GOLDMINE VILLAGE
Conditional Letter of
Map Revision

TECHNICAL DATA NOTEBOOK

July 2002

Prepared for:
P & J Investors, Inc.
510 North Tegner Street, Suite A
Wickenburg, AZ 85390

Prepared by:

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 s. Rural Rd., Suite 110
Tempe, AZ 85283
Phone: (480) 752-2124
Fax: (480) 839-2193

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 19 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 02-09-1425R

The Honorable Lon McDermott
Mayor, Town of Wickenburg
Wickenburg Town Hall
155 North Tegner Street, Suite A
Wickenburg, AZ 85390

Community: Town of Wickenburg, AZ
Community No.: 040056

104

Dear Mayor McDermott:

This responds to a request that the Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated August 29, 2002, Mr. W. Scott Ogden, P.E., Project Manager, JE Fuller/Hydrology & Geomorphology, Inc., requested that FEMA evaluate the effects that the proposed project and a revised hydraulic analysis that incorporated updated topographic information along Sols Wash from approximately 300 feet downstream to approximately 2,000 feet upstream of the U.S. Highway 93/89 (US 93/89) bridge crossing would have on the flood hazard information shown on the effective FIRM and FIS report. The proposed project will include grading, placement of fill, and a bank-protection plan for the proposed Goldmine Village development along the south bank of Sols Wash from the US 93/89 bridge crossing to approximately 2,000 feet upstream.

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Mr. Ogden.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. The submitted revised existing conditions HEC-RAS hydraulic computer model, dated July 12, 2002, was used as the base conditions model in our review of the proposed conditions model for this CLOMR request. The revised existing conditions HEC-RAS model incorporated the updated topographic information from approximately 300 feet downstream to approximately 2,000 feet upstream of the US 93/89 bridge crossing and included modeling of physical changes that have occurred since the original FIS of Sols Wash in the vicinity of the revised reach. The physical changes include replacement of the original US 93/89 bridge located in the regulatory floodway of Sols Wash, removal of a berm that once ran parallel to US 93/89 along its western edge from just north to approximately 900 feet north of the US 93/89 bridge crossing, construction of a floodwall along the north bank of Sols Wash from approximately 300 feet downstream to just downstream of the US 93/89 bridge, and construction of bank protection along the north bank to

provide for emergency mitigation of severe scour and eroded areas at target locations. We believe that, if the proposed project is constructed as shown on the undated plan entitled "Concept Grading Plan for P & J Investors, Inc., Goldmine Village Clomr" and as described in the submitted Technical Data Notebook entitled "Goldmine Village, Conditional Letter of Map Revision," dated June 2002, both prepared by JE Fuller/Hydrology & Geomorphology, Inc., and the data listed below are received, a revision to the FIRM would be warranted.

Our review of existing conditions revealed that the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) increased in some areas and decreased in other areas compared to the effective Base Flood Elevations (BFEs). The maximum increase in BFE, 3.5 feet, occurred just upstream of the US 93/89 bridge. The increases in BFE are a result of replacement of the original US 93/89 bridge that was located in the regulatory floodway of Sols Wash. The maximum decrease in BFE, 1.2 feet, occurred approximately 240 feet downstream of the US 93/89 bridge.

The width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, increased in some areas and decreased in other areas compared to the effective SFHA width. The maximum increase in SFHA width, approximately 120 feet, occurred just upstream of the US 93/89 bridge. The maximum decrease in SFHA width, approximately 480 feet, occurred approximately 240 feet downstream of the US 93/89 bridge. In addition, in conjunction with the replacement of the original US 93/89 bridge, US 93/89 was widened, and a berm that once ran parallel to US 93/89 along its western edge from just north to approximately 900 feet north of the US 93/89 bridge crossing was removed. As a result of removal of the berm, the base flood will, under existing conditions, overtop US 93/89, and an additional SFHA was created along US 93/89 eastward to the Hassayampa River from just north to approximately 900 feet north of the US 93/89 bridge crossing.

The width of the regulatory floodway increased in some areas and decreased in other areas compared to the effective floodway width along the modified reach of Sols Wash. The maximum increase in floodway width, approximately 60 feet, occurred approximately 780 feet upstream of the US 93/89 bridge. The maximum decrease in floodway width, approximately 100 feet, occurred approximately 500 feet upstream of the US 93/89 bridge.

On March 26, 2003, we notified your office by letter (copy attached) that the above-referenced increases are a potential violation of Paragraph 60.3(d)3 of the NFIP regulations. On the same date, we notified Mr. Michael Hornick, Natural Hazards Program Specialist, of the FEMA Region IX Office in Oakland, California, of the potential violation. We understand that the Town of Wickenburg and our Regional Office have worked together to resolve this issue.

The proposed conditions model was based on the existing conditions model for Sols Wash and incorporated the effects of the proposed grading, placement of fill, and bank protection for the proposed Goldmine Village development within the regulatory floodway and floodway fringe along the south bank from the US 93/89 bridge crossing to approximately 2,000 feet upstream. As a result of the proposed project, the BFEs will increase in some areas and decrease in other areas compared to the existing conditions BFEs for Sols Wash. The maximum increase in BFE, 0.3 foot, will occur just upstream of the US 93/89 bridge. The maximum decrease in BFE, 0.6 foot, will occur approximately 560 feet upstream of the US 93/89 bridge.

As a result of the proposed project, the width of the SFHA will increase in some areas and decrease in other areas compared to the existing conditions SFHA width along the modified reach of Sols Wash. The maximum increase in SFHA width, approximately 10 feet, will occur approximately 70 feet downstream of the US 93/89 bridge. The maximum decrease in SFHA width, approximately 580 feet, will occur approximately 300 feet upstream of the US 93/89 bridge.

As a result of the proposed project, the width of the regulatory floodway will increase in some areas and decrease in other areas compared to the existing conditions floodway width along the modified reach of Sols Wash. The maximum increase in floodway width, approximately 10 feet, will occur approximately 320 feet downstream of the US 93/89 bridge. The maximum decrease in floodway width, approximately 500 feet, will occur approximately 560 feet upstream of the US 93/89 bridge.

As a result of the proposed project, the BFEs will increase in some areas and decrease in other areas compared to the effective BFEs for Sols Wash. The maximum increase in BFE, 3.8 feet, will occur just upstream of the US 93/89 bridge. The maximum decrease in BFE, 1.2 feet, will occur approximately 240 feet downstream of the US 93/89 bridge. The width of the SFHA will increase in some areas and decrease in other areas compared to the effective SFHA width. The maximum increase in SFHA width, approximately 120 feet, will occur just upstream of the US 93/89 bridge. The maximum decrease in SFHA width, approximately 530 feet, will occur approximately 1,000 feet upstream of the US 93/89 bridge.

As a result of the proposed project, the width of the regulatory floodway will increase in some areas and decrease in other areas compared to the effective floodway width along the modified reach of Sols Wash. The maximum increase in floodway width, approximately 20 feet, will occur approximately 70 feet downstream of the US 93/89 bridge. The maximum decrease in floodway width, approximately 480 feet, will occur approximately 560 feet upstream of the US 93/89 bridge.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms, which were used in processing this request, must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)

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

  Form 2, entitled "Riverine Hydrology & Hydraulics Form"

  Form 3, entitled "Riverine Structures Form"

  Hydraulic analyses, for as-built conditions, of the base flood and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries, must be submitted with Form 2.

- Effective September 1, 2002, FEMA revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. In accordance with this schedule, the current fee for this map revision request is $3,800 and must be received before we can begin processing the request. Please note, however, that the fee schedule is subject to change, and requesters are required to submit the fee in effect at the time of the submittal. Payment of this fee shall be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card. The payment must be forwarded to the following address:

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

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

- Community acknowledgment of the map revision request

- A copy of the public notice distributed by your community stating its intent to revise the regulatory floodway, or a statement by your community that it has notified all affected property owners and affected adjacent jurisdictions

- In accordance with Section 65.12 of the NFIP regulations, please provide certification that no insurable structures will be affected by the increases in BFE, and a copy of the individual legal notice distributed by the community to all property owners affected by the increased BFEs.

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the BFEs would change as a result of the project, a 90-day appeal period would be initiated, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

This CLOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Chief, National Flood Insurance Program

Branch, Federal Insurance and Mitigation Division of FEMA in Oakland, California, at (510) 627-7184. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Study Branch
Federal Insurance and
Mitigation Administration

For: Mary Jean Pajak, P.E., Acting Chief
Hazard Study Branch
Federal Insurance and
Mitigation Administration

Enclosures

cc: Mr. Kenneth "Skip" Blunt
Floodplain Administrator
Town of Wickenburg

Ms. Shanna Yager
Branch Manager
Floodplain Administrator
Flood Control District of Maricopa County

Ms. Terri Miller
Executive Consultant
Mitigation Section
Arizona Division of Emergency
Management

Mr. W. Scott Ogden, P.E.
Project Manager
JE Fuller/Hydrology & Geomorphology, Inc.

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July 2002

Prepared for:
P & J Investors, Inc.
510 North Tegner Street, Suite A
Wickenburg, AZ 85390

Registered Professional Engineer (Civil)
CERTIFICATE NO. 28857
W. SCOTT OGDEN
Date Signed 7/22/02
ARIZONA, U.S.A.

Prepared by:

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DISKETTE HOLDER

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SECTION 1: INTRODUCTION

1.1 Project Purpose and Authorization

The purpose of the study is to obtain a Conditional Letter of Map Revision (CLOMR) for proposed changes to the floodplain and floodway of Sols Wash for a distance of approximately 2,000 feet upstream of the U.S. Highway 93 / 89 bridge crossing. The basis for the CLOMR will be a preliminary grading and bank protection plan that is a precursor to the proposed Goldmine Village development.

Commencement of this study and analysis was authorized by the owner of the subject property, P & J Investors, Inc. This Technical Data Notebook (TDN) has been submitted to and reviewed by the Town of Wickenburg, Arizona.

1.2 Project Description

Goldmine Village is a proposed mixed use development of portions of the SW ¼ of Section 1 and SE ¼ of Section 2, Township 7 North, Range 5 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona. The project is generally situated along the south bank of Sols Wash, just upstream of U.S. Highway 93/89 (locally named Tegner Street) in Wickenburg, Arizona. Figure 1.1 indicates the project location within the State of Arizona. Figure 1.2 shows the project vicinity within Town of Wickenburg.

The entire site is located within a flood hazard Zone AE, with a majority located within the jurisdictional floodway. Figure 1.3 is a copy of the current FEMA FIRM Panel, Map Number 04013C0255 G, revision date of July 19, 2001.

1.3 Floodplain History

1.3.1 Effective FIS

The effective Flood Insurance Study (FIS) establishing the current Sols Wash floodplain and floodway limits was based on a 1986 floodplain delineation study [CBA, 1986] contracted by the Flood Control District of Maricopa County.

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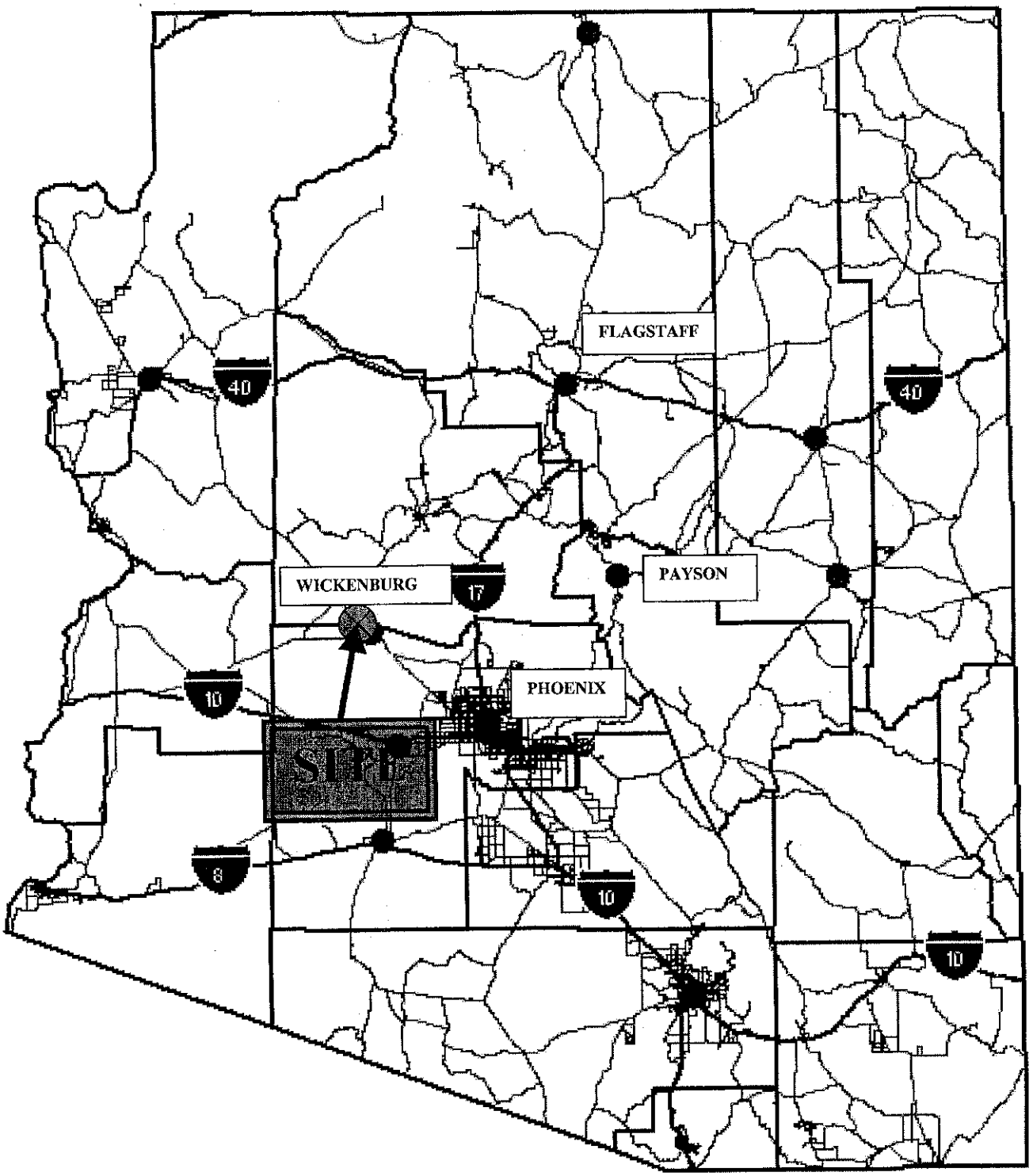

Figure 1.1

Project location map

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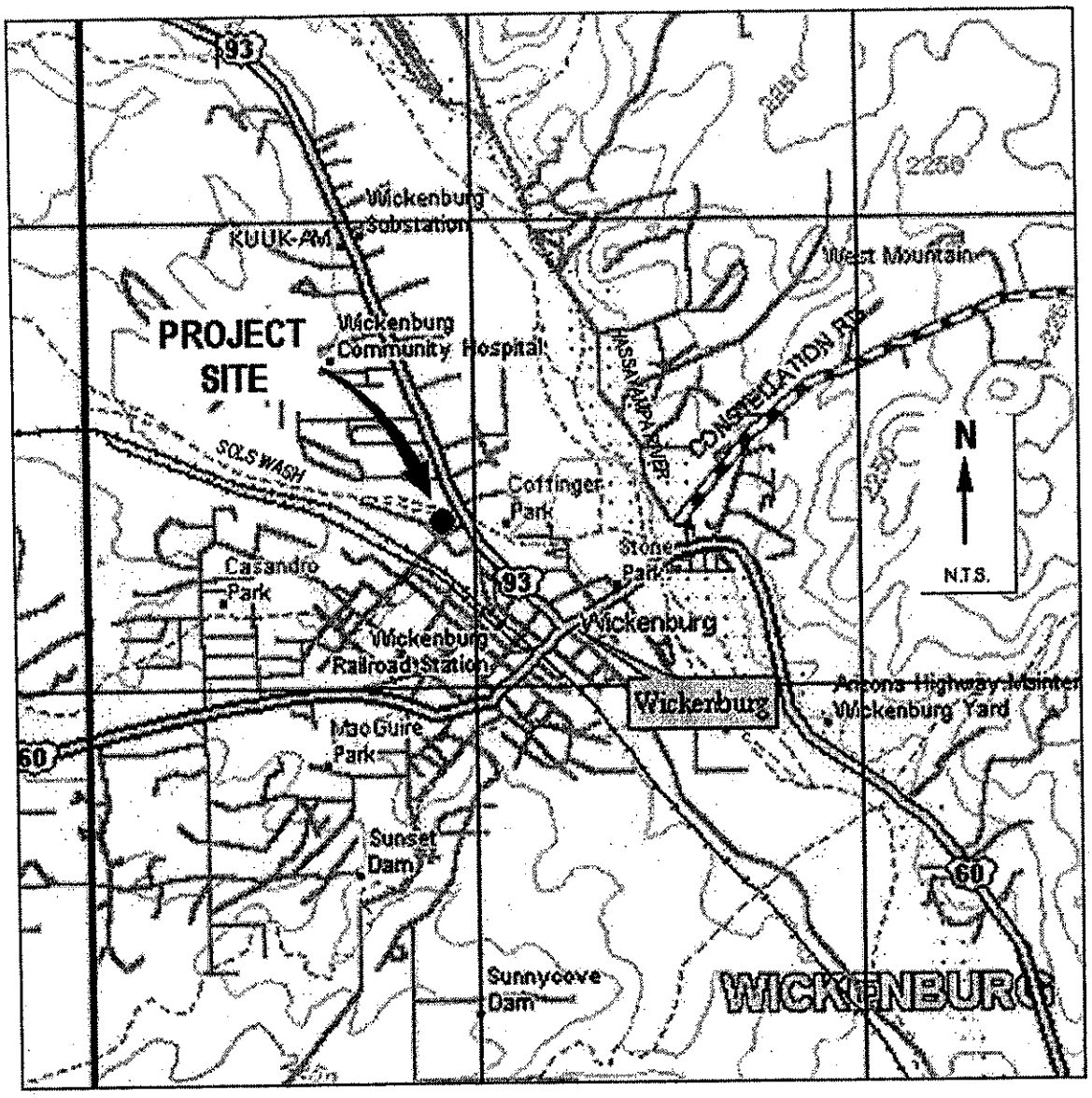

Figure 1.2

Project vicinity map

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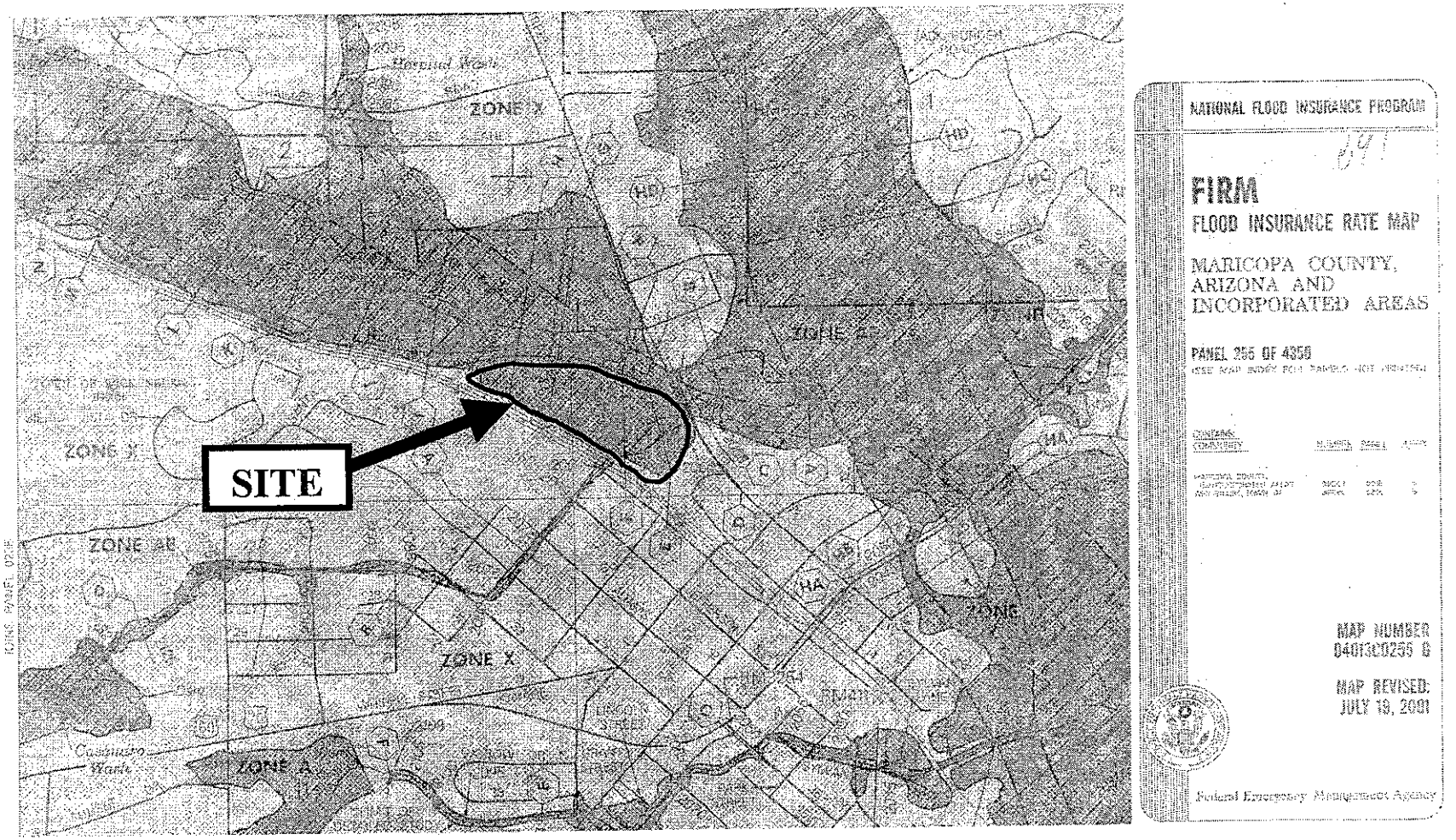

Figure 1.3

FEMA Firm Panel

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1.3.2 Recent Flooding

The most recent flooding of Sols Wash occurred during August and October 2000. Peak discharge estimates for the August 2000 storm were approximately 5,000 cfs. Peak discharge estimates for the late October 2000 storm was approximately 8,500 cfs. During the October 2000 storm, floodwaters in Sols Wash were reported to have overtopped US 93/89 by an unknown depth and caused significant flooding damage to several residences downstream. No overtopping was reported for the August 2000 storm.

1.3.3 Watercourse Changes

Since that study, significant physical changes to the Sols Wash watercourse in the vicinity of the subject reach have occurred. Those changes include:

- Replacement of the U.S. Highway 89 / 93 bridge by the Arizona Department of Transportation (ADOT) in 1998.
- Widening and repaving of US 93/89 by ADOT.
- Construction of a floodwall by the Town of Wickenburg on the left (north) bank of Sols Wash immediately downstream of the bridge.
- Construction of bank protection on the left (north) bank of Sols Wash at two locations along the subject reach by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS).

The original US 93/89 bridge was supported by seven sets of piers that were skewed at approximately 45 degrees to the roadway. The new bridge is comprised of six reinforced concrete boxes, with the barrels skewed at 45 degrees to the roadway.

Subsequent to the new bridge construction, US 93/89 was widened and new curb, gutter and sidewalks were constructed. Comparing topographic information obtained for the 1989 FIS and the new topographic mapping developed for this project (See TDN Section 3), it appears that a berm that once existed along the western edge of the highway, has been removed and replaced with a new sidewalk.

The Town of Wickenburg recently constructed a structural floodwall to protect the adjacent park from flooding by Sols Wash. The wall is constructed along the left (north) top of bank, beginning at the new bridge and extending approximately 300 feet downstream.

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Channel bank revetment was recently constructed by the NRCS at target locations along Sols Wash following the August and October 2000 floods. The revetment is comprised of loose rock rip rap placed to a four foot thickness along the channel bank. The primary goal of the revetment was to provide emergency mitigation of severe scour and eroded areas. Funding for the design and construction of the facilities was administered via the Emergency Watershed Protection Program.

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SECTION 2: ABSTRACT AND FEMA FORMS

2.1 Study Documentation Abstract

2.1.1	Date Study Accepted	No acceptance – in review
2.1.2	Study Contractor	JE Fuller / Hydrology & Geomorphology, Inc.
	Contact(s)	W. Scott Ogden, P.E.
	Address	6101 South Rural Road, Suite 110
		Tempe, AZ 85283
	Phone / Fax	480-752-2124 / 480-839-2193
	Email	scott@jefuller.com
2.1.3	FEMA Technical Review Contractor	Unknown
	Contact(s)	
	Adress	
	Phone	
	Internal Reference Number	
2.1.4	FEMA Regional Reviewer	Unknown
	Phone	
2.1.5	State Technical Reviewer	Unknown
	Phone	
2.1.6	Local Technical Reviewer	Skip Blunt, Town of Wickenburg
	Phone	928-684-5451
2.1.7	Reach Description	Sols Wash Above US Hwy 93/89
2.1.8	Aerial Mapping Contractor	Databased Terrain Mapping, Lee Harbers
	Phone	520-292-2020
	Flight Date / Contour Interval	February 6, 2002 / 1"=100', 2' CI
2.1.9	Unique Conditions and Problems	• New Bridge • Breakout flows overtop Hwy 93/89 north of bridge
2.1.10	Coordination of Peak Discharges	Used existing FIS Discharges

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2.2 FEMA Forms

Application for a CLOMR requires the use of the FEMA Form Series 81-89, MT-2 forms. The following is a list of the forms required for this submittal:

- MT-2, Form 1 – Revision Requestor and Community Official Form
- MT-2, Form 4 – Riverine Hydraulic Analysis Form
- MT-2, Form 5 – Riverine/Coastal Mapping Form
- MT-2, Form 6 – Channelization Form
- MT-2, Form 7 – Bridge/Culvert Form

The remainder of this section is comprised of the completed forms. The appropriate supplements are included in Appendix E.

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FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

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

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☒ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☐ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☐ Other Describe: _____

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☒ Physical Change ☐ Improved Methodology/Data ☒ Floodway Revision

☐ Other Describe: _____

Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Sols Wash

3. Project Name/Identifier: Goldmine Village

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

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040056	Town of Wickenburg	AZ	04013C	0255G	07/19/01
040037	Unincorporated Maricopa County	AZ	04013C	0255G	07/19/01

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

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

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

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

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

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☒ No ☐ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☒ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☒ overseeing compliance with the maintenance and operation plans of the Goldmine Village Revetment
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☒ Yes Fee amount: $3,100

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt. ☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

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

Signature of Revision Requester

Phil Richardson, Owner
Printed Name and Title of Revision Requester

P&J Investors, Inc.
Company Name

Telephone No.: 928-684-7653 Date: 7-24-02

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

Signature of Community Official

Lon R. McDermott, Mayor
Printed Name and Title of Community Official

Town of Wickenburg
Community Name

Telephone No.: 928.684.5451 Date: 8-20-02

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

W. Scott Ogden, P.E. - Project Manager
Printed Name and Title of Revision Requester

Registr No. 28857 Expires (Date) 03/31/2004 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☒ **Channelization** (6)	channel is modified
☒ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for viewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

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

Note: Fill out one form for each flooding source studied

Community Name: Wickenburg, Maricopa County, Arizona

Flooding Source: Sols Wash

Project Name/Identifier: Goldmine Village

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Section 0.22, Hassyampa River Confluence

Upstream Limit: Section 0.79

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	**for areas which do not have detailed flooding:**
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☒ **Natural** **File Name** Sol206.prj ☒ **Floodway** **File Name** Sol206w.prj
Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name** _____
The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ **Natural** **File Name** SolsCLOMR.prj ☐ **Floodway** **File Name** _____
The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☒ **Natural** **File Name** SolsCLOMR.prj ☒ **Floodway** **File Name** SolsCLOMR.prj
The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended.
For detailed analysis studies, using a known water-surface elevation is recommended.

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

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☒ Supercritical depth ☒ Critical Depth ☐ Drawdowns ☒ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☒ Water surface elevations higher than the end points of cross sections.

☒ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End 0.22 within 0.1 (feet) *Cross-Section #* Upstream End 1.12 within 0.1 (feet) *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End 0.22 within 0.1 (feet) *Cross-Section #* Upstream End 1.12 within 0.1 (feet) *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End 0.22 within 20 (feet) *Cross-Section #* Upstream End 1.12 within 0.0 (feet) *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☐ Corporate Limits labeled ☒ Study limits labeled

☐ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☒ Road Crossings ☐ Labeled ☒ Low Chord Elevations ☒ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

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

Floodway Data Table Attached ☒ **Yes** ☐ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

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

Note: Fill out one form for each flooding source studied

Community Name: Town of Wickenburg, Maricopa County, Arizona

Flooding Source: Sols Wash

Project Name/Identifier: Goldmine Village

This is a ☒ Manual ☐ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☒ Yes	☐ No	☐ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☒ Yes	☐ No	☐ N/A
c. Revised floodway boundaries	☒ Yes	☐ No	☐ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☒ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Aerial Photogrammetry with flight date of February 2002

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

Effective FIS Scale 1" = 200' Contour Interval 2 feet

Revision Request Scale 1" = 200' Contour Interval 2 foot

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

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

The fill is: ☐ Existing ☒ Proposed

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

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

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

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

If Yes, justify steeper slopes _____

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.*)

☒ Yes ☐ No

If No, describe erosion protection provided _____

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

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

If Yes, attach certification of fill compaction (*item 3c. above*) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☒ **Yes** ☐ **No**

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

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

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

Community Name: Town of Wickenburg, Maricopa County, AZ

Flooding Source: Sols Wash

Project Name/Identifier: Goldmine Village

1. REACH TO BE REVISED

Describe the limits of the revision **OR** submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: River Station 0.22

Upstream Limit: River Station 0.76

2. CHANNEL DESCRIPTION

Attach the following information about the channel (check box if information has been provided):

☒ Description of the inlet and outlet

☒ Description of the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)*:

3. ACCESSORY STRUCTURES

The channelization includes:

- ☐ Levees *(Attach Levee/Floodwall System Analysis Form - Form 8)*
- ☐ Drop structures
- ☐ Superelevated sections
- ☐ Transitions in cross sectional geometry
- ☐ Debris basin/detention basin
- ☐ Energy dissipater
- ☐ Other (Describe):

4. DRAWING CHECKLIST

Attach the plans of the channelization certified by a registered professional engineer. The plan detail and information should include (check box if information has been provided):

☒ Channel alignment and locations of inlet, outlet, and accessory structures

☒ Channel lining

☒ Typical cross sections and profiles of channel banks and invert

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

5. HYDRAULIC CONSIDERATIONS

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

2. The design elevation in the channel based on:

   ☒ Subcritical flow

   ☐ Critical flow

   ☐ Supercritical flow

   ☐ Energy grade line

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

Inlet to channel?	☐ Yes
Outlet of channel?	☐ Yes
At Drop Structures?	☐ Yes
At Transitions?	☐ Yes
Other locations?	☒ Yes

Explanation Attached? ☒ **Yes** ☐ **No** ☐ **N/A**

6. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood water-surface elevations, then provide the following information **(Check the box if provided):**

☐ Estimated sediment load

☐ Method used to estimate sediment transport

☐ Method used to estimate scour and/or deposition

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

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

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Community Name: Town of Wickenburg

Flooding Source: Sols Wash

Project Name/Identifier: Goldmine Village

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): US Highway 93/89 Bridge

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   River Station 0.42

3. This revision reflects (check one of the following):

   ☒ New bridge/culvert not modeled in the FIS

   ☐ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

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

   HEC-RAS with Pressure/Weir Flow Option

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☐ **N/A**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

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

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

SECTION 3: SURVEY AND MAPPING INFORMATION

3.1 Field Survey Information

3.1.1 Mapping Control Survey

Horizontal and vertical control surveys for the aerial mapping produced for this project were performed by Databased Terrain Mapping, Inc (DTM) and were conducted in February 2002. The survey was performed under the direct supervision of Lee Harbers, R.L.S.(AZ RLS No. 26401). The survey work included establishment of a horizontal and vertical control net, a bench loop for the vertical control, and placement and location of aerial photography panels.

The coordinate grid is based North American Datum of 1983 (NAD 83), Central Zone of Arizona State Plane Coordinate System. Elevations are based upon the National Geodetic Vertical Datum of 1929 (NGVD 29) with a conversion factor to North American Vertical Datum of 1988 (NAVD 88) provided. The primary control for the survey was based on the Maricopa County Geodetic Densification and Cadastral Survey (GDACS) points 4OI2 and 4NJ1. The control surveys also tied into existing ERM Numbers 3254 and 605 for verification of vertical datum. A more detailed description of the procedures, techniques and equipment used for control surveying are provided in Appendix C.1.

3.1.2 As-Built Structure Surveys

Structure as-built surveys and property boundary information are provided by Richard "Tim" Mead, R.L.S. (AZ RLS No. 28730) of Wickenburg, Arizona. Mr. Mead surveyed the Cassandro Wash culvert outlet headwall and pipes, the US 93/89 bridge, and the floodwall located downstream of the bridge at the top of the left (north) bank. The survey data was provided as an AutoCAD® file. A printed copy of that file is provided in Appendix C.2. Pertinent copies of the construction drawings for the US 93/89 bridge are also provided in Appendix C.2, however, it should be noted that the elevation datum referenced on those plans is not the same as that used in this study.

6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

3.2 Topographic Mapping

Two foot contour interval topographic mapping[1] compiled to a horizontal scale accuracy of 1 inch equals 100 feet was produced for this project using aerial photogrammetry. Additionally, 0.5 foot pixel orthophotography was also generated for the mapped area. The flight date for the aerial photography was February 6, 2002.

The mapping horizontal coordinate system is based on the North American Datum of 1983 (NAD 83), Central Zone of Arizona State Plane Coordinate System. Vertical elevations are based upon the National Geodetic Vertical Datum of 1929 (NGVD 29) with a conversion factor to North American Vertical Datum of 1988 (NAVD 88) provided. See data in Appendix C.1 for conversion factors and control.

[1] Mapping contractor was Databased Terrain Mapping, Inc. (Project No. 22017; Contact: Lee Harbers, R.L.S., Certified Photogrammetrist)

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SECTION 4: HYDROLOGY

4.1 General

No new hydrology was developed for this study. Existing peak discharges published in the current FIS[2] were used without change. The 100-year peak discharges for the subject reach of Sols Wash are summarized in Table 4.1.

Table 4.1
Summary of FIS discharges

Location	JEF River Mile	Drainage Area, in sq mi	Peak 100-Yr Discharge, in cfs
At confluence with Hassayampa River	0.00	147.2	15,045
Above confluence of Cassandro Wash	0.48	145.2	14,459
Above confluence of Hospital Wash	0.66	145.1	14,413
Above confluence of Flying E Wash	---	134.8	12,945

[2] Federal Emergency Management Agency, 2001, *Flood Insurance Study for Maricopa County, Arizona and Incorporated Areas*, Volumes 1 through 16, revision date July 19, 2001.

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Phone: 480-752-2124 Fax: 480-839-2193

SECTION 5: HYDRAULICS

5.1 Method Description

The U.S. Army Corps of Engineers computer program, HEC-RAS version 3.0 was utilized to analyze the 100-year floodplain conditions along Sols Wash and developed the existing condition and post-development hydraulic models for the Sols Wash Village project site. Three hydraulic models are included in this report; the Duplicate Effective model, the Existing Conditions model, and the Developed Conditions model.

5.1.1 Duplicate Effective Model

The original Sols Wash Floodplain Delineation study utilized the U.S. Army Corps of Engineers HEC-2 computer program to model the 100-year floodplain conditions. In the FIS HEC-2 model, the Special Bridge option was used to analyze the old US 93/89 bridge crossing of Sols Wash. The HEC-2 model was imported into HEC-RAS to create the duplicate effective model. Due to the discontinued use of the Special Bridge option in HEC-RAS and limitations in accurately converting the old HEC-2 data to HEC-RAS bridge data, the bridge modeling was excluded from the Duplicate Effective Model. Instead, separate upstream and downstream reaches were created from the bridge and known water surface elevations from the HEC-2 results were input as boundary conditions for each reach. The conveyance computational method in HEC-RAS was set to HEC-2 style (conveyance calculations for every segment between coordinate points). The results of the duplicate effective model showed little to no difference in output compared to the original HEC-2 model. The only location of note is at river mile 0.90 where the elevation difference is 0.24 feet. This is attributed to the difference in algorithms used in HEC-2 versus HEC-RAS in assigning a weighted n-value to the channel where the n-value varies within between the assigned bank stations. A comparison of the two models' results are provided in Table 5.1. The original HEC-2 model output and the Duplicate Effective model output are provided in Appendix E.5.

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Table 5.1
Comparison of FIS (HEC-2) and Duplicate Effective (HEC-RAS) modeling results

River Mile	Original FIS Water Surface Elevation, in feet	Duplicate Effective Water Surface Elevation, in feet	Delta In feet
0.22	2052.81	2052.85	0.04
0.36	2058.22	2058.23	0.01
0.40	2058.32	2058.33	0.01
0.42	2059.37	2059.37	0.00
0.47	2061.63	2061.65	0.02
0.50	2063.62	2063.66	0.03
0.60	2067.68	2067.68	0.00
0.69	2070.74	2070.70	-0.04
0.79	2074.89	2074.91	0.03
0.90	2078.82	2078.58	-0.24
1.00	2083.96	2083.86	-0.10
1.12	2088.38	2088.39	0.01

5.1.2 Existing Conditions Model

HEC-RAS 3.0 was utilized to develop the Existing Conditions model. Cross-sections for the reach bounded by river miles 0.35 to 0.79 were generated using the updated topographic mapping. As compared to the FIS modeling, several cross-sections were added to further detail the reach immediately adjacent to the Goldmine Village Property. In some cases, the duplicate effective cross section alignments were re-aligned to better reflect the topography and flooding paths. New bridge data was also incorporated into the model based on as-built drawings and field survey notes. A lateral weir was also added along the left (northern) overbank area to model the flows that overtop US 93/89, north of the bridge crossing. Cross sections upstream of river mile 0.79 and downstream of river mile 0.35 are inserted without change from the Duplicate Effective model.

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The starting downstream water surface elevation (WSEL) and discharge were set equal to the FIS values as boundary conditions for the Existing Conditions model. The upstream WSEL was set at critical depth for supercritical analyses. At river station 0.22, an arbitrary discharge was coded to force the model to use the full FIS 100-year discharge of 15,045 cfs as a starting discharge, even though the flows overtopping US 93/89 are considered to nor re-enter Sols Wash. This was done to preserve an hydraulic relationship to the current FIS.

5.1.3 Developed Conditions Model

The Existing Conditions Model was modified to reflect the proposed modifications to the right (south) bank and right overbank, that would be associated with the Goldmine Village improvements. Modifications to the model are based on the Concept Grading Plan included in Appendix F. Those modifications include widening of the main channel by moving the right bank and filling the right overbank area to an elevation above the 100-year floodplain.

The starting downstream WSEL and discharge were set equal to the FIS values as boundary conditions for the Developed Conditions model. The upstream WSEL was set at critical depth for supercritical analyses. At river station 0.22, an arbitrary discharge was coded to force the model to use the full FIS 100-year discharge of 15,045 cfs as a starting discharge, even though the flows overtopping US 93/89 are considered to nor re-enter Sols Wash. This was done to preserve an hydraulic relationship to the current FIS.

5.2 Work Study Maps

Three work study maps are provided with this TDN and are included in pockets at the back of this report. The first is labeled Plate 1 and is a reprographic copy of the work study map that was used to establish the current FIS for the subject reach of Sols Wash. The purpose for including this map is to provide a reference for cross sections included in the Existing and Developed Conditions Models, but not included within the updated mapping area. The second map, labeled Plate 2, shows the Existing Condition cross sections and floodplain modeling results. The third map, labeled Plate 3, shows the Developed Conditions floodplain and floodway boundaries and water surface elevations. The floodplain and floodway data indicated on Plate 3 are the basis for this CLOMR. Flows overtopping US 93/89 are also shown on Plates 2 and 3.

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5.3 Parameter Estimation

The following discussions primarily refer to the data developed for the reach bounded by river mile 0.35 to 0.79 of the Existing and Developed Condition models. No changes were made to the remaining upstream or downstream cross sections that are included in each model.

5.3.1 Roughness Coefficients

Manning's n-values for the main channel were estimated to be 0.030 based on data published in a USGS professional paper[3] for the Hassayampa River near Morristown. That reach of the river is hydraulically similar to Sols Wash, with the exception that it is wider. A measured n-value of 0.026 was established for a flow of approximately 6,200 cfs in February, 1993. The value of 0.030 was assigned to Sols Wash to account for a higher degree of curvature and narrower width. The original FIS assigned overbank values of 0.065 to the vegetated areas, 0.010 to the lightly urbanized areas, and 1.00 to the densely urban areas. Those values were assigned accordingly in the Existing and Developed Condition models based on field visits to the site and engineering judgment. Ground photographs of the wash and overbank areas are included in Appendix E.1.

5.3.2 Expansion and Contraction Coefficients

For a 100-year flood, flows approaching the bridge at river mile 0.57 must contract from a 2,000 foot wide floodplain down to a 200 foot wide bridge opening at river mile 0.43. Accordingly, contraction and expansion coefficients ranging between 0.3 and 0.6, and 0.5 and 0.8, were used to estimate the transitional losses in these areas. Typical contraction and expansion coefficient values of 0.1 and 0.3 were assigned to all other locations. Table 5.2 summarizes the assigned values for each cross section. It is noted that the values are the same for both the Existing and Developed Condition models.

[3] Phillips, J. V., Ingersoll, T. L., 1998, *Verification of Roughness Coefficients for Selected Natural and Constructed Stream Channels in Arizona*, USGS Professional Paper 1584.

