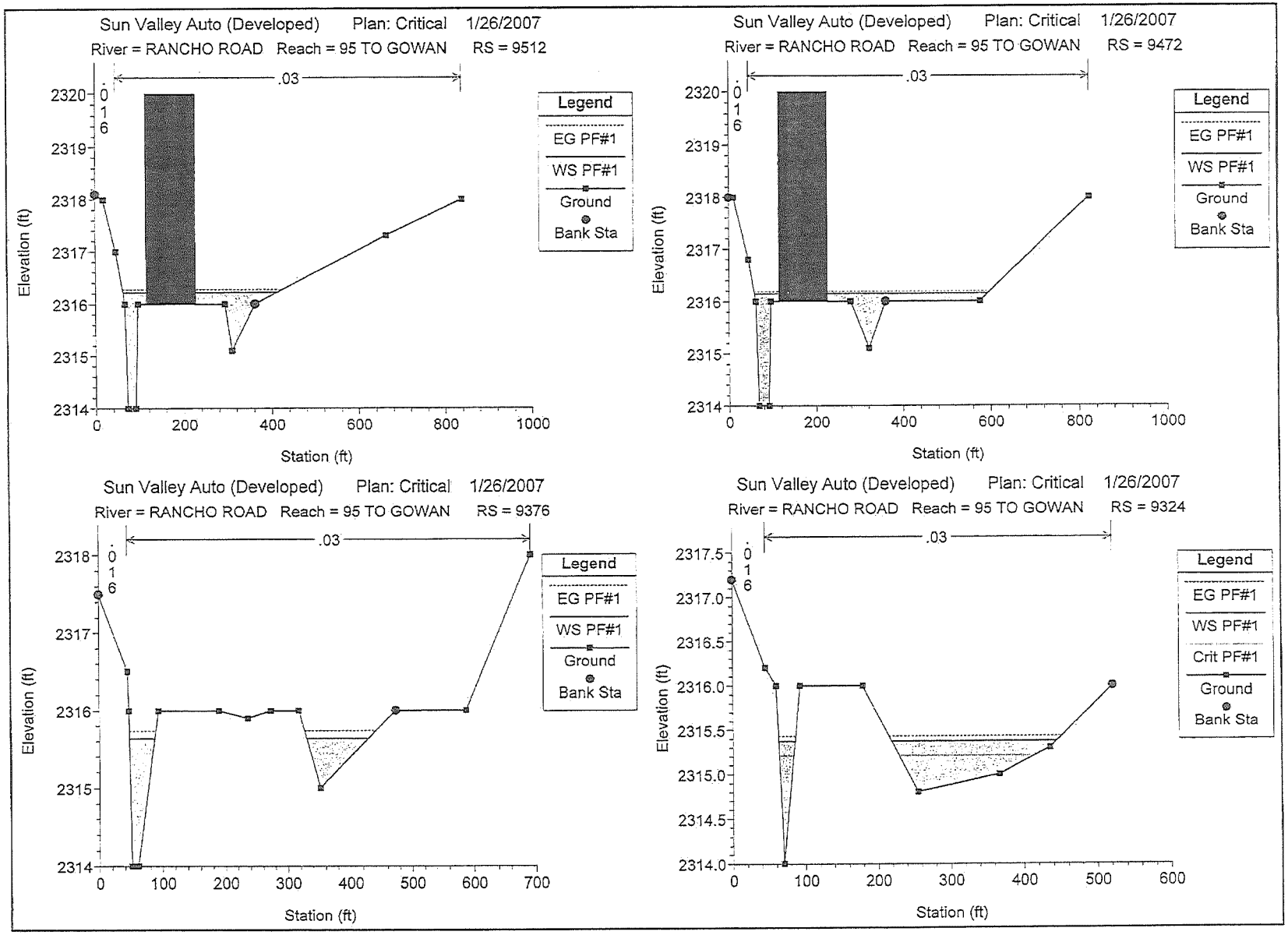
Note:	Culvert critical depth exceeds the height of the culvert.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8506 Profile: PF#1
Warning:	The energy equation could not be balanced within the specified number of iterations. The program
	selected the water surface that had the least amount of error between computed and assumed
	values.
Warning:	Divided flow computed for this cross-section.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Note:	Manning's n values were composited to a single value in the main channel.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8476 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Hydraulic jump has occurred between this cross section and the previous upstream section.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8410 Profile: PF#1
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 8155 Profile: PF#1
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7939 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7578 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
	or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7478 Profile: PF#1
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
	This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,
	the calculated water surface came back below critical depth. This indicates that there is not a valid
	subcritical answer. The program defaulted to critical depth.
Location:	River: RANCHO ROAD Reach: 95 TO GOWAN RS: 7373 Profile: PF#1
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7

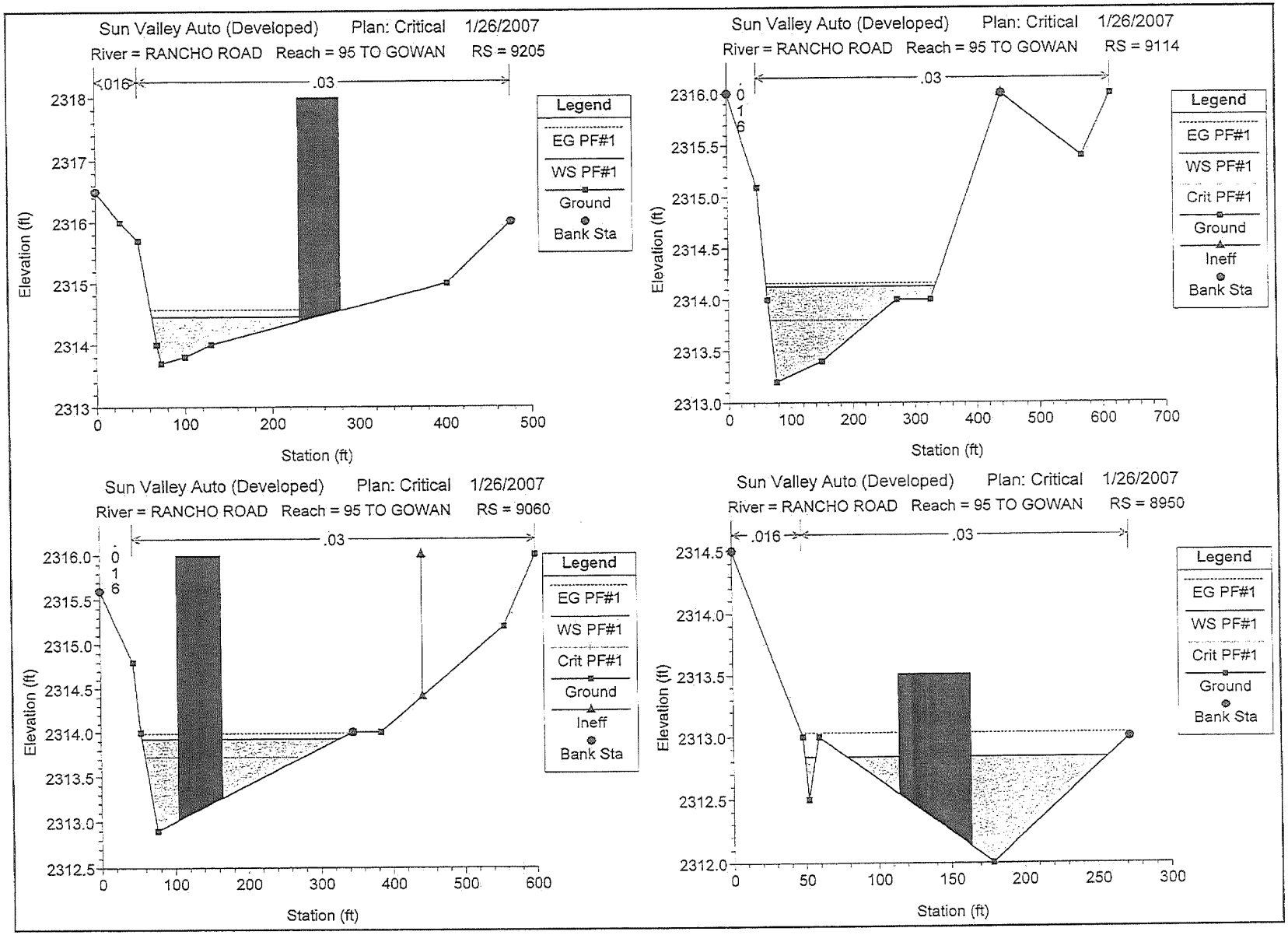
Errors Warnings and Notes for Plan : Plan 1 (Continued)