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Table 5.2
Summary of contraction and expansion coefficients

River Station	Contraction	Expansion
1.12	0.1	0.3
1.00	0.1	0.3
0.90	0.1	0.3
0.79	0.1	0.3
0.76	0.1	0.3
0.71	0.1	0.3
0.66	0.1	0.3
0.61	0.1	0.3
0.57	0.3	0.5
0.52	0.3	0.5
0.48	0.6	0.8
0.43	0.3	0.5
0.40	0.3	0.5
0.35	0.3	0.5
0.22	0.1	0.3

5.4 Cross Section Description

New cross section data were generated for river mile stations 0.35 through 0.79, using the new two-foot contour interval mapping developed for this project. Cross section geometry for each new river station was developed by generating a digital terrain model (DTM) from the mapping data and digitally querying the DTM along the cross section alignment to create a set of elevation versus station data. Cross sections were oriented perpendicular to the predominant flow-path. Hinged cross sections were used to approximate the flow of floodwaters through the left (northern) overbank area.

Cross section station and elevation data at river mile stations 0.43 (upstream face of bridge) and 0.40 (downstream face of bridge) were to obtained along an alignment that is parallel to the face of the bridge. A skew factor of 0.707 (45 degrees) was then applied to each section to project the section perpendicular to the flow path.

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Developed condition cross sections are modifications of the existing condition cross sections to reflect the improvements proposed for the Goldmine Village property as indicated on the .

Plots of the Existing Condition and Developed Condition cross sections are provided in Appendix E.2.

5.5 Modeling Considerations

5.5.1 Hydraulic Jump and Drop Analysis

No significant hydraulic jumps are expected for this reach of Sols Wash and there are no drops present. Most flows for the 100-year flood are expected to remain near or below critical energy and all flows are considered stable based on the criteria set forth in State Standard Attachment 3-94[4].

5.5.2 Bridges and Culverts

The US 93/89 bridge is the only hydraulic structure included in the model. The bridge is situated at 45 degree skew to the roadway and is comprised of six reinforced concrete box (RCB) cells. The bridge data, like the bounding cross section data, was entered into HEC-RAS with an original orientation that is parallel to the bridge, and then adjusted by a 45 degree skew (factor of 0.707) to project the geometry perpendicular to the flow in Sols Wash. The interior walls of the RCB cells are modeled as piers.

Figure 5.1 indicates the bridge modeling settings used in both the Existing and Developed Condition Models. After a couple of test runs, it became evident that the 100-year water surface was within one foot of the low chord elevation. When performing "Pressure and/or Weir Flow" calculations within HEC-RAS, the program was set to use the upstream energy grade line elevation to check for pressure flow in the bridge. This will result in conservative water surface elevations upstream of the bridge which is desirable for this study.

[4] Arizona Department of Water Resources, 1994, *Floodway Modeling Standards for Supercritical Flow*

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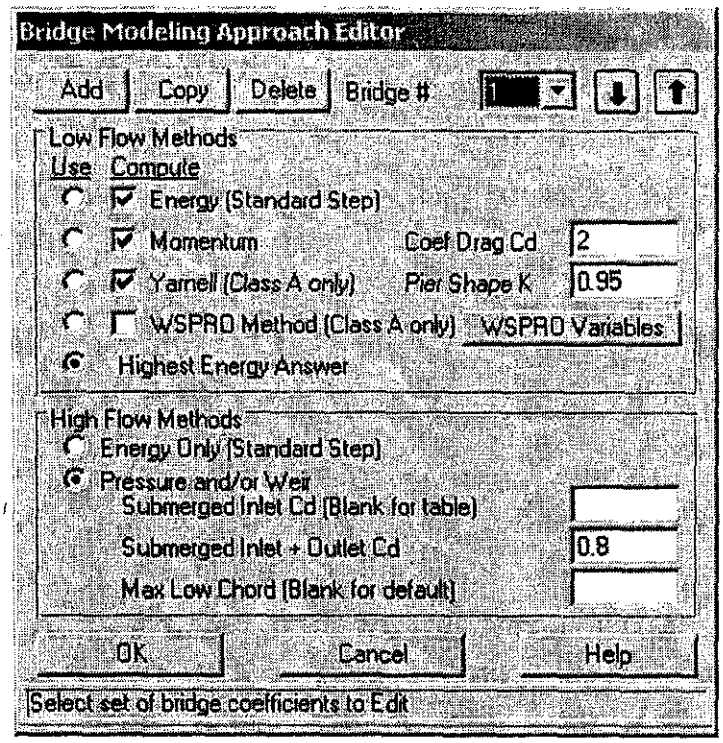

Figure 5.1

HEC-RAS bridge modeling settings

5.5.3 Levees and Dikes

The existing floodwall downstream of the US 93/89 bridge is modeled as a levee in HEC-RAS to assess the backwater impacts on the bridge. However, there are no true levees or dikes within the project.

5.5.4 Islands and Flow Splits

Islands – There are no significant or specifically modeled islands within CLOMR area.

Flow Splits – The portion of US 93/89 north of the bridge has a low point in the highway near the Cavaness Avenue intersection. Flooding in the left overbank is concentrated at that low point, with some flows overtopping US 93/89 and the rest draining back into Sols Wash. During the October 2000 storm, floodwaters overtopped US 93/89 causing flooding and damage to the downstream homes and park. The peak discharge estimated for that event was approximately 8,500 cfs. Accordingly, it can be

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expected that significant overtopping of US 93/89 would be expected during a 100-year flood.

Estimation of the discharges overtopping the highway are accomplished by using the lateral weir operation within HEC-RAS. A rating table for the weir flow was generated using an uneven weir program.[5] Figure 5.2 is a graphical plot of the weir rating relation developed. Copies of the program output are included in Appendix E.4. The rating table was coded into HEC-RAS to correspond to the portion of the highway between the left overbank endpoints of river stations 0.52 and 0.48.

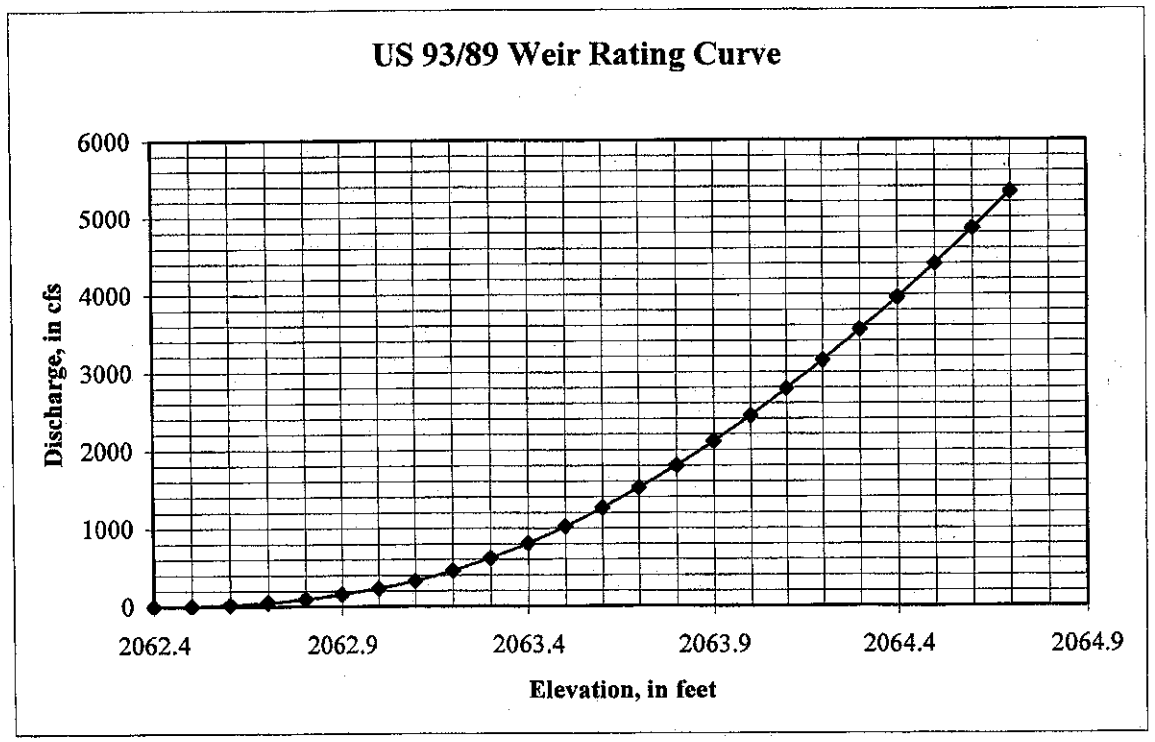

Figure 5.2

US 93/89 Weir Rating Curve

[5] Program was originally developed by the Ohio Department of Natural Resources (ODNR) and was based on a 1968 USGS publication entitled; *Techniques of Water-Resources Investigatins of the United States Geological Survey, Book 3, Chapter A5, Measurement of Peak Discharge at Dams by Indirect Method* (USGS, 1968)

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5.5.5 Ineffective Flow Areas

Ineffective flow areas were set to model a one to one contraction of the flows into the US 93/89 bridge, and to constrain the effective flow area to bridge opening for the cross sections bounding the bridge. The ineffective flow limits are indicated on the cross section plots in Appendix E.2.

5.5.6 Supercritical Flow

The HEC-RAS computations default to critical depths for several of the river stations modeled. Both the Existing and Developed Condition models were run in supercritical mode to check for highly supercritical flow and the possibility of significant hydraulic jumps. Tables 5.3 and 5.4 summarize the subcritical and supercritical results for the Existing and Developed Conditions modeling. For the Developed Conditions, a third model using the mixed profile option of HEC-RAS was used to check for controlling profile.

At this time, HEC-RAS cannot perform the mixed profile analysis and run the lateral weir optimization at the same time. Accordingly, the discharges resulting from the developed condition subcritical model with the lateral weir optimization were hard coded into a new steady flow data file. That lateral weir was removed from the Developed Conditions geometry file, and using the new steady flow data file, a mixed use run was executed. Table 5.5 summarizes the results of that run. As indicated by the data, the flow regime within the main channel is at or near critical depth for most of the reach. At about river station 0.57, the profile transitions to subcritical due to the backwater caused by the bridge. The flow at transitions to subcritical due to the backwater caused by the bridge. The flow at this transition point is only mildly supercritical and hence, no significant hydraulic jump is expected to form. For the purposes of this CLOMR, the Developed Condition subcritical results are used for the floodplain mapping. Reference Plates 1, 2, and 3 for locations of the referenced river stations.

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Table 5.3
Summary of subcritical and supercritical flows for Existing Conditions modeling

	Subcritical					Supercritical				
River Station	Total Discharge (cfs)	Water Surface Elevation (ft)	Critical W.S.E. (ft)	Energy Gradeline Elevation (ft)	Froude Number	Total Discharge (cfs)	Water Surface Elevation (ft)	Critical W.S.E. (ft)	Energy Gradeline Elevation (ft)	Froude Number
0.22	15045	2052.91	2052.91	2054.80	0.75	15045	2051.90	2052.91	2055.22	1.01
0.35	13011	2056.23	2056.23	2059.48	0.93	13545	2056.43	2056.43	2059.75	0.93
0.40	13011	2059.62	2056.34	2060.82	0.51	13545	2056.41	2056.51	2059.51	1.02
0.42	US 93/89 Bridge					US 93/89 Bridge				
0.43	13011	2062.85	2057.62	2063.71	0.39	13545	2056.79	2057.84	2061.23	1.32
0.48	13011	2063.17	---	2064.39	0.67	13545	2061.58	2062.59	2064.79	1.15
0.51	Lateral Weir Rating Curve					Lateral Weir Rating Curve				
0.52	14459	2064.56	---	2065.31	0.56	14459	2063.59	2063.99	2065.26	0.84
0.57	14459	2065.37	2065.37	2066.53	0.75	14459	2064.56	2065.37	2067.02	1.08
0.61	14459	2067.52	2067.52	2068.64	0.73	14459	2067.31	2067.52	2068.67	0.81
0.66	14413	2068.42	---	2069.90	0.88	14413	2068.64	2068.74	2069.83	0.79
0.71	14413	2070.23	2070.23	2071.37	0.81	14413	2069.69	2070.23	2071.53	1.03
0.76	14413	2071.96	2071.96	2073.59	0.93	14413	2071.79	2071.96	2073.61	0.99
0.79	14413	2073.94	2073.94	2075.50	1.07	14413	2073.94	2073.94	2075.50	1.07
0.90	14413	2078.92	2078.30	2080.24	1.00	14413	2078.30	2078.30	2080.27	1.25
1.00	14413	2083.20	2083.20	2085.42	1.24	14413	2082.81	2083.20	2085.64	1.41
1.12	14413	2088.51	2088.51	2089.89	0.92	14413	2088.51	2088.51	2089.89	0.92

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Table 5.4
Summary of subcritical and supercritical flows for Developed Conditions modeling

River Station	Subcritical					Supercritical				
	Total Discharge (cfs)	Water Surface Elevation (ft)	Critical W.S.E. (ft)	Energy Gradeline Elevation (ft)	Froude Number	Total Discharge (cfs)	Water Surface Elevation (ft)	Critical W.S.E. (ft)	Energy Gradeline Elevation (ft)	Froude Number
0.22	15045	2052.91	2052.91	2054.80	0.75	15045	2051.71	2052.91	2055.42	1.08
0.35	13553	2056.37	2056.37	2059.75	0.94	14545	2056.77	2056.77	2060.24	0.93
0.40	13553	2059.88	2056.51	2061.12	0.51	14545	2056.45	2056.81	2059.98	1.08
0.42	US 93/89 Bridge					US 93/89 Bridge				
0.43	13553	2063.18	2057.85	2064.05	0.39	14545	2058.15	2058.15	2061.33	1.00
0.48	13553	2063.41	---	2064.49	0.50	14545	2058.75	2060.23	2063.97	1.48
0.51	Lateral Weir Rating Curve					Lateral Weir Rating Curve				
0.52	14459	2063.97	---	2065.14	0.63	14459	2063.37	2063.37	2065.03	0.76
0.57	14459	2064.92	2064.92	2066.40	0.76	14459	2063.98	2064.92	2066.82	1.07
0.61	14459	2067.03	2067.03	2068.49	0.76	14459	2066.80	2067.03	2068.51	0.82
0.66	14413	2068.59	2068.59	2069.77	0.77	14413	2068.47	2068.59	2069.78	0.81
0.71	14413	2070.14	2070.14	2071.38	0.81	14413	2069.57	2070.14	2071.53	1.02
0.76	14413	2071.96	2071.96	2073.59	0.93	14413	2071.79	2071.96	2073.61	0.99
0.79	14413	2073.94	2073.94	2075.50	1.07	14413	2073.94	2073.94	2075.50	1.07
0.90	14413	2078.92	2078.30	2080.24	1.00	14413	2078.30	2078.30	2080.27	1.25
1.00	14413	2083.20	2083.20	2085.42	1.24	14413	2082.81	2083.20	2085.64	1.41
1.12	14413	2088.51	2088.51	2089.89	0.92	14413	2088.51	2088.51	2089.89	0.92

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Table 5.5
Summary of Developed Conditions mixed flow regime modeling

River Station	Total Discharge	Water Surface Elevation	Critical W.S.E.	Energy Gradeline Elevation	Channel Velocity	Flow Area	Top Width	Channel Froude #
	(cfs)	(ft)	(ft)	(ft)	(ft/s)	(sq ft)	(ft)	
0.22	15045	2051.90	2052.91	2055.22	15.4	1469.5	596.4	1.01
0.35	13553	2056.43	2056.43	2059.75	14.9	1030.3	171.6	0.93
0.40	13553	2059.86	2056.46	2061.10	9.0	1514.7	229.0	0.51
0.42	Bridge							
0.43	13553	2063.04	2057.84	2063.93	7.6	1787.0	209.1	0.40
0.48	13553	2063.28	---	2064.40	8.5	1697.4	308.0	0.51
0.52	14459	2063.85	2063.37	2065.10	9.7	2374.2	882.8	0.65
0.57	14459	2063.98	2064.92	2066.82	14.1	1754.4	1200.5	1.07
0.61	14459	2066.80	2067.03	2068.51	11.5	2662.5	1165.2	0.82
0.66	14413	2068.47	2068.59	2069.78	11.1	2535.2	1094.7	0.81
0.71	14413	2069.57	2070.14	2071.53	13.2	1732.9	1009.5	1.02
0.76	14413	2071.79	2071.96	2073.61	12.6	1520.0	797.6	0.99
0.79	14413	2073.94	2073.94	2075.50	13.2	1922.0	928.4	1.07
0.90	14413	2078.92	2078.30	2080.24	12.8	2409.3	1339.1	1.00
1.00	14413	2082.81	2083.20	2085.64	16.6	1224.1	625.7	1.41
1.12	14413	2088.51	2088.51	2089.89	12.2	2066.6	880.8	0.92

5.6 Floodway Modeling

Floodway encroachments are only analyzed for the Developed Conditions model. For river stations 1.12, 1.00, 0.90, 0.35, and 0.22, encroachments are set at or very near to the same location as those indicated in the current FIS floodway. The right bank encroachments for river

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stations 0.79 to 0.43 are set at the proposed top of bank for the Goldmine Village project. The left bank encroachments are the same as those in the current FIS floodway. All encroachments were set using Method 1 and it was also assumed that no flow is lost over US 93/89 for the fully encroached condition.

5.7 Special Problems

5.7.1 US Highway 93/89 Bridge and Overtopping

The current FIS study assumed that all flows in the left overbank would return to Sols Wash upstream of the bridge. This is probably due to the presence of what appears to be a small berm that ran parallel to the highway on the west side. Additionally, the old bridge was modeled using the special bridge routine within HEC-2. A review of the HEC-2 output revealed that a headloss of only 0.3 feet was calculated by HEC-2 through the bridge. This appeared to be significantly small, especially for a location where the floodplain constriction is so significant and the bridge is skewed so harshly. As a check, the special bridge card was removed from the data set and the HEC-2 model was re-run. With the bridge, the energy gradeline and water surface elevation at the upstream face were 2061.93 and 2059.37 feet. Without the bridge, the results for the same location were 2062.57 and 2060.89 feet. It is unlikely that the bridge *increases* the efficiency of the system and therefore, the original modeling results are suspect. This is important in that the new modeling presented in this report indicate that pressure flow occurs at the bridge for the 100-year flow. This translates to water surface elevations that are as much as 3.8 feet higher than those in the Effective FIS and a corresponding backwater condition that extends approximately 400 feet upstream of the bridge, where it eventually matches or is below the Effective FIS floodplain. See Section 5.9.3 for a detailed comparison of the old and new results. It is reiterated that this increase is not due to any improvements proposed by Goldmine Village, but is a result of more detailed modeling of the bridge using the updated tools in HEC-RAS that better identify the flood hazard.

For the Developed Condition model, approximately 1,500 cfs will break out over the roadway and continue easterly through an existing neighborhood. The flows will not return directly to Sols Wash, but ultimately will flow easterly to the Hassayampa River. A new flood hazard Zone A delineation is proposed (see Plate 3) to map the flood hazard associated with the overtopping flows. The current Zone AE boundary east of the highway is maintained with the

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exception of modified BFE's. The limits of the new Zone A were established by connecting the point at which overtopping begins near the endpoint of river station 0.52, with the Zone AE delineation for the Hassayampa.

5.7.2 Town Well Site

Currently, the Town of Wickenburg operates a municipal water supply well within project area. The well is located within the floodway at river station 0.48 on the right overbank about 50 feet south of the existing top of bank. The Town has chosen to keep the well at its current location and has agreed to work with Goldmine Village to raise the wellhead and surrounding infrastructure to an elevation that is above the proposed 100-year flood. Dual protection of the well will be provided in the form of a retaining wall immediately adjacent to the well and the bank revetment proposed with this project. The Concept Grading Plan in Appendix F, illustrates the typical channel section adjacent to the well improvements.

5.7.3 Error and Warning Messages

There are no modeling error messages and the warning messages primarily deal with the defaulting of calculations to critical depth and minimum specific energy. The minimum specific energy messages were checked by conducting the supercritical and mixed flow regime analyses previously discussed. Other messages included warnings of divided flow and changes in velocity head that exceeded the set tolerance. All results were checked and the warnings were found to be inconsequential to the modeling accuracy or results.

5.8 Calibration

No calibration was performed for this model.

5.9 Final Results

Results are presented herein for the following models:

- Existing Conditions with weir optimization (Table 5.6)
- Developed Conditions with weir optimization (Tables 5.7)
- Comparisons of the Effective FIS, Existing Conditions and Developed Conditions modeling results (Table 5.8)
- Developed Conditions Floodplain/Floodway with hand-coded discharges (Table 5.9)

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5.9.1 Existing Conditions

Table 5.6 summarizes the results of the Existing Conditions modeling. A significant volume of the 100-year flow is conveyed in the left overbank area. At river station 0.52 the left overbank discharge is estimated at approximately 3,100 cfs. Once that flow reaches US 93/89, approximately 2,034 cfs overtops the highway with the rest returning to Sols Wash upstream of the bridge. The bridge calculations indicate that the floodwaters seal the upstream face and cause a pressure flow condition. This results in a short backwater effect upstream through river station 0.52.

5.9.2 Developed Conditions

Table 5.7 summarizes the results of the Developed Conditions modeling. The widening of the main channel decreases the flow in the left overbank and generally decreases the water surface elevations throughout the improved reach. The main channel velocities are increased slightly due to the greater volume of runoff being conveyed by the main channel. At river station 0.52 the left overbank discharge is estimated at approximately 2,260 cfs. The flow overtopping US 93/89 is reduced to approximately 1,500 cfs.

5.9.3 Comparison of Models

Table 5.8 provides a comparison between the Effective FIS, Existing Conditions, and Developed Conditions modeling results. As previously discussed, the most notable change is the base flood elevations within the 400 foot reach just upstream of the bridge. See Section 5.7.1 for further discussion of this area.

5.9.4 Floodplain and Floodway Results

Floodway analyses are only performed for the developed condition model as this is the basis for the CLOMR request. Table 5.9 summarizes the floodway data presented in the typical FIS format.

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Table 5.6
Summary of Existing Conditions modeling results

River Station	Q100	Minimum Channel Elevation	Water Surface Elevation	Critical W.S.E.	Energy Gradient Elevation	Energy Gradeline Slope	Channel Velocity	Flow Area	Top Width	Channel Froude #
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
0.22	15045	2043.0	2052.9	2052.9	2054.8	0.0041	12.2	2073	598	0.75
0.35	13011	2047.7	2056.2	2056.2	2059.5	0.0058	14.7	997	171	0.93
0.40	13011	2049.3	2059.6	2056.3	2060.8	0.0017	8.8	1476	222	0.51
0.42	US 93/89 Bridge									
0.43	13011	2051.3	2062.9	2057.6	2063.7	0.0009	7.4	1758	337	0.39
0.48	13011	2053.5	2063.2	---	2064.4	0.0031	10.6	2307	888	0.67
0.51	Lateral Weir Rating Curve									
0.52	14459	2055.5	2064.6	---	2065.3	0.0022	8.4	3723	1421	0.56
0.57	14459	2057.7	2065.4	2065.4	2066.5	0.0040	10.8	3772	1685	0.75
0.61	14459	2059.9	2067.5	2067.5	2068.6	0.0038	10.6	3921	1604	0.73
0.66	14413	2061.8	2068.4	---	2069.9	0.0056	12.1	2587	1370	0.88
0.71	14413	2063.9	2070.2	2070.2	2071.4	0.0048	11.1	2618	1221	0.81
0.76	14413	2065.8	2072.0	2072.0	2073.6	0.0067	12.1	1666	905	0.93
0.79	14413	2067.4	2073.9	2073.9	2075.5	0.0091	13.2	1922	928	1.07
0.90	14413	2073.1	2078.9	2078.3	2080.2	0.0080	12.8	2409	1339	1.00
1.00	14413	2078.1	2083.2	2083.2	2085.4	0.0085	15.3	1541	1093	1.24
1.12	14413	2082.3	2088.5	2088.5	2089.9	0.0044	12.2	2067	881	0.92

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Table 5.7
Summary of Developed Conditions modeling results

River Station	Q100	Minimum Channel Elevation	Water Surface Elevation	Critical W.S.E.	Energy Gradient Elevation	Energy Gradeline Slope	Channel Velocity	Flow Area	Top Width	Channel Froude #
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
0.22	15045	2043.0	2052.9	2052.9	2054.8	0.0041	12.2	2073	597.6	0.75
0.35	13553	2047.7	2056.4	2056.4	2059.8	0.0059	15.0	1021	171.5	0.94
0.40	13553	2049.3	2059.9	2056.5	2061.1	0.0017	8.9	1519	229.7	0.51
0.42	US 93/89 Bridge									
0.43	13553	2051.3	2063.2	2057.9	2064.1	0.0009	7.5	1809	232.1	0.39
0.48	13553	2053.5	2063.4	---	2064.5	0.0016	8.4	1737	308.2	0.50
0.51	Lateral Weir Rating Curve									
0.52	14459	2055.5	2064.0	---	2065.1	0.0028	9.4	2468	887.3	0.63
0.57	14459	2057.7	2064.9	2064.9	2066.4	0.0041	10.7	2805	1292.0	0.76
0.61	14459	2059.9	2067.0	2067.0	2068.5	0.0042	10.8	2926	1166.2	0.76
0.66	14413	2061.8	2068.6	2068.6	2069.8	0.0044	10.7	2664	1096.9	0.77
0.71	14413	2063.9	2070.1	2070.1	2071.4	0.0048	11.0	2330	1059.5	0.81
0.76	14413	2065.8	2072.0	2072.0	2073.6	0.0067	12.1	1666	905.4	0.93
0.79	14413	2067.4	2073.9	2073.9	2075.5	0.0091	13.2	1922	928.4	1.07
0.90	14413	2073.1	2078.9	2078.3	2080.2	0.0080	12.8	2409	1339.1	1.00
1.00	14413	2078.1	2083.2	2083.2	2085.4	0.0085	15.3	1541	1092.5	1.24
1.12	14413	2082.3	2088.5	2088.5	2089.9	0.0044	12.2	2067	880.8	0.92

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Table 5.8
Comparison of Effective FIS, Existing, and Developed Conditions modeling results

River Station	Effective FIS		Existing Conditions			Developed Conditions		
	Q100	Water Surface Elevation	Q100	Water Surface Elevation	Energy Gradeline Elevation	Q100	Water Surface Elevation	Energy Gradeline Elevation
	(cfs)	(ft)	(cfs)	(ft)	(ft)	(cfs)	(ft)	(ft)
0.22	15045	2052.8	15045	2052.9	2054.8	15045	2052.9	2054.8
0.35			13011	2056.2	2059.5	13553	2056.4	2059.8
0.36	15045	2058.2						
0.40	15045	2058.3	13011	2059.6	2060.8	13553	2059.9	2061.1
0.42	15045	2059.4	US 93/89 Bridge					
0.43			13011	2062.9	2063.7	13553	2063.2	2064.1
0.47	15045	2061.6						
0.48			13011	2063.2	2064.4	13553	2063.4	2064.5
0.50	15045	2063.6						
0.51			Lateral Weir Rating Curve					
0.52			14459	2064.6	2065.3	14459	2064.0	2065.1
0.57			14459	2065.4	2066.5	14459	2064.9	2066.4
0.60	14459	2067.7						
0.61			14459	2067.5	2068.6	14459	2067.0	2068.5
0.66			14413	2068.4	2069.9	14413	2068.6	2069.8
0.69	14413	2070.7						
0.71			14413	2070.2	2071.4	14413	2070.1	2071.4
0.76			14413	2072.0	2073.6	14413	2072.0	2073.6
0.79	14413	2074.9	14413	2073.9	2075.5	14413	2073.9	2075.5
0.90	14413	2078.8	14413	2078.9	2080.2	14413	2078.9	2080.2
1.00	14413	2084.0	14413	2083.2	2085.4	14413	2083.2	2085.4
1.12	14413	2088.4	14413	2088.5	2089.9	14413	2088.5	2089.9

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Table 5.9
Developed Conditions floodway data table

Flooding Source		Floodway			Base Flood Water Surface Elevation				
River Station	Distance	Width	Flow Area	Average Velocity	Regulatory	Without Floodway	With Floodway	WSEL Increase	EGL Increase
	(ft)	(ft)	(sq ft)	(ft/s)	(feet NGVD)				
0.22	1010	271	1282	11.7	2052.9	2052.9	2052.9	0.0	1.0
0.35	1700	173	1119	13.5	2056.4	2056.4	2056.9	0.5	0.7
0.40	1950	162	1668	9.3	2059.9	2059.9	2060.5	0.6	0.7
0.42 BRD	1960	152	1538	9.8	2059.9	2059.9	2060.5	0.6	0.7
0.42 BRU	2090	152	1443	10.4	2061.4	2061.4	2061.4	0.0	0.7
0.43	2100	158	2057	8.0	2063.0	2063.0	2063.6	0.6	0.7
0.48	2330	185	1701	8.8	2063.3	2063.3	2063.9	0.6	0.7
0.52	2570	319	1717	8.4	2063.9	2063.9	2064.3	0.5	0.7
0.57	2790	334	1267	11.4	2064.9	2064.9	2064.8	-0.1	1.0
0.61	3030	466	1515	9.5	2067.0	2067.0	2067.3	0.2	1.0
0.66	3280	630	2408	6.0	2068.6	2068.6	2069.6	1.0	0.9
0.71	3530	841	2273	6.3	2070.1	2070.1	2070.4	0.3	0.2
0.76	3800	905	1666	8.7	2072.0	2072.0	2072.0	0.0	0.0
0.79	4030	929	1926	7.5	2073.9	2073.9	2073.9	0.0	0.0
0.90	4590	681	1873	7.7	2078.9	2078.9	2079.4	0.5	0.7
1.00	5150	585	1252	11.5	2083.2	2083.2	2083.2	0.0	0.4
1.12	5770	880	2067	7.0	2088.5	2088.5	2088.5	0.0	0.0

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5.9.5 HEC-RAS Files and Output

Table 5.10 is a matrix summarizing the project files and associated plans for the HEC-RAS analysis. Detailed output for each of these plans are provided in Appendix D.

Table 5.10
Summary of project files for CLOMR submittal

Modeling Condition	HEC-RAS Project	HEC-RAS Plan	Appendix for Output	Notes
Duplicate Effective	sol206w.prj	sol206w.p01	D.4	Duplicate Effective Floodplain and Floodway provided in this plan
Existing Conditions	solsCLOMR.prj	solsCLOMR.p04	D.5	Existing Conditions geometry with weir rating table and subcritical analysis.
Developed Conditions without Floodway	solsCLOMR.prj	solsCLOMR.p02	D.6	Developed Conditions geometry with weir rating table and subcritical analysis.
Developed Conditions with Floodway	solsCLOMR.prj	solsCLOMR.p07	D.7	Developed Conditions geometry with no weir analysis. Discharges reflecting loss to weir flow in natural conditions are hard coded in steady flow data file. No weir flow losses assumed for floodway model.

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Phone: 480-752-2124 Fax: 480-839-2193

Appendix A

List of References

Arizona Department of Transportation, Bridge Group, Bridge Drainage Section, *1999, Final Drainage Report for the Analysis of Sols Wash Bridge No. 526*, Wickenburg-Kingman Highway, US 93, Tracs No.: 93 MA 199 H 4169 01C BR-035-1()P.

Arizona Department of Water Resources, 1996, *State Standard for Flood Study Technical Documentation,* SSA1-97.

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Federal Emergency Management Agency, 2001, *Flood Insurance Study for Maricopa County, Arizona and Incorporated Areas*, Volumes 1-16.

Flood Control District of Maricopa County, 1996, *Drainage Design Manual, Volume II – Hydraulics.*

Phillips, J. V., Ingersoll, T. L., 1998, *Verification of Roughness Coefficients for Selected Natural and Constructed Stream Channels in Arizona*, USGS Professional Paper 1584.

USGS, 1968, *Techniques of Water-Resources Investigatins of the United States Geological Survey, Book 3, Chapter A5, Measurement of Peak Discharge at Dams by Indirect Method.*

US Army Corps of Engineers, 2001, *HEC-RAS River Analysis System – Hydraulic Reference Manual*, version 3.0, CPD-69.

6101 South Rural Road, Suite 110, Tempe, Arizona 85283
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Appendix B

General Documentation and Correspondence

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

Facsimile Transmittal

REALTY EXECUTIVES

REALTY EXECUTIVES OF WICKENBURG
928-684-7653 VOICE
928-684-0478 FAX
510 N. TEGNER STE. A
WICKENBURG, AZ 85390
1-800-225-4891
E-mail: philrichardson@w3az.net

Date: 5-3-02

Attention: Scott

FAX NUMBER: 480-839-2193

From: **PHIL RICHARDSON**
OWNER/BROKER

Number of pages (including this cover): 8

Comments:

Scott:

The following is the Staff Report Given to Council,

They want us to Pay for the move?

I'll Call you later

Reply requested: ☐ Yes No

TOWN OF WICKENBURG

155 N. Tegner, Ste. A • Wickenburg, Arizona 85390 • (928) 684-5451
Phoenix Line (602) 506-1622 • FAX (602) 506-1580

DATE: APRIL 30TH, 2002

TO: FRED CARPENTER, TOWN MANAGER

FROM: GERALD STRICKLIN, TOWN PLANNER

RE: REQUEST BY P&J INVESTORS (PHIL & JULIE RICHARDSON to Move Sols Wash Well)

The Town's Sols Wash Well is located on property, which is surrounded by property owned by P&J Investors (P&J) (Exhibit "A"). Much of the property is located within the regulatory Flood Way as established by the Federal Emergency Management Agency (FEMA). The Well Head is located approximately 40 feet from the bank of the wash. Flooding may, from time to time, overtop the bank and inundate the area around the well.

P&J has submitted a letter to the Town dated March 25TH, 2002, that asks that the Town consider moving the well to an alternate location (Exhibit "B").

Town Engineer, Wendell Folkerts initial response to the letter is attached as Exhibit "C"

After obtaining additional information, Mr. Folkerts subsequently determined that the base of the well should be raised by 1.5 feet to meet ADEQ standards and avoid possible problems with the 100 year flood. The100 year flood has an elevation of 2062. The top of the pump base is 2061.5 or one-half foot lower than the 100 year flood. According to the Arizona Department of Environmental Quality (ADEQ) the base should be a minimum of one foot higher than the

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elevation of the 100 year flood event. In this case the base should be raised 1.5 feet.

P&J has submitted a preliminary plan for the development of the property (Exhibit "D") and has asked that Council consider moving Sols Wash Well. It is P&J's contention that moving the well would enhance their development as well as mitigating flood risks to both the well and surrounding neighborhoods.

P&J has hired a hydrologist to study the property. It is their intent to file an application with the Federal Emergency Management Agency (FEMA) in an attempt to show that additional property can be moved out of the floodway and made available and safe for development. In order to achieve this state certain modifications will have to be made to the channel. P&J contend that making the channel more efficient will reduce the flood elevation and thereby mitigate inundation and flooding problems.

The hydrologist has suggested that moving the well is one way to open up the channel, increase the carrying capacity of the wash, and mitigate the potential for overflow and neighborhood flooding. This would allow the water to have a straight shot through the bridge rather than being forced to the north, which causes it to back up and spill over the banks of the wash into the surrounding area.

The Technical Review Committee has been briefed and discussed three possible scenarios or options that the Council may wish to consider.

1. **DO NOTHING:** Leave the well in its' current location at the existing height. This would leave the well exposed to possible inundation. The well has been in place for 60 or 70 years and has not, at least in recent years, been effected by flooding.

   COST TO "DO NOTHING"
   $000.00 at this time.

2. **LEAVE IN PLACE AND RAISE THE BASE TO MITIGATE POTENTIAL INUNDATION HAZARDS.** The Town Engineer has estimated the cost to raise the well at $62,000.00 (Exhibit "E"). Amortization

of this expense assumes that the well, in its' current location will continue to serve the Town's needs and will not be in conflict with any flood mitigation or development projects that the Town would like to see accomplished.

Russell Willis, Director of Public Works has indicated that the casing was filmed last year and is in good condition at this time.

COST TO RAISE AND PROTECT.....$62,000.00

3. **DRILL A NEW WELL IN A DIFFERENT LOCATION.** This option would require that a suitable location be acquired and a new well be drilled and the old well closed in conformance with environmental regulations. Certain equipment from the Sols Wash Well could be salvaged and is not included in the estimated cost to move the well.

Prior to drilling a new well, a productive location would need to be found which would require the services of a hydrologist.

COST TO RELOCATE WELL

Hydrologist.....	$ 10,000.00
Drill and case.....	$150,000.00
Pipe, fittings, etc.....	$ 30,000.00
Electrical.....	$ 20,000.00
Close old well.....	$ 20,000.00
Sub Total	$240,000.00

P& J has offered the land to relocate the well on the property they own and intend to develop. The initial offering was located on the old APS substation (Exhibit "A"). Potential problems with this site have been identified including possible contamination from old APS transformers and adequate production of water. A hydrologist would have to evaluate the site as the Town Engineer has indicated that the sub-surface geology in the area may not be conducive to water production. The sub-strata may have cut off the aquifer.

If a satisfactory location on the property owned by P&J can't be found then PROPERTY ACQUISITION may become an additional cost. It has been suggested that a likely location may be the Boetto property that the Town purchased last year. A hydrologist would have to confirm. If Town property were not available then market rates would drive the acquisition costs.

FLOODWAY IMPACTS

Options #1 and #2 do not mitigate the flooding problem along Sols Wash. The hydrologist hired by P&J contends that moving the well will allow mitigation measures to be accomplished that will eliminate or reduce over topping from the wash that from time to time has inundated Coffinger Park and the adjacent neighborhoods.

By memo dated April 29th, 2002, Russell Willis, Director of Public Works concurred with the Town Engineer's recommendation that the pump base be raised 1.5 feet at a cost of $62,000.00. (Exhibit "F")

Mr. Willis also indicated that if P&J Investors would like to move the well that the $62,000.00 could, with Council approval, be contributed to that effort.

ATT: Exhibit "A" Location Map (2 pages)
Exhibit "B" P & J letter (2 pages)
Exhibit "C" Town Engineer Letter (3 pages)
Exhibit "D" Concept Plan (6 pages)
Exhibit "E" Cost Estimate from Engineer (2 pages)
Exhibit "F" Memo Public Works Director (2 pages)

April 26, 2002

Town of Wickenburg
155 N. Tegner Street, Suite A
Wickenburg, AZ 85390

Attn: Jerry Stricklin, Town Planner

Re: Sols Wash Well

Dear Jerry;

I have received additional information on the water surface for a 100 year storm event at Sols Wash Well and I am now able to provide an estimate to correct possible flooding problems.

- The flood water level will be 2062. The top of the pump base is 2061.5 meaning that the flood level will be 6-inches above the base.
- The base should be a minimum of one foot above flood elevation meaning that the base should be a minimum of 1.5 foot higher.
- Raising the pump and piping connection is very similar to the job we did at Mariposa Well in 1991. Bid price for that job was $42,500. Adjusting for today's prices, (11 years at 3.5% compounded) would be $62,000.

Sincerely,

Yost and Gardner Engineers

By
Wendell H. Folkerts, P.E.

WHF/ep
Y&G Job No. 7261

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PAGE 20 OF 23
DATE 5-6-02

RECEIVED
APR 29 2002
TOWN MANAGER

Town of Wickenburg
155 N. Tegner, Suite A Wickenburg, Arizona 85390
(928) 684-5451
Phoenix Line (602) 506-1622 Fax (602) 506-1580

Date: April 29, 2002

To: Fred Carpenter, Town Manager

From Russell Willis, Director of Public Works

Re: Sols Wash Well

Wendell Folkerts of Yost and Gardner Engineers has received additional information on the water surface for a 100 year storm event at Sols Wash Well. The flood water level will be 2062 feet. The top of the pump base is 2061.5 feet meaning that the flood level will be 6 inches above the base. The base should be a minimum of one foot above flood elevation meaning that the base should be a minimum of 1.5 foot higher. Raising the pump and piping connection is very similar to the job we did at Mariposa Well in 1991. Bid price for that job was $42,500. Adjusting for today's prices (11 years at 3.5% compounded) would be $62,000.

In talking to Wendell, I concur with his recommendation of raising the pump base 1.5 feet at a cost of $62,000. If P & J Investments would like that well moved, we could contribute $62,000 towards the cost of relocating the well.

AGENDA ITEM M-3:

I MOVE TO DIRECT STAFF TO PROCEED WITH THE SOLS WASH WELL RELOCATION PROJECT AND CONTRIBUTE $62,000 WITH THE REMAINDER OF COSTS TO BE PAID FOR BY THE DEVELOPER

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Councilmember Johnson asked if the Town spent $82,000 on the well, could Maricopa County Flood Control tell the Town the well had to be relocated. He stated he was in favor of the well improvements and suggested staff obtain a statement from Flood Control indicating they would be in favor of the improvements. Town Manager Carpenter reported staff had a meeting scheduled for this Thursday with Mike Ellegood of the Flood Control District and suggested taking him to the project site for his comments and possibly a preliminary indication. Councilmember Johnson felt Flood Control would be ecstatic with Phil's project and the Town's well improvements.

Mr. Richardson asked Council, with regard to whatever decision they made this evening, if they could provide him with a letter stating this was what the Town planned to do so he could move forward with the project. Mayor McDermott suggested Phil use a copy of the minutes in lieu of a letter from the Town. Mr. Richardson agreed.

Darrell Singleton, resident, addressed Council by stating this project was an answer to his prayers for 15 years. He has been trying to divert the water through the bridge unsuccessfully and he has managed water all his life. Mr. Singleton felt more should be done including removal of the trees hanging down in the flowing stream. He also discussed the problem once the water did pass through the bridge and strongly urged the removal of debris such as car bodies and cement pieces from the channel. Mr. Singleton complimented Council for considering this issue.

Councilmember Girard mentioned the Cassandro Wash Outfall would be cut off or shortened because Phil's wall would run along there. They also discussed the possibility of turning the outfall line approximately 33 degrees. Mr. Richardson responded it was County property for which he would need to obtain authorization prior to making any modifications.

MOTION: MOVED TO APPROVE AN ESTIMATED $82,000 PROJECT TO RAISE THE SOLS WASH WELL TO AN ELEVATION OVER THE 100 YEAR FLOOD PLAIN ELEVATION AS SUGGESTED BY COUNCILMAN GIRARD AND AS REVIEWED BY YOST & GARDNER ENGINEERS, SUBJECT TO FURTHER REVIEW BY MARICOPA COUNTY FLOOD CONTROL DISTRICT
BY: COUNCILMEMBER JOHNSON
SECOND: COUNCILMEMBER LANE

Councilmember Badowski stated the Town did not have anything budgeted for this project and expressed concern about going ahead with it. He felt it was the developer's responsibility to ensure the well was safe and the earthmoving for the project did not negatively impact the well site. Following further lengthy discussion,

VOTE: 5-1-1 (Badowski- No/Roberts-Excused) MOTION PASSED

****

CERTIFICATION OF COUNCIL MEETING MINUTES

I hereby certify that the foregoing is a true and correct copy of a portion of the minutes of the regular meeting of the Wickenburg Common Council held on the 20th day of May, 2002. I further certify that the meeting was duly called and held and that a quorum was present.

Certified this Twenty-First (21st) Day of May, 2002

Donna Vivona

Donna Vivona, Town Clerk

4. Discussion/Action On A Request By P & J Investors For The Town To Relocate The Sols Wash Well From Its Current Location

Councilmember Girard reported he met with Russell Willis, Public Works Director, Phil & Julie Richardson, and Wendell Folkerts, Town Engineer to discuss various concepts regarding this issue. They walked the property and reviewed the Town's options. He was suggesting the well be raised by three feet, a protective retaining wall be constructed around it and a one foot thick concrete pad be constructed to facilitate necessary maintenance and repairs. Councilmember Girard stated Council provided Mr. Richardson's engineer with information to run a model to determine the effect on the floodwater with each available option. With the option of raising the well, Sols Wash would be widened by 48 feet. The model ran with five feet between the well pad and in actuality it would be adjacent to the pad. There was a one-foot difference with the model run with regard to the wash widening and it would change from 12,800 cfs to 13,184 cfs. This scenario would provide a flow that is 91.5% of Alternative A at a cost to the Town of $82,000. Councilmember Girard felt the cost to shut down the well and drill a new one would be at least $200,000. He proceeded to the display board and drew a configuration of his proposal including the wall to be constructed four feet out on each side of the well head, the placement of a wing for structural protection, and raising the well three feet. In order to provide enough room to work on the well, they would construct a platform.

At the conclusion of Councilmember Girard's presentation, Mayor McDermott asked if the Town Engineer had reviewed his recommendation and confirmed the calculations presented. Councilmember Girard replied yes and discussed the advantages of his recommendation including eliminating the high cost of a new well, the well would be more protected from flood waters, the flood water cfs would be reduced, and with the new development it would be above grade.

Councilmember Lane questioned the change in raising the well from 1½ feet to 3 feet as to the cost to the Town. Councilmember Girard replied the cost difference would not be significant. Councilmember Lane asked if this option precluded the developer from building the wall on the north side of the wash bank. Councilmember Girard stated he felt it may reduce the length but would not eliminate the need for the wall.

Phil Richardson stated that Councilmember Badowski requested at the May 6th meeting some additional studies on the different flow rates. They commissioned their engineer to conduct the studies that have been provided to Council noting all of the cfs flows. He felt moving the well was the best way, but even with Councilmember Girard's alternative, the cfs would be reduced significantly.

Following lengthy discussion, Mayor McDermott summarized the issue as follows:

- ✓ Currently, the 100 year flow capacity at the bridge is 15,045 cfs
- ✓ The floods of last year were 8,500 cfs
- ✓ The water over banked the roads at the 8,500 cfs rate
- ✓ All of the scenarios provided by P&J Investors and Councilmember Girard would improve the situation markedly
- ✓ Mr. Girard's recommendation would handle 13,184 cfs which is approximately 5,000 cfs more than what was previously handled
- ✓ Approximately 90% of the worst-case scenario of what might happen at that location could be eliminated for a cost of $82,000

If the well were raised without protection, the cost quoted was $62,500 and if the well were relocated it would cost approximately $240,000. Mayor McDermott indicated he was inclined to go with raising the well with protection for approximately $82,000.

Appendix C

Survey and Field Notes

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

C.1 – Mapping Control Field Notes and Report

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

4400 East Broadway Boulevard
Suite 508
Tucson, Arizona USA 85711
520.292.2020 Tel
520.888.4393 Fax
DATABASED TERRAIN MAPPING, INC.

March 5, 2002

Mr. Scott Ogden
J.E. FULLER
6101 S. Rural Road, Suite 110
Tempe, Arizona 85283

RE: Surveying & Photogrammetric Mapping
Sols Wash CLOMR
DTM, Inc. # 22017
LETTER OF CERTIFICATION

Dear Mr. Ogden:

Databased Terrain Mapping, Inc. completed field surveys and photogrammetric mapping of the aforementioned project based on a request from your office. The data delivered includes hardcopy plots and electronic files for the topographic map coverage, digital terrain model and ortho-rectified imagery.

This letter certifies that the photogrammetric map data delivered on CD-ROM **(Volume Label 020301_0859)** was completed to National Map Accuracy Standards for 1"=100', 2-foot contour interval mapping based on ground control survey data provided by our office . The electronic image included on the CD (tiff & tfw files) is ortho-rectified and bears the same standard of accuracy as the topographic map data.

DATABASED TERRAIN MAPPING, INC.
Lee Harbers, RLS, Certified Photogrammetrist
President

REGISTERED LAND SURVEYOR
CERTIFICATE NO. 26401
LEE HARBERS
Date Signed 3-5-02
ARIZONA U.S.A.

DTM-DATABASED TERRAIN MAPPING, INC.
4400 E. Broadway Blvd, Suite 508
Tucson, Arizona 85711
(520) 292-2020
FAX (520) 888-4393

TRANSMITTAL

TO: VE FULLER
1.480.839.2193

Attn: SCOTT OGDEN

DATE: 2.26.02
DTM Job# 22017
Client Job#

Shipped VIA: FAX
Shipping Date:
3 Pages, including this page

The following items/documents are attached:

COPIED	DATE	DESCRIPTION
		SOLS WASH
1		SURVEY DATA
		CONTROL POINT INFO

REMARKS:

COPY TO: File

SIGNED: Lee Hagens

JE Fuller
Sols Wash CLOMR - Wickenburg
DTM, Inc. Project Number 22017
Photogrammetric/Survey Control Data

Pt.	NAD83 North	NAD83 East	NGVD29	NAVD88 Grnd. Elev.
1	1085019.22	461498.79	2283.31	2285.57
2	1071577.50	440653.01	2374.05	2376.31
3	1079848.76	452323.88	2068.3(Published)	2070.56
4	1081228.69	452393.71	2084.6	2086.86
5	1081984.23	451435.59	2065.2	2067.46
6	1082670.21	450046.07	2074.88	2077.14
7	1081807.27	453536.12	2048.53	2050.79
8	1083113.70	452229.28	2056.87	2059.13
9	1083741.02	450035.37	2076.48	2078.74
10	1084663.25	451793.97	2074.87	2077.13
11	1084399.18	453104.10	2052.49	2054.75

Survey was conducted with GPS RTK, using Maricopa County GDACS Point 4012 as the base point (Pt 1), and checking into Maricopa County GDACS Point 4NJ1 (Pt 2) for primary control.

Point 3 on the above list is FEMA RM 3254 - recovered brass cap as described on FIRM MAP "04013C0255 G"

Point 11 on the above list is an offset point from FEMA RM 605 - found as described on FIRM MAP "04013C0255 G" The point could not be occupied by GPS because of overhanging metal roof at the structure. Conventional measurements from the offset point back to the RM validate the published NGVD 29 elevation.

The resultant comparisons establish the NAVD83 elevations as NGVD29 + 2.26 feet

Some of the photogrammetric control points were set as "Photo ID" rather than placing "targets" in developed areas. All photogramemtric control points within the map area (other than the two recovered RMs) are described as follows:

Point 4 - Photogrammetric target - Set cotton picker spindle (flush) on natural ground between Yavapai and the railroad tracks at the southeast corner of Washington and Yavapai.

Point 5 - Photogrammetric target - Set cotton picker spindle (flush) south of railroad tracks on private property between two manholes southwest of barbed wire fence. Point is +/- 100 feet northwest of two transformers on small mound along railroad right-of-way.

Point is approximately 0.25 miles west-northwest of the intersection of Washington and Yavapai along the south side of the railroad.

Point 6 - Photogrammetric target - Set cotton picker spindle (flush) along south side of railroad tracks on flat ground in area holding construction materials. Point is below (north of) the base of a hill. Point is approximately 0.55 miles west-northwest of the intersection of Washington and Yavapai along the south side of the railroad tracks.

Point 7 - Near Chestnut & Yavapai - Inside angle point of sidewalk north of covered walkway entrance to building.

Point 8 - Manhole - in centerline of Caveness Street - five houses East of Highway 93/89.

Point 9 - Natural ground at the northeast corner of a +/- 20'x20' concrete slab at the west end of Palm Drive (+/- 25 feet west of the end of the Cul-de-Sac in the mobile home park

Point 10 - Photogrammetric target - Set cotton picker spindle (flush) east of Highway 93/89, east of the south end of the Super8 Motel. Point is set at east end of cleared area south of the driveway into the mobile home area and approximately 20 feet north of the wood pole power line.

Lee Harbers, RLS
DATABASED TERRAIN MAPPING, INC.

C.2 – As-Built Structure Survey Notes and Record Drawings

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

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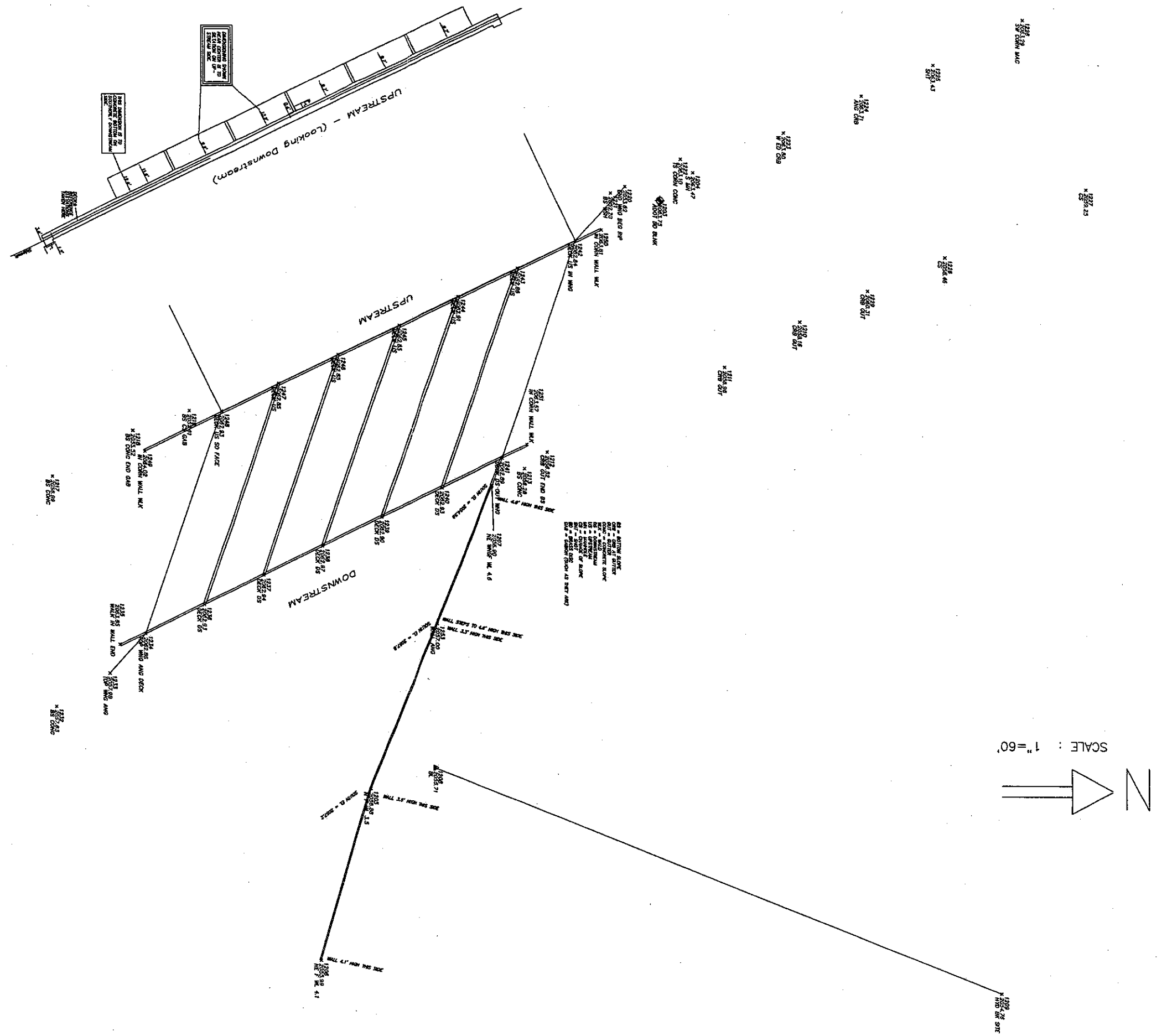
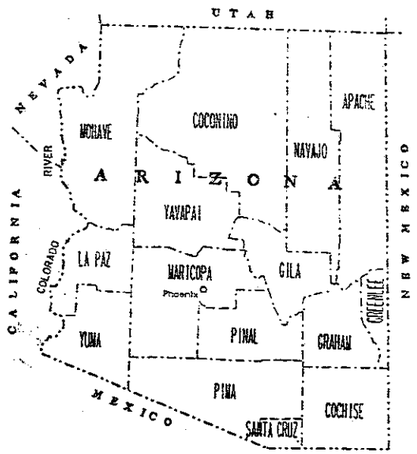
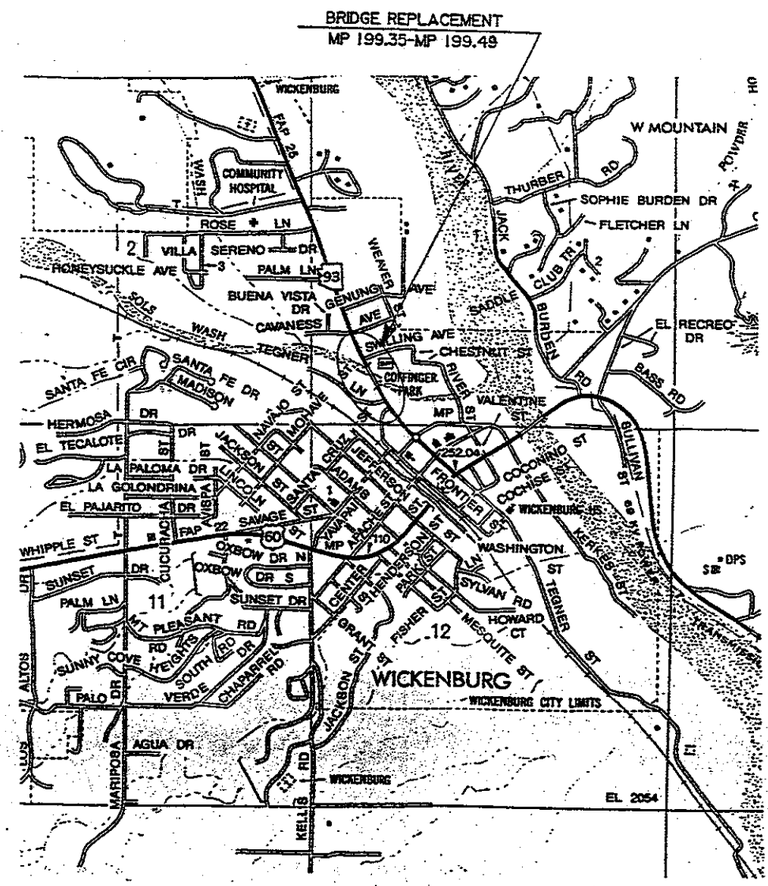

UPSTREAM - (Looking Downstream)
UPSTREAM
DOWNSTREAM
N
SCALE : 1"=60'



STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

PLAN AND PROFILE OF PROPOSED

STATE HIGHWAY
WICKENBURG-KINGMAN HIGHWAY(US-93)
BR-035-1(56)P
093 MA 199



SOLS WASH BRIDGE

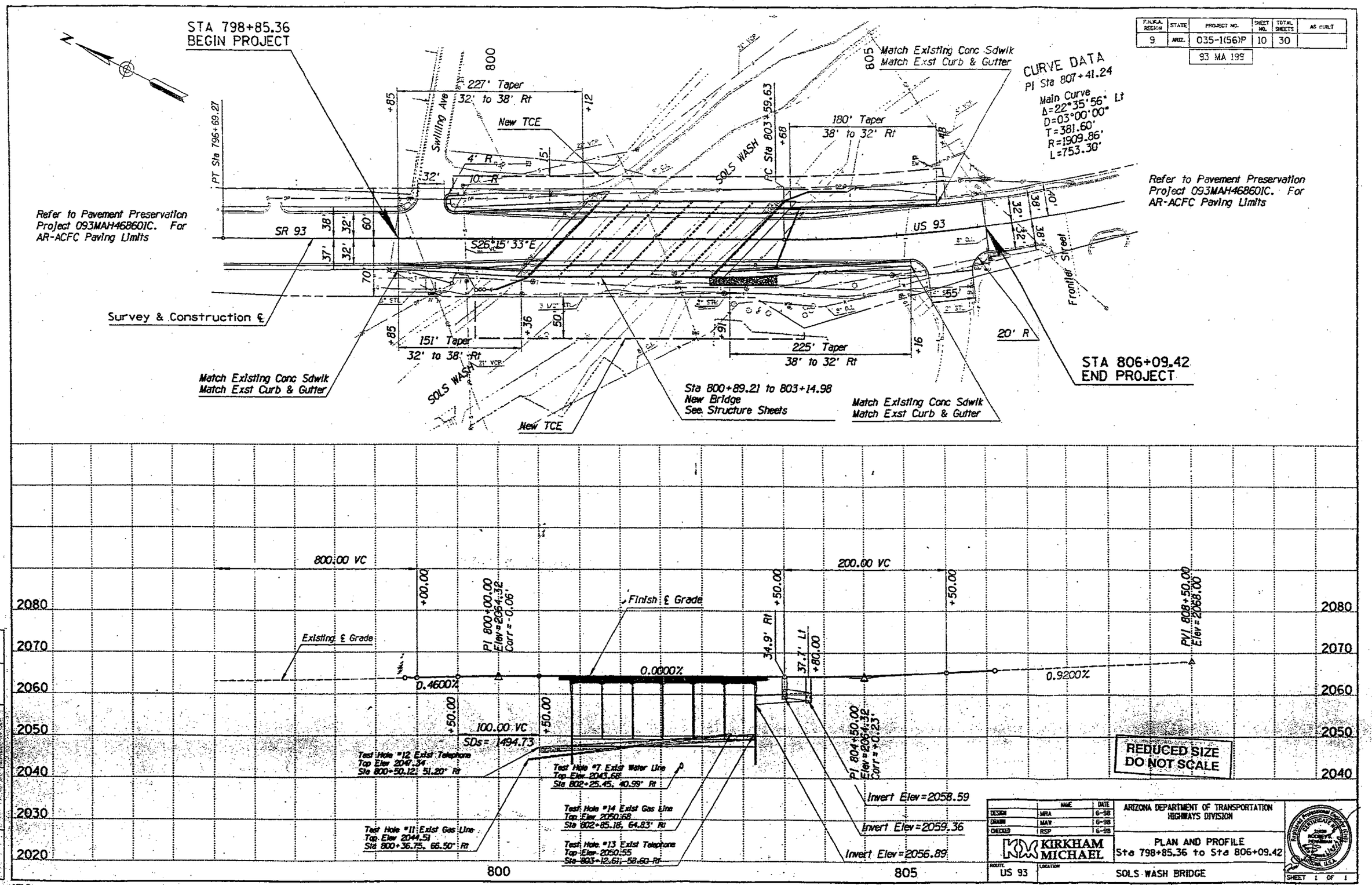
REDUCED SIZE
DO NOT SCALE

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
APPROVED: THOMAS G. SCHMITT
STATE ENGINEER

APPROVED DATE 7-2-98
ASSISTANT STATE ENGINEER

TRACS NO. H4169 01 C | BR-035-1( )P | 1 OF 3

FEDERAL REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	035-1(56)P	10	30	
		93 MA 199			



	NAME	DATE
DESIGN	MRA	6-98
DRAWN	MAW	6-98
CHECKED	RSP	6-98

KIRKHAM MICHAEL

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN AND PROFILE
Sta 798+85.36 to Sta 806+09.42

ROUTE: US 93
LOCATION: SOLS WASH BRIDGE

SHEET 1 OF 1

TRACS NO. H 4169 01C

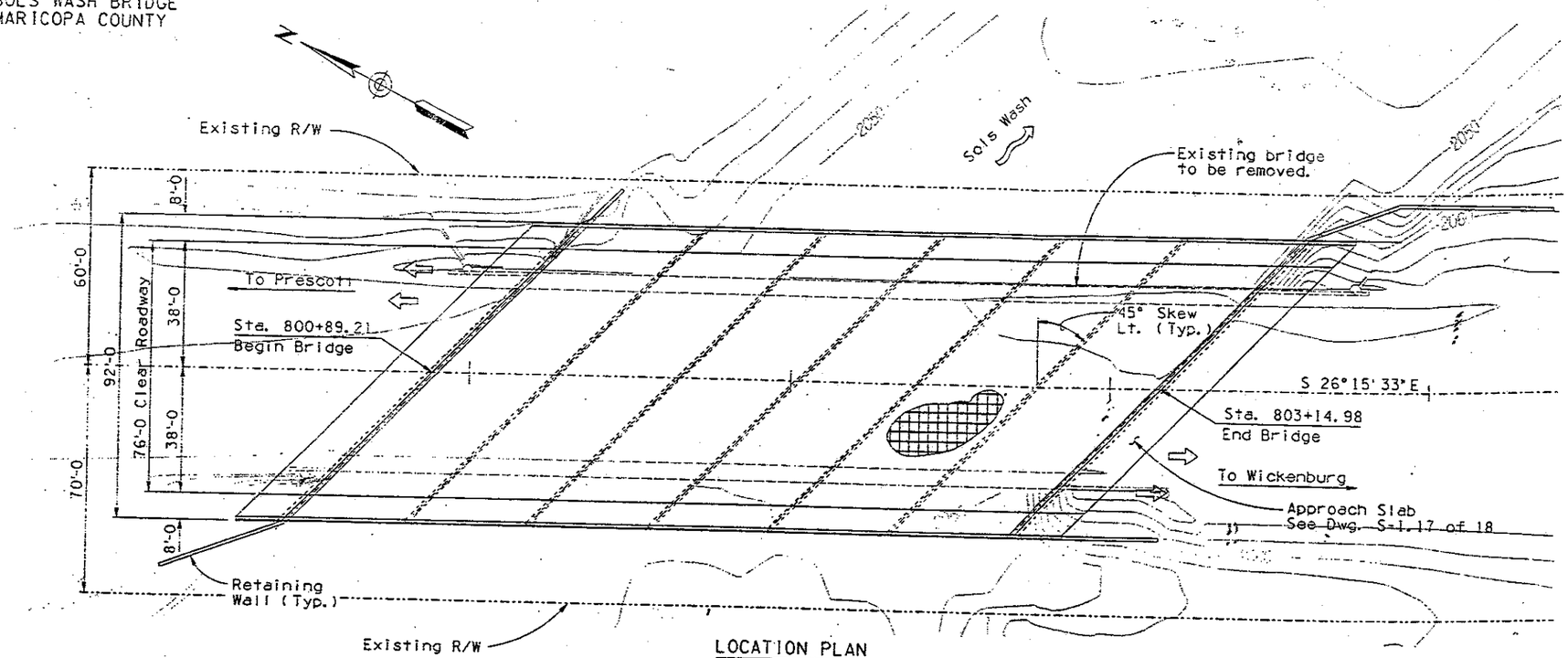
BR-035-1(56)P

$FILE$
$DATE$ $TIME$

WICKENBURG - KINGMAN HWY. (US 93)
SOLS WASH BRIDGE
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	-035-1(56)P	11	30	

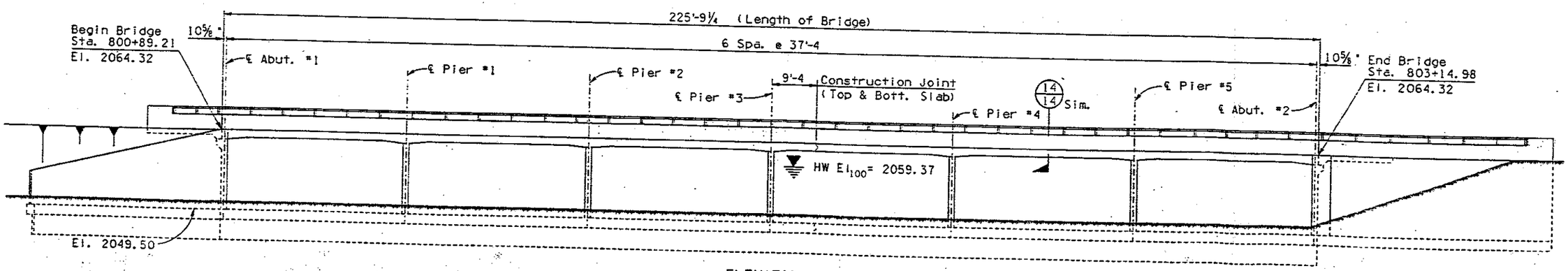
93 MA 199



LOCATION PLAN
New 6 Span R.C. Box Culvert Bridge
Skew 45° Rt.
Scale: 1"=20'-0

SHEET LIST

TITLE	NO.
General Plan	1
General Notes & Quantities	2
Construction Phasing Details	3
Foundation Layout	4
Foundation Details	5
Abutment Details - 1	6
Abutment Details - 2	7
Abutment Details - 3	8
Wingwall Details	9, 10, 11
Pier Details	12
Deck Details 1	13
Retaining Wall Details	14
Miscellaneous Details	15
Excavation and Backfill Details	16



ELEVATION
Sta.'s & Elev.'s on℄ US 93
Scale: 1"=10'-0

HYDRAULIC DATA

Q_{50} = 12,453 cfs
Q_{500} = 20,836 cfs

REDUCED SIZE
DO NOT SCALE

BRIDGE DESIGN SECTION 'S'		DATE
DESIGN	C. Hubbard	11-97
DESIGN CKD	K. Ruffennach	11-97
DRAWN	J. Kessler	11-97
DWG CKD	K. Ruffennach	11-97
APPROVED-PROJ. ENGINEER	K. Ruffennach	6-98
APPROVED-DESIGN LEADER	S. Hassan	6-98

ROUTE	MILEPOST	STRUCTURE NO.
US 93	199.56	2688

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

STA. 800+
SOLS WASH BRIDGE
GENERAL PLAN

LOCATION: SOLS WASH BRIDGE

BRIDGE ENGINEER

DWG. S-1.1 OF 16

TRACS NO. H4169 01 C

-035-1(56)P

OF

/usr3/br205/s2688gp.dgn
25-JUN-1998 12:57

VIEW NAME:

FEDERAL REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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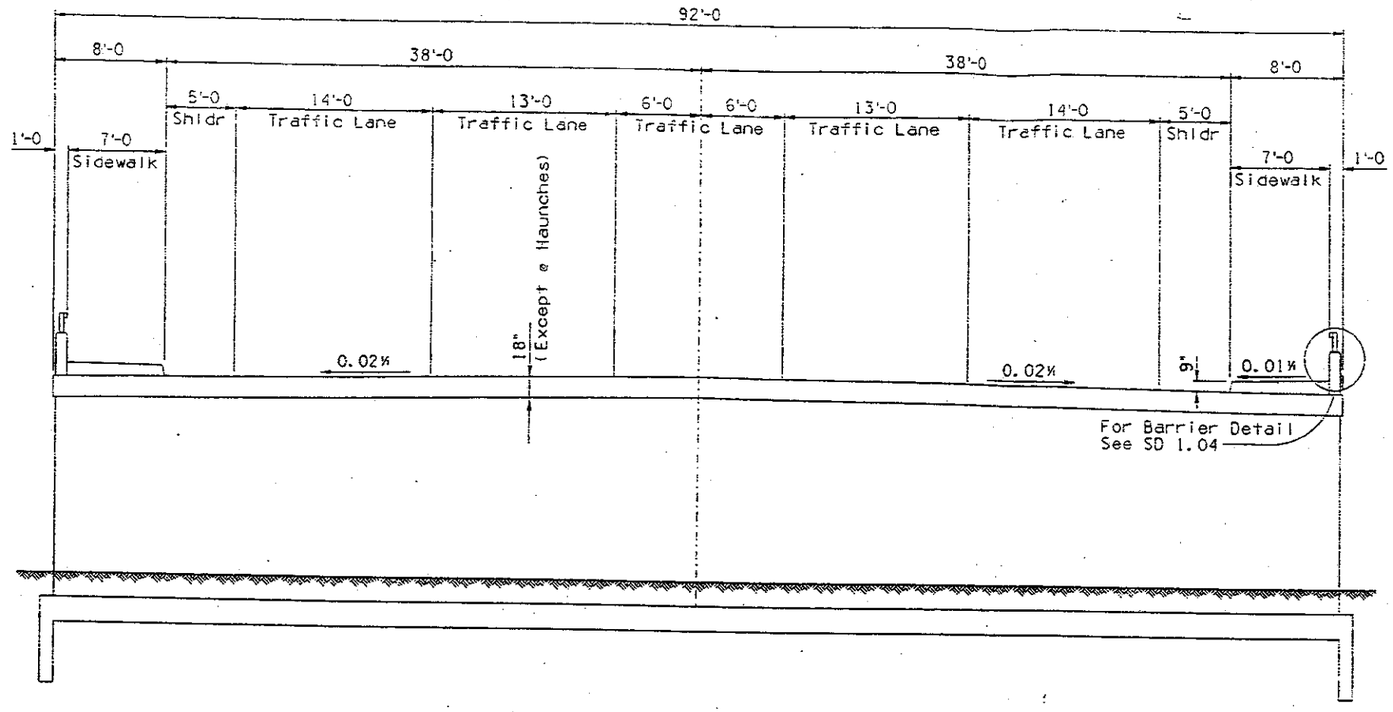
		93 MA 199			



TYPICAL SECTION
Scale: 1"=15'-0

APPROXIMATE QUANTITIES						
ITEM	STRUC. EXCAV.	STRUC. BKFILL.	CLASS 'S' CONCRETE		REINFORCING STEEL	DOWEL PLACEMENT
			f'c=3000psi	f'c=4500psi		
	C. Y.	C. Y.	C. Y.	C. Y.	LBS.	EACH
Abutment #1	840	400	156		50.050	20
Pier #1 - #5	4200	325	377		184.975	
Abutment #2	840	400	218		56.915	20
Superstructure				1207	247.595	
Bottom Slab			1639		261.970	
Sidewalk			111		3500	
TOTAL	5880	1125	2501	1207	805.005	40
As-built Total						

Combination Pedestrian - Traffic Bridge Railing (SD-1.04) ..... 542 L.F.
Approach Slab (B-19.11 Modified) ..... 2760 S.F.
Remove Existing Bridge ..... 1 Lump Sum

LEGEND:

Title/Detail Marker — Detail Number / Drawing Number (S-1.**OF**)

Section Marker — Section Number / Drawing Number (S-1.**OF**)

Elevation Marker — Elevation Number / Drawing Number (S-1.**OF**)

REDUCED SIZE
DO NOT SCALE

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 1990.

Design Specifications -
AASHTO Standard Specifications for Highway Bridges, 16th Edition 1996 and 1997 Interim.

Dead Load - Dead Load includes allowance of 25 pounds per square foot for future wearing surface.

Seismic Performance Category A (Acc = 0.04 g)

Inventory and operating ratings for HS20-44 are in accordance with AASHTO Manual for Condition Evaluation of Bridges, Edition of 1994.

Inventory Rating HS- 20.0
Operating Rating HS- 48.1

All concrete shall be Class "S" unless noted otherwise.

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2 inch clear cover unless noted otherwise.

Stresses:

Superstructure except barriers ...	f'c =	4500 psi
(Deck ...	fc =	1400 psi)
Barriers	f'c =	4000 psi
Abutments	f'c =	3000 psi
Pier	f'c =	3000 psi
Bottom Slab	f'c =	3000 psi
All other Class "S" concrete	f'c =	3000 psi
Grade 60 Reinforcement	fs =	24000 psi

Barriers shall not be slip formed.

Chamfer all exposed corners 3/4" unless noted otherwise.

Dimensions shall not be scaled from drawings.

JOINT NOTE:

All Retaining Walls shall have construction joints spaced at not more than 30'-0 apart or as shown. Reinforcing steel shall project through the joint. Footings may be continuous with no joint.

STANDARDS LIST

Structures Section Standards, June 1992:
B-19.11
Standard Detail Drawings (SD):
SD 1.04.

BRIDGE DESIGN SECTION		DATE
DESIGN	C. Hubbard	11-97
DESIGN CKD	K. Ruffennach	11-97
DRAWN	J. Kessler	11-97
DWG CKD	K. Ruffennach	11-97
APPROVED-PROJ. ENGINEER	K. Ruffennach	6-98
APPROVED-DESIGN LEADER	S. Hasan	6-98

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

STA. 800+
SOLS WASH BRIDGE
GENERAL NOTES & QUANTITIES

US 93	199.56	2688
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION: SOLS WASH BRIDGE

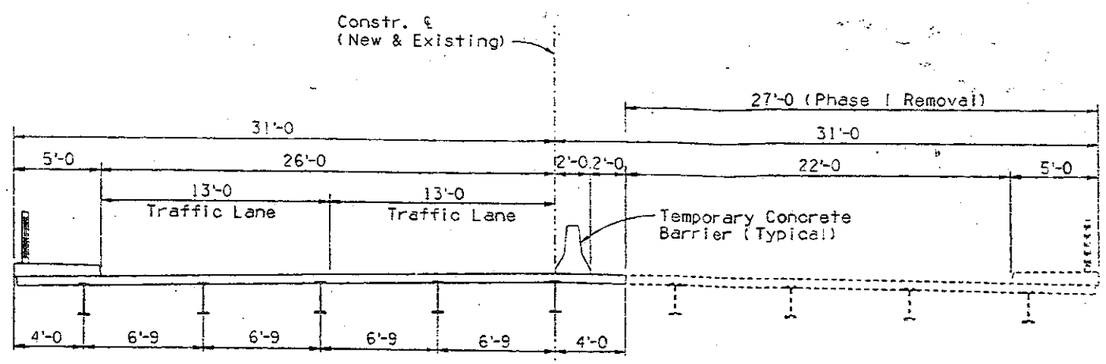
BRIDGE ENGINEER

DWG. S-1.2 OF 16

TRACS NO. H4169 01 C | -035-1(56)P | OF

/usr3/br205/s2688nq.dgn
25-JUN-1998 13:00
VIEW NAME:

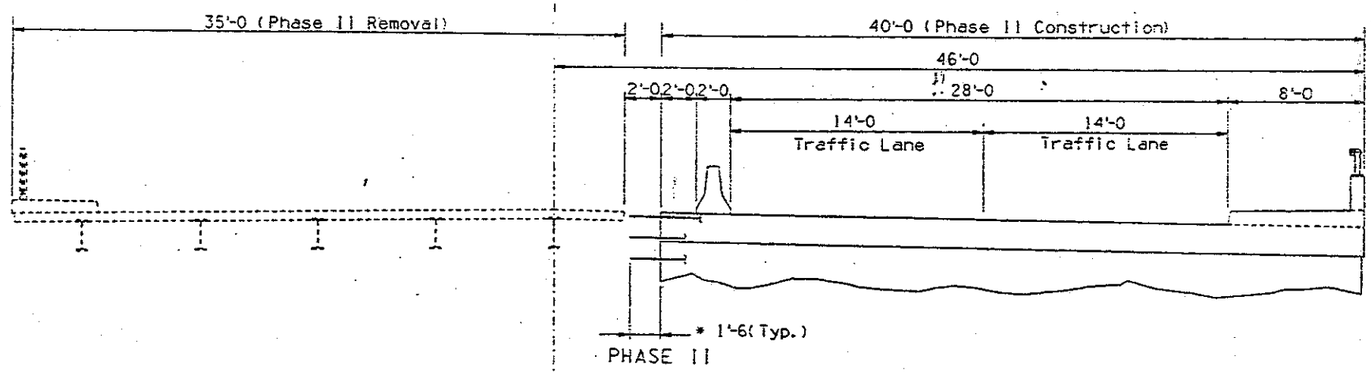
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	-035-1(56)P	13	30	
		93 MA 199			



PHASE I

CONSTRUCTION PROCEDURE

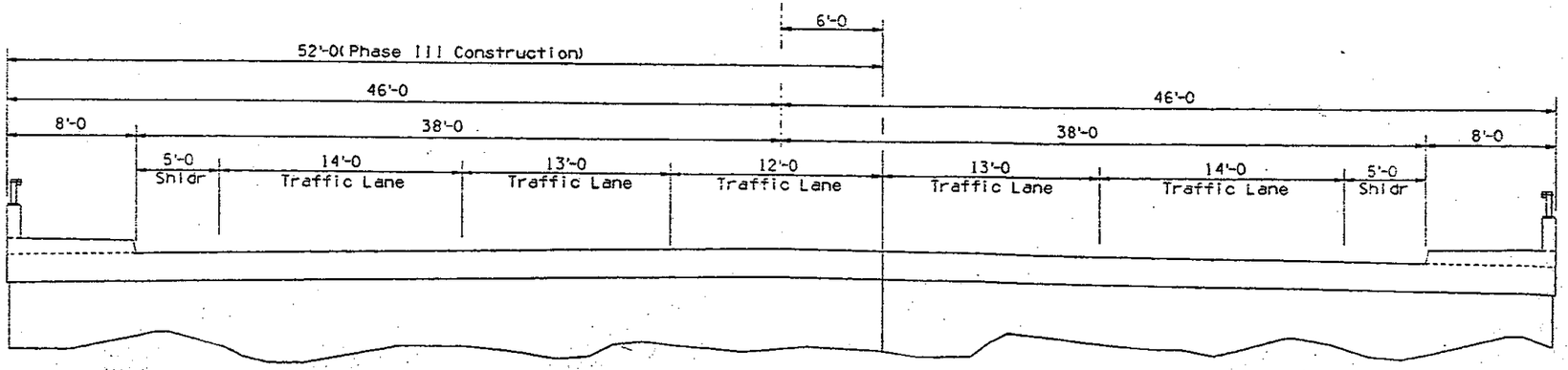
1. Remove portion of existing bridge.
2. Reroute traffic on remaining portion of existing bridge.
3. Construct first portion of new bridge.
4. Reroute traffic to first portion of new bridge.
5. Remove remaining portion of existing bridge.
6. Construct remaining portion of new bridge.
7. Reroute traffic to the completed new bridge.



PHASE II

NOTE:

* Provide 1'-6 (min.) lap splice for transverse reinforcements at construction joints (Typ.).