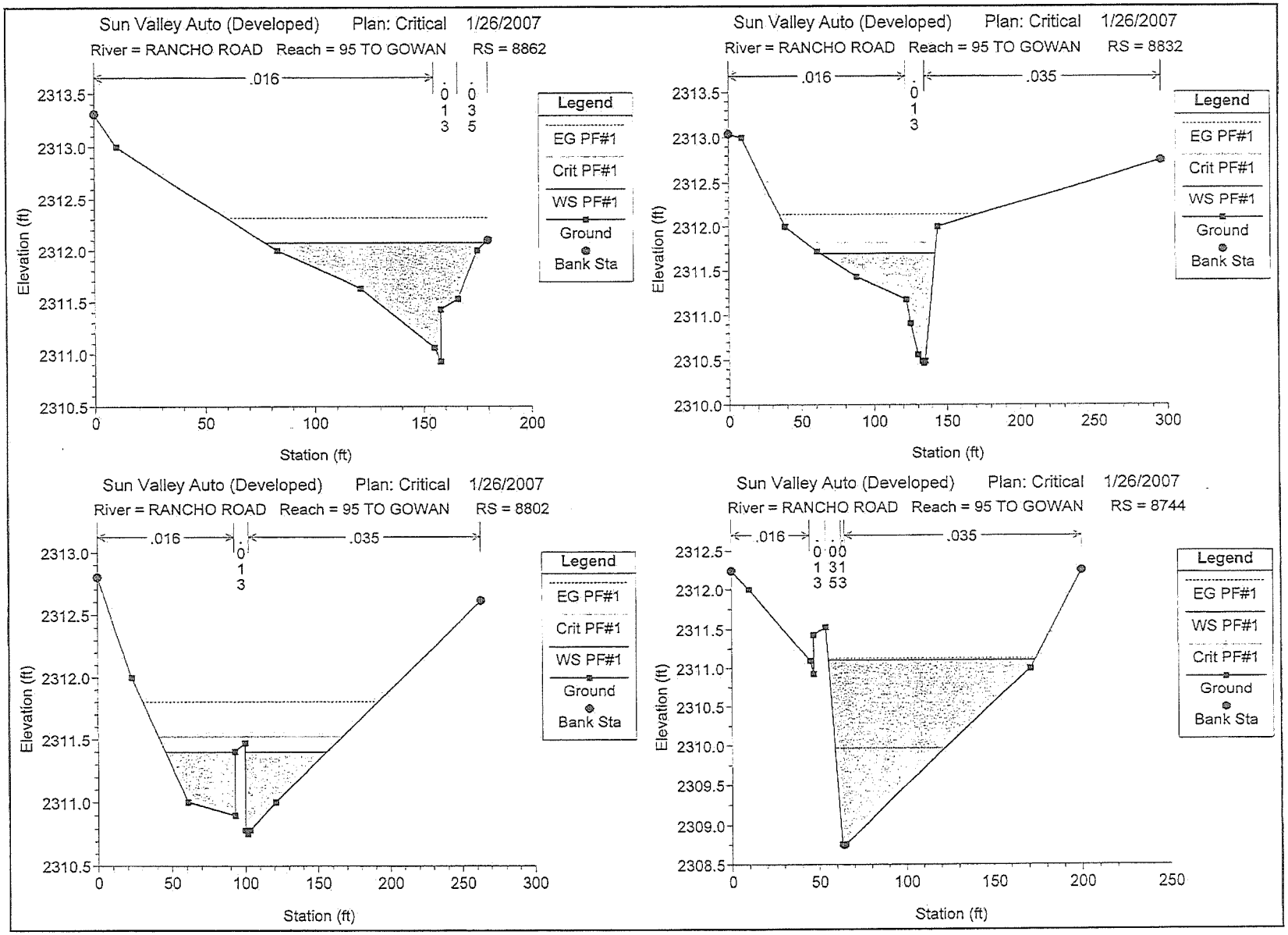
	or greater than 1.4. This may indicate the need for additional cross sections.
Note:	Hydraulic jump has occurred between this cross section and the previous upstream section.

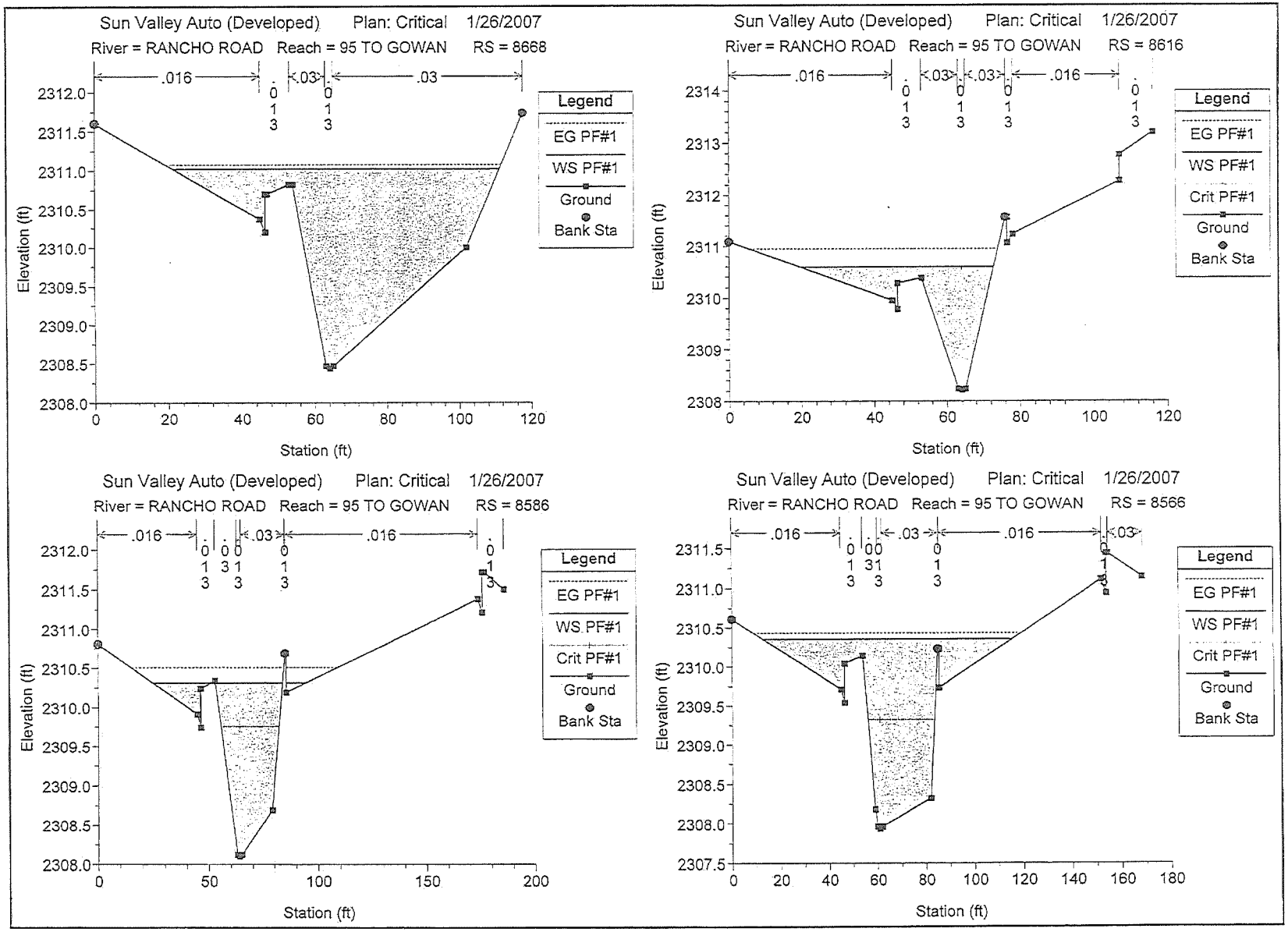
HEC-RAS CROSS SECTIONS

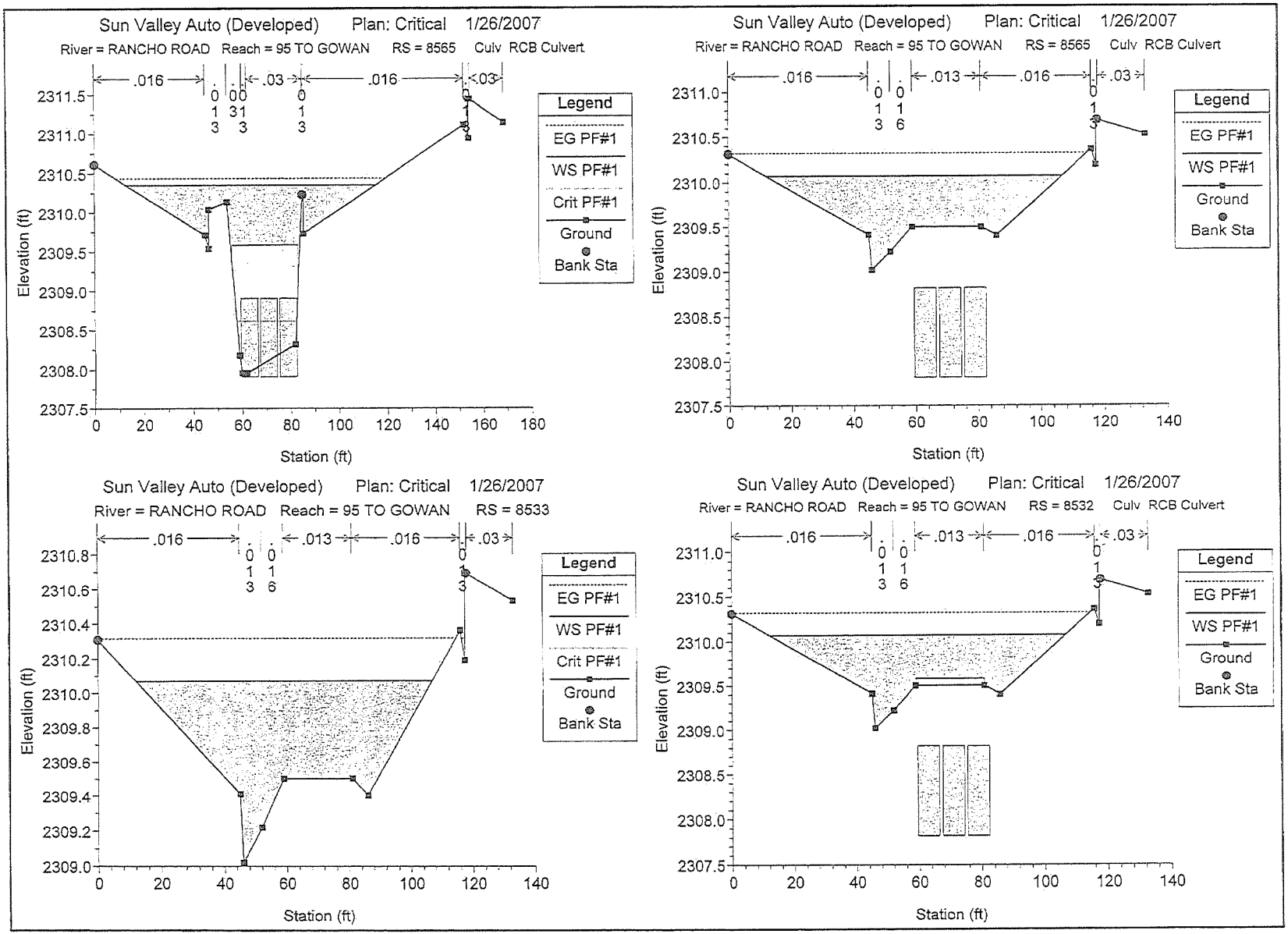

Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 10075
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9918
.016
.03
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9796
.016
.03
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9566
.016
.03
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