PHASE III

REDUCED SIZE
DO NOT SCALE

BRIDGE DESIGN SECTION "B"		DATE
DESIGN	C. Hubbard	11-97
DESIGN CKD	K. Ruffennach	11-97
DRAWN	J. Kessler	11-97
DWG CKD	K. Ruffennach	11-97
APPROVED-PROJ. ENGINEER	K. Ruffennach	6-98
APPROVED-DESIGN LEADER	S. Hasan	6-98

ROUTE	MILEPOST	STRUCTURE NO.
US 93	199.56	2688

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

STA. 800+
SOLS WASH BRIDGE
CONSTRUCTION PHASING

LOCATION: SOLS WASH BRIDGE

BRIDGE ENGINEER

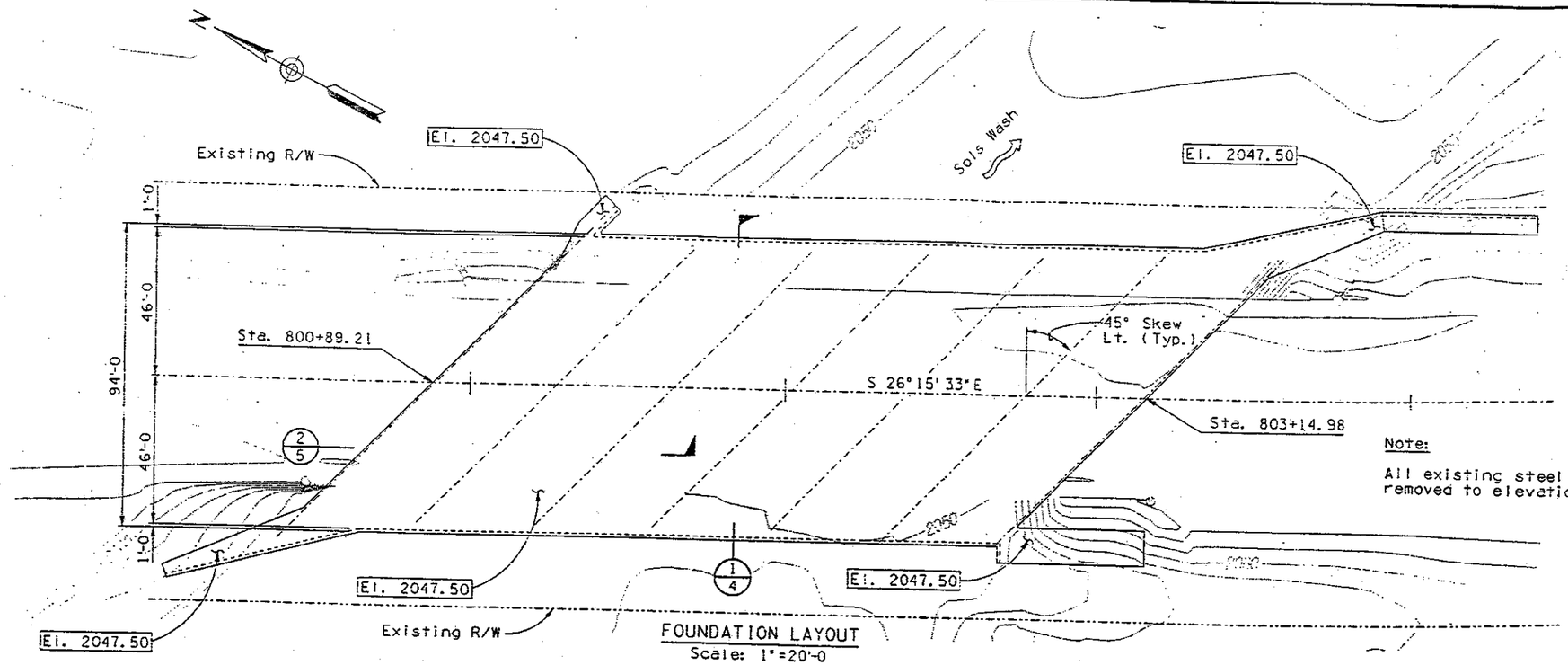
DWG. S-1.3 OF 16

TRACS NO. H4169 01 C | -035-1(56)P | OF

/usr3/br205/s2688cp.dgn
25-JUN-1998 13:02

VIEW NAME:

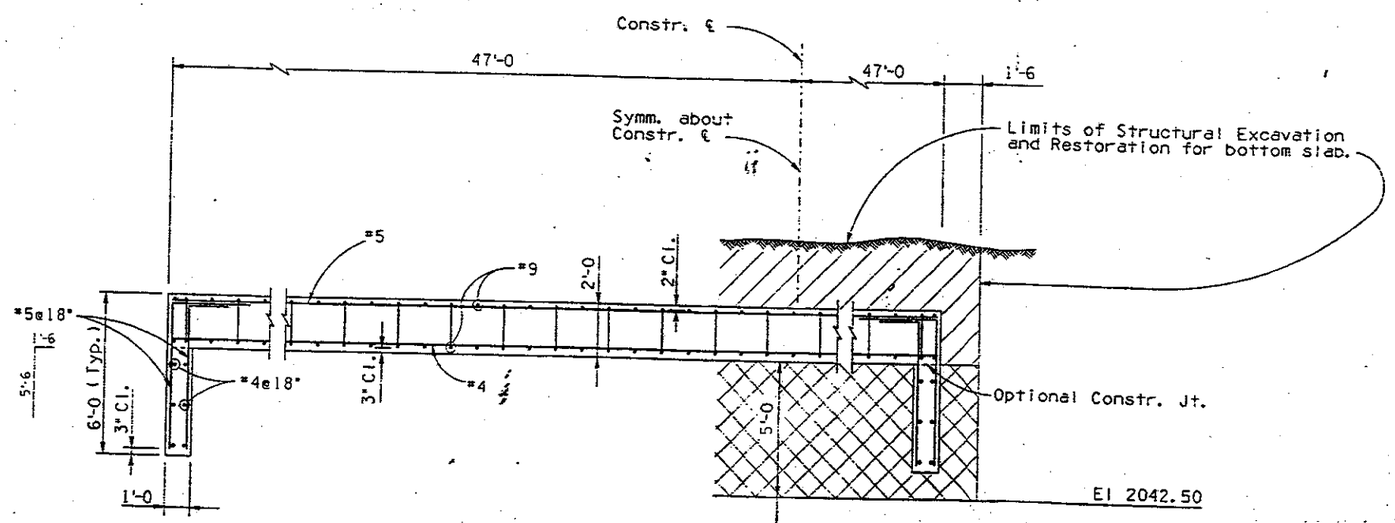
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	-035-1(56)P	14	32	
		93 MA 199			



FOUNDATION LAYOUT
Scale: 1"=20'-0

Note:

All existing steel piles shall be removed to elevation 2042.50.



BOTTOM SLAB SECTION (TRANSVERSE) (1)
Scale: 3/8" = 1'-0

Recompact a minimum of 5'-0 depth under the bottom slab as shown to minimum 95% of ASTM D698 maximum dry density.

NOTE:

Allowable Bearing Pressure = 1.2 ksf
Modulus of Subgrade Reaction = 350 pci/in.

[ ] Denotes Bottom of Footing Elevations

CONSTRUCTION JOINT NOTE:

At Contractor's option, transverse construction joints may be provided at 6'-0 from ℄ Pier.

REDUCED SIZE
DO NOT SCALE

BRIDGE DESIGN SECTION 'B'		DATE
DESIGN	C. Hubbard	11-97
DESIGN CK'D	K. Ruffennach	11-97
DRAWN	J. Kessler	11-97
DWG CK'D	K. Ruffennach	11-97
APPROVED-PROJ. ENGINEER	K. Ruffennach	6-98
APPROVED-DESIGN LEADER	S. Hasan	6-98
US 93 (ROUTE)	199.56 (MILEPOST)	2688 (STRUCTURE NO.)

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

STA. 800+
SOLS WASH BRIDGE
FOUNDATION LAYOUT

LOCATION: SOLS WASH BRIDGE

BRIDGE ENGINEER

DWG. S-1.4 OF 16

TRACS NO. H4169 01 C | -035-1(56)P | ___ OF ___

/usr3/br205/s2688fd.dgn
25-JUN-1998 13:04
VIEW NAME:

Appendix D

Hydraulic Analysis Supporting Documentation

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

D.1 – Roughness Coefficient Field Photos

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

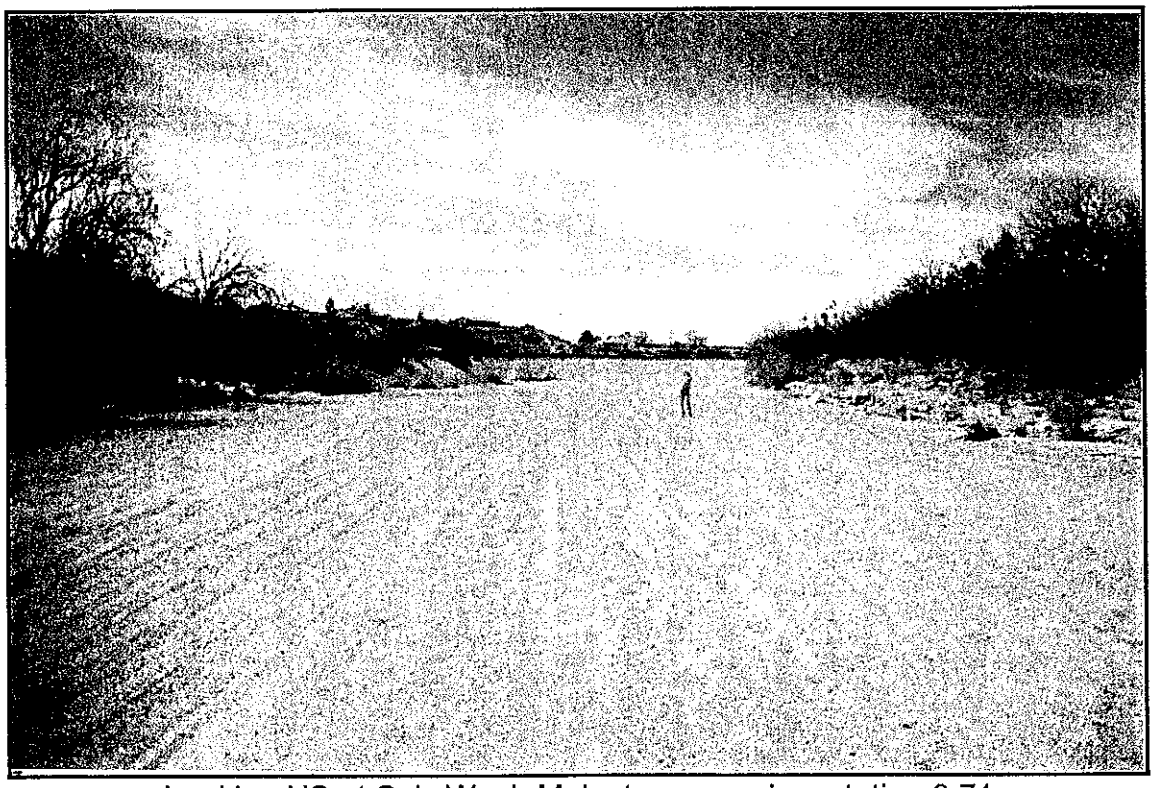
Looking US at river station 0.48

Looking US at river station 0.52

Looking US at river station 0.61

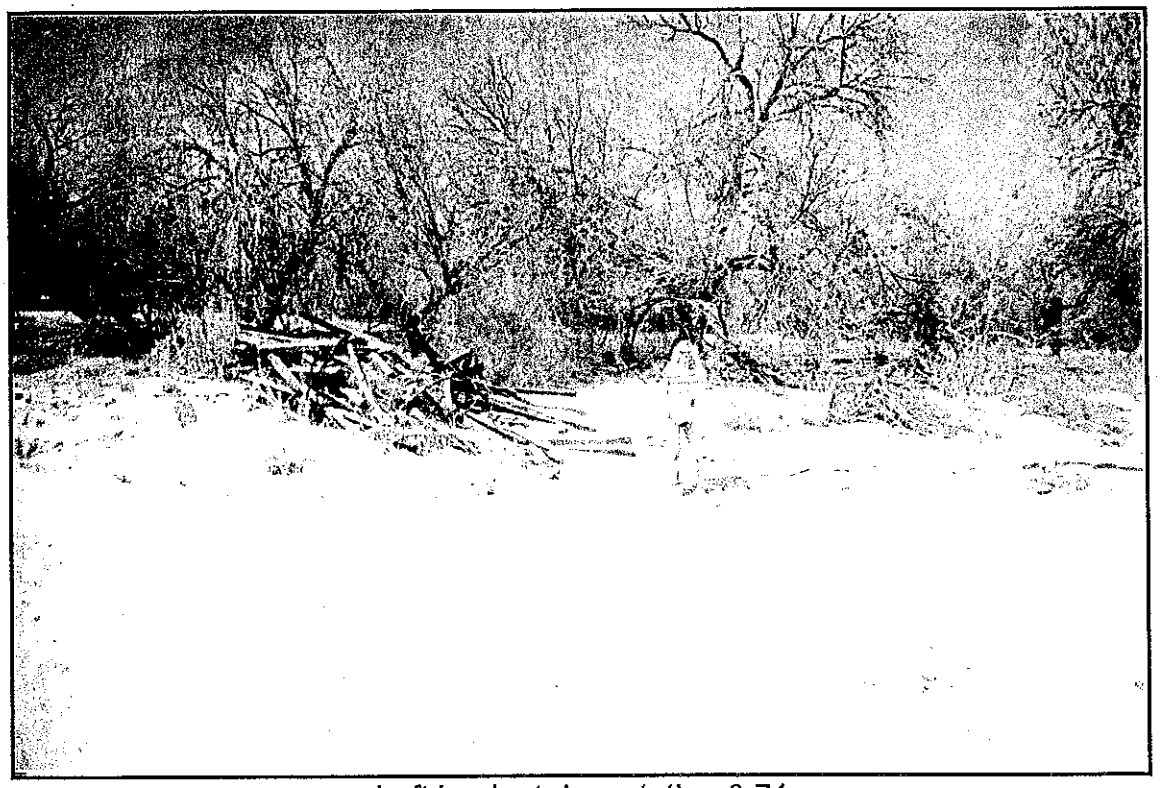
Looking US at confluence of Hospital Wash and Sols Wash

Looking US at Sols Wash Mainstem near river station 0.66

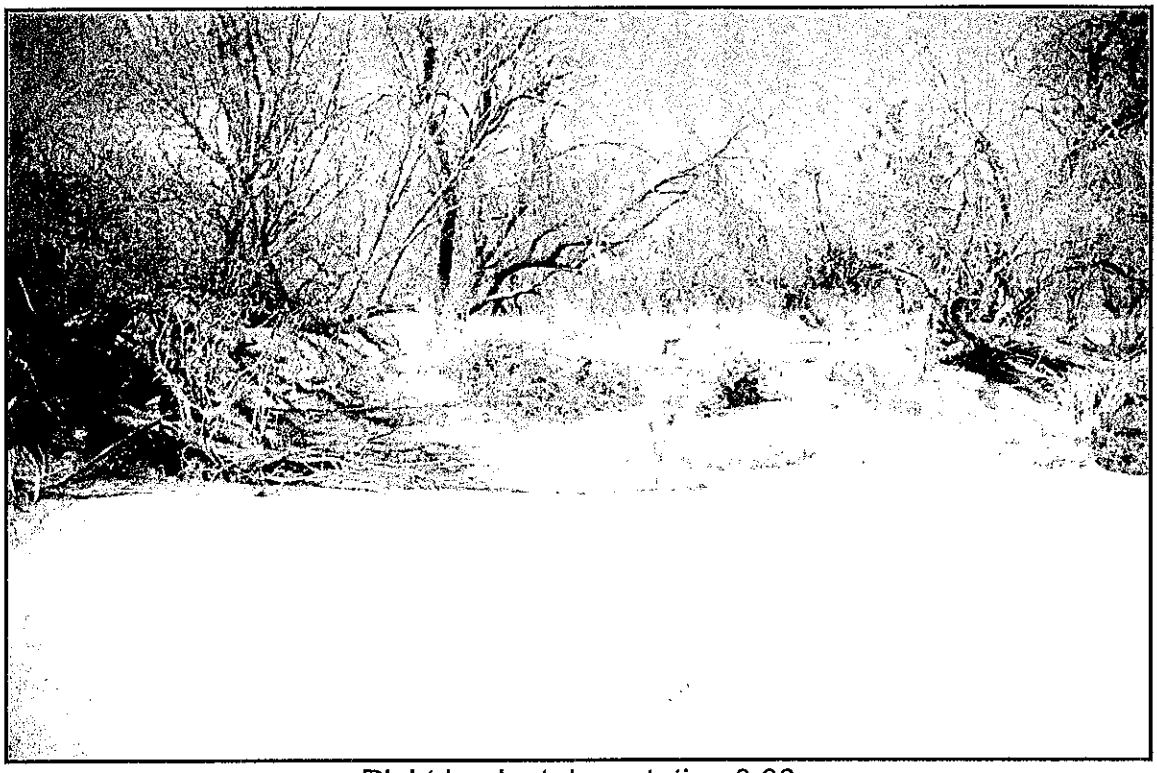


Looking US at Sols Wash Mainstem near river station 0.71

Right bank at river station 0.71



Left bank at river station 0.71

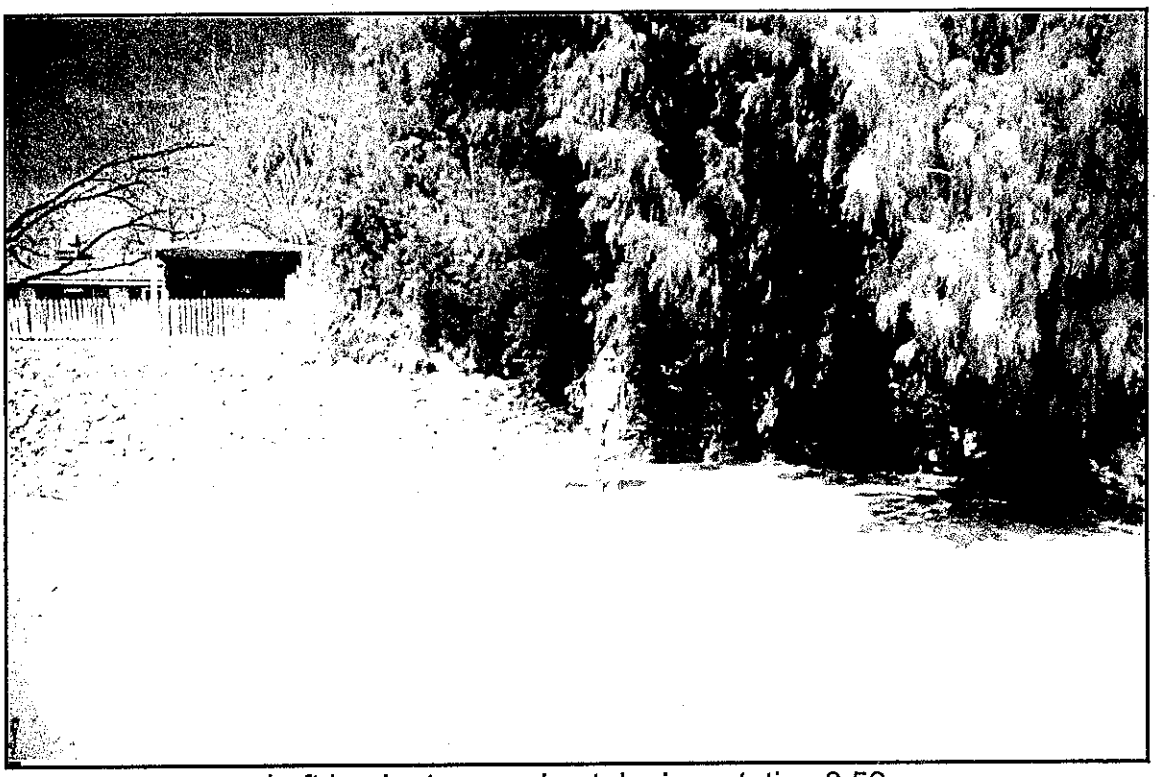


Right bank at river station 0.66

Left bank at river station 0.66

Right bank at river station 0.61

Left bank at river station 0.61



Left bank at approximately river station 0.59

Right bank at approximately river station 0.59

Right bank at river station 0.52

Left bank at river station 0.52

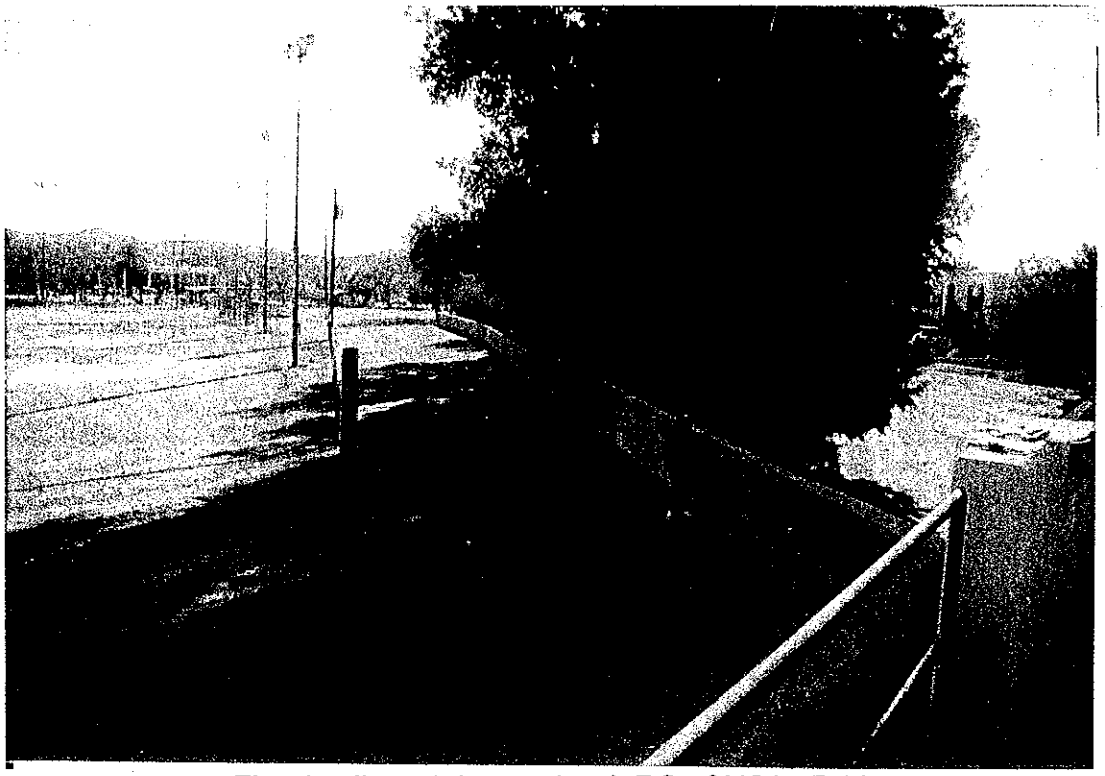
Left bank at river station 0.48

Right bank near river station 0.48

Looking DS on Sols mainstem with concrete lined RR embankment to right

Looking DS of US93 Bridge at right bank

Looking DS of US 93 Bridge at left bank



Floodwall on right overbank DS of US93 Bridge

Looking NW along US93 – Car is on Sols Wash bridge

Photo 1 of SE to NW panorama looking at area US of US93 bridge.

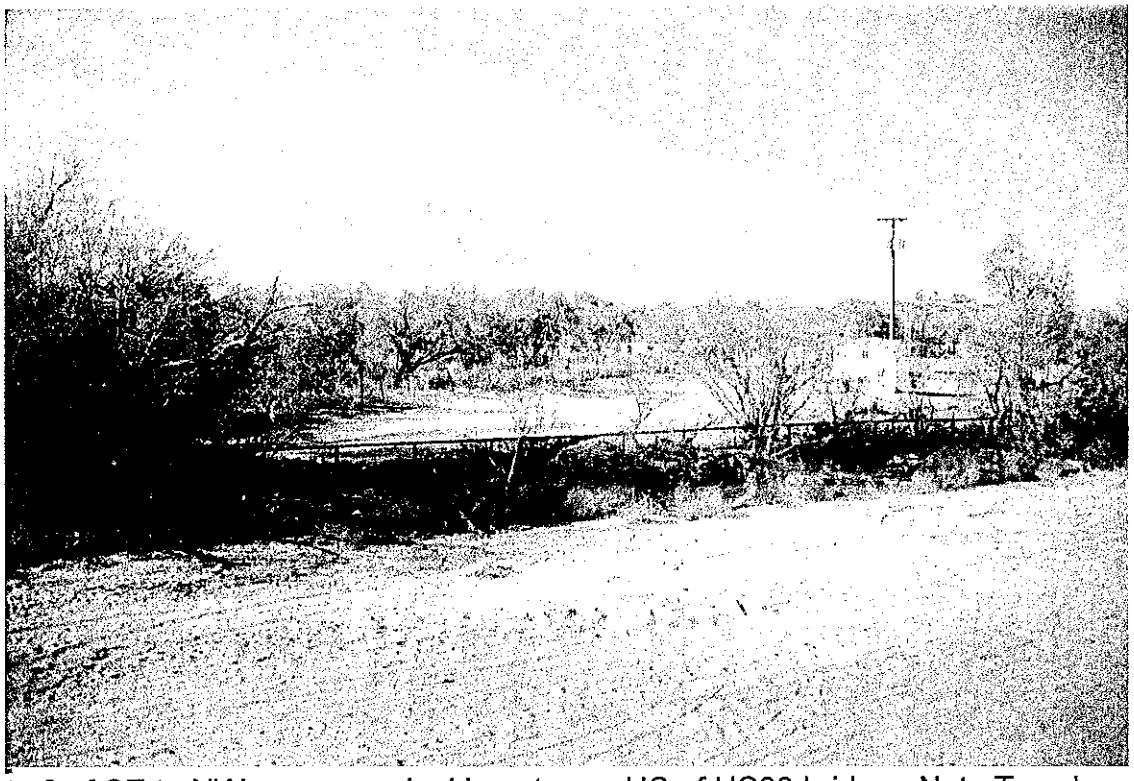
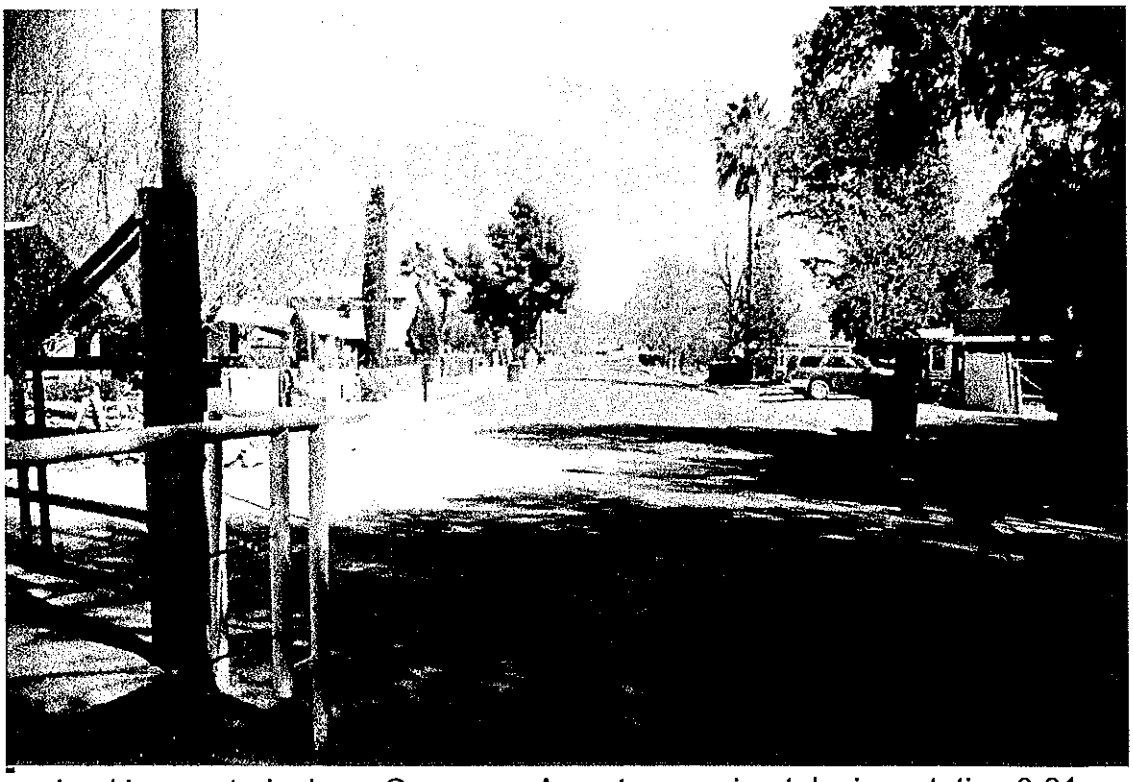


Photo 2 of SE to NW panorama looking at area US of US93 bridge. Note Town's pump house location respective to wash

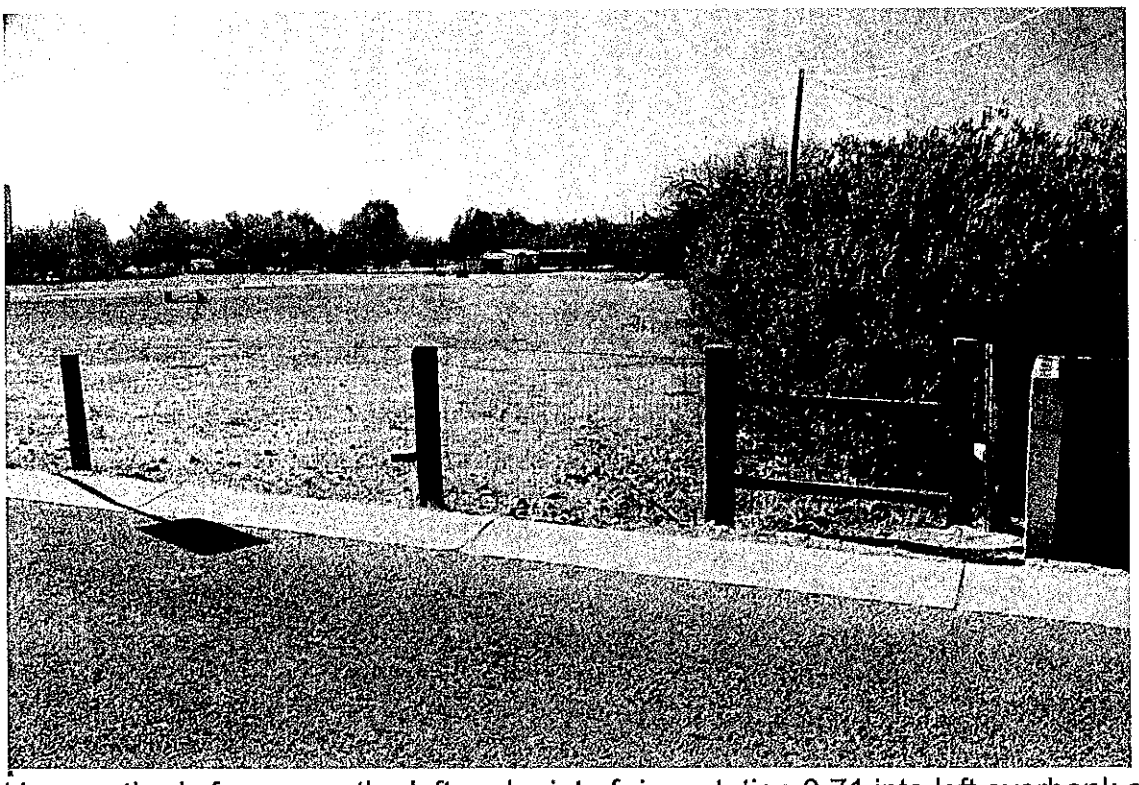
Photo 3 of SE to NW panorama looking at area US of US93 bridge. Note Cassandro Wash outfall pipe headwall center picture

Photo 4 of SE to NW panorama looking at area US of US93 bridge. Note recent revetment placement.

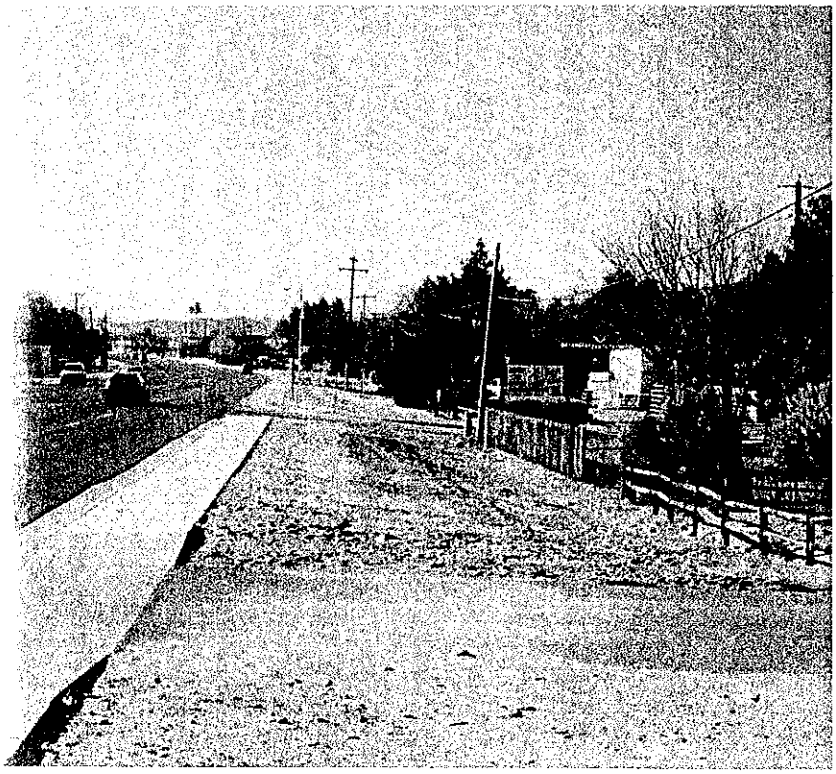


Looking easterly down Cavaness Ave at approximately river station 0.61

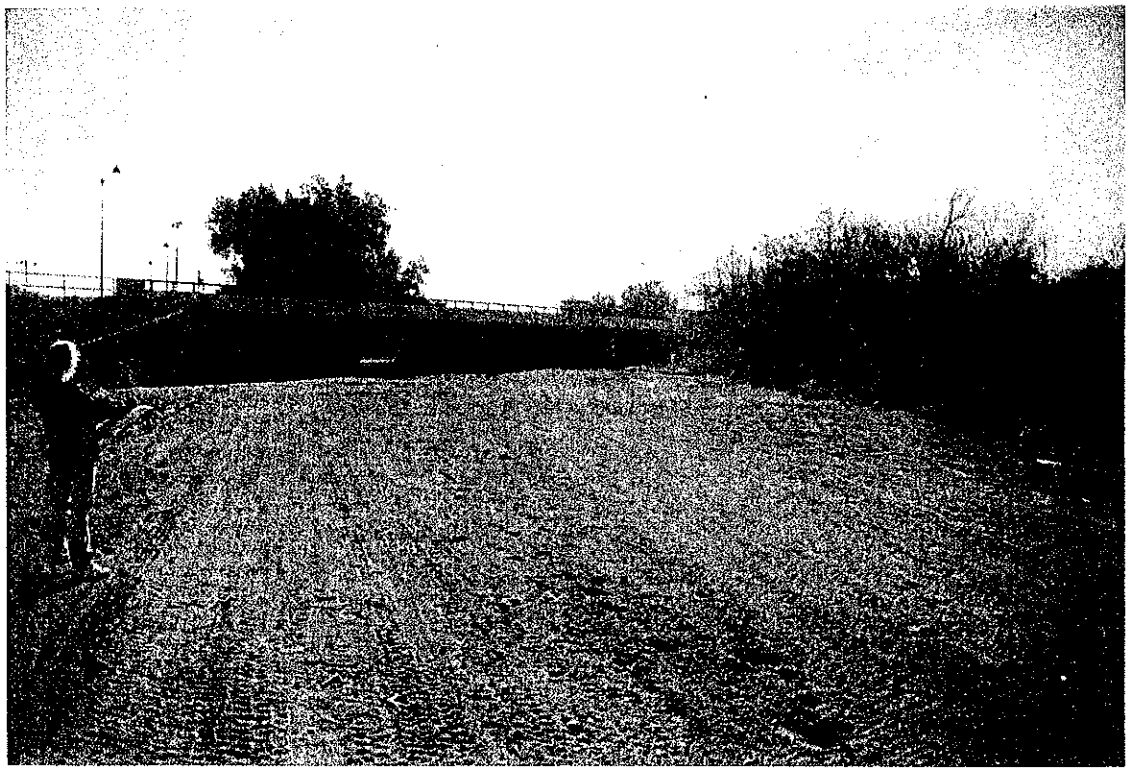
Looking SE from near the left endpoint of river station 0.71 into left overbank area



Looking southerly from near the left endpoint of river station 0.71 into left overbank area



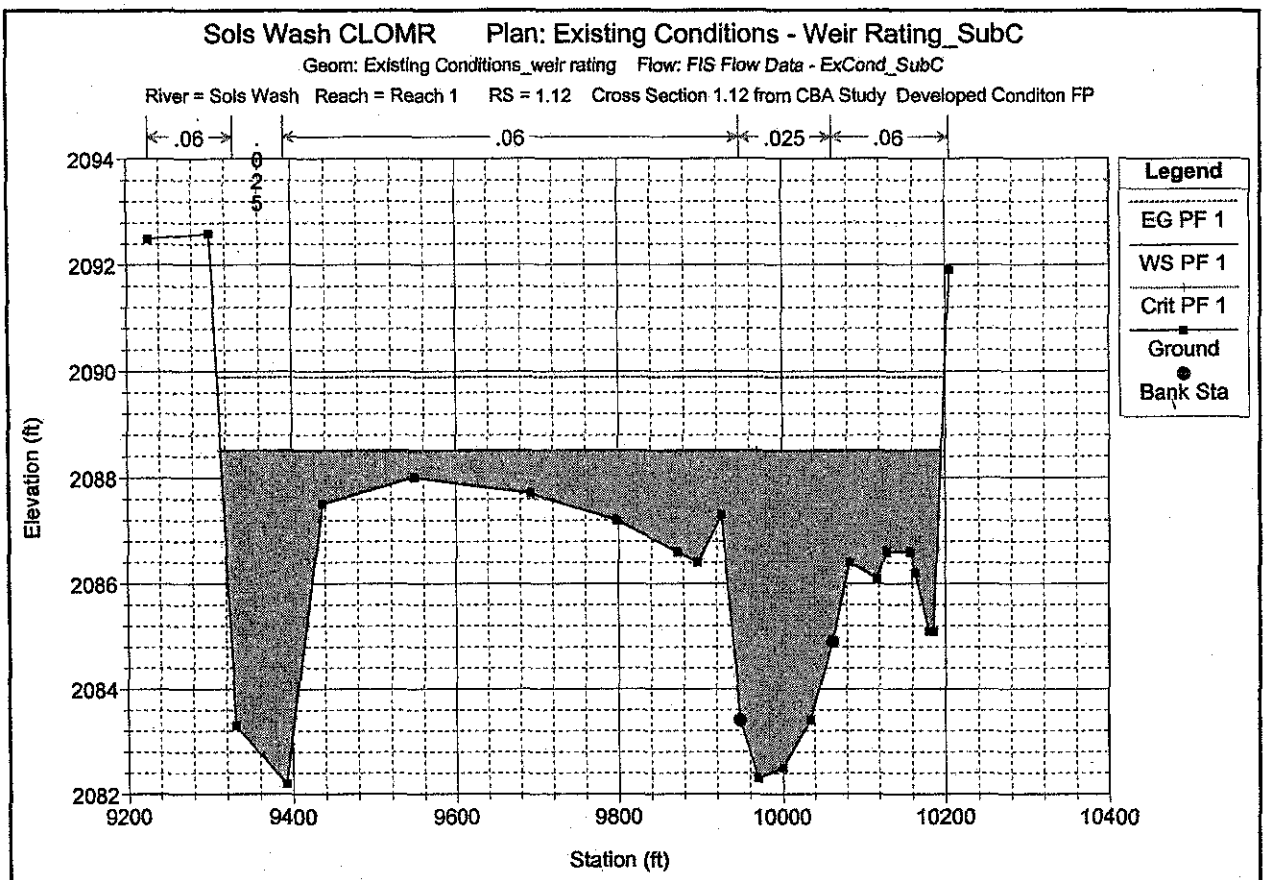
Looking SE along US93 from near the right endpoint of river station 0.57. Note the new sidewalk improvements and no evidence of berming.

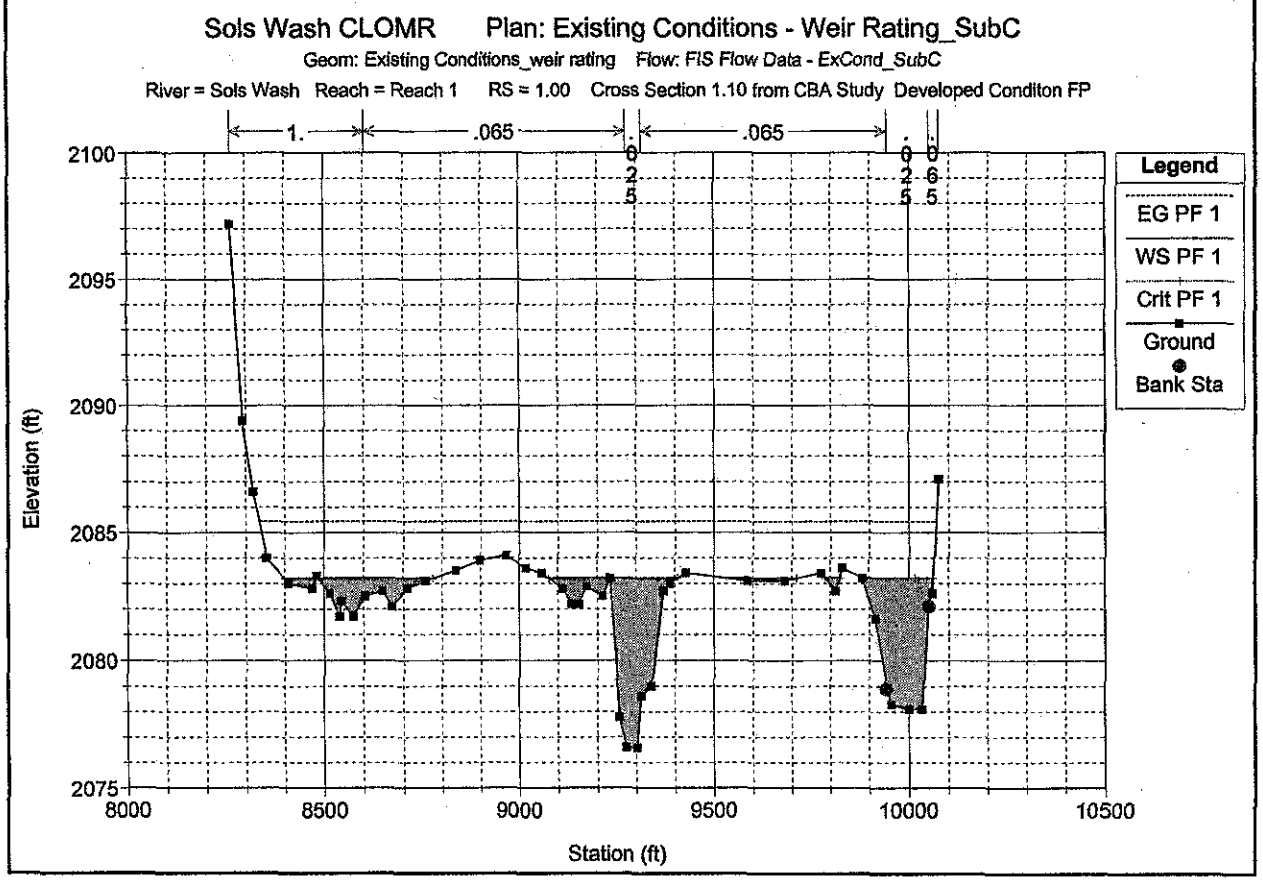


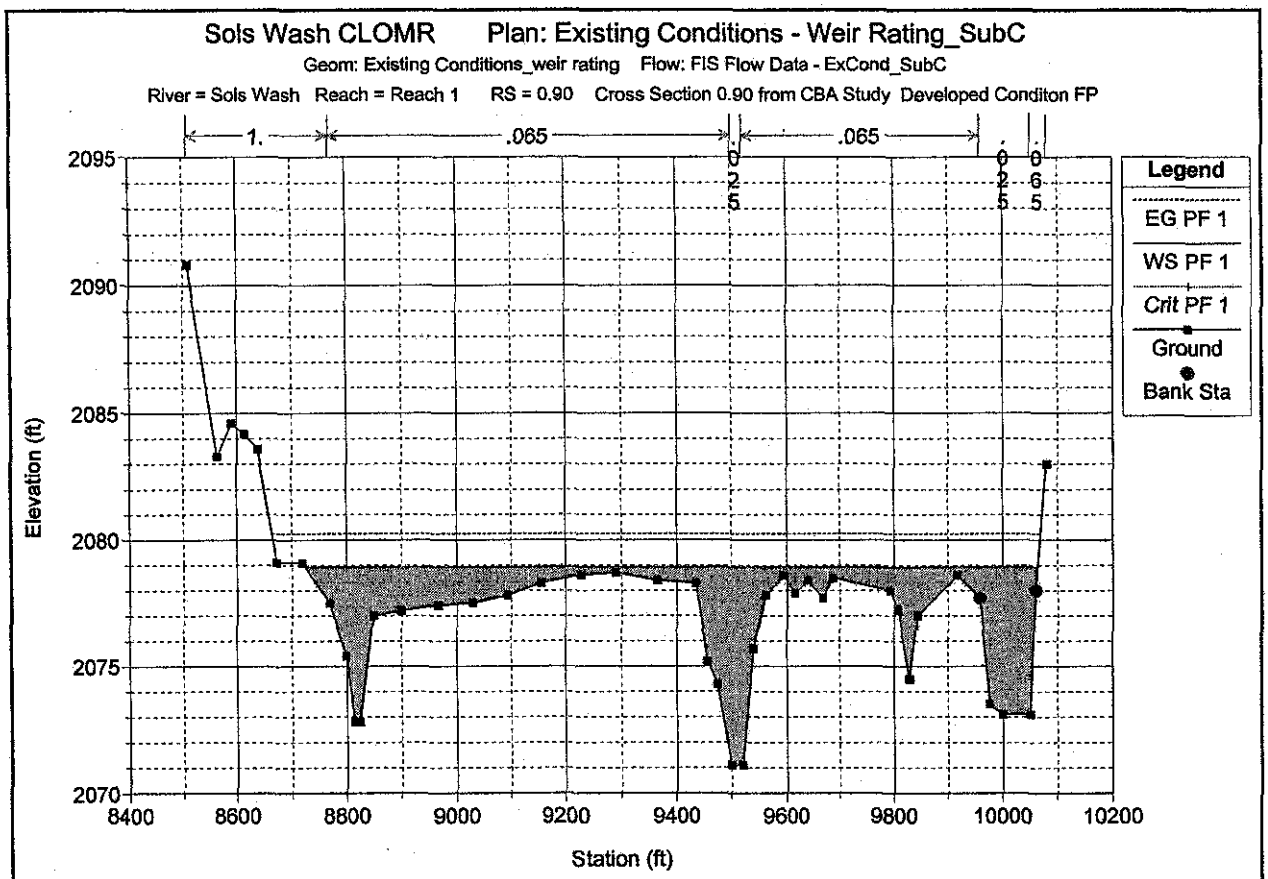
Looking DS from river station 0.48 at US93 bridge opening. Note the adverse skew on bridge

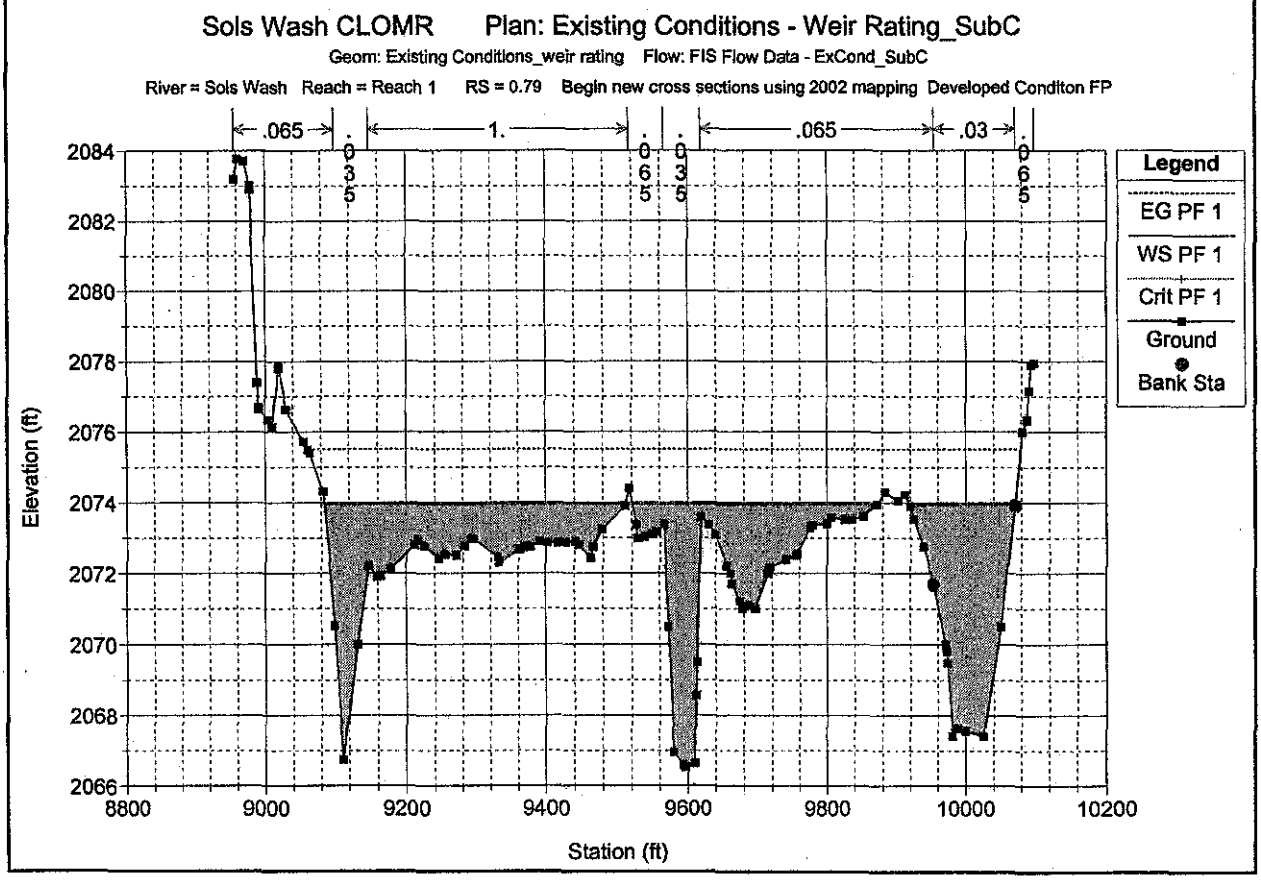
D.2 – Cross Section Plots

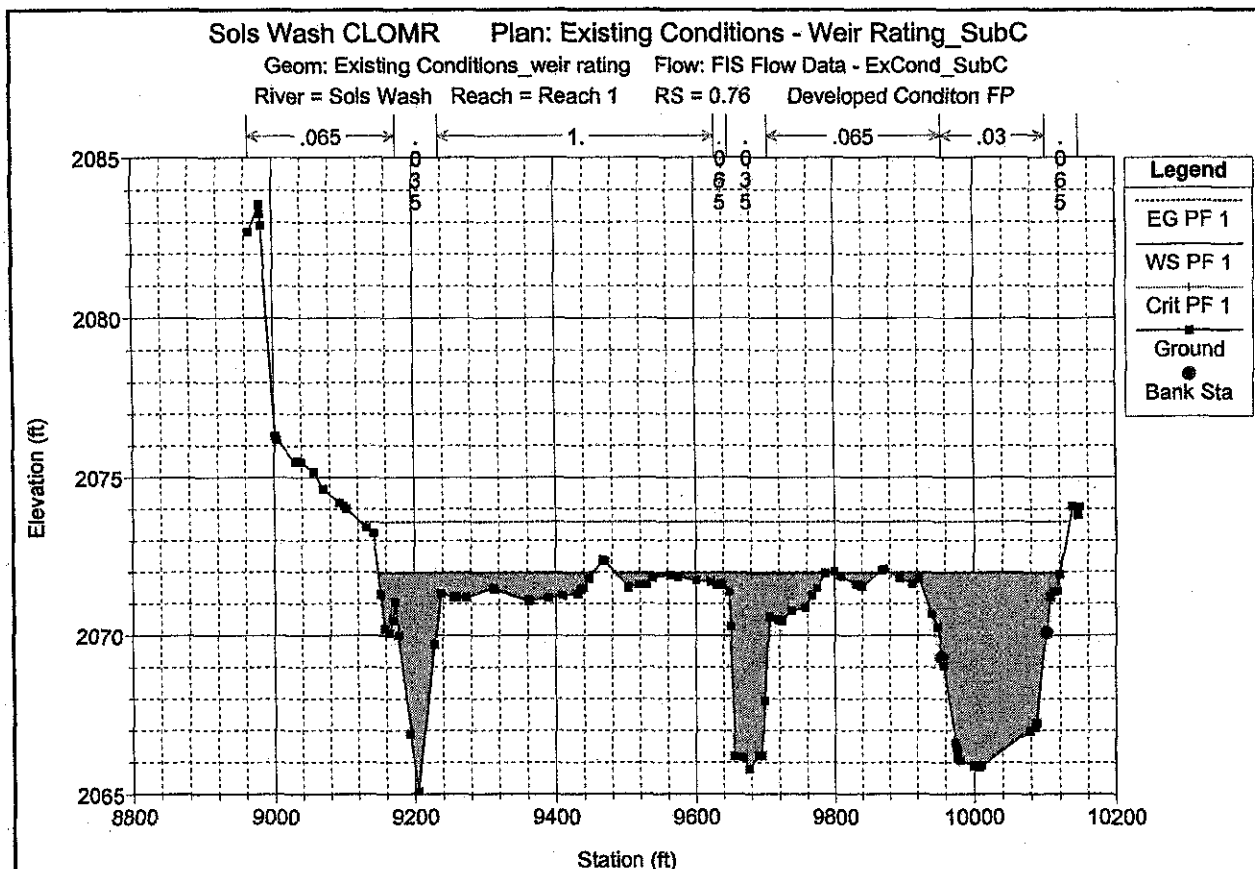
JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

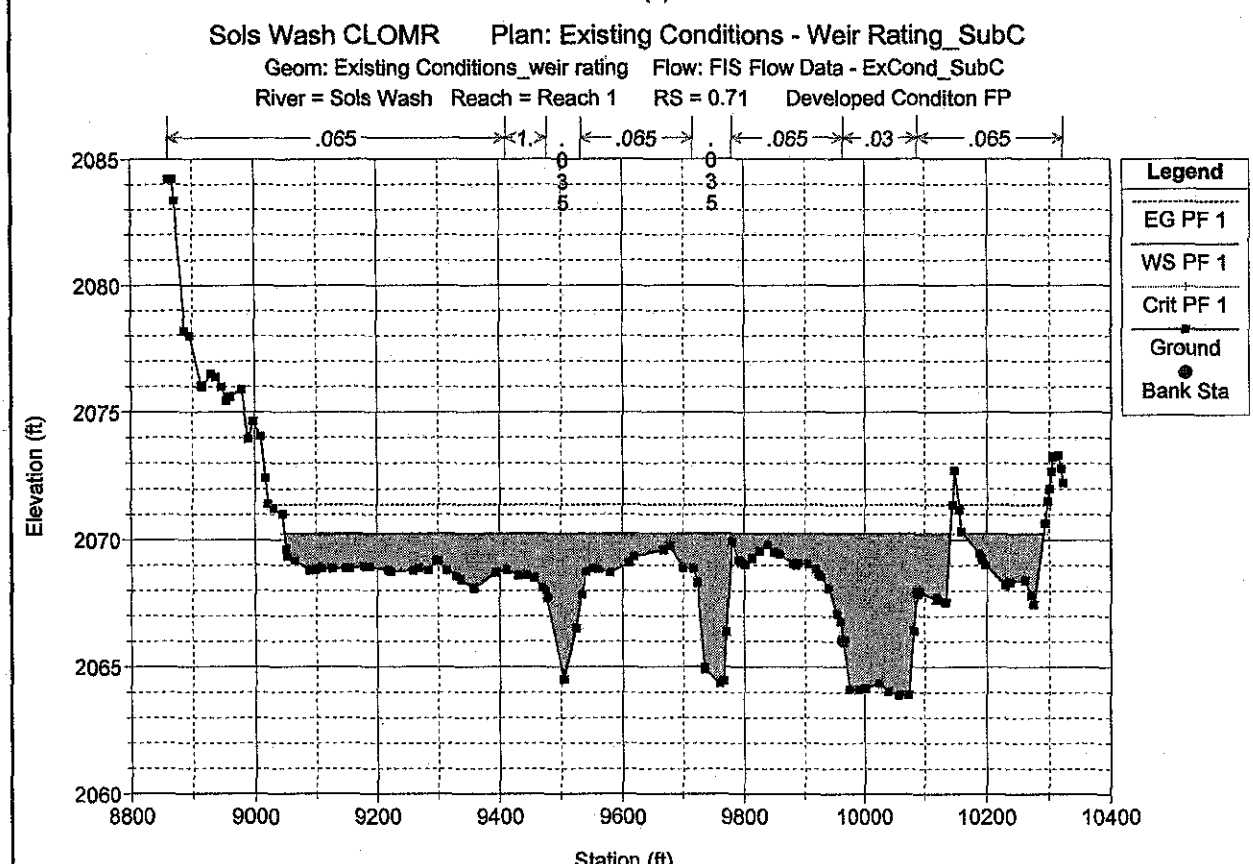

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 1.12 Cross Section 1.12 from CBA Study Developed Conditon FP
.06
.025
.06
.06
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2094
2092
2090
2088
2086
2084
2082
9200
9400
9600
9800
10000
10200
10400
Station (ft)

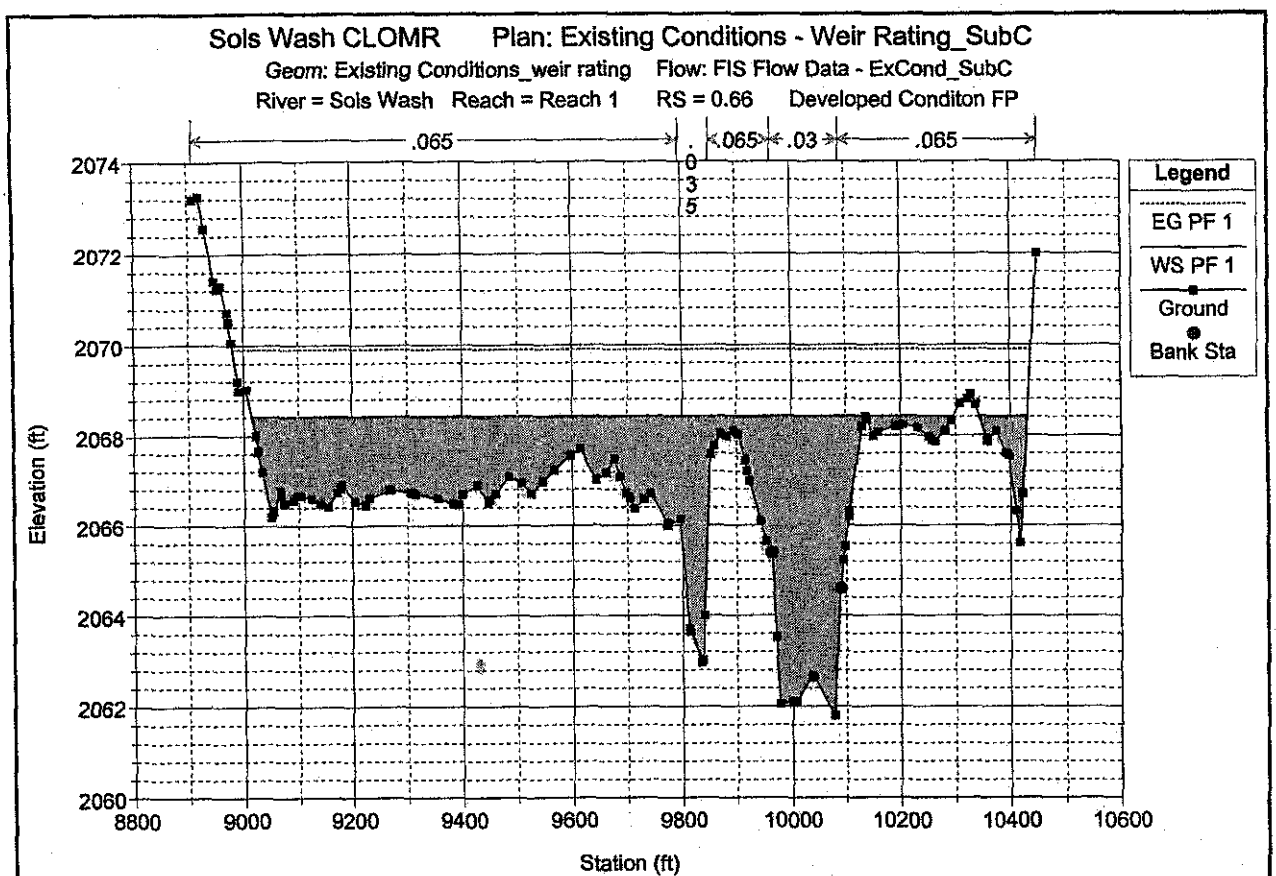

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 1.00 Cross Section 1.10 from CBA Study Developed Conditon FP
1.
.065
.065
.025
.025
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2100
2095
2090
2085
2080
2075
8000
8500
9000
9500
10000
10500
Station (ft)

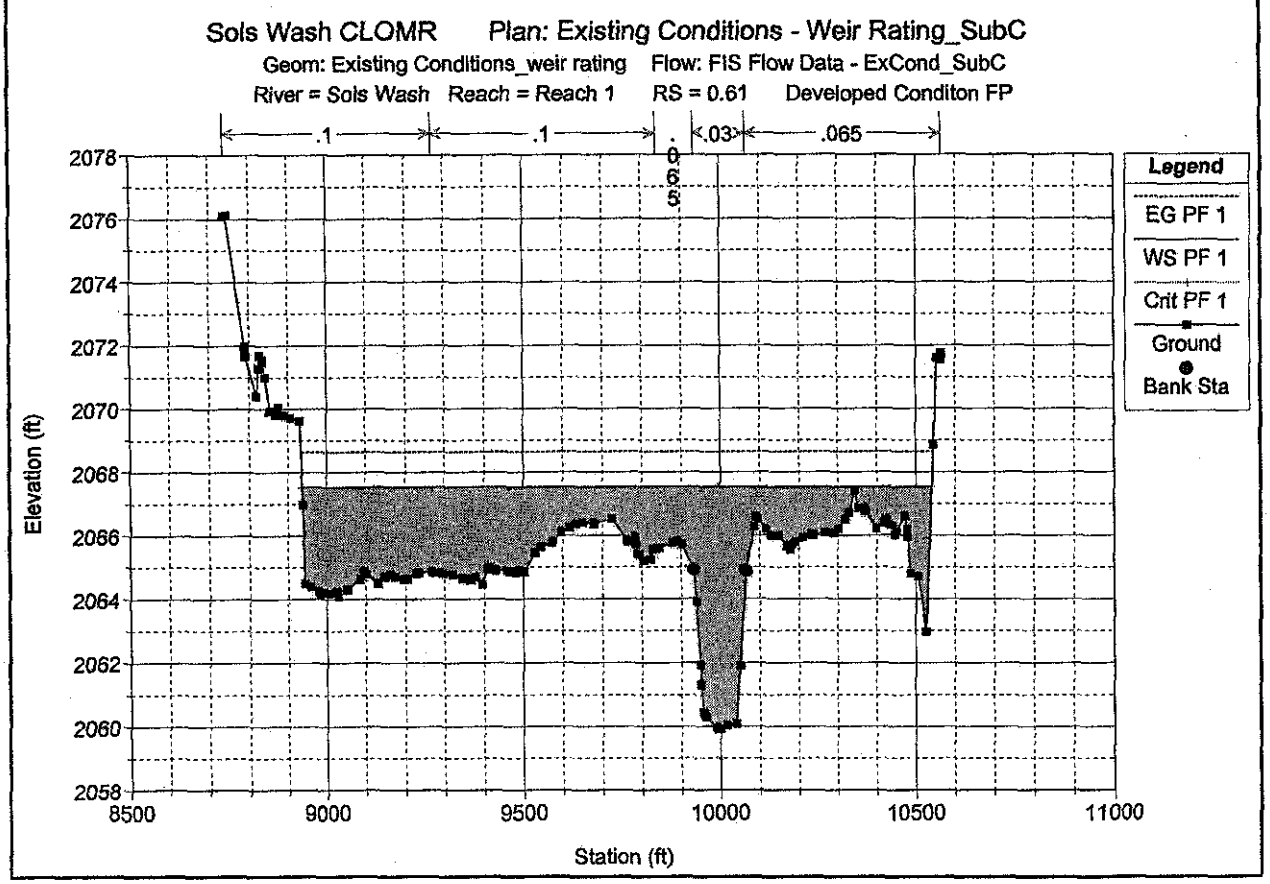

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.90 Cross Section 0.90 from CBA Study Developed Conditon FP
1.
.065
.025
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

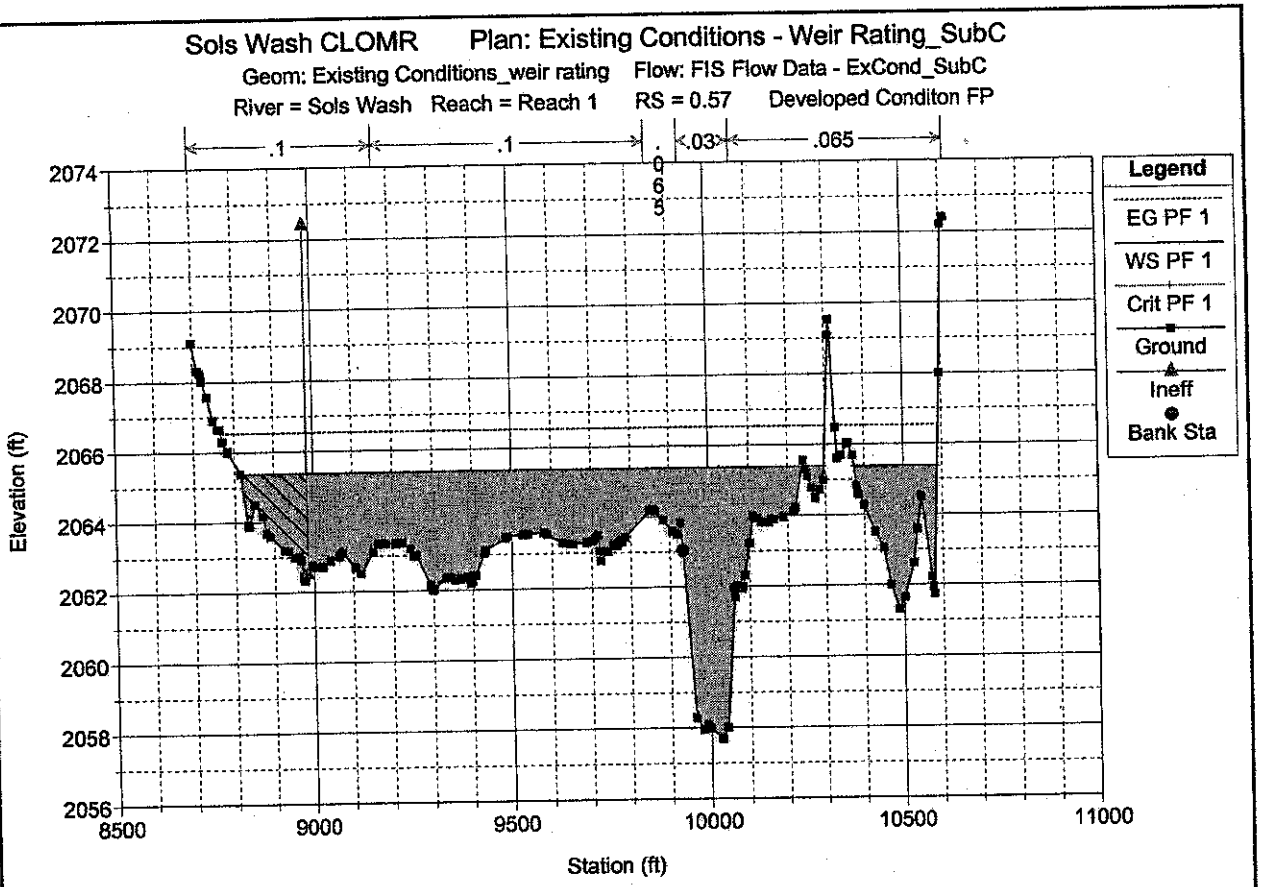

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.79 Begin new cross sections using 2002 mapping Developed Conditon FP
.065
.035
1.
.065
.035
.065
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

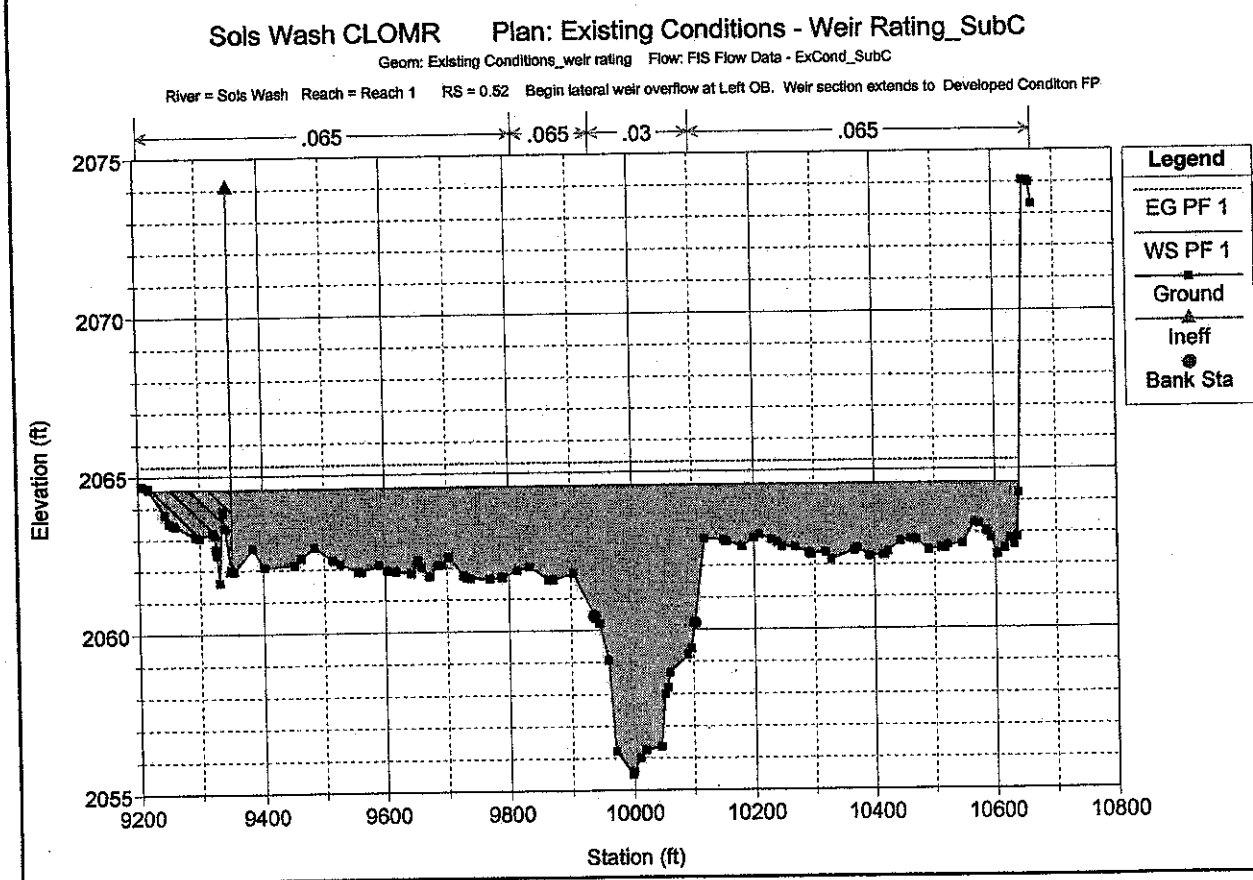

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.76 Developed Conditon FP
.065
.035
1.
.065
.035
.065
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2085
2080
2075
2070
2065
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

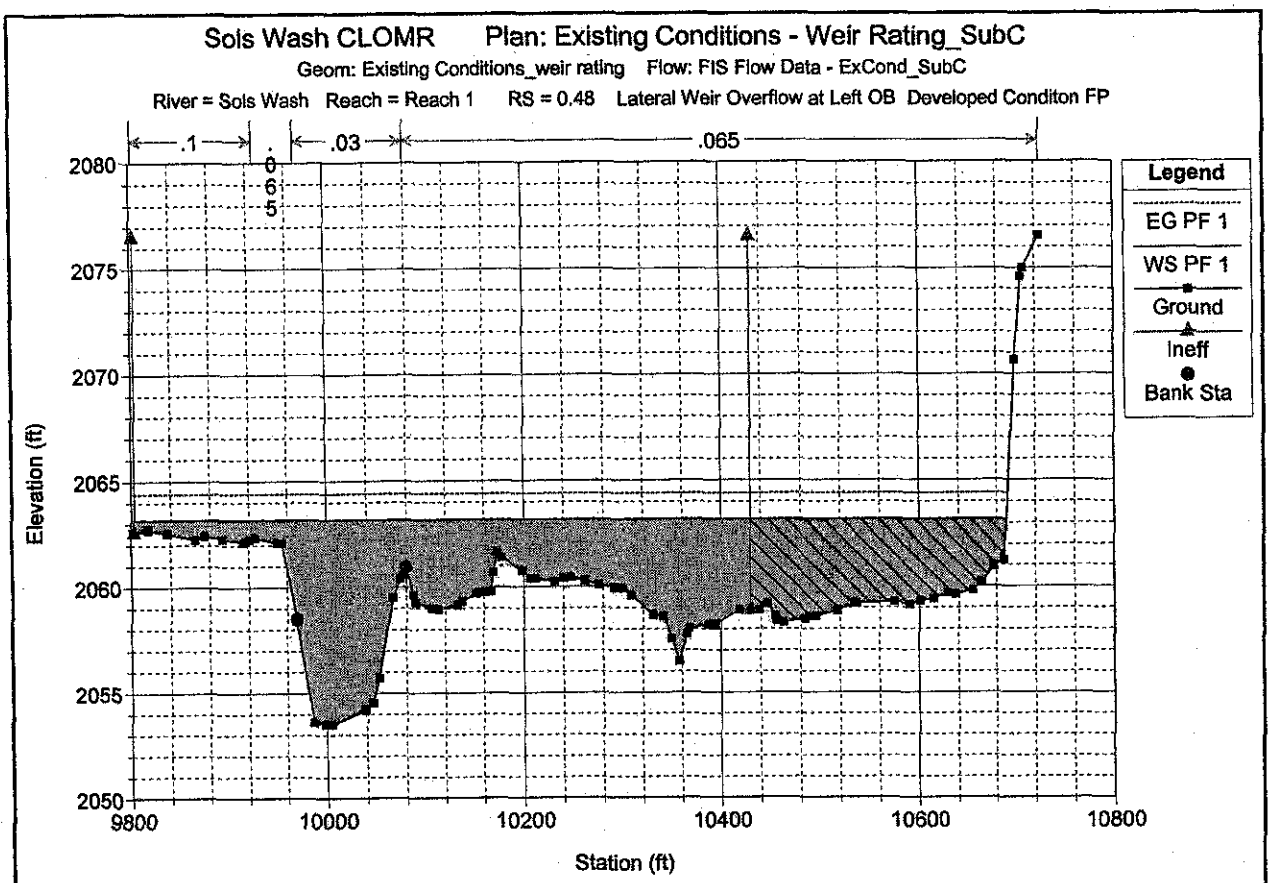

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.71 Developed Conditon FP
.065
1.
.035
.065
.035
.065
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2085
2080
2075
2070
2065
2060
8800
9000
9200
9400
9600
9800
10000
10200
10400
Station (ft)

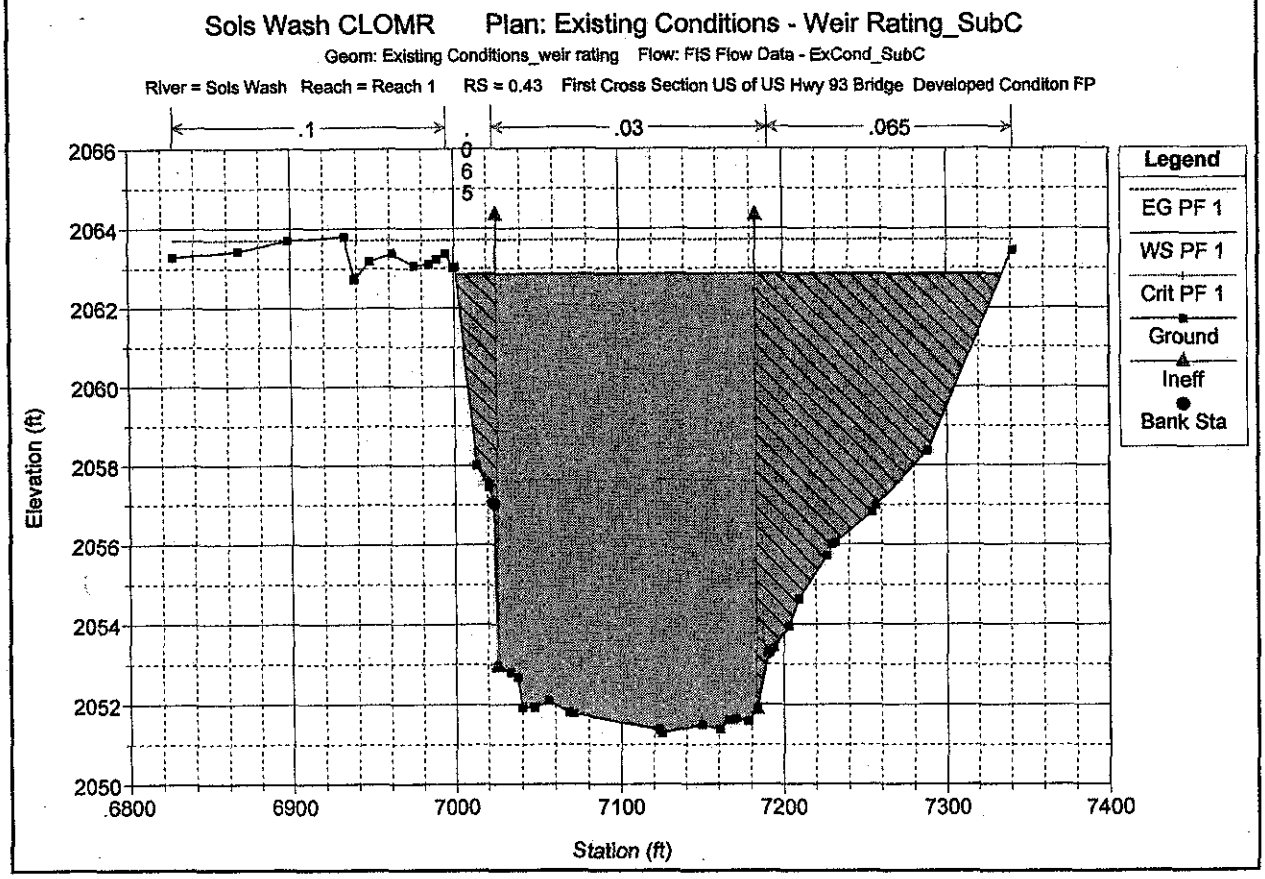

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.66 Developed Conditon FP
.065
.065
.03
.065
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

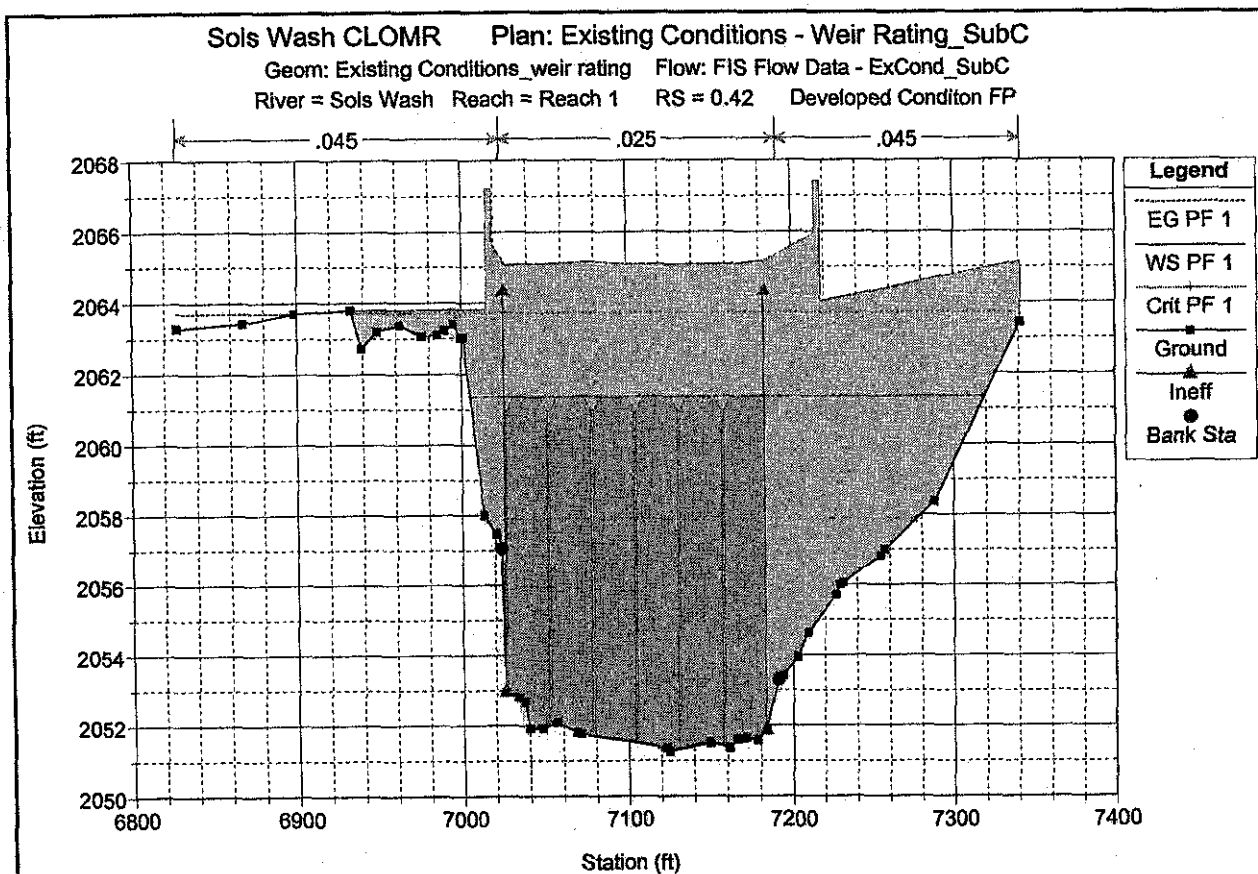

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.61 Developed Conditon FP
.1
.1
.03
.065
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