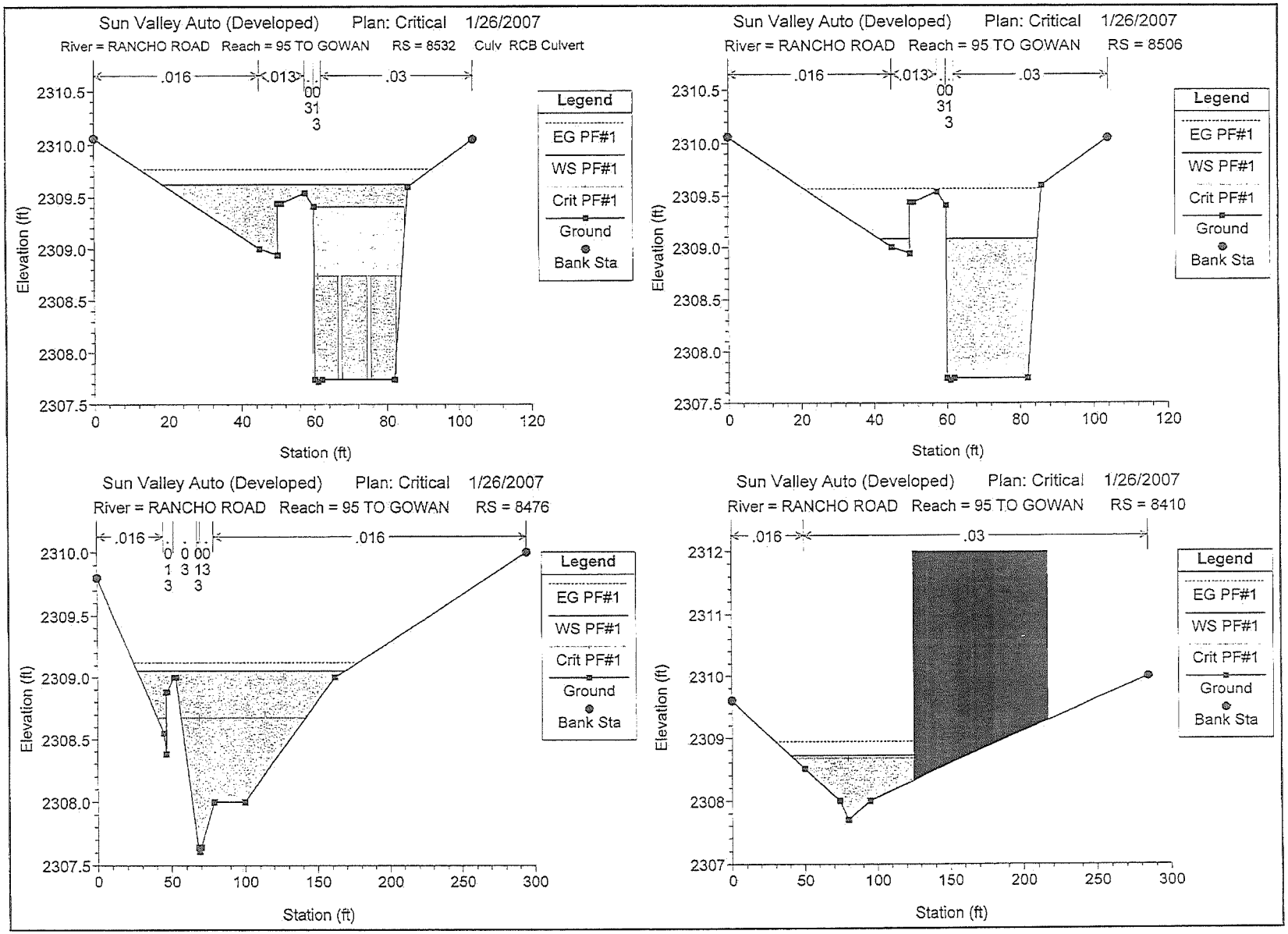

Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9512
.03
.016
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9472
.03
.016
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9376
.03
.016
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9324
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

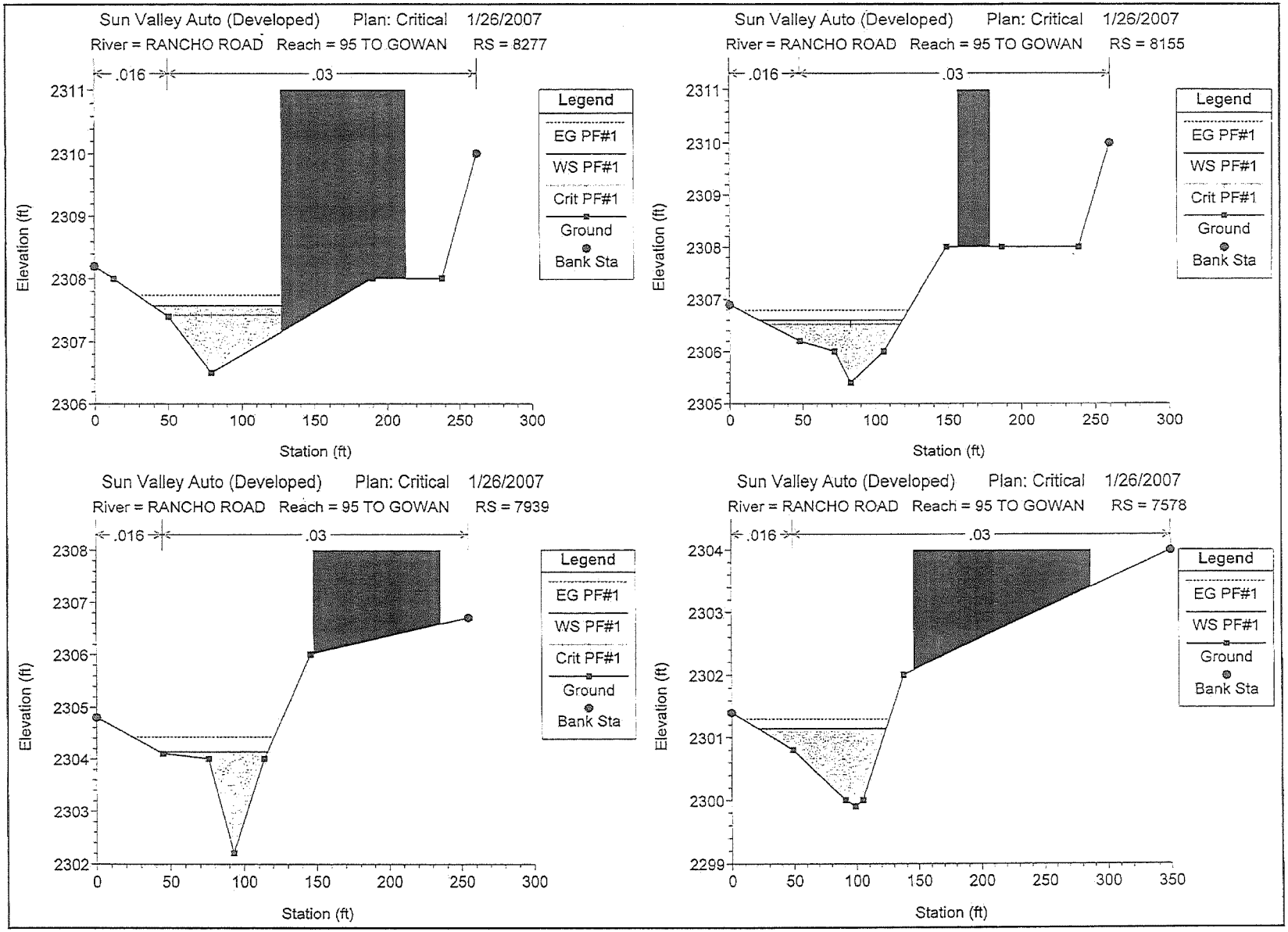

Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9205
.016
.03
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9114
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 9060
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8950
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