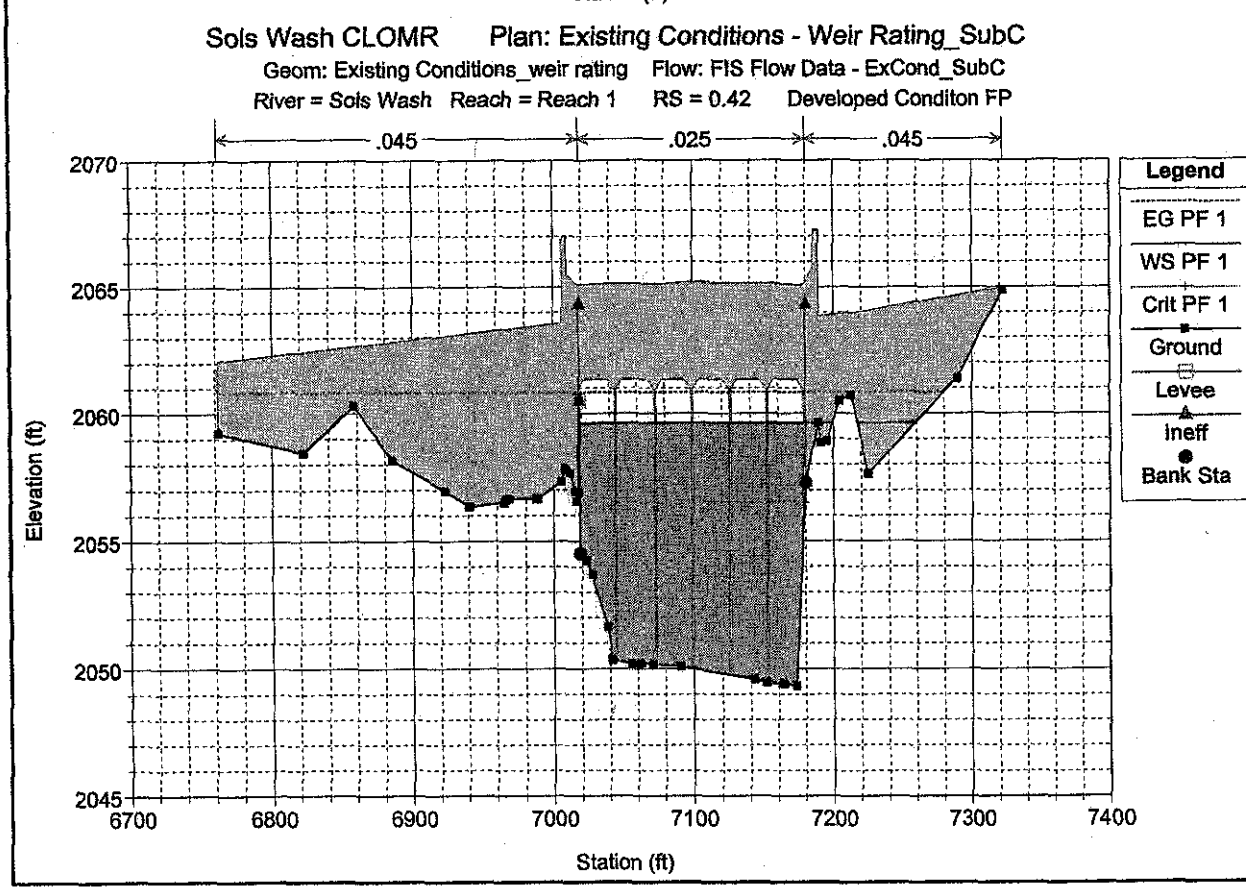

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.57 Developed Conditon FP
.1
.1
.065
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2074
2072
2070
2068
2066
2064
2062
2060
2058
2056
8500
9000
9500
10000
10500
11000

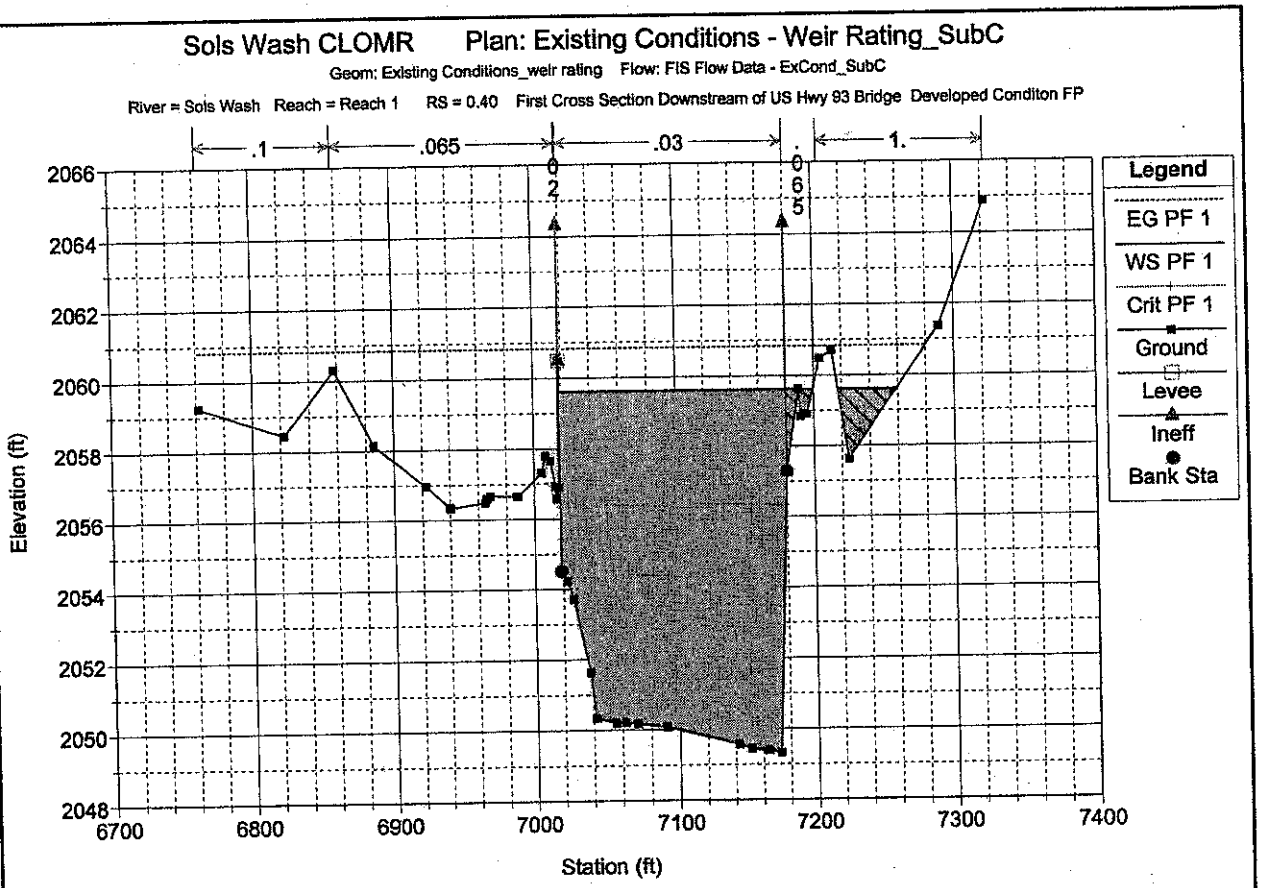

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.52 Begin lateral weir overflow at Left OB. Weir section extends to Developed Conditon FP
.065
.065
.03
.065
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2075
2070
2065
2060
2055
9200
9400
9600
9800
10000
10200
10400
10600
10800

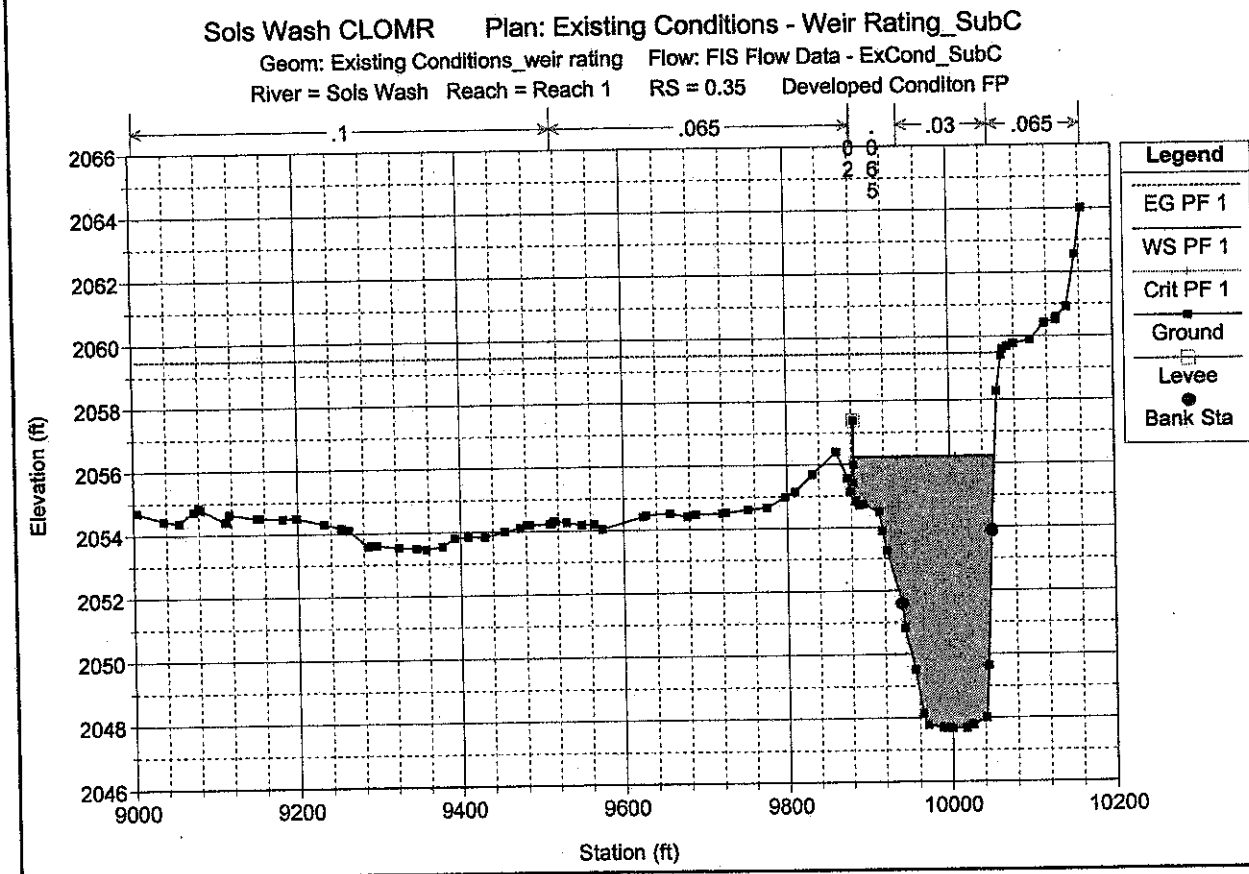

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.48 Lateral Weir Overflow at Left OB Developed Conditon FP
.1
.03
.065
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2080
2075
2070
2065
2060
2055
2050
9800
10000
10200
10400
10600
10800

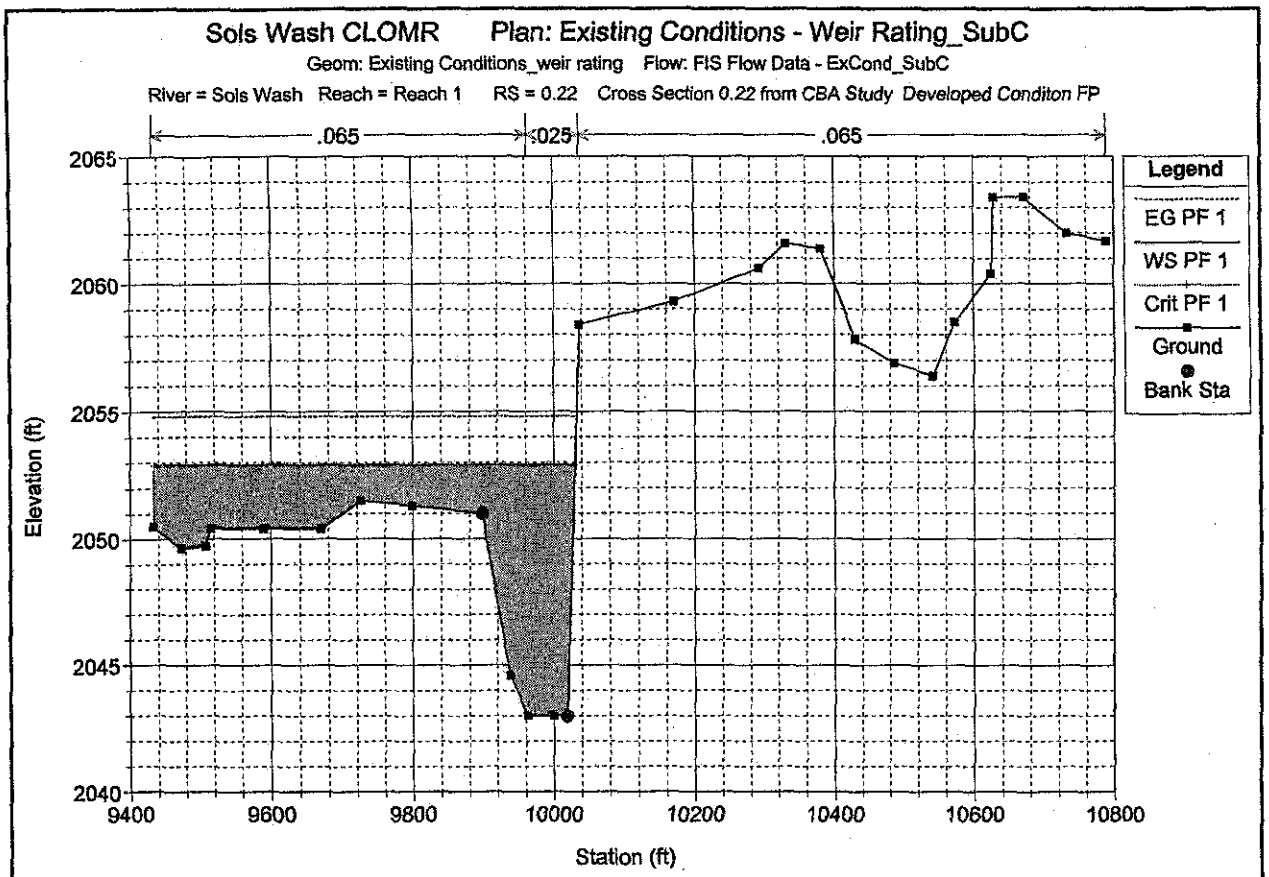

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.43 First Cross Section US of US Hwy 93 Bridge Developed Conditon FP
.1
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2066
2064
2062
2060
2058
2056
2054
2052
2050
6800
6900
7000
7100
7200
7300
7400

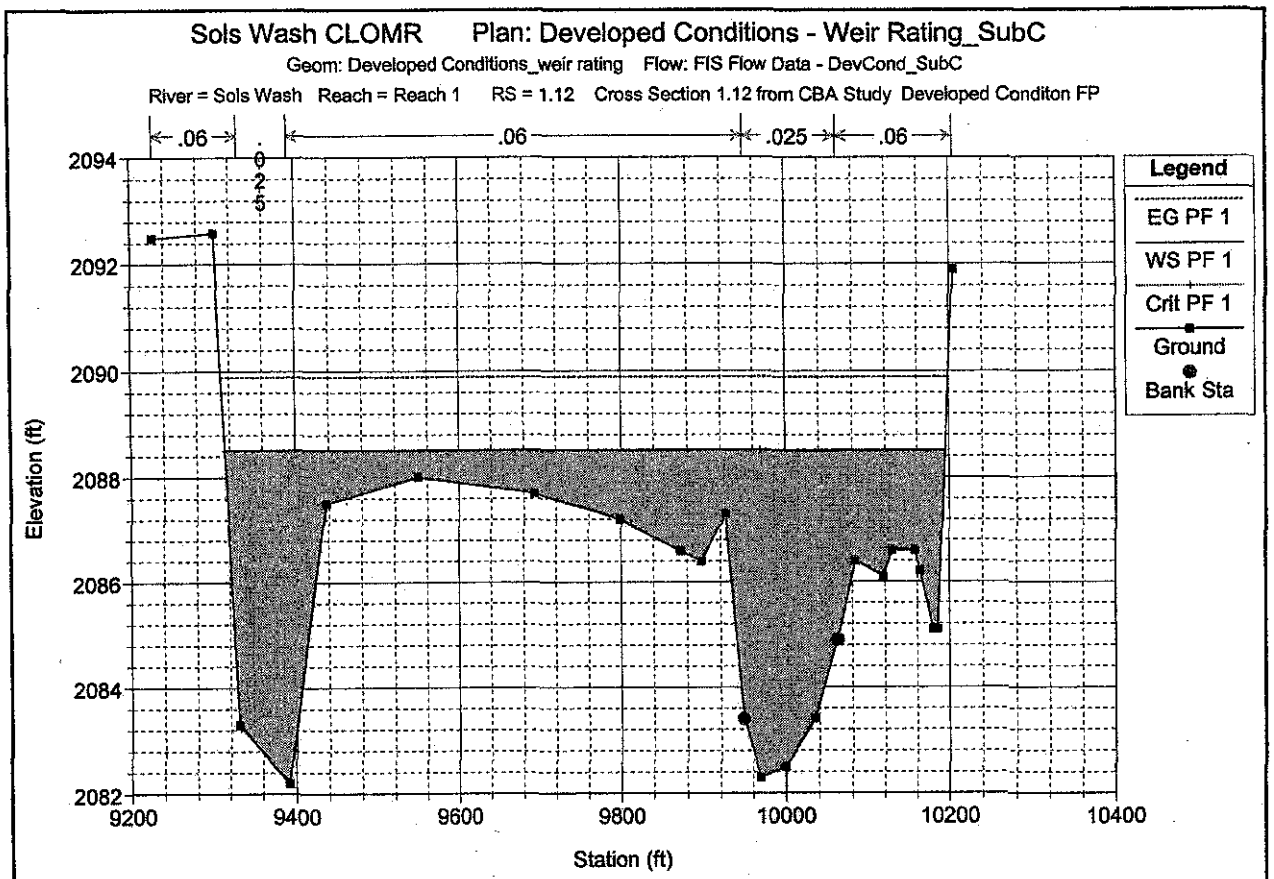

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.42 Developed Conditon FP
.045
.025
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

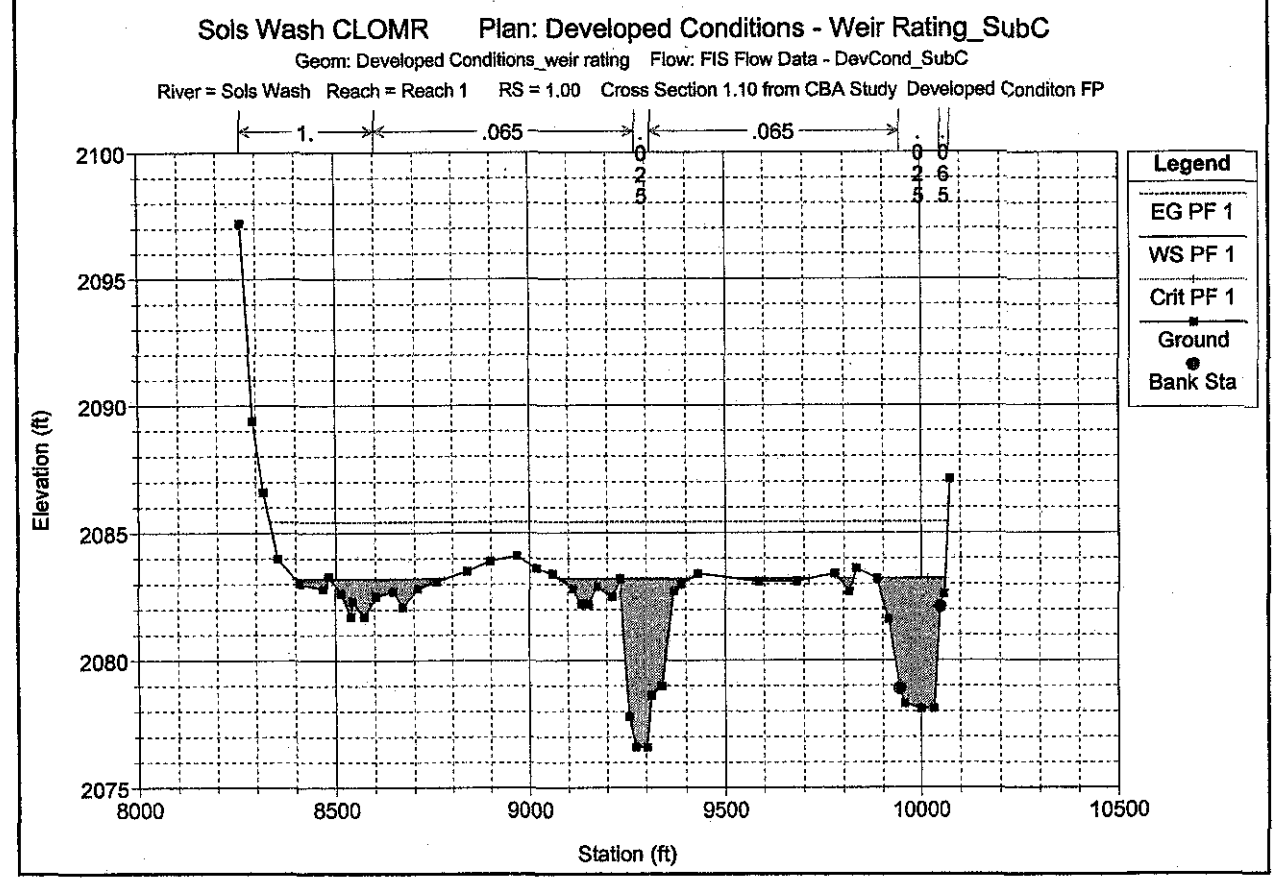

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.42 Developed Conditon FP
.045
.025
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

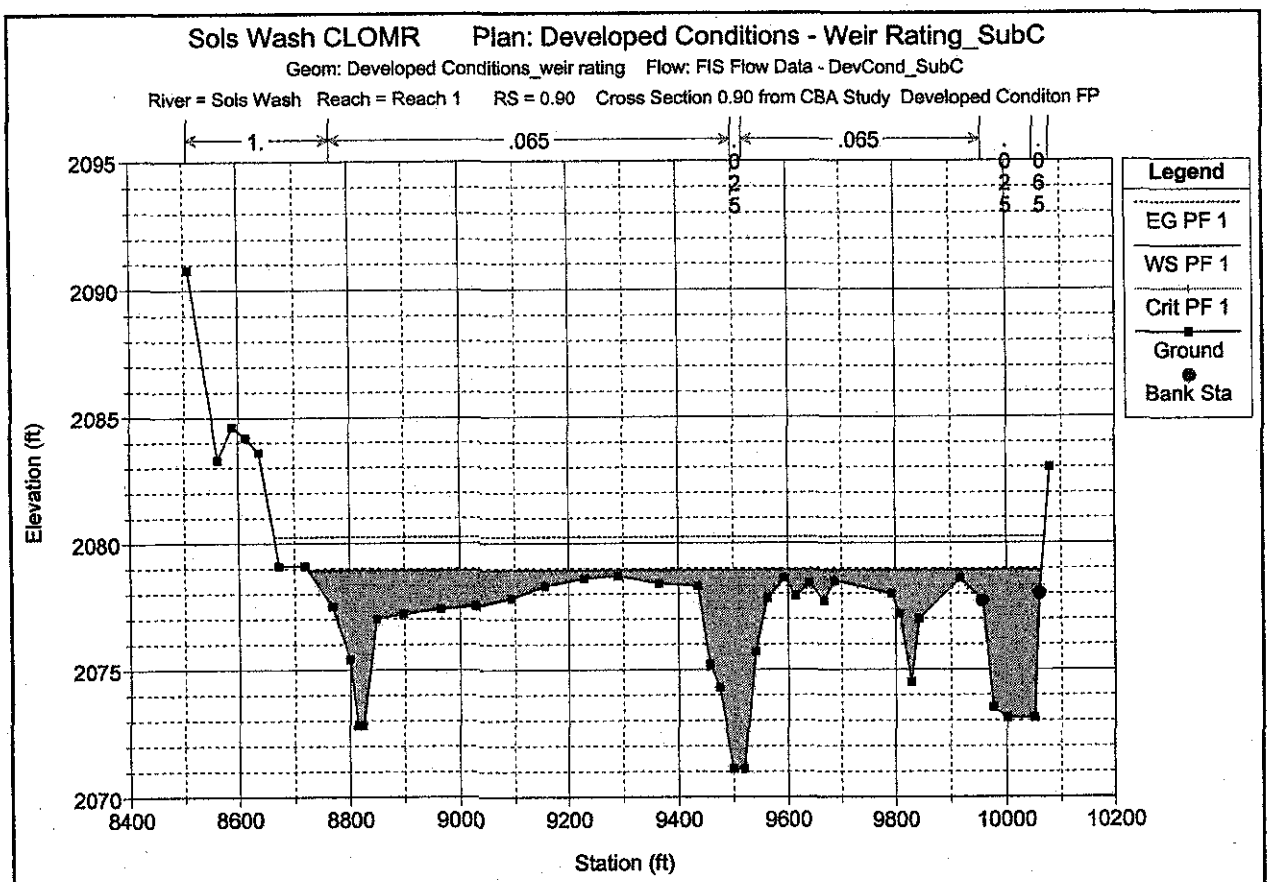

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.40 First Cross Section Downstream of US Hwy 93 Bridge Developed Conditon FP
.1
.065
.03
1.
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

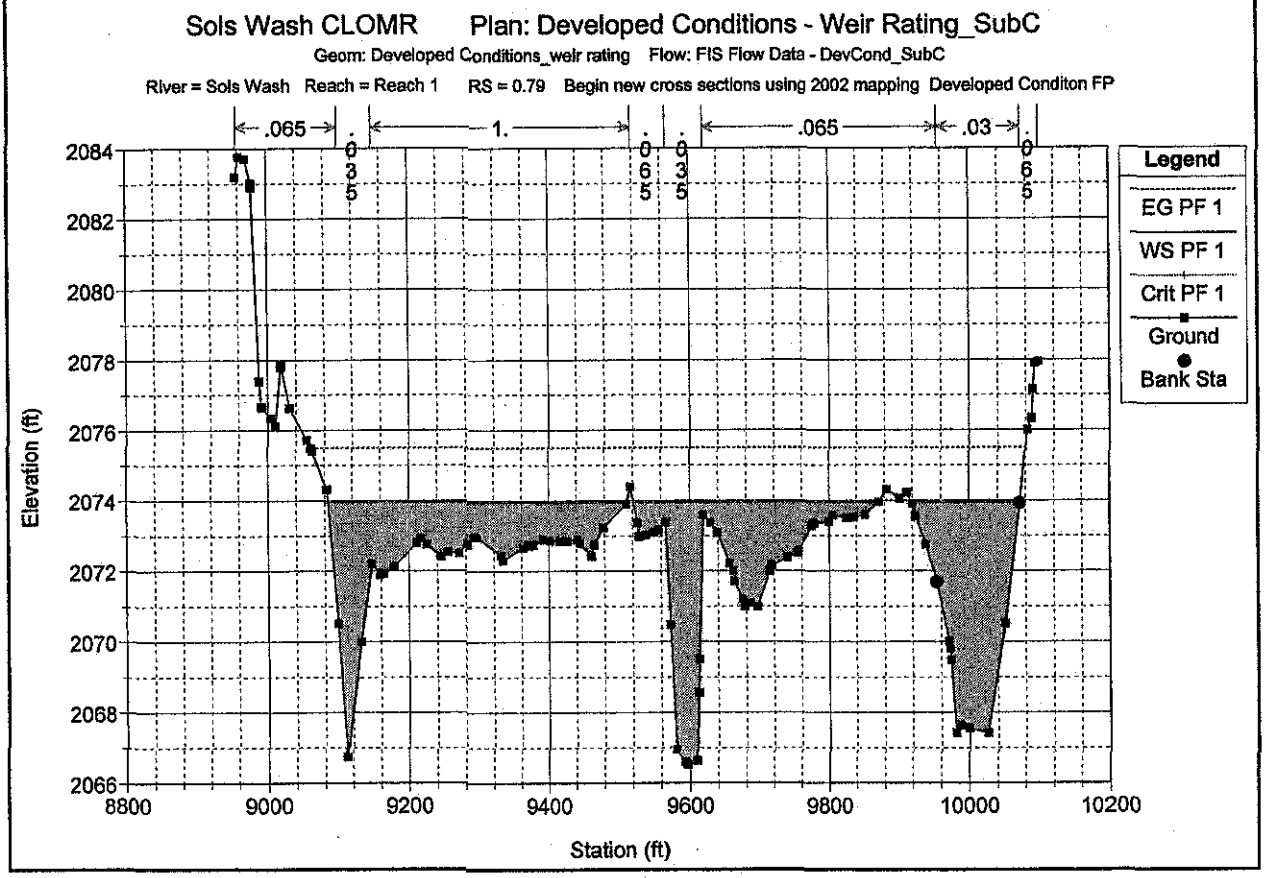

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.35 Developed Conditon FP
.1
.065
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

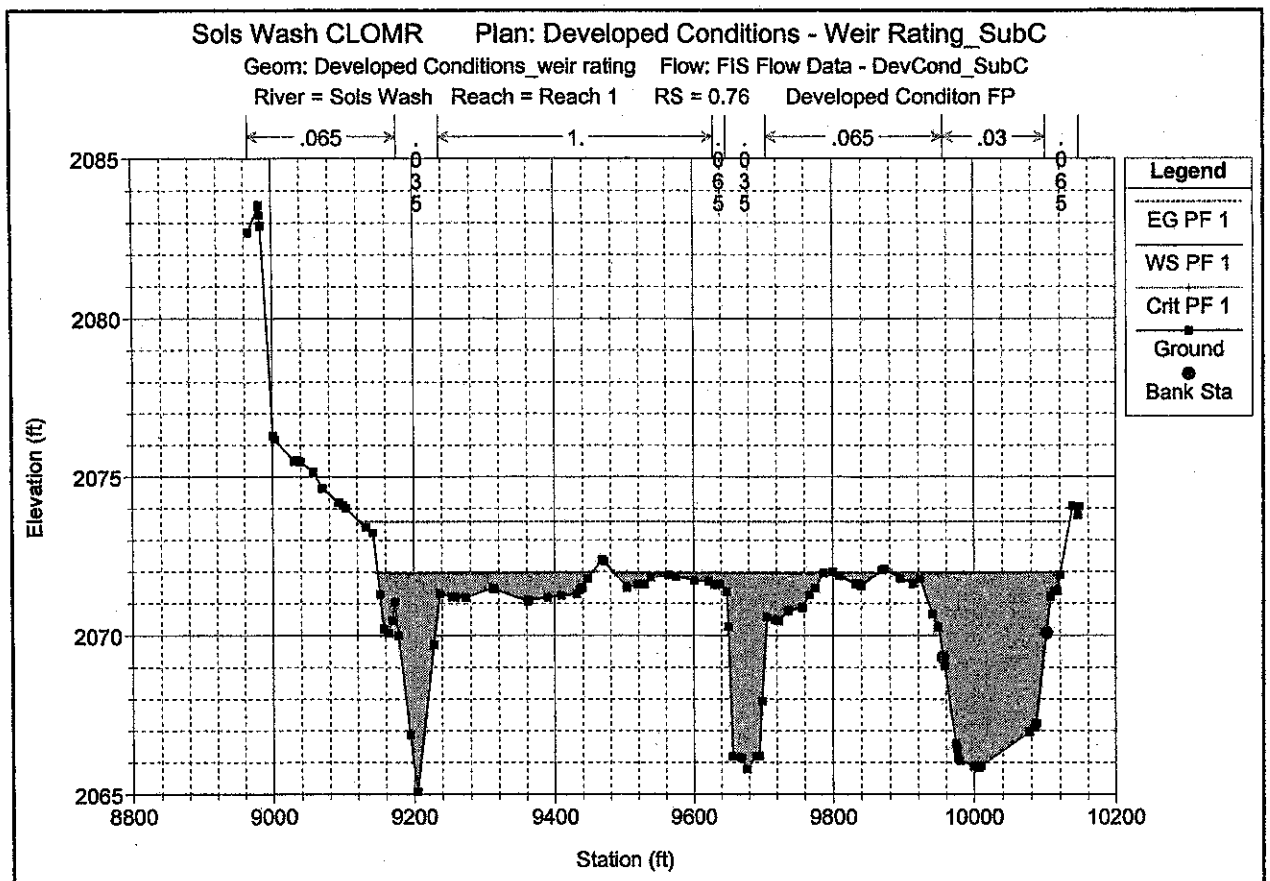

Sols Wash CLOMR Plan: Existing Conditions - Weir Rating_SubC
Geom: Existing Conditions_weir rating Flow: FIS Flow Data - ExCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.22 Cross Section 0.22 from CBA Study Developed Conditon FP
.065
.025
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2065
2060
2055
2050
2045
2040
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

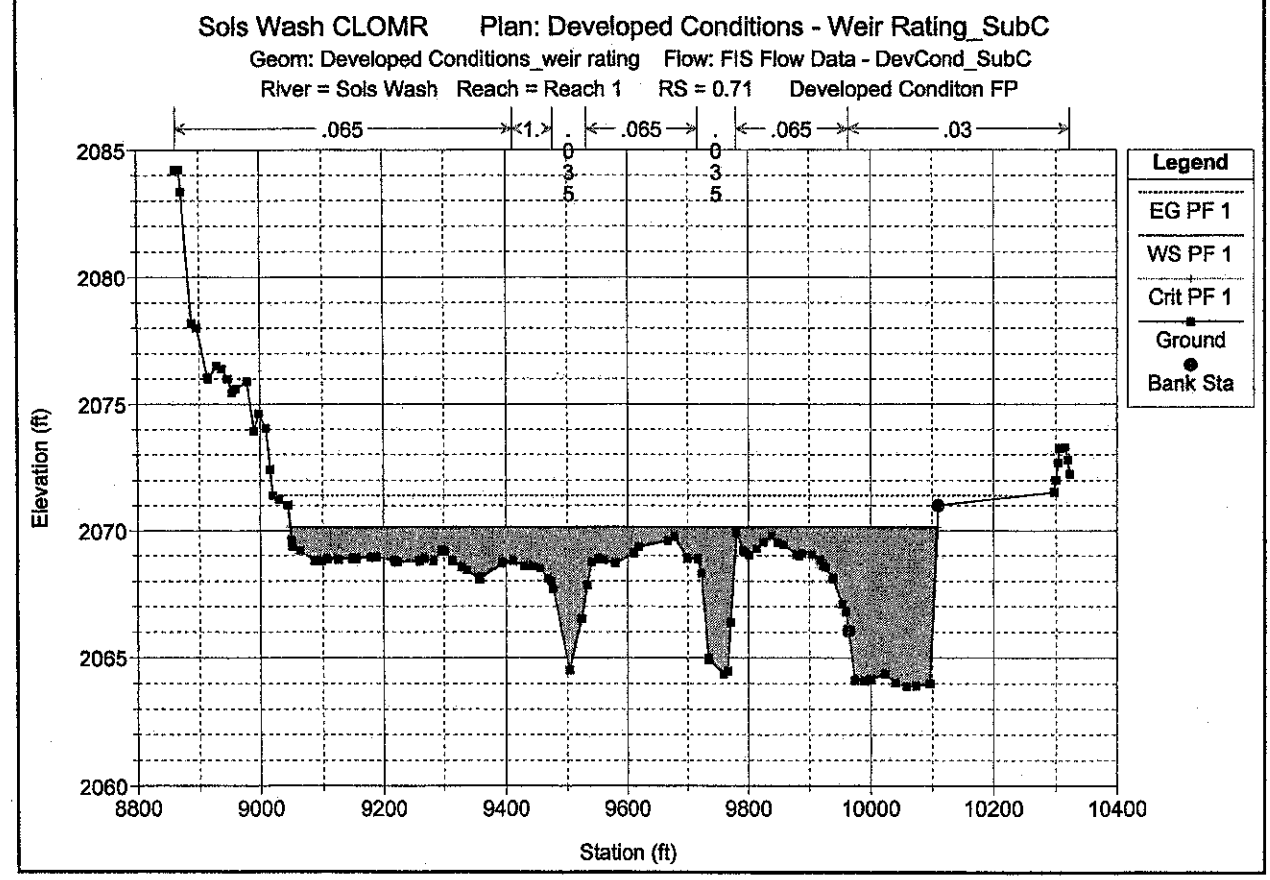

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 1.12 Cross Section 1.12 from CBA Study Developed Conditon FP
.06
.025
.06
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

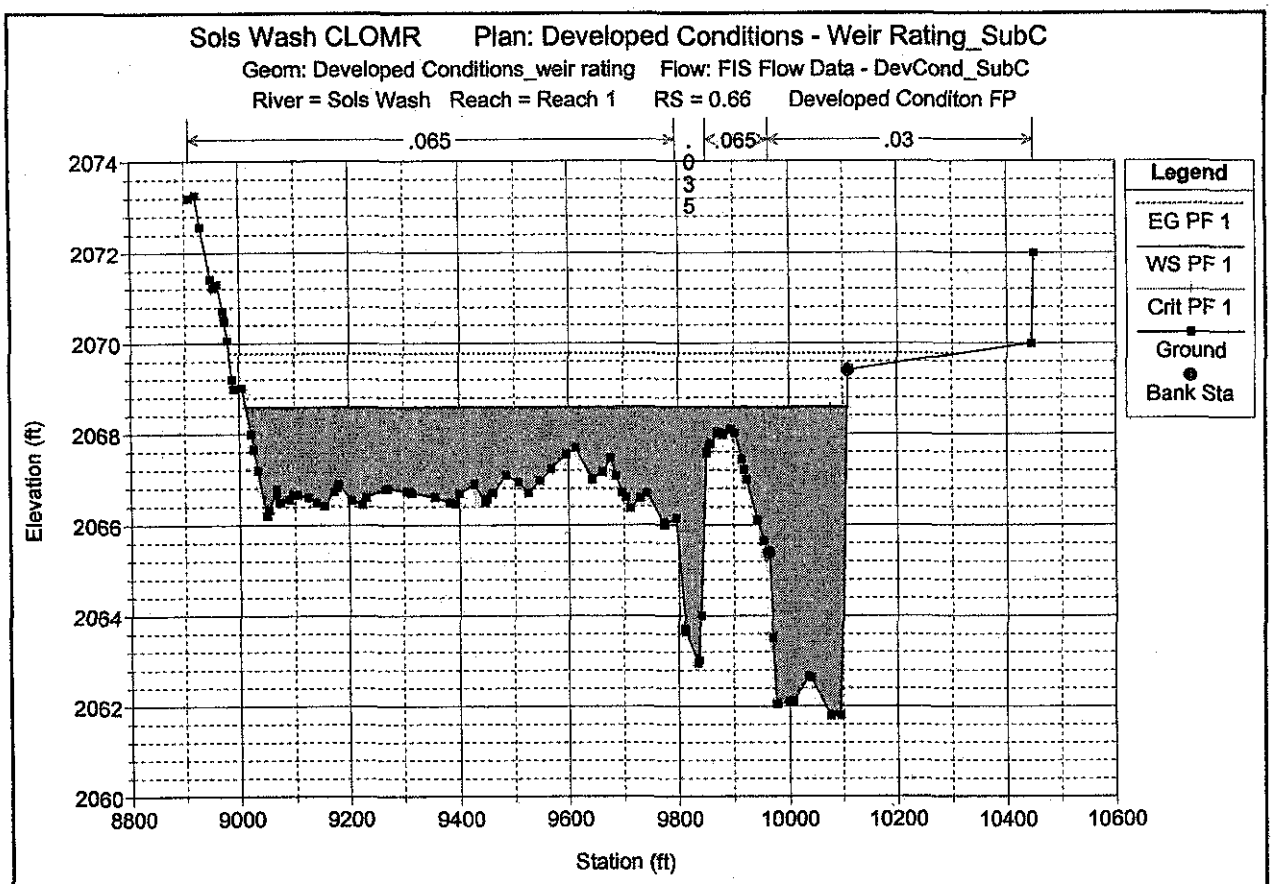

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 1.00 Cross Section 1.10 from CBA Study Developed Conditon FP
1.
.065
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

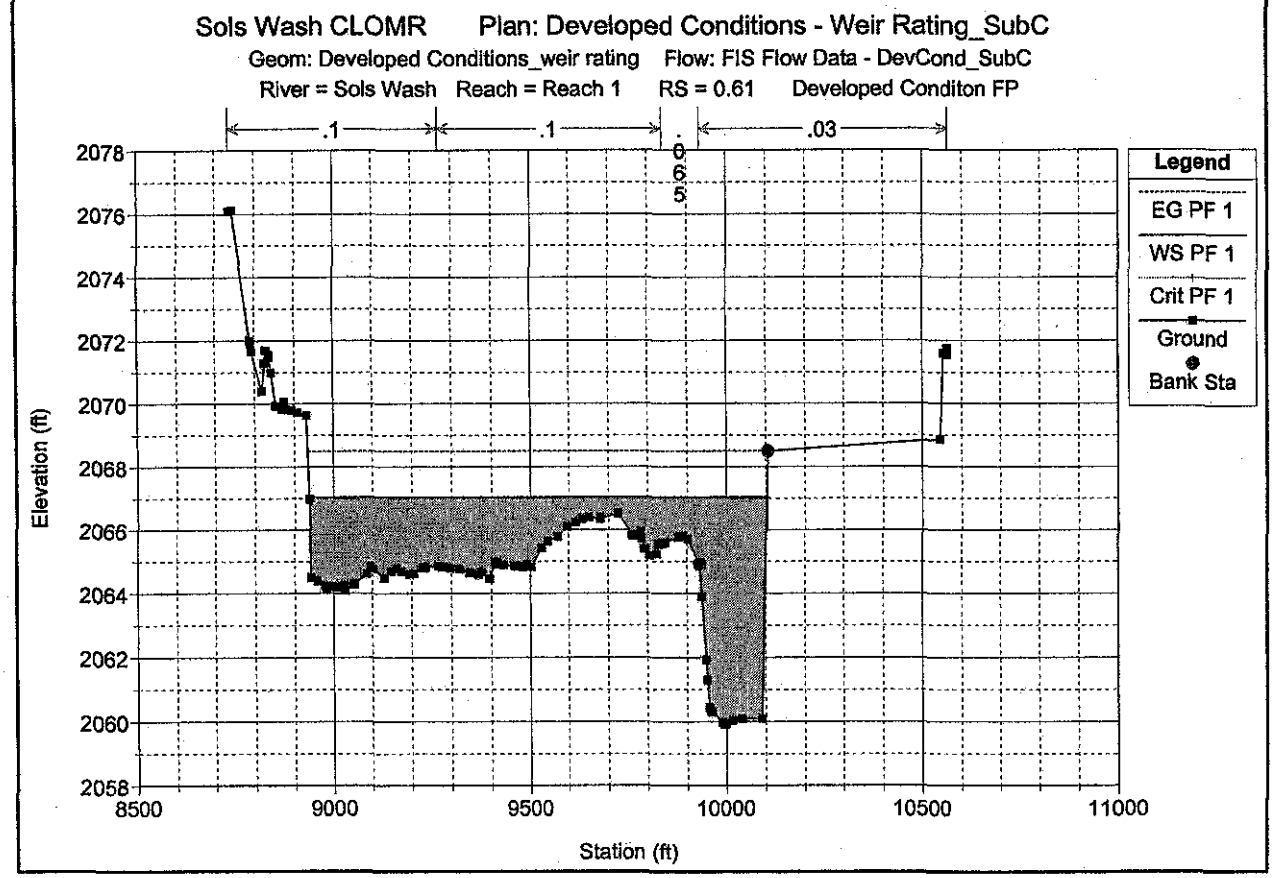

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.90 Cross Section 0.90 from CBA Study Developed Conditon FP
1.
.065
.065
.025
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

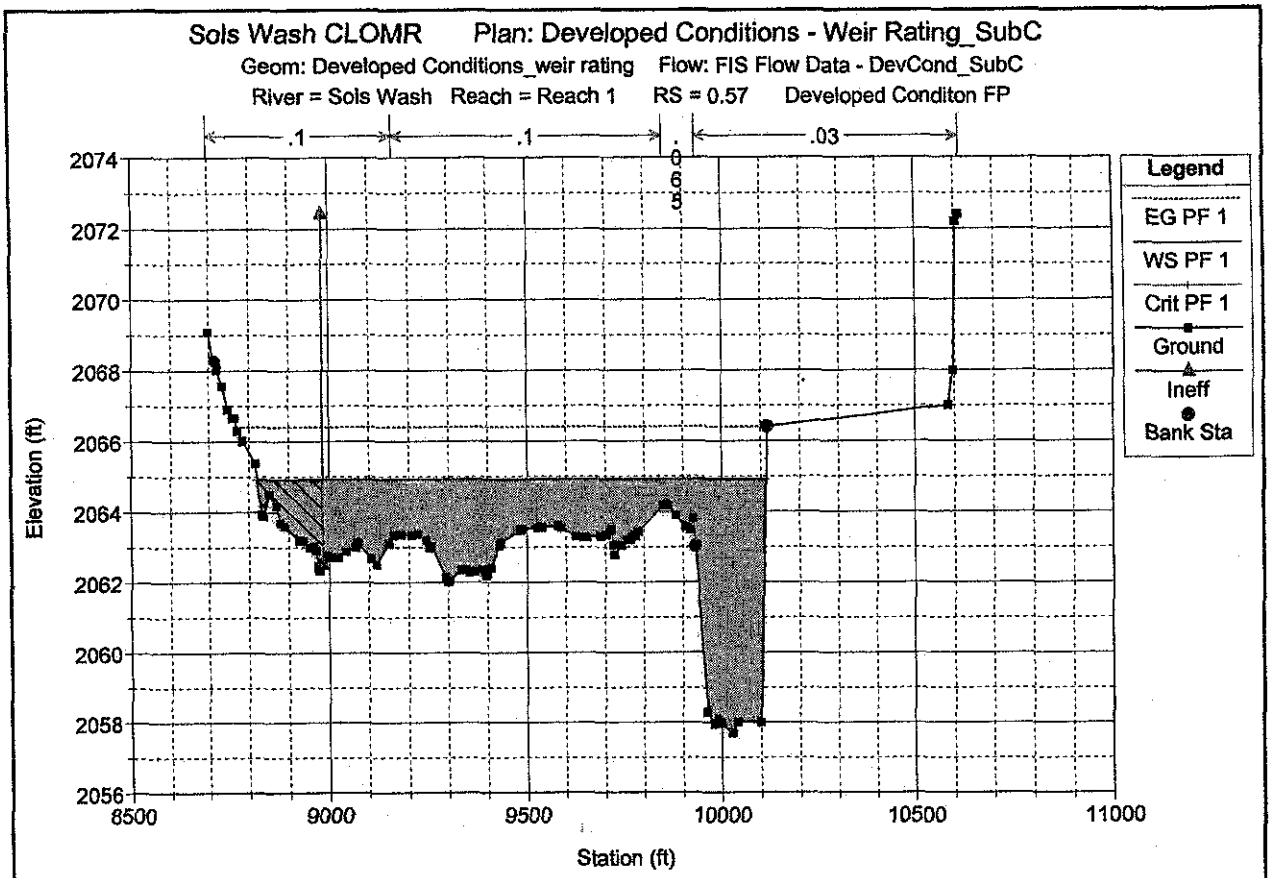

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.79 Begin new cross sections using 2002 mapping Developed Conditon FP
.065
.035
1.
.065
.035
.065
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

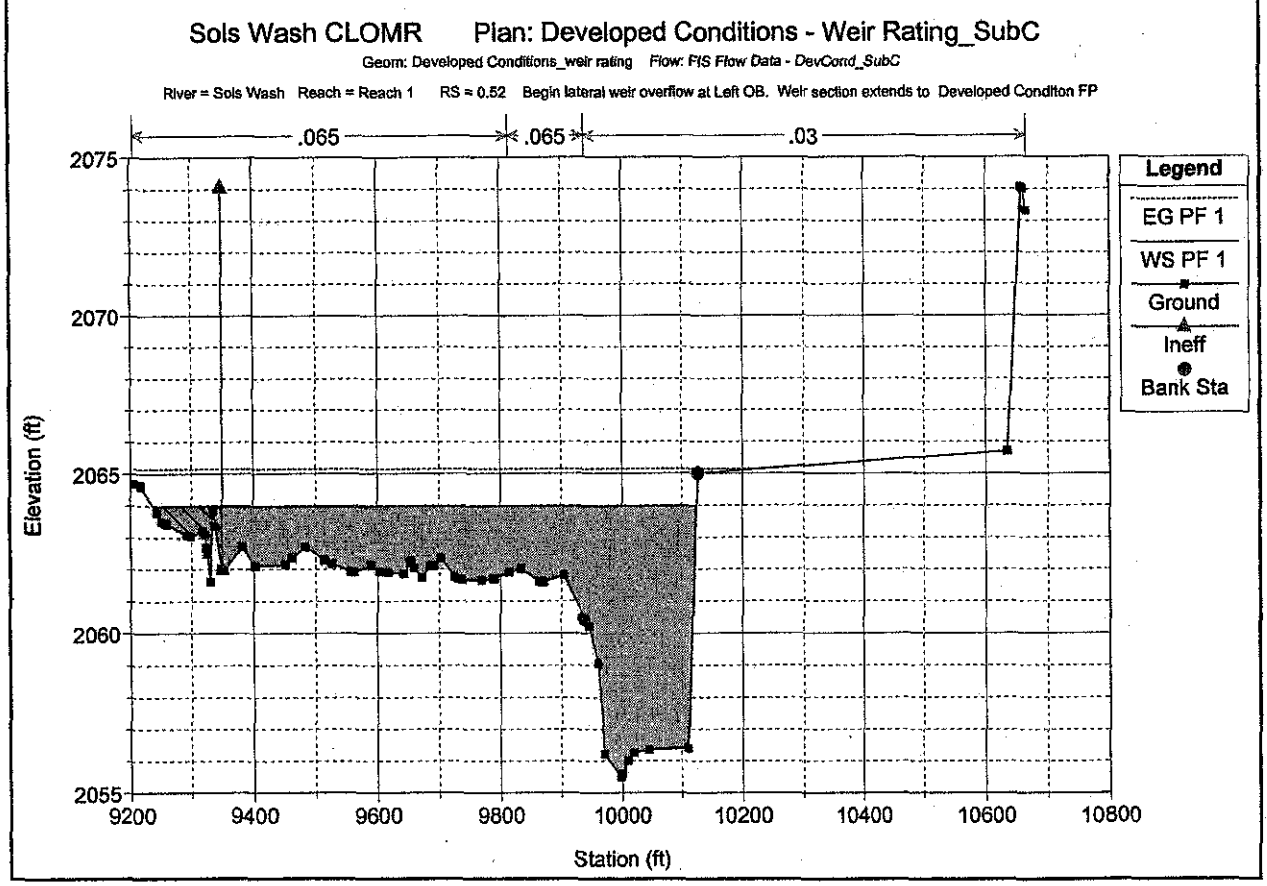

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.76 Developed Conditon FP
.065
.035
1.
.065
.035
.065
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2085
2080
2075
2070
2065
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

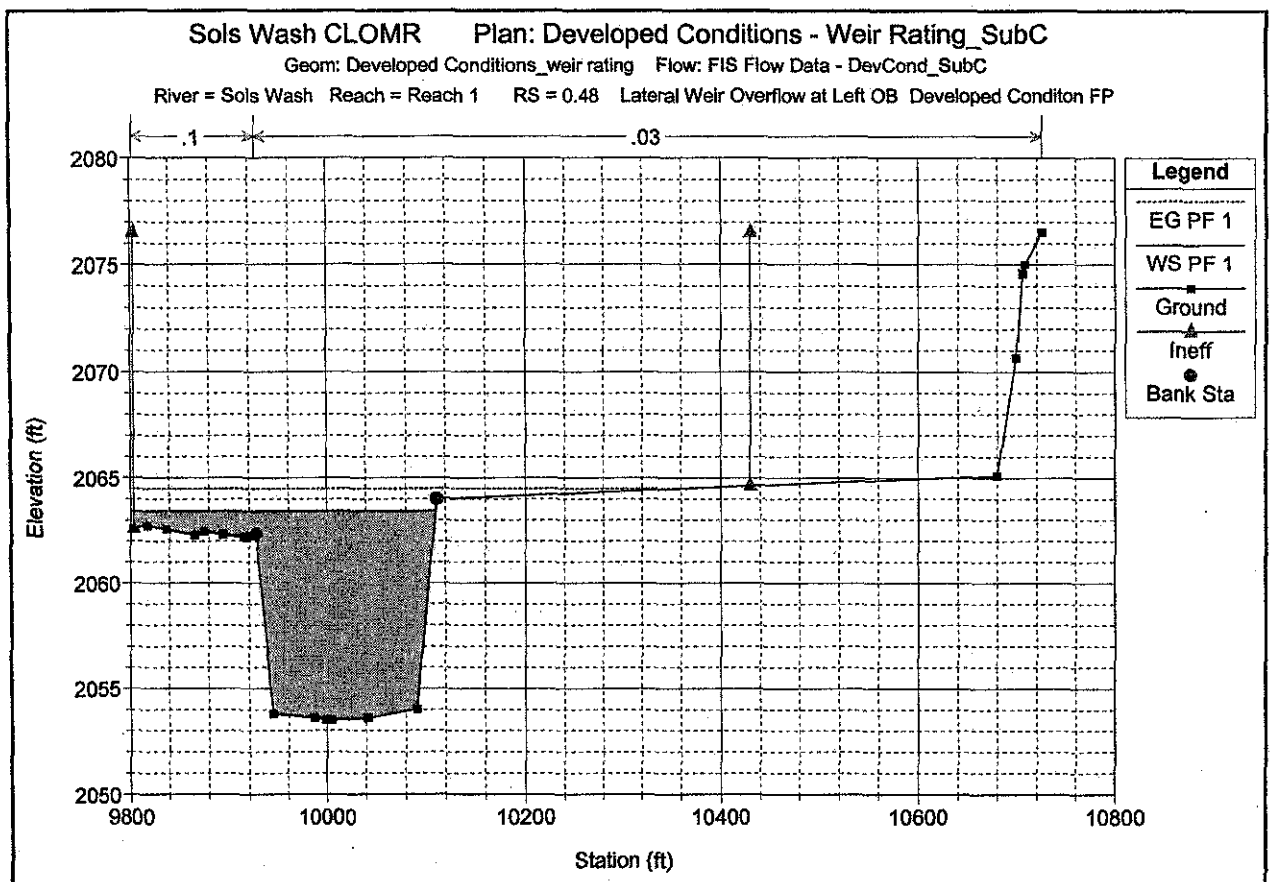

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.71 Developed Conditon FP
.065
1.
.035
.065
.035
.065
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2085
2080
2075
2070
2065
2060
8800
9000
9200
9400
9600
9800
10000
10200
10400
Station (ft)

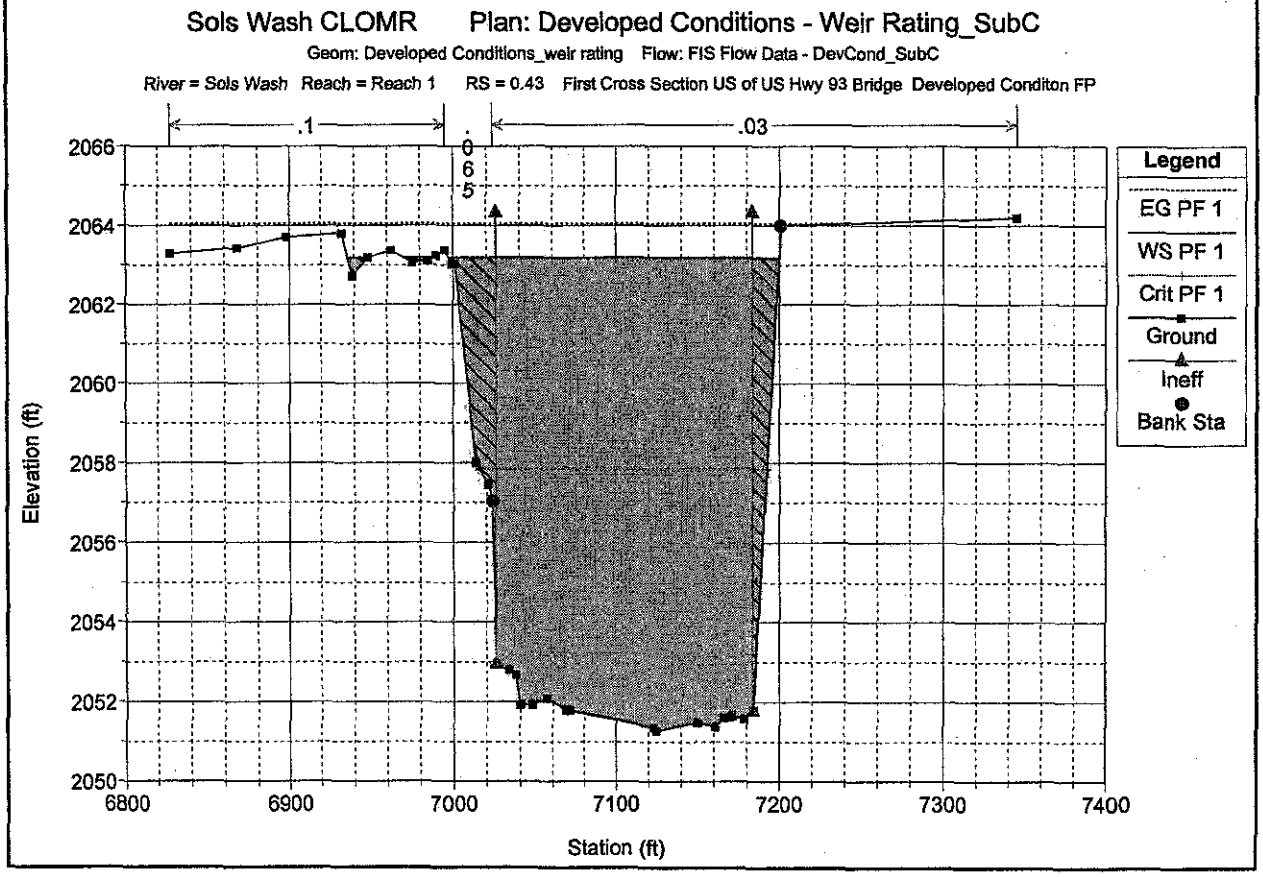

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.66 Developed Conditon FP
.065
.035
.065
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2074
2072
2070
2068
2066
2064
2062
2060
8800
9000
9200
9400
9600
9800
10000
10200
10400
10600

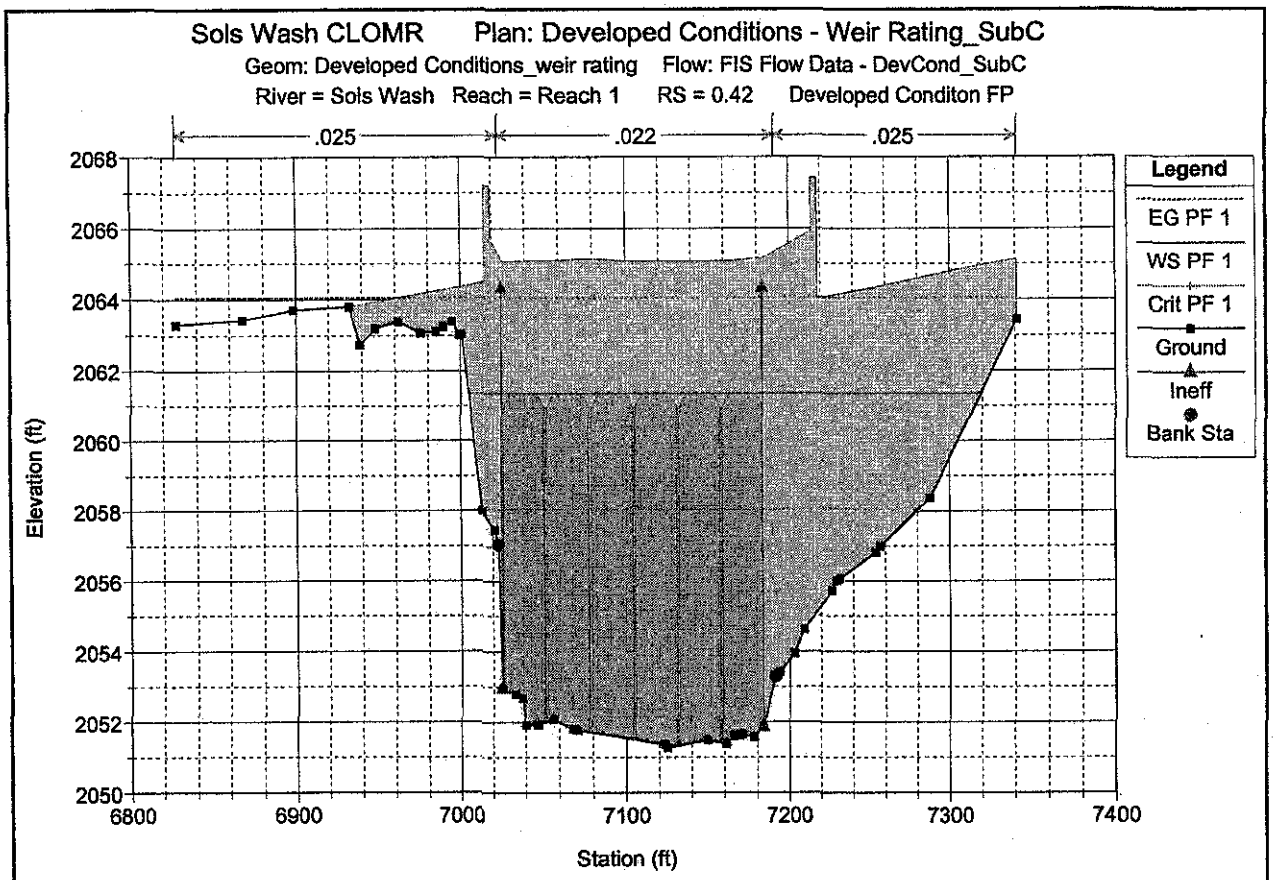

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.61 Developed Conditon FP
.1
.1
.065
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2078
2076
2074
2072
2070
2068
2066
2064
2062
2060
2058
8500
9000
9500
10000
10500
11000

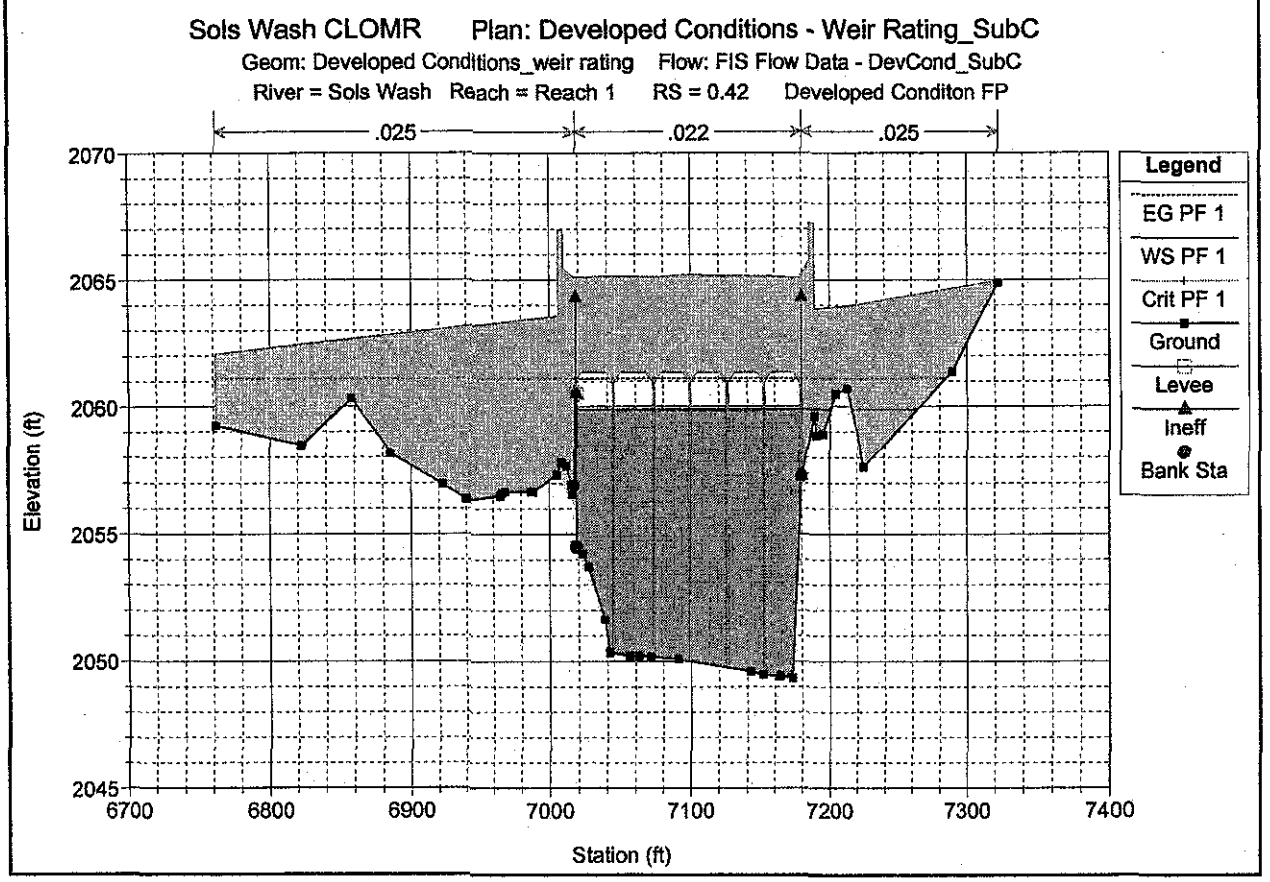

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.57 Developed Conditon FP
.1
.1
.065
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

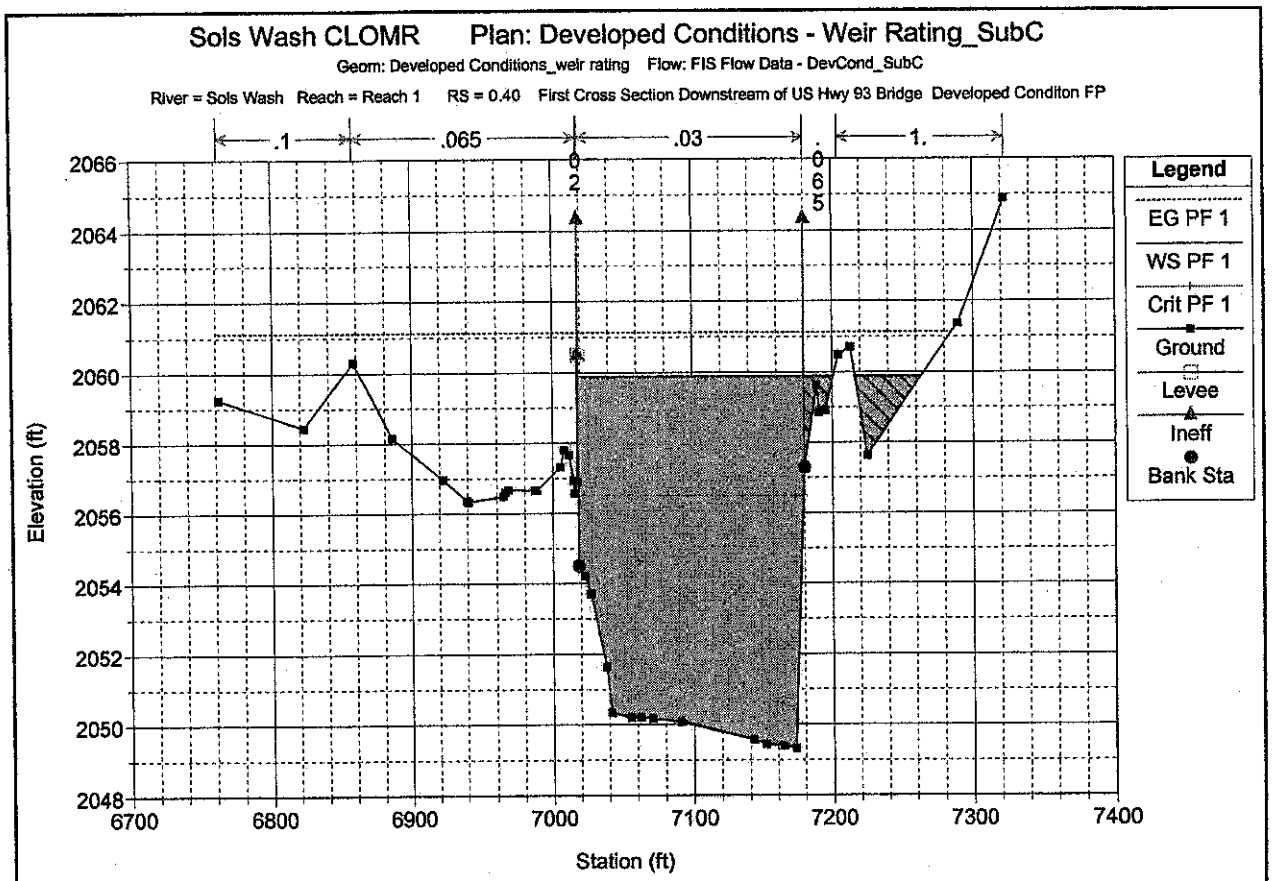

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.52 Begin lateral weir overflow at Left OB. Weir section extends to Developed Condition FP
.065
.065
.03
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

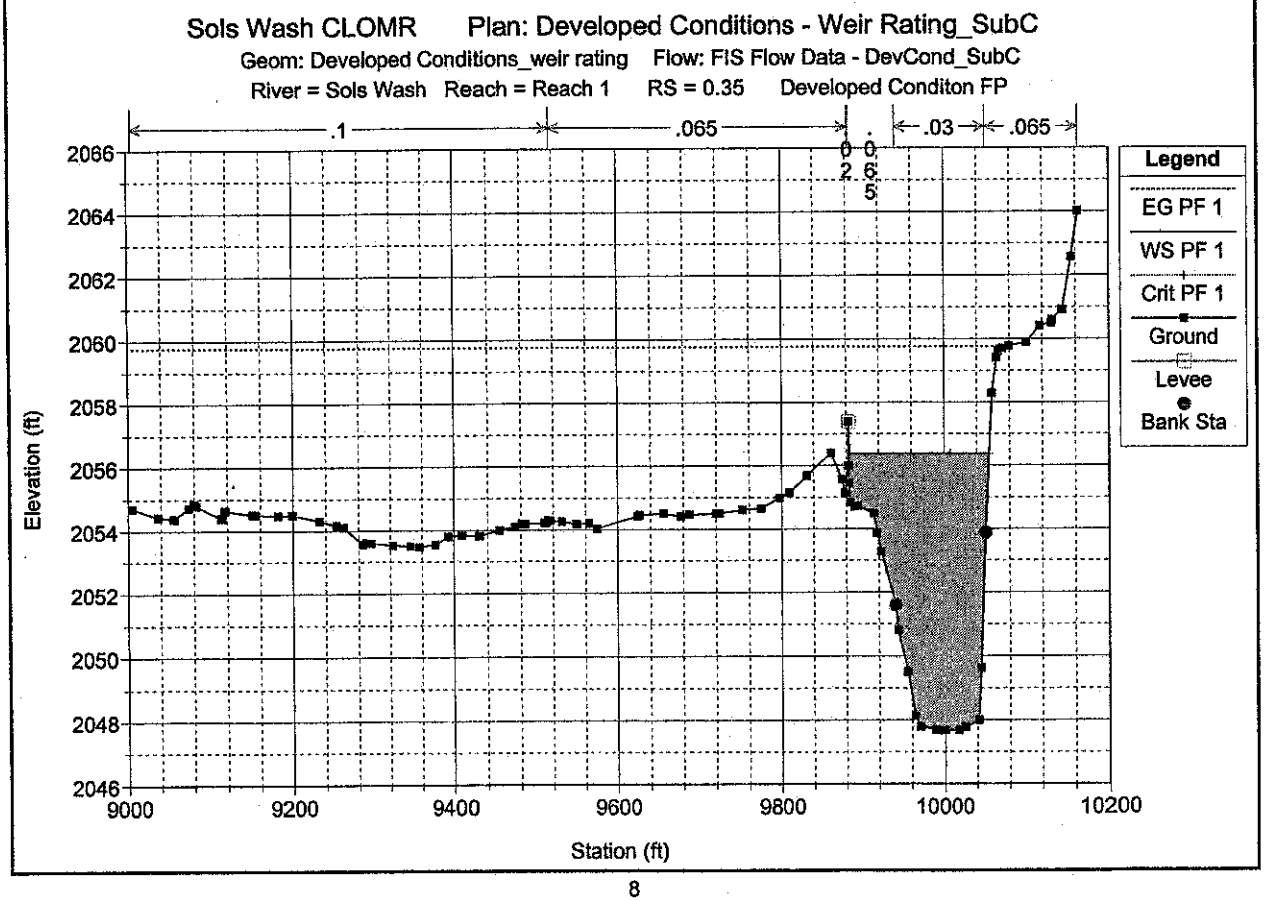

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.48 Lateral Weir Overflow at Left OB Developed Conditon FP
.1
.03
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
2080
2075
2070
2065
2060
2055
2050
9800
10000
10200
10400
10600
10800
Station (ft)

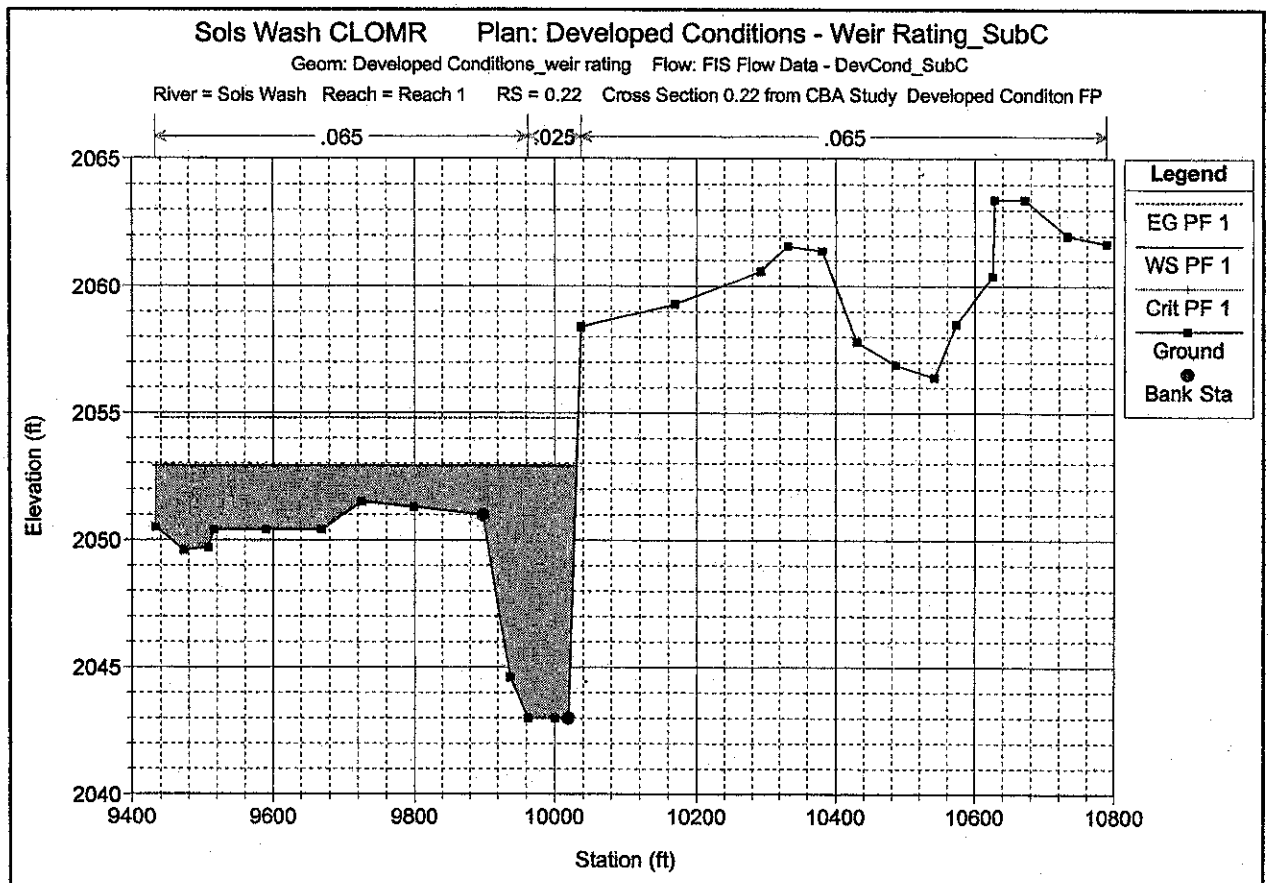

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.43 First Cross Section US of US Hwy 93 Bridge Developed Conditon FP
.1
.03
065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
2066
2064
2062
2060
2058
2056
2054
2052
2050
6800
6900
7000
7100
7200
7300
7400
Station (ft)


Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.42 Developed Conditon FP
.025
.022
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.42 Developed Conditon FP
.025
.022
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta

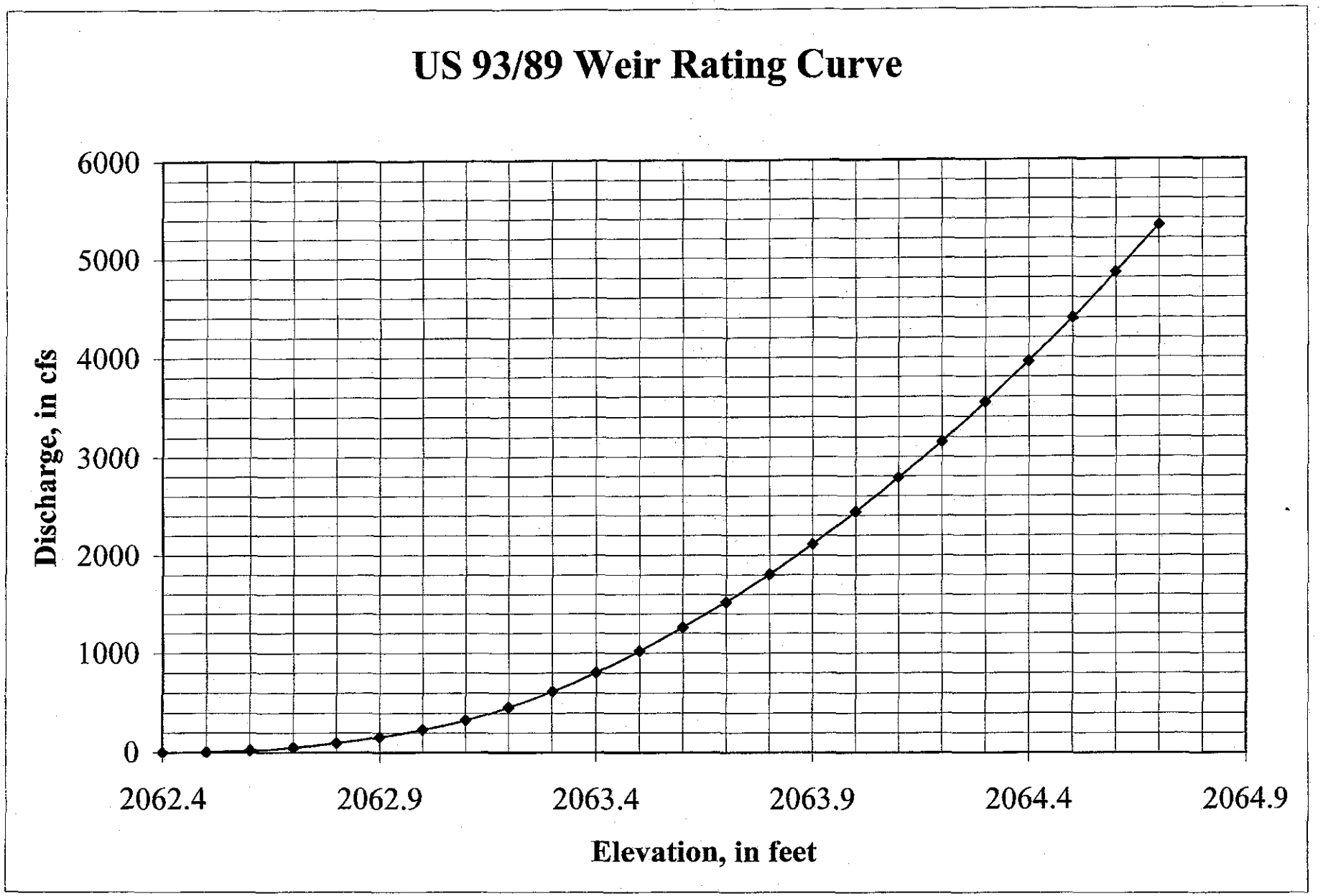

Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.40 First Cross Section Downstream of US Hwy 93 Bridge Developed Conditon FP
.1
.065
.03
.065
1.
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.35 Developed Conditon FP
.1
.065
.03
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


Sols Wash CLOMR Plan: Developed Conditions - Weir Rating_SubC
Geom: Developed Conditions_weir rating Flow: FIS Flow Data - DevCond_SubC
River = Sols Wash Reach = Reach 1 RS = 0.22 Cross Section 0.22 from CBA Study Developed Conditon FP
.065
.025
.065
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2065
2060
2055
2050
2045
2040
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

D.3 – Uneven Weir Analysis

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193


US 93/89 Weir Rating Curve
6000
5000
4000
3000
2000
1000
0
Discharge, in cfs
2062.4
2062.9
2063.4
2063.9
2064.4
2064.9
Elevation, in feet

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************


    PROJECT:  Goldmine Village CLOMR
    ENGINEER:  wso
    DATE:   7/ 2/2002
    TIME:  13:19.56



---------------------------------------------
    INPUT PARAMETERS
---------------------------------------------


    STARTING WSEL:        2062.40
    MAXIMUM WSEL:         2064.70
    STEP SIZE:               0.10
    BREADTH OF WEIR:        50.00


*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  Goldmine Village CLOMR
    DATE:   7/ 2/2002
    TIME:  13:19.56
*********************************************
```

POINT	ELEVATION	STATION	POINT	ELEVATION	STATION
1	2064.70	0.00	16	2063.40	180.13
2	2064.69	1.01	17	2063.38	184.57
3	2064.54	14.41	18	2063.38	188.24
4	2064.43	27.63	19	2063.13	216.38
5	2064.34	36.07	20	2063.15	219.41
6	2064.20	50.95	21	2063.10	245.87
7	2064.15	59.68	22	2063.11	251.16
8	2064.23	75.17	23	2063.04	277.33
9	2064.18	82.18	24	2063.04	300.26
10	2064.23	87.48	25	2063.04	302.52
11	2064.10	112.35	26	2063.00	304.75
12	2064.08	114.62	27	2063.05	333.63
13	2064.06	117.66	28	2063.05	336.21
14	2063.80	142.31	29	2063.06	362.60
15	2063.67	146.99	30	2063.01	368.74

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  Goldmine Village CLOMR
    DATE:   7/ 2/2002
    TIME:  13:19.56
*********************************************
```

POINT	ELEVATION	STATION	POINT	ELEVATION	STATION
31	2063.00	391.53	46	2062.50	532.07
32	2063.04	405.22	47	2062.30	541.21
33	2063.04	421.21	48	2062.62	545.83
34	2063.12	431.33	49	2062.65	552.48
35	2063.16	444.55	50	2062.67	558.42
36	2063.10	449.65	51	2062.60	574.08
37	2062.96	470.29	52	2062.53	577.20
38	2062.69	474.40	53	2062.43	601.93
39	2062.39	479.95	54	2062.41	606.21
40	2062.35	482.32	55	2062.39	623.91
41	2062.50	493.48	56	2062.40	630.09
42	2062.55	497.57	57	2062.53	654.70
43	2062.60	513.85	58	2062.68	670.23
44	2062.67	516.43	59	2062.67	685.56
45	2062.45	522.29	60	2062.57	706.68