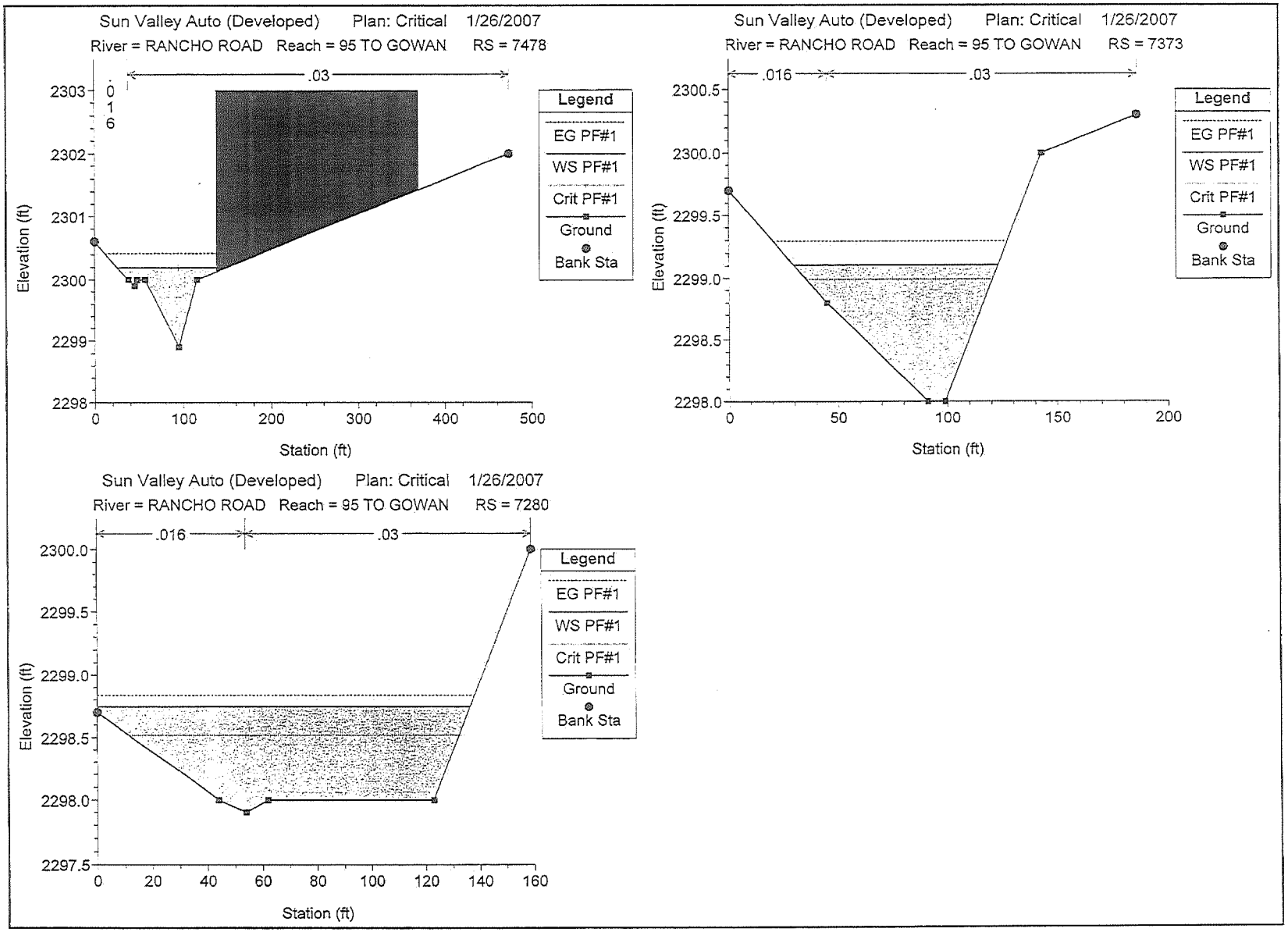

Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8862
.016
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8832
.016
.035
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8802
.016
.035
Legend
EG PF#1
Crit PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8744
.016
.035
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

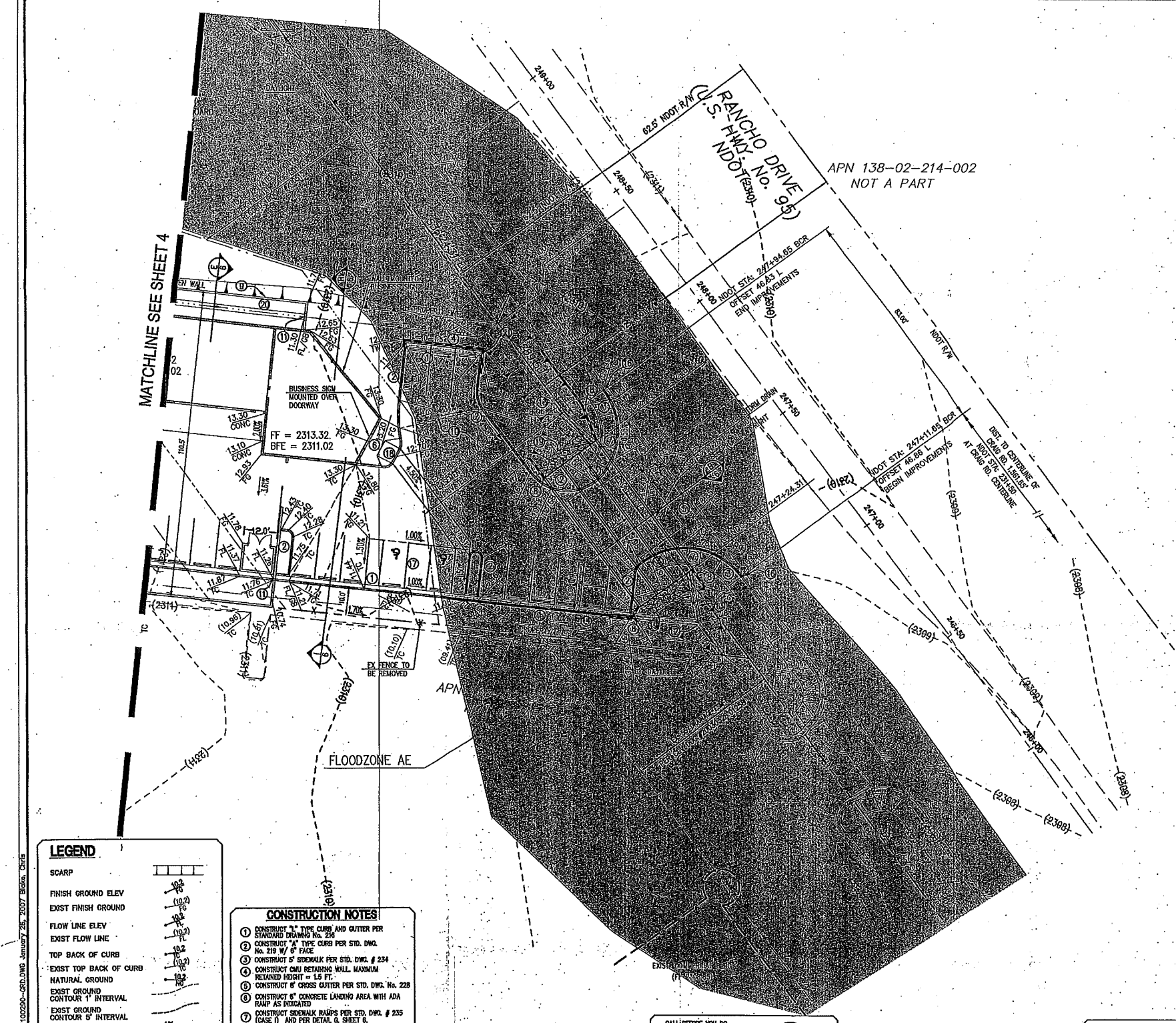

Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8668
.016
.03
.03
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8616
.016
.03
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8586
.016
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8566
.016
.03
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)

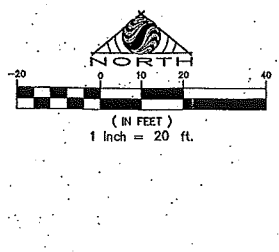

Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8565 Culv RCB Culvert
.016
.03
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8565 Culv RCB Culvert
.016
.013
.016
.03
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8533
.016
.013
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8532 Culv RCB Culvert
.016
.013
.016
.03
Legend
EG PF#1
WS PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8532 Culv RCB Culvert
.016
.013
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8506
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8476
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8410

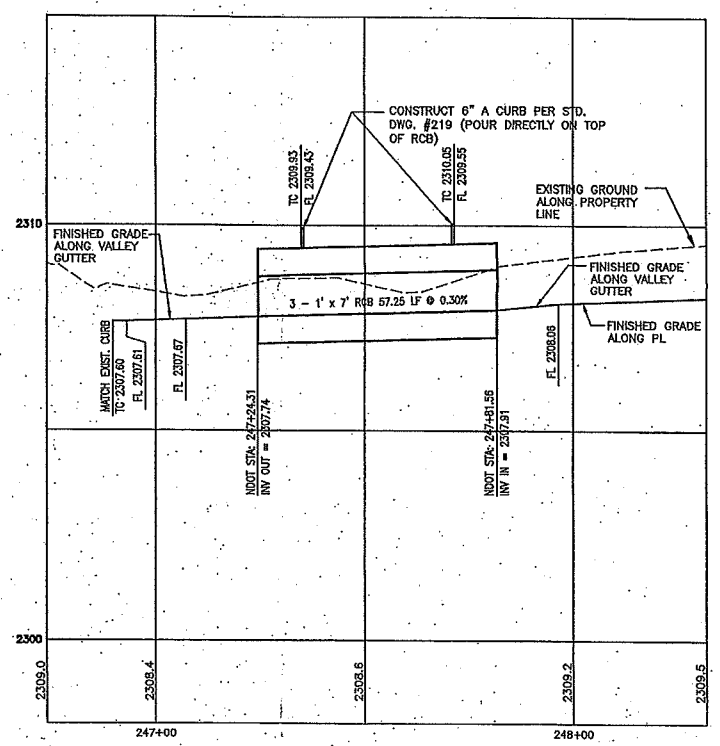

Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8277
.016
.03
Elevation (ft)
Station (ft)
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 8155
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7939
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7578


Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7478
.03
.016
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7373
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Sun Valley Auto (Developed) Plan: Critical 1/26/2007
River = RANCHO ROAD Reach = 95 TO GOWAN RS = 7280
.016
.03
Legend
EG PF#1
WS PF#1
Crit PF#1
Ground
Bank Sta
Elevation (ft)
Station (ft)





LOCATION MAP
N.T.S.



REINFORCED BOX CULVERT
PROFILE

SCALE: HORIZ. 1" = 20'
VERT. 1" = 2'

LEGEND

- SCARP
- FINISH GROUND ELEV
- EXIST FINISH GROUND
- FLOW LINE ELEV
- EXIST FLOW LINE
- TOP BACK OF CURB
- EXIST TOP BACK OF CURB
- NATURAL GROUND
- EXIST GROUND CONTOUR 1' INTERVAL
- EXIST GROUND CONTOUR 5' INTERVAL
- RATE OF SLOPE
- DIRECTION OF DRAINAGE
- "L" TYPE CURB & GUTTER
- 6" CURB
- EXIST CURB
- EXIST. CROSS GUTTER
- GRADE BREAK
- STORMDRAIN
- EXIST STORMDRAIN
- SAWCUT LINE
- EDGE OF PAVEMENT (EOP)
- DRAINAGE EASEMENT
- FEMA DESIGNATED FLOOD ZONE AE
- EASEMENT

CONSTRUCTION NOTES

1. CONSTRUCT "L" TYPE CURB AND GUTTER PER STANDARD DRAWING No. 216
2. CONSTRUCT "A" TYPE CURB PER STD. DWG. No. 219 W/ 6" FACE
3. CONSTRUCT 5' SIDEWALK PER STD. DWG. # 234
4. CONSTRUCT CMU RETAINING WALL. MAXIMUM RETAINED HEIGHT = 1.5 FT.
5. CONSTRUCT 6" CROSS GUTTER PER STD. DWG. No. 228
6. CONSTRUCT 6" CONCRETE LANDING AREA WITH ADA RAMP AS INDICATED
7. CONSTRUCT SIDEWALK RAMPS PER STD. DWG. # 235 (CASE I), AND PER DETAIL Q, SHEET 6. "A" & "B" = 0.0' UNLESS OTHERWISE NOTED
8. CONSTRUCT CMU RETAINING WALLS AT BOX CULVERT WITH TOP OF WALL AS INDICATED
9. CONSTRUCT 6.0' CMU SCREEN WALL PER DETAIL C & D ON SHEET 6
10. SEE DETAIL L ON SHEET 6 FOR PAVEMENT DESIGN
11. 16'x6'6" BLOCK WALL OPENING PER DETAIL K, SHEET 6
12. CONSTRUCT 2' WIDE VALLEY GUTTER PER DETAIL J ON SHEET 6
13. REMOVE EX. VALLEY GUTTER AND CONSTRUCT 2' WIDE VALLEY GUTTER PER DETAIL A ON SHEET 6
14. 18" CURB & GUTTER OPENING FOR VALLEY GUTTER
15. CONSTRUCT 6.0' CHAIN LINK FENCE WITH 20.0' GATE AS INDICATED
16. SAWCUT AND REMOVE EXISTING CURB, GUTTER AND SIDEWALK. MATCH CROSS GUTTER TO EXISTING GUTTER FLOWLINE
17. CONSTRUCT ADA STALLS PER DETAIL F SHEET 6
18. CONSTRUCT HANDICAP RAMP WITH RETURN PER STD. DETAIL NO. 235, CASE II
19. NOT USED
20. CONSTRUCT 3' WIDE VALLEY GUTTER PER DETAIL A ON SHEET 6

FEMA NOTE

FLOOD ZONE AE ADJUSTED FOR 1' CONTOURS AND DIFFERS FROM WHAT IS SHOWN ON FLOOD INSURANCE RATE MAP NUMBER 32003C2165E REVISED TO REFLECT LOMR DATED DECEMBER 31, 2003

CALL BEFORE YOU DO UNDERGROUND-- AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEM CONDUITS--IT'S COSTLY

Call before you underground

1-702-455-7511 CLARK COUNTY TRAFFIC OPERATIONS

1-702-229-6611 LAS VEGAS AREA COMPUTERIZED TRAFFIC SYSTEM

Call before you do Overhead AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. 1-702-227-2929

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call before you Dig. 1-800-227-2600 UNDERGROUND SERVICE ALERT

ADA NOTE

ALL SIDEWALKS AND HANDICAP ACCESS RAMPS SHALL MEET ADA REQUIREMENTS. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN DESIGN INFORMATION AND ADA REQUIREMENTS PRIOR TO CONSTRUCTION.

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT (034078)

MATTHEW T. HASKIN, P.E. #14910 — DATE

NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) PERMIT REQUIRED

AN APPROVED NDOT OCCUPANCY PERMIT SHALL BE OBTAINED THROUGH THE DISTRICT PRIOR TO ANY CONSTRUCTION WITHIN THE NDOT RIGHT-OF-WAY. PLANS SHOWING WORK IN NDOT RIGHT-OF-WAY MUST SHOW NDOT STATIONING. THE DEVELOPER ASSUMES ALL LIABILITY FOR WORK CONDUCTED UNDER THE DISTRICT OBTAINED PERMIT THROUGH WARRANTY EXPIRATION.

APN

APN #138-02-202-016

BENCHMARK

CITY OF LAS VEGAS BENCHMARK No. 0000 2NW8

A RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB AT THE NORTHWEST CORNER OF RANCHO DRIVE AND RED COACH AVENUE.

NAVD 88 DATUM ELEVATION = 705.0097 METERS

BASIS OF BEARINGS

SOUTH 83°40'36" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 2, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., AS SHOWN IN BOOK 105 OF PLATS, PAGE 58, OFFICIAL RECORDS OF CLARK COUNTY, NEVADA.

GRADING NOTES

1. ALL PROPOSED PAD ELEVATIONS AND SWALE ELEVATIONS ARE ROUGH GRADES, ALL OTHER PROPOSED ELEVATIONS ARE FINISHED GRADE.
2. THE GRADING PLANS SHALL BE AT THE PROJECT SITE THROUGHOUT THE COURSE OF CONSTRUCTION.
3. ALL GRADING SHALL BE PERFORMED IN CONFORMANCE WITH THE LINES, GRADES AND DETAILS AS SHOWN ON THESE PLANS. ANY DEVIATION FROM THESE PLANS WILL ONLY BE PERMITTED UPON WRITTEN APPROVAL FROM THE ENGINEER.
4. ALL PADS ARE TO BE GRADED WITHIN ±0.3' OF THE ELEVATIONS AS SHOWN ON THE PLANS. GRADING IS NOT COMPLETE UNTIL THE ENGINEER HAS CERTIFIED THAT THE PADS HAVE BEEN GRADED IN SUBSTANTIAL CONFORMANCE TO THE PLANS.
5. ALL PLACEMENT OF OVERSIZED MATERIALS AND/OR FILL MATERIALS SHALL BE PER THE SOILS REPORT REFERENCED ON THIS PLAN.

NO.	DESCRIPTION	DATE	APP'D

The contractor shall verify all dimensions for all operations, do NOT scale the drawings. Any discrepancies shall be reported to Stantec without delay. This copyrighted drawing is the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is prohibited.

Copyright Reserved

DATE:	10/04/06
PM:	SBC
DRAWN:	JRP
DESIGNED:	SBC
CHECKED:	BVL
JOB NO:	138102290
SCALE:	AS SHOWN

Stantec Consulting, Inc.
7251 W. Charleston Blvd.
Las Vegas, Nevada, U.S.A. 89117
Tel. (702) 258-0115
Fax. (702) 258-4656
www.stantec.com

Stantec

SUN VALLEY AUTOMOTIVE
SUN VALLEY AUTO
GRADING PLAN

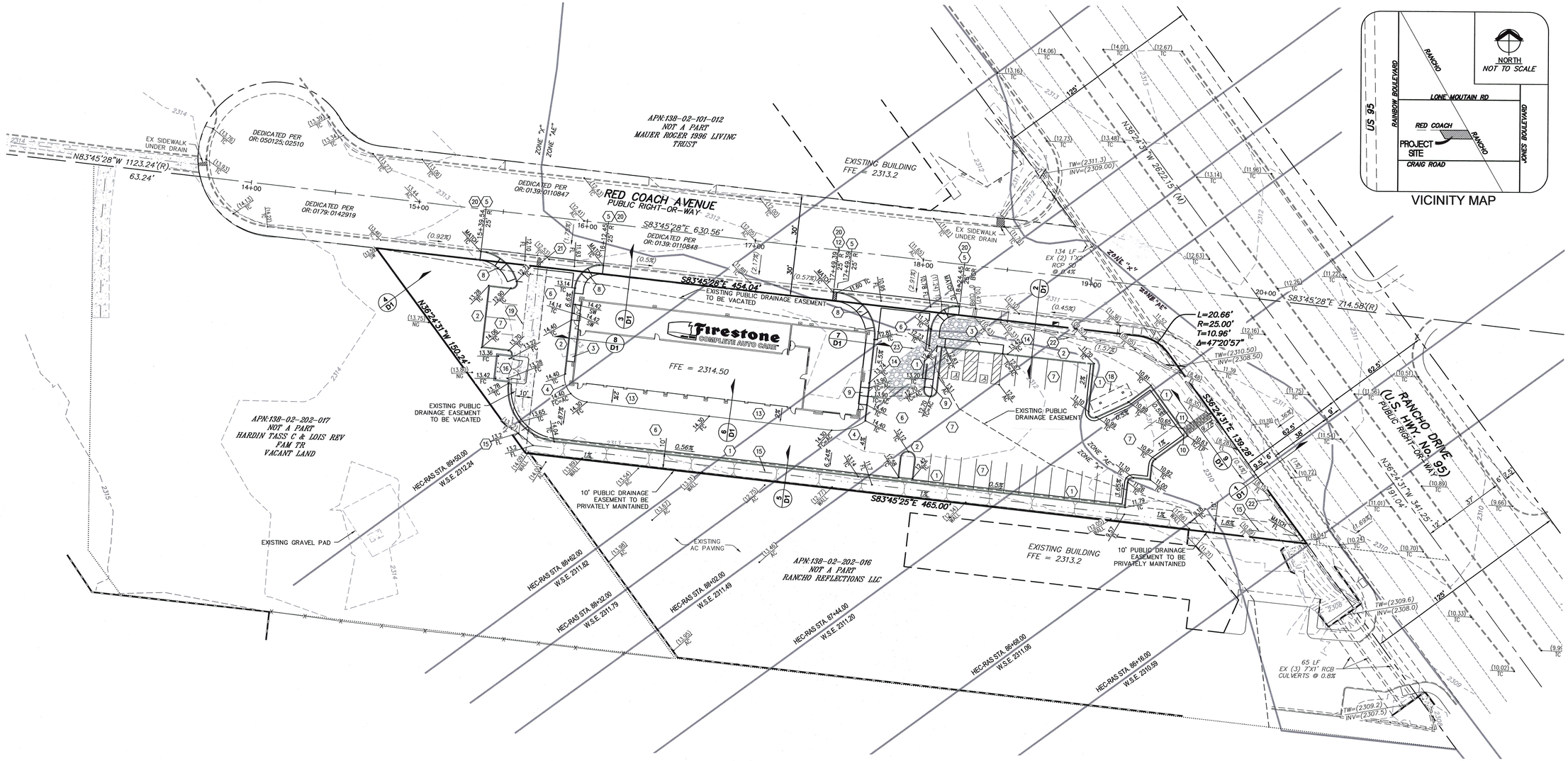
MATTHEW T. HASKIN — Exp. 06-30-07 — CIVIL — No. 14910 — STATE OF NEVADA — PROFESSIONAL ENGINEER — 10/06/06

SHEET 5 OF 7

C.L.V. DWG.#

APPENDIX C

Revised Plan, Profile and Detail Sheets



VICINITY MAP

FLOOD ZONE

A PORTION OF THIS SITE IS LOCATED IN ZONE "AE", AREAS WHERE BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C2155 E. CLARK COUNTY, NEVADA DATED SEPTEMBER 27, 2002, REVISED TO REFLECT LOMAR DATED JANUARY 12, 2006.

FLOOD ZONE "AE" DEPICTED ON PLAN REFLECTS PROPOSED CONDITION AND WILL BE SUBMITTED AS PART OF A CLOMAR TO FEMA FOR THIS PROJECT.

BASIS OF BEARING

NORTH 83°40'36" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF SECTION 2, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN FILE 111, PAGE 12 OF OFFICIAL RECORDS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

BENCHMARK

BENCHMARK STATION: BLVOO 2C4N

RIVET AND ROUND ALUMINUM PLATE IN THE TOP OF CURB, 4521 N RANCHO DR AND 100' SW OF P.I. OF TORREY PINES DR AND RANCHO DR.

ELEVATION = 2303.01 FEET, 701.959 METERS
N.A.V.D. 88 DATUM

PER THE CITY OF LAS VEGAS VERTICAL CONTROL V.2008 UPDATED 2010

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
or 1-800-227-2600
and CLARK COUNTY TRAFFIC SIGNALS 1-702-455-7544

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEM CONDUITS. IT'S COSTLY.
Call before you do UnderGround
1-702-455-7591
CLARK COUNTY TRAFFIC OPERATIONS
and
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

NOTES

1. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING STRUCTURES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
3. OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS SHOWN AND TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DISTURBED, DESTROYED OR OBSCURED DURING CONSTRUCTION.

GRADING

1. CONSTRUCT "L" CURB AND GUTTER PER CCAUSD #216
2. CONSTRUCT "A" CURB AND GUTTER PER CCAUSD #219
3. CONSTRUCT SIDEWALK PER CCAUSD #234
4. 6"-0" AC TRANSITION
5. CONSTRUCT 32' (FACE TO FACE) WIDE COMMERCIAL DRIVEWAY PER CCAUSD #222A AND #228
6. MAIN CORRIDOR (TRUCK ACCESS) INSTALL 4" AC OVER 5" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON MAY 12, 2011
7. AUTOMOBILE ROUTE / PARKING. INSTALL 3" AC OVER 5" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON MAY 12, 2011
8. CONSTRUCT HANDICAP RAMPS PER CCAUSD #235 CASE III A AND B = 8' UNLESS OTHERWISE NOTED
9. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIV. PER LATEST ADA GUIDE LINE
10. CONSTRUCT 5' CURB CUT
11. INSTALL RIP-RAP PAD D50=6", 12" DEEP (PAD SIZE PER PLAN) SEE DETAIL 9 SHEET D1
12. INSTALL SIDEWALK UNDER DRAIN PER CCAUSD # 236
13. CONCRETE APRON. INSTALL 5" CONCRETE OVER 4" TYPE II AGGREGATE BASE PER GEOTECH REPORT PREPARED BY TERRACON MAY 12, 2011
14. CONSTRUCT 3' CURB TRANSITION PER DETAIL 10 ON SHEET D1
15. CONSTRUCT EARTH SWAIL AT MIN 1% SLOPE
16. INSTALL TRASH ENCLOSURE, SEE ARCHITECTURAL PLANS FOR DETAILS
17. SAWCUT (CLEAN), REMOVE CURB, GUTTER, & SIDEWALK
18. EXISTING BILLBOARD SIGN TO REMAIN IN PLACE
19. REMOVE EXISTING CONCRETE VALLEY GUTTER
20. REMOVE EXISTING CURB, GUTTER, AND SIDEWALK
21. REMOVE EXISTING SIDEWALK UNERDRAIN
22. EXISTING VALLEY GUTTER TO REMAIN IN PLACE
23. REMOVE EXISTING RIP-RAP TRACK OUT PAD

LEGEND

- INDEX CONTOUR (5' INTERVAL)
- INTERMEDIATE CONTOUR (1' INTERVAL)
- CENTERLINE
- RIGHT-OF-WAY
- PROPERTY LINE
- EASEMENT
- EXISTING CMU WALL
- EXISTING EDGE OF PAVEMENT
- PROPOSED FLOW LINE
- EXISTING CHAIN LINK FENCE
- EXISTING SIDEWALK UNDER DRAIN

PROPOSED		EXISTING	
00.00 TC	TOP BACK CURB	(00.00) TC	TOP BACK CURB
00.00 FG	FINISH GRADE	(00.00) FG	FINISH GRADE
00.00 EP	EDGE OF PAVEMENT	(00.00) EP	EDGE OF PAVEMENT
00.00 FL	FLOW LINE	(00.00) FL	FLOW LINE
00.00 AC	ASPHALT CONCRETE	(00.00) AC	ASPHALT CONCRETE

APN # 138-02-202-015

DATUM

ADD 2300.00 TO PLAN GRADES, EXCEPT FOR CONTOURS.
TOPOGRAPHY BY AERIAL FLIGHT PROVIDED BY OTHERS
CONTOUR INTERVAL = 1'

GEOTECHNICAL REPORT

PROJECT No. 64115013
DATED: MAY 12, 2011
AS PREPARED BY: TERRACON

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY CLV # DS4533A FOR THIS SITE ON FILE AT CITY OF LAS VEGAS FOR THIS PROJECT.

ERIC J. RIETZ, P.E. No. 16350 — DATE

DRAINAGE QUANTITIES

ITEM	
1 EA	SIDEWALK UNDER DRAIN
1 EA	RIP-RAP PAD D_{50}=6", 12" DEEP, 5'x17.5'

SCALE: 1"=30'
30 15 0 30

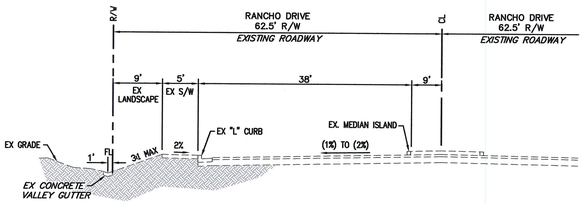
DESCRIPTION:	GRADING PLAN
DATE:	8/23/2011
REV:	
PROJECT	FIRESTONE RANCHO DRIVE/RED COACH AVENUE CITY OF LAS VEGAS APN: 138-02-202-015
DRAFTER:	RES
CHECKED:	EJR
SCALE	1" = 30'
SHEET	C3 SHEET 3 OF X SHEETS
CLV DWG #	XXXXXXXX

PROFESSIONAL ENGINEER – STATE OF NEVADA
ERIC J. RIETZ
Expir. 12/31/11
CIVIL
No. 16350
8/23/11

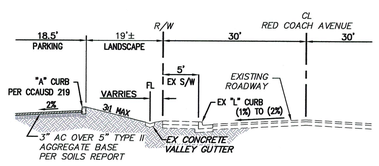
CLIENT: Firestone COMPLETE AUTO CARE

PREPARED: RIETZ CONSULTING INC.
5740 SOUTH ARVILLE STREET, #206
LAS VEGAS, NEVADA 89118
PH:702.321.3355 FX:702.212.3963

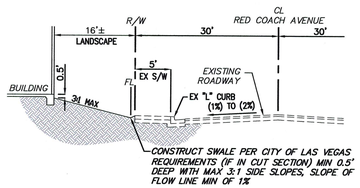
08-23-11 08:11:32 N:\Eric\Firestone at rancho and red coach\cad\GRADING\PLAN\GRADING PLAN.dwg



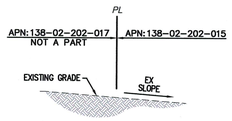
① RANCHO DRIVE (PUBLIC)
NTS



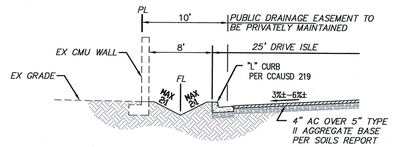
② RED COACH AVENUE (PUBLIC)
NTS



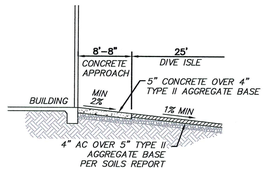
③ RED COACH AVENUE (PUBLIC)
NTS



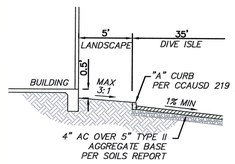
④ SECTION (PRIVATE)
NTS



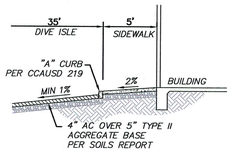
⑤ SECTION (PRIVATE)
NTS



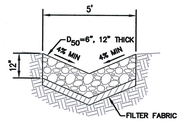
⑥ SECTION (PUBLIC)
NTS



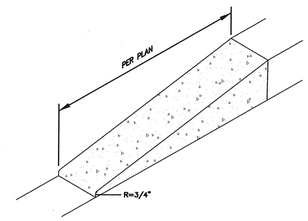
⑦ SECTION (PUBLIC)
NTS



⑧ SECTION (PUBLIC)
NTS



⑨ SECTION (PUBLIC)
NTS



⑩ DEPRESSED CURB
NTS

REV:	DATE:	DESCRIPTION:

CLIENT: Firestone COMPLETE AUTO CARE

PREPARED:
RIETZ CONSULTING INC.
5740 SOUTH ARVILLE STREET, #206
LAS VEGAS, NEVADA 89118
PH:702.521.3355 FX:702.212.3963

SHEET: DETAIL SHEET

PROJECT:
FIRESTONE
RANCHO DRIVE/RED COACH AVENUE
CITY OF LAS VEGAS
APN: 138-02-202-016

DATE:	DRAFTER:	CHECKED:	SCALE
8/23/2011	RES	EJR	NTS

PROFESSIONAL ENGINEER - STATE OF NEVADA
ERIC J. RIETZ
Exp: 12/31/11
CIVIL
No. 16350
8/23/11

SHEET
C4
SHEET 4 OF X SHEETS

CLV DWG #
XXXXXXXX

GEOTECHNICAL REPORT

PROJECT No.	64115013
DATED:	MAY 12, 2011
AS PREPARED BY:	TERRACON