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  Goldmine Village CLOMR
    DATE:   7/ 2/2002
    TIME:  13:19.56
*********************************************
```

POINT	ELEVATION	STATION
61	2062.60	724.60
62	2062.63	736.71
63	2062.67	748.06
64	2062.85	764.23
65	2062.85	773.85
66	2062.86	799.49
67	2063.00	814.79
68	2063.24	841.50
69	2063.22	848.31
70	2063.19	865.75
71	2062.92	886.18
72	2063.10	891.85
73	2063.37	920.76
74	2063.28	926.44
75	2063.34	946.16
76	2063.36	946.78
77	2063.70	962.38
78	2063.73	965.32
79	2063.73	965.79
80	2063.81	983.97
81	2063.81	988.44

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  Goldmine Village CLOMR
    DATE:   7/ 2/2002
    TIME:  13:19.56
*********************************************
```

REFERENCE: COE CHART - LOWER CURVE

POINT	HEAD	COEFFICIENT
1	0.00	2.5000
2	0.10	2.5067
3	0.20	2.5133
4	0.30	2.5200
5	0.40	2.5267
6	0.50	2.5333
7	0.60	2.5400
8	0.70	2.5467
9	0.80	2.5533
10	0.90	2.5600
11	1.00	2.5667
12	1.10	2.5733
13	1.20	2.5800
14	1.30	2.5867
15	1.40	2.5933
16	1.50	2.6000
17	1.60	2.6067
18	1.70	2.6133
19	1.80	2.6200
20	1.90	2.6267
21	2.00	2.6333
22	2.10	2.6400
23	2.20	2.6467
24	2.30	2.6533

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  Goldmine Village CLOMR
    DATE:   7/ 2/2002
    TIME:  13:19.56
*********************************************
```

ELEVATION	DISCHARGE (CFS)
2062.40	0.28
2062.50	5.31
2062.60	20.06
2062.70	49.80
2062.80	96.34
2062.90	156.36
2063.00	231.04
2063.10	327.35
2063.20	456.63
2063.30	616.81
2063.40	805.35
2063.50	1020.27
2063.60	1259.18
2063.70	1520.85
2063.80	1804.48
2063.90	2110.35
2064.00	2437.37
2064.10	2784.71
2064.20	3152.55
2064.30	3544.06
2064.40	3958.16
2064.50	4393.59
2064.60	4849.93
2064.70	5326.74

D.4 – Duplicate Effective Model

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```
                    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: Duplicate Effective Floodway Model
Project File : sol206w.prj
Run Date and Time: 7/12/2002 12:27:07 PM

Project in English units

Project Description:
SOLS WASH FLOODPLAIN DELINEATION, MARICOPA COUNTY, ARIZONA
 BY CELLA BARR
ASSOCIATES FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
      100 YEAR
DISCHARGE - R1       FLOODWAY ANALYSIS



PLAN DATA

Plan Title: Duplicate Effective Floodway Plan
Plan File : x:\projects\Consult\P_JInvst\hec-ras\sol206w.p01

           Geometry Title: Duplicate Effective Floodway Geometry
           Geometry File : x:\projects\Consult\P_JInvst\hec-ras\sol206w.g02

           Flow Title    : Duplicate Effective Floodway Flow Data
           Flow File     : x:\projects\Consult\P_JInvst\hec-ras\sol206w.f01

Plan Summary Information:
Number of:  Cross Sections =   14    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

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

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow

Encroachment Data
   Equal Conveyance = True
   Left Offset      =        0
   Right Offset     =        0

River = Sols Wash        Reach = Reach 1
RS      Profile           Method  Value1  Value2
0.40    PF 2                   1 9802.64 9945.45
0.36    PF 2                   1    9870   10102
0.22    PF 2                   1    9780   10170
0.13    PF 2                   1    9500   10045
0.03    PF 2                   1    8730   10682

River = Sols Wash        Reach = Reach 2
RS      Profile           Method  Value1  Value2
1.12    PF 2                   1    9315   10195
1       PF 2                   1    9214   10075
0.9     PF 2                   1    9380   10061
0.79    PF 2                   1    9520   10060
0.69    PF 2                   1    9640   10279
0.6     PF 2                   1    9830   10545
0.5     PF 2                   1    9870   10665
0.47    PF 2                   1    9870   10470
0.42    PF 2                   1 9784.33 9946.94
```

OW DATA

Title: Duplicate Effective Floodway Flow Data
ow File : x:\projects\Consult\P_JInvst\hec-ras\sol206w.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
Sols Wash	Reach 2	1.12	14413	14413
Sols Wash	Reach 2	0.69	14413	14413
Sols Wash	Reach 2	0.6	14459	14459
Sols Wash	Reach 2	0.42	15045	15045
Sols Wash	Reach 1	0.40	15045	15045

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Sols Wash	Reach 2	PF 1		Known WS = 2059.37
Sols Wash	Reach 2	PF 2		Known WS = 2059.37
Sols Wash	Reach 1	PF 1		Known WS = 2040.14
Sols Wash	Reach 1	PF 2		Known WS = 2040.7

GEOMETRY DATA

Geometry Title: Duplicate Effective Floodway Geometry
Geometry File : x:\projects\Consult\P_JInvst\hec-ras\sol206w.g02

CROSS SECTION RIVER: Sols Wash
REACH: Reach 2 RS: 1.12

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9227	2092.5	9301	2092.6	9331	2083.3	9392	2082.2	9437	2087.5
9549	2088	9693	2087.7	9798	2087.2	9872	2086.6	9897	2086.4
9926	2087.3	9949	2083.4	9970	2082.3	10000	2082.5	10035	2083.4
10062	2084.9	10084	2086.4	10118	2086.1	10129	2086.6	10157	2086.6
10164	2086.2	10180	2085.1	10185	2085.1	10205	2091.9		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9227	.06	9331	.025	9392	.06	9949	.025	10062	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9949	10062	615	620	630	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2089.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.43	Wt. n-Val.	0.035	0.025	0.060
W.S. Elev (ft)	2088.39	Reach Len. (ft)	615.00	620.00	630.00
Crit W.S. (ft)	2088.39	Flow Area (sq ft)	1064.99	600.86	295.66
E.G. Slope (ft/ft)	0.004597	Area (sq ft)	1064.99	600.86	295.66
Q Total (cfs)	14413.00	Flow (cfs)	6177.47	7372.67	862.87
Top Width (ft)	880.09	Top Width (ft)	634.42	113.00	132.67
Vel Total (ft/s)	7.35	Avg. Vel. (ft/s)	5.80	12.27	2.92
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)	1.68	5.32	2.23
Conv. Total (cfs)	212588.2	Conv. (cfs)	91116.1	108745.0	12727.1
Length Wtd. (ft)	617.95	Wetted Per. (ft)	635.86	113.08	133.33
Min Ch El (ft)	2082.30	Shear (lb/sq ft)	0.48	1.52	0.64
Alpha	1.70	Stream Power (lb/ft s)	2.79	18.71	1.86
Frctn Loss (ft)	2.84	Cum Volume (acre-ft)	118.36	55.11	40.83
C & E Loss (ft)	0.05	Cum SA (acres)	74.96	9.13	18.25

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 OUTPUT Profile #PF 2

E.G. Elev (ft)	2089.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.	0.035	0.025	0.060
W.S. Elev (ft)	2088.39	Reach Len. (ft)	615.00	620.00	630.00
Crit W.S. (ft)	2088.39	Flow Area (sq ft)	1067.13	601.24	296.11
E.G. Slope (ft/ft)	0.004583	Area (sq ft)	1067.13	601.24	296.11
Q Total (cfs)	14413.00	Flow (cfs)	6179.96	7369.37	863.68
Top Width (ft)	879.68	Top Width (ft)	634.00	113.00	132.68
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)	5.79	12.26	2.92
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)	1.68	5.32	2.23
Conv. Total (cfs)	212911.4	Conv. (cfs)	91291.4	108861.6	12758.4
Length Wtd. (ft)	618.02	Wetted Per. (ft)	635.55	113.08	133.34
Min Ch El (ft)	2082.30	Shear (lb/sq ft)	0.48	1.52	0.64
Alpha	1.70	Stream Power (lb/ft s)	2.78	18.64	1.85
Frctn Loss (ft)	2.99	Cum Volume (acre-ft)	60.78	56.69	39.45

& E Loss (ft)	0.02	Cum SA (acres)	32.22	9.13	16.84

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 2 RS: 1

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8262	2097.2	8292	2089.4	8319	2086.6	8354	2084	8410	2083
8469	2082.8	8481	2083.3	8516	2082.6	8539	2081.7	8544	2082.3
8574	2081.7	8603	2082.5	8648	2082.7	8671	2082.1	8710	2082.8
8757	2083.1	8837	2083.5	8898	2083.9	8967	2084.1	9018	2083.6
9059	2083.4	9113	2082.8	9135	2082.2	9154	2082.2	9174	2082.9
9214	2082.5	9234	2083.2	9257	2077.8	9274	2076.6	9302	2076.6
9314	2078.6	9340	2079	9371	2082.7	9387	2083	9429	2083.4
9586	2083.1	9682	2083.1	9776	2083.4	9814	2082.7	9831	2083.6
9884	2083.2	9916	2081.6	9944	2078.9	9957	2078.3	10000	2078.1
10033	2078.1	10050	2082.1	10059	2082.6	10075	2087.1		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8262	1	8603	.065	9274	.025	9310	.065	9944	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9944	10050	570	560	565	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.25	Wt. n-Val.	0.049	0.025	0.065
W.S. Elev (ft)	2083.87	Reach Len. (ft)	570.00	560.00	565.00
Crit W.S. (ft)	2083.87	Flow Area (sq ft)	1930.17	567.24	16.60
E.G. Slope (ft/ft)	0.004603	Area (sq ft)	1930.17	567.24	16.60
Q Total (cfs)	14413.00	Flow (cfs)	7404.83	6976.80	31.37
Top Width (ft)	1606.47	Top Width (ft)	1486.94	106.00	13.53
el Total (ft/s)	5.73	Avg. Vel. (ft/s)	3.84	12.30	1.89
Max Chl Dpth (ft)	7.27	Hydr. Depth (ft)	1.30	5.35	1.23
Conv. Total (cfs)	212449.0	Conv. (cfs)	109147.9	102838.8	462.4
Length Wtd. (ft)	565.75	Wetted Per. (ft)	1488.36	106.48	13.72
Min Ch El (ft)	2078.10	Shear (lb/sq ft)	0.37	1.53	0.35
Alpha	2.46	Stream Power (lb/ft s)	1.43	18.83	0.66
Frctn Loss (ft)	3.23	Cum Volume (acre-ft)	97.22	46.80	38.57
C & E Loss (ft)	0.06	Cum SA (acres)	59.99	7.57	17.19

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.042	0.025	0.065
W.S. Elev (ft)	2083.88	Reach Len. (ft)	570.00	560.00	565.00
Crit W.S. (ft)	2083.88	Flow Area (sq ft)	1210.78	567.47	16.63
E.G. Slope (ft/ft)	0.005123	Area (sq ft)	1210.78	567.47	16.63
Q Total (cfs)	14413.00	Flow (cfs)	7014.42	7365.40	33.18
Top Width (ft)	849.54	Top Width (ft)	730.00	106.00	13.54
Vel Total (ft/s)	8.03	Avg. Vel. (ft/s)	5.79	12.98	2.00
Max Chl Dpth (ft)	7.28	Hydr. Depth (ft)	1.66	5.35	1.23
Conv. Total (cfs)	201378.1	Conv. (cfs)	98005.3	102909.2	463.6
Length Wtd. (ft)	565.37	Wetted Per. (ft)	732.65	106.48	13.73
Min Ch El (ft)	2078.10	Shear (lb/sq ft)	0.53	1.70	0.39
Alpha	1.59	Stream Power (lb/ft s)	3.06	22.12	0.77
Frctn Loss (ft)	3.26	Cum Volume (acre-ft)	44.70	48.37	37.19
C & E Loss (ft)	0.10	Cum SA (acres)	22.59	7.58	15.78

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

CROSS SECTION RIVER: Sols Wash

EACH: Reach 2 RS: 0.9

UT
.cription:

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8508	2090.8	8563	2083.3	8590	2084.6	8614	2084.2	8638	2083.6
8672	2079.1	8719	2079.1	8769	2077.5	8800	2075.4	8815	2072.8
8824	2072.8	8849	2077	8898	2077.2	8966	2077.4	9029	2077.5
9093	2077.8	9156	2078.3	9229	2078.6	9290	2078.7	9365	2078.4
9435	2078.3	9457	2075.2	9474	2074.3	9500	2071.1	9520	2071.1
9540	2075.7	9562	2077.8	9595	2078.6	9615	2077.9	9640	2078.4
9668	2077.7	9688	2078.5	9793	2078	9808	2077.2	9828	2074.5
9843	2077	9917	2078.6	9958	2077.7	9976	2073.5	10000	2073.1
10050	2073.1	10060	2078	10080	2083				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8508	1	8769	.065	9475	.025	9520	.065	9958	.025
10045	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9958	10060	540	565	575	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2079.63	Element			
Vel Head (ft)	1.04	Wt. n-Val.	0.042	0.033	0.065
W.S. Elev (ft)	2078.58	Reach Len. (ft)	540.00	565.00	575.00
Crit W.S. (ft)	2078.55	Flow Area (sq ft)	1477.56	484.74	0.67
E.G. Slope (ft/ft)	0.007280	Area (sq ft)	1477.56	484.74	0.67
Q Total (cfs)	14413.00	Flow (cfs)	9158.51	5253.92	0.57
Top Width (ft)	1228.51	Top Width (ft)	1124.18	102.00	2.32
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)	6.20	10.84	0.84
Max Chl Dpth (ft)	7.48	Hydr. Depth (ft)	1.31	4.75	0.29
Conv. Total (cfs)	168926.0	Conv. (cfs)	107341.3	61578.0	6.6
Length Wtd. (ft)	550.64	Wetted Per. (ft)	1126.40	103.62	2.39
Min Ch El (ft)	2073.10	Shear (lb/sq ft)	0.60	2.13	0.13
Alpha	1.25	Stream Power (lb/ft s)	3.70	23.04	0.11
Frctn Loss (ft)	3.17	Cum Volume (acre-ft)	74.92	40.03	38.46
C & E Loss (ft)	0.04	Cum SA (acres)	42.91	6.24	17.09

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.
ote: Manning's n values were composited to a single value in the main channel.

SS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2080.39	Element			
Vel Head (ft)	1.27	Wt. n-Val.	0.038	0.033	0.065
W.S. Elev (ft)	2079.12	Reach Len. (ft)	540.00	565.00	575.00
Crit W.S. (ft)	2078.98	Flow Area (sq ft)	1153.78	539.85	1.00
E.G. Slope (ft/ft)	0.006546	Area (sq ft)	1153.78	539.85	1.00
Q Total (cfs)	14413.00	Flow (cfs)	8450.26	5961.54	1.20
Top Width (ft)	681.00	Top Width (ft)	578.00	102.00	1.00
Vel Total (ft/s)	8.51	Avg. Vel. (ft/s)	7.32	11.04	1.20
Max Chl Dpth (ft)	8.02	Hydr. Depth (ft)	2.00	5.29	1.00
Conv. Total (cfs)	178139.7	Conv. (cfs)	104442.3	73682.6	14.8
Length Wtd. (ft)	552.01	Wetted Per. (ft)	580.29	103.62	1.90
Min Ch El (ft)	2073.10	Shear (lb/sq ft)	0.81	2.13	0.21
Alpha	1.13	Stream Power (lb/ft s)	5.95	23.51	0.26
Frctn Loss (ft)	3.15	Cum Volume (acre-ft)	29.23	41.26	37.07
C & E Loss (ft)	0.07	Cum SA (acres)	14.03	6.24	15.69

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: 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: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Sola Wash
REACH: Reach 2 RS: 0.79

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8960	2080.6	8976	2078.3	9002	2077.7	9041	2074.7	9080	2068.4
9088	2068.5	9126	2073.4	9135	2073.2	9149	2073.2	9214	2074.3
9245	2074	9274	2074.5	9343	2074.1	9404	2074.4	9472	2074.6
9518	2074.3	9557	2068.2	9585	2067.7	9598	2074.4	9644	2073.6
9666	2068.6	9685	2073.7	9699	2073.9	9712	2072.6	9741	2074.2
9794	2074.6	9883	2075.2	9911	2073.9	9940	2070.3	9959	2068.9
10000	2068.9	10040	2068.9	10059	2077.1	10067	2078	10075	2078.2

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8960	.065	9550	.025	9590	.065	9959	.025

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

9959	10040	485	500	495	.1	.3

SS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2076.41	Element			
Vel Head (ft)	1.49	Wt. n-Val.	0.045	0.025	0.025
W.S. Elev (ft)	2074.92	Reach Len. (ft)	485.00	500.00	495.00
Crit W.S. (ft)	2074.92	Flow Area (sq ft)	1521.28	487.42	41.95
E.G. Slope (ft/ft)	0.004658	Area (sq ft)	1521.28	487.42	41.95
Q Total (cfs)	14413.00	Flow (cfs)	7536.46	6541.48	335.05
Top Width (ft)	967.78	Top Width (ft)	872.83	81.00	13.94
Vel Total (ft/s)	7.03	Avg. Vel. (ft/s)	4.95	13.42	7.99
Max Chl Dpth (ft)	7.22	Hydr. Depth (ft)	1.74	6.02	3.01
Conv. Total (cfs)	211180.9	Conv. (cfs)	110425.1	95846.5	4909.2
Length Wtd. (ft)	492.80	Wetted Per. (ft)	877.44	81.00	15.19
Min Ch El (ft)	2068.90	Shear (lb/sq ft)	0.50	1.75	0.80
Alpha	1.94	Stream Power (lb/ft s)	2.50	23.48	6.42
Frctn Loss (ft)	2.31	Cum Volume (acre-ft)	56.33	33.73	38.17
C & E Loss (ft)	0.00	Cum SA (acres)	30.53	5.05	16.98

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2077.18	Element			
Vel Head (ft)	1.97	Wt. n-Val.	0.039	0.025	0.025
W.S. Elev (ft)	2075.20	Reach Len. (ft)	485.00	500.00	495.00
Crit W.S. (ft)	2075.20	Flow Area (sq ft)	1013.68	510.62	46.04
E.G. Slope (ft/ft)	0.005013	Area (sq ft)	1013.68	510.62	46.04
Q Total (cfs)	14413.00	Flow (cfs)	6686.40	7333.14	393.46
Top Width (ft)	534.61	Top Width (ft)	439.00	81.00	14.61
Vel Total (ft/s)	9.18	Avg. Vel. (ft/s)	6.60	14.36	8.55
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)	2.31	6.30	3.15
Conv. Total (cfs)	203560.4	Conv. (cfs)	94434.6	103568.7	5557.0
Length Wtd. (ft)	493.60	Wetted Per. (ft)	443.95	81.00	15.91
Min Ch El (ft)	2068.90	Shear (lb/sq ft)	0.71	1.97	0.91
Alpha	1.51	Stream Power (lb/ft s)	4.71	28.33	7.74
Frctn Loss (ft)	2.31	Cum Volume (acre-ft)	15.80	34.44	36.76
C & E Loss (ft)	0.06	Cum SA (acres)	7.73	5.05	15.58

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: Sols Wash
REACH: Reach 2 RS: 0.69

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8940	2074.7	8966	2072.3	9004	2069.3	9025	2069.3	9034	2068.7
9080	2069	9145	2069.4	9209	2069.7	9269	2069.8	9332	2069.6
9369	2069.4	9423	2069.9	9472	2069.9	9494	2064.8	9509	2064.9
9543	2070.2	9609	2070.3	9663	2070.5	9702	2070.5	9720	2065.2
9745	2064.6	9758	2064.7	9775	2070.5	9808	2071	9868	2070.2
9918	2069.8	9950	2067.6	9973	2064.5	10000	2064.2	10034	2064.2
10050	2065.8	10063	2064.4	10071	2065.1	10088	2067.3	10100	2067.6
10118	2065.4	10124	2066.9	10135	2065.3	10152	2070.3	10184	2070.2
10222	2068.6	10241	2068.6	10264	2068.2	10288	2072.1	10297	2072.8
10300	2072.8								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8940	1	9332	.065	9720	.025	9760	.065	9973	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9973	10050	495	510	490	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2072.21	Element			
Vel Head (ft)	1.52	Wt. n-Val.	0.051	0.025	0.065
W.S. Elev (ft)	2070.70	Reach Len. (ft)	495.00	510.00	490.00
Crit W.S. (ft)	2070.70	Flow Area (sq ft)	1435.05	483.24	613.28
E.G. Slope (ft/ft)	0.004735	Area (sq ft)	1435.05	483.24	613.28
Q Total (cfs)	14413.00	Flow (cfs)	5449.31	6719.69	2244.00
Top Width (ft)	1249.95	Top Width (ft)	943.60	77.00	229.35
el Total (ft/s)	5.69	Avg. Vel. (ft/s)	3.80	13.91	3.66
ax Chl Dpth (ft)	6.49	Hydr. Depth (ft)	1.52	6.28	2.67
Conv. Total (cfs)	209455.0	Conv. (cfs)	79191.3	97653.0	32610.7

Length Wtd. (ft)	503.60	Wetted Per. (ft)	946.70	77.08	230.99
Min Ch El (ft)	2064.20	Shear (lb/sq ft)	0.45	1.85	0.78
Alpha	3.01	Stream Power (lb/ft s)	1.70	25.77	2.87
Frctn Loss (ft)	1.78	Cum Volume (acre-ft)	39.88	28.16	34.45
C & E Loss (ft)	0.01	Cum SA (acres)	20.42	4.14	15.60

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2072.88	Element			
Vel Head (ft)	1.77	Wt. n-Val.	0.036	0.025	0.065
W.S. Elev (ft)	2071.11	Reach Len. (ft)	495.00	510.00	490.00
Crit W.S. (ft)	2071.11	Flow Area (sq ft)	688.87	515.46	709.10
E.G. Slope (ft/ft)	0.004373	Area (sq ft)	688.87	515.46	709.10
Q Total (cfs)	14413.00	Flow (cfs)	4599.19	7190.78	2623.03
Top Width (ft)	639.00	Top Width (ft)	333.00	77.00	229.00
Vel Total (ft/s)	7.53	Avg. Vel. (ft/s)	6.68	13.95	3.70
Max Chl Dpth (ft)	6.91	Hydr. Depth (ft)	2.07	6.69	3.10
Conv. Total (cfs)	217964.7	Conv. (cfs)	69552.6	108744.7	39667.4
Length Wtd. (ft)	504.35	Wetted Per. (ft)	335.73	77.08	231.12
Min Ch El (ft)	2064.20	Shear (lb/sq ft)	0.56	1.83	0.84
Alpha	2.01	Stream Power (lb/ft s)	3.74	25.47	3.10
Frctn Loss (ft)	1.87	Cum Volume (acre-ft)	6.32	28.56	32.47
C & E Loss (ft)	0.02	Cum SA (acres)	3.43	4.15	14.20

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.
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.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 2 RS: 0.6

OUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8792	2070.3	8819	2069	8838	2070	8862	2065.6	8891	2063.8
8917	2064.8	8930	2065.4	9013	2064.9	9064	2064.3	9104	2065
9168	2065.2	9230	2065.4	9320	2064.8	9403	2064.2	9446	2065
9486	2065.1	9503	2064.3	9548	2065.3	9615	2066.1	9671	2066.8
9736	2066.9	9798	2066.2	9809	2066.1	9842	2066.1	9859	2066.4
9928	2065.8	9954	2059.7	10000	2059.9	10052	2059.9	10075	2066.4
10097	2067.1	10124	2066.8	10141	2067.9	10154	2067	10178	2065.5
10195	2066.8	10225	2067	10257	2066.4	10334	2067.1	10403	2066.4
10431	2063.9	10476	2064.8	10494	2065.1	10520	2062.7	10532	2063.1
10552	2069.7	10561	2070.4	10575	2069.7				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8792	1	9446	.065	9928	.025	10075	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9928	10075	515	505	505	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2069.17	Element			
Vel Head (ft)	1.48	Wt. n-Val.	0.201	0.025	0.065
W.S. Elev (ft)	2067.69	Reach Len. (ft)	515.00	505.00	505.00
Crit W.S. (ft)	2067.69	Flow Area (sq ft)	2467.41	1000.09	759.74
E.G. Slope (ft/ft)	0.002752	Area (sq ft)	2467.41	1000.09	759.74
Q Total (cfs)	14459.00	Flow (cfs)	1763.64	11114.40	1580.96
Top Width (ft)	1688.82	Top Width (ft)	1077.37	147.00	464.45
Vel Total (ft/s)	3.42	Avg. Vel. (ft/s)	0.71	11.11	2.08
Max Chl Dpth (ft)	7.98	Hydr. Depth (ft)	2.29	6.80	1.64
Conv. Total (cfs)	275643.4	Conv. (cfs)	33621.8	211882.6	30139.0
Length Wtd. (ft)	505.79	Wetted Per. (ft)	1077.72	148.61	465.61
Min Ch El (ft)	2059.70	Shear (lb/sq ft)	0.39	1.16	0.28
Alpha	8.16	Stream Power (lb/ft s)	0.28	12.85	0.58
Frctn Loss (ft)	1.44	Cum Volume (acre-ft)	17.70	19.47	26.73
C & E Loss (ft)	0.00	Cum SA (acres)	8.93	2.83	11.69

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

JSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2069.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.94	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2067.81	Reach Len. (ft)	515.00	505.00	505.00
Crit W.S. (ft)	2067.81	Flow Area (sq ft)	164.68	1018.00	816.30
E.G. Slope (ft/ft)	0.003176	Area (sq ft)	164.68	1018.00	816.30
Q Total (cfs)	14459.00	Flow (cfs)	296.83	12298.50	1863.67
Top Width (ft)	712.20	Top Width (ft)	98.00	147.00	467.20
Vel Total (ft/s)	7.23	Avg. Vel. (ft/s)	1.80	12.08	2.28
Max Chl Dpth (ft)	8.11	Hydr. Depth (ft)	1.68	6.93	1.75
Conv. Total (cfs)	256583.2	Conv. (cfs)	5267.5	218243.9	33071.9
Length Wtd. (ft)	505.13	Wetted Per. (ft)	99.71	148.61	468.73
Min Ch El (ft)	2059.70	Shear (lb/sq ft)	0.33	1.36	0.35
Alpha	2.39	Stream Power (lb/ft s)	0.59	16.41	0.79
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)	1.47	19.58	23.89
C & E Loss (ft)	0.07	Cum SA (acres)	0.98	2.83	10.28

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 2 RS: 0.5

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9600	2064	9622	2063.2	9628	2062.6	9665	2062.4	9694	2062.9
9740	2062.2	9800	2061.9	9843	2062.5	9919	2062.2	9958	2055.5
10000	2055.5	10041	2055.5	10058	2059.1	10079	2059.2	10114	2062.8
10129	2062.8	10146	2062	10204	2062.9	10253	2062.6	10316	2061.3
10373	2060.4	10426	2059.8	10444	2058.1	10457	2058.3	10470	2060.7
10505	2061.3	10530	2060.6	10569	2060.9	10634	2061.8	10663	2062.2
10671	2067.5	10705	2073.6						

anning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9600	.065	9919	.025	10041	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9919	10041	200	200	220	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2065.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.51	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2063.57	Reach Len. (ft)	200.00	200.00	220.00
Crit W.S. (ft)	2063.57	Flow Area (sq ft)	361.06	853.54	1527.72
E.G. Slope (ft/ft)	0.002934	Area (sq ft)	361.06	853.54	1527.72
Q Total (cfs)	14459.00	Flow (cfs)	514.31	10020.12	3924.57
Top Width (ft)	1053.16	Top Width (ft)	307.10	122.00	624.06
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)	1.42	11.74	2.57
Max Chl Dpth (ft)	8.07	Hydr. Depth (ft)	1.18	7.00	2.45
Conv. Total (cfs)	266953.6	Conv. (cfs)	9495.5	184999.5	72458.6
Length Wtd. (ft)	206.02	Wetted Per. (ft)	307.15	122.57	625.41
Min Ch El (ft)	2055.50	Shear (lb/sq ft)	0.22	1.28	0.45
Alpha	3.50	Stream Power (lb/ft s)	0.31	14.97	1.15
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	0.98	8.73	13.47
C & E Loss (ft)	0.01	Cum SA (acres)	0.75	1.27	5.38

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2065.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2063.50	Reach Len. (ft)	200.00	200.00	220.00
Crit W.S. (ft)	2063.50	Flow Area (sq ft)	58.91	845.20	1485.06
E.G. Slope (ft/ft)	0.003263	Area (sq ft)	58.91	845.20	1485.06
Q Total (cfs)	14459.00	Flow (cfs)	85.68	10396.10	3977.22
Top Width (ft)	794.96	Top Width (ft)	49.00	122.00	623.96
Vel Total (ft/s)	6.05	Avg. Vel. (ft/s)	1.45	12.30	2.68
Max Chl Dpth (ft)	8.00	Hydr. Depth (ft)	1.20	6.93	2.38
Conv. Total (cfs)	253122.9	Conv. (cfs)	1500.0	181996.7	69626.3
Length Wtd. (ft)	205.51	Wetted Per. (ft)	50.11	122.57	625.29
Min Ch El (ft)	2055.50	Shear (lb/sq ft)	0.24	1.40	0.48
Alpha	3.02	Stream Power (lb/ft s)	0.35	17.28	1.30

Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	0.15	8.78	10.55
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	1.27	3.96

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: Sols Wash
REACH: Reach 2 RS: 0.47

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9738	2063.5	9790	2064	9856	2063.3	9921	2062.3	9941	2054.9
9961	2053.4	10000	2053.6	10024	2053.6	10038	2059.9	10145	2060.2
10268	2059.7	10325	2054.3	10334	2054.7	10363	2057.9	10470	2058.6
10536	2058.9	10574	2058.9	10597	2059.8	10664	2060.1	10711	2060.1
10724	2064	10770	2078.4						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9738	.065	9921	.025	10038	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9921	10038	190	230	260	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2063.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.65	Wt. n-Val.		0.025	0.065
W.S. Elev (ft)	2061.54	Reach Len. (ft)	190.00	230.00	260.00
Crit W.S. (ft)	2061.54	Flow Area (sq ft)		778.23	1691.68
E.G. Slope (ft/ft)	0.003524	Area (sq ft)		778.23	1691.68
Q Total (cfs)	14459.00	Flow (cfs)		9682.64	4776.36
Top Width (ft)	792.73	Top Width (ft)		114.94	677.79
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)		12.44	2.82
Max Chl Dpth (ft)	8.14	Hydr. Depth (ft)		6.77	2.50
Conv. Total (cfs)	243556.3	Conv. (cfs)		163100.4	80455.9
Length Wtd. (ft)	234.89	Wetted Per. (ft)		117.54	678.46
Min Ch El (ft)	2053.40	Shear (lb/sq ft)		1.46	0.55
Alpha	3.10	Stream Power (lb/ft s)		18.13	1.55
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)	0.15	4.98	5.34
C & E Loss (ft)	0.27	Cum SA (acres)	0.04	0.73	2.10

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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2063.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.01	Wt. n-Val.		0.025	0.065
W.S. Elev (ft)	2061.66	Reach Len. (ft)	190.00	230.00	260.00
Crit W.S. (ft)	2061.66	Flow Area (sq ft)		792.02	1231.68
E.G. Slope (ft/ft)	0.003899	Area (sq ft)		792.02	1231.68
Q Total (cfs)	14459.00	Flow (cfs)		10466.78	3992.22
Top Width (ft)	547.26	Top Width (ft)		115.26	432.00
Vel Total (ft/s)	7.14	Avg. Vel. (ft/s)		13.22	3.24
Max Chl Dpth (ft)	8.26	Hydr. Depth (ft)		6.87	2.85
Conv. Total (cfs)	231552.9	Conv. (cfs)		167619.7	63933.2
Length Wtd. (ft)	234.06	Wetted Per. (ft)		117.88	435.50
Min Ch El (ft)	2053.40	Shear (lb/sq ft)		1.64	0.69
Alpha	2.53	Stream Power (lb/ft s)		21.61	2.23
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.01	5.02	3.69
C & E Loss (ft)	0.25	Cum SA (acres)	0.00	0.73	1.29

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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 2 RS: 0.42

PUT
cription:
tion Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9428	2063.59	445.675	2064.29	507.891	2064.29	581.419	2064.29	645.756	2064.7
9751.806	2064	9785.035	2052.39	832.404	2052.59	874.824	2052.59	896.034	2053.3
9924.314	2052.39	946.231	2051.4	9979.46	2062.21	0036.73	2063.61	0091.17	2064.9
10137.83	2066.41	0203.58	2066.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9428	.065	9785.035	.025	9946.231	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9785.035	9946.231	135	135	135	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2061.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.56	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2059.37	Reach Len. (ft)			
Crit W.S. (ft)	2058.79	Flow Area (sq ft)	70.98	1109.45	97.72
E.G. Slope (ft/ft)	0.003692	Area (sq ft)	70.98	1109.45	97.72
Q Total (cfs)	15045.00	Flow (cfs)	220.07	14494.95	329.98
Top Width (ft)	205.80	Top Width (ft)	20.08	161.20	24.52
Vel Total (ft/s)	11.77	Avg. Vel. (ft/s)	3.10	13.06	3.38
Max Chl Dpth (ft)	7.97	Hydr. Depth (ft)	3.54	6.88	3.99
Conv. Total (cfs)	247598.1	Conv. (cfs)	3621.7	238545.8	5430.6
Length Wtd. (ft)		Wetted Per. (ft)	21.29	161.25	25.78
Min Ch El (ft)	2051.40	Shear (lb/sq ft)	0.77	1.59	0.87
Alpha	1.19	Stream Power (lb/ft s)	2.38	20.72	2.95
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2062.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.85	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2059.37	Reach Len. (ft)			
Crit W.S. (ft)	2058.96	Flow Area (sq ft)	4.90	1109.45	5.57
E.G. Slope (ft/ft)	0.003972	Area (sq ft)	4.90	1109.45	5.57
Q Total (cfs)	15045.00	Flow (cfs)	5.28	15033.66	6.06
Top Width (ft)	162.61	Top Width (ft)	0.71	161.20	0.71
Vel Total (ft/s)	13.43	Avg. Vel. (ft/s)	1.08	13.55	1.09
Max Chl Dpth (ft)	7.97	Hydr. Depth (ft)	6.95	6.88	7.85
Conv. Total (cfs)	238725.7	Conv. (cfs)	83.8	238545.8	96.1
ngth Wtd. (ft)		Wetted Per. (ft)	7.57	161.25	8.49
in Ch El (ft)	2051.40	Shear (lb/sq ft)	0.16	1.71	0.16
Alpha	1.02	Stream Power (lb/ft s)	0.17	23.12	0.18
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.40

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9546	2062.89	567.917	2063.99	627.305	2064.19	637.203	2063.29	667.604	2062.1
9689.521	2064.79	752.444	2064.79	776.482	2064.79	803.348	2051.89	830.214	2051.7
9866.978	2051.69	944.748	2050.69	961.716	2058.29	981.512	2065.21	019.69	2065.2
10072.71	2065.81	108.77	2066.4						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9546	.065	9803.348	.025	9944.748	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9803.348	9944.748	250	170	105	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2061.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.36	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2058.33	Reach Len. (ft)	250.00	170.00	105.00
Crit W.S. (ft)	2058.33	Flow Area (sq ft)	44.36	984.23	66.66
E.G. Slope (ft/ft)	0.004724	Area (sq ft)	44.36	984.23	66.66
Q Total (cfs)	15045.00	Flow (cfs)	143.11	14656.70	245.19
Top Width (ft)	172.32	Top Width (ft)	13.59	141.40	17.33
Vel Total (ft/s)	13.74	Avg. Vel. (ft/s)	3.23	14.89	3.68
Max Chl Dpth (ft)	7.73	Hydr. Depth (ft)	3.26	6.96	3.85
Conv. Total (cfs)	218906.2	Conv. (cfs)	2082.3	213256.3	3567.6
Length Wtd. (ft)	177.21	Wetted Per. (ft)	15.08	141.41	18.97
Min Ch El (ft)	2050.60	Shear (lb/sq ft)	0.87	2.05	1.04
Alpha	1.15	Stream Power (lb/ft s)	2.80	30.57	3.81
rctn Loss (ft)	0.62	Cum Volume (acre-ft)	64.28	33.90	14.46
& E Loss (ft)	0.64	Cum SA (acres)	28.45	5.16	3.07

ning: 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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2061.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.46	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2058.48	Reach Len. (ft)	250.00	170.00	105.00
Crit W.S. (ft)	2058.43	Flow Area (sq ft)	4.61	1006.22	5.42
E.G. Slope (ft/ft)	0.004617	Area (sq ft)	4.61	1006.22	5.42
Q Total (cfs)	15045.00	Flow (cfs)	5.36	15033.32	6.33
Top Width (ft)	142.81	Top Width (ft)	0.71	141.40	0.70
Vel Total (ft/s)	14.80	Avg. Vel. (ft/s)	1.16	14.94	1.17
Max Chl Dpth (ft)	7.88	Hydr. Depth (ft)	6.51	7.12	7.73
Conv. Total (cfs)	221428.5	Conv. (cfs)	78.8	221256.5	93.1
Length Wtd. (ft)	174.90	Wetted Per. (ft)	7.13	141.41	8.34
Min Ch El (ft)	2050.60	Shear (lb/sq ft)	0.19	2.05	0.19
Alpha	1.02	Stream Power (lb/ft s)	0.22	30.64	0.22
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)	31.44	34.69	14.99
C & E Loss (ft)	0.27	Cum SA (acres)	11.66	5.16	2.78

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
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.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.36

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9433	2055.2	9497	2055.8	9533	2055.7	9538	2056.5	9594	2056.4
9667	2056.1	9752	2056.8	9866	2056.8	9905	2057.5	9942	2053.3
9969	2049.2	9996	2048.4	10000	2048.4	10046	2049.4	10061	2054
10101	2060.9	10136	2066	10149	2065.8	10235	2066.8	10290	2066.6
10356	2066.3	10387	2066.2	10414	2072.8				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9433	1	9538	.065	9905	.025	10101	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9969	10046	615	770	785	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2060.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.07	Wt. n-Val.	0.046	0.025	0.025
W.S. Elev (ft)	2058.24	Reach Len. (ft)	615.00	770.00	785.00
Crit W.S. (ft)	2058.24	Flow Area (sq ft)	1175.26	724.09	150.32
E.G. Slope (ft/ft)	0.002688	Area (sq ft)	1175.26	724.09	150.32
Q Total (cfs)	15045.00	Flow (cfs)	3816.32	9939.11	1289.57
Top Width (ft)	652.60	Top Width (ft)	536.00	77.00	39.60
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)	3.25	13.73	8.58
Max Chl Dpth (ft)	9.84	Hydr. Depth (ft)	2.19	9.40	3.80
Conv. Total (cfs)	290186.8	Conv. (cfs)	73608.8	191704.8	24873.2
Length Wtd. (ft)	738.08	Wetted Per. (ft)	539.67	77.02	40.65
Min Ch El (ft)	2048.40	Shear (lb/sq ft)	0.37	1.58	0.62
Alpha	2.48	Stream Power (lb/ft s)	1.19	21.65	5.32
Frctn Loss (ft)	2.45	Cum Volume (acre-ft)	60.78	30.57	14.20
C & E Loss (ft)	0.07	Cum SA (acres)	26.87	4.73	3.00

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2061.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.92	Wt. n-Val.	0.026	0.025	0.025
W.S. Elev (ft)	2058.07	Reach Len. (ft)	615.00	770.00	785.00
Crit W.S. (ft)	2058.07	Flow Area (sq ft)	314.17	711.03	143.68
E.G. Slope (ft/ft)	0.003336	Area (sq ft)	314.17	711.03	143.68
Total (cfs)	15045.00	Flow (cfs)	2945.98	10741.59	1357.43
op Width (ft)	214.61	Top Width (ft)	99.00	77.00	38.61
Vel Total (ft/s)	12.87	Avg. Vel. (ft/s)	9.38	15.11	9.45

Max Chl Dpth (ft)	9.67	Hydr. Depth (ft)	3.17	9.23	3.72
Conv. Total (cfs)	260481.6	Conv. (cfs)	51005.2	185974.5	23501.8
ength Wtd. (ft)	753.34	Wetted Per. (ft)	100.75	77.02	39.65
.in Ch El (ft)	2048.40	Shear (lb/sq ft)	0.65	1.92	0.75
Alpha	1.14	Stream Power (lb/ft s)	6.09	29.05	7.13
Frctn Loss (ft)	3.24	Cum Volume (acre-ft)	30.53	31.34	14.81
C & E Loss (ft)	0.03	Cum SA (acres)	11.37	4.73	2.73

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: Sols Wash
REACH: Reach 1 RS: 0.22

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9433	2050.5	9473	2049.6	9508	2049.7	9516	2050.4	9590	2050.4
9669	2050.4	9726	2051.5	9799	2051.3	9899	2051	9938	2044.6
9963	2043	10000	2043	10019	2043	10037	2058.4	10170	2059.3
10292	2060.6	10331	2061.6	10381	2061.4	10430	2057.8	10485	2056.9
10541	2056.4	10573	2058.5	10625	2060.4	10628	2063.4	10671	2063.4
10732	2062	10788	2061.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9433	.065	9963	.025	10037	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9899	10019	465	500	515	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2054.77	Element			
Vel Head (ft)	1.92	Wt. n-Val.	0.065	0.032	0.025
W.S. Elev (ft)	2052.85	Reach Len. (ft)	465.00	500.00	515.00
Crit W.S. (ft)	2052.85	Flow Area (sq ft)	1004.66	974.61	56.68
E.G. Slope (ft/ft)	0.004204	Area (sq ft)	1004.66	974.61	56.68
Q Total (cfs)	15045.00	Flow (cfs)	2556.71	11961.75	526.54
Top Width (ft)	597.51	Top Width (ft)	466.00	120.00	11.51
el Total (ft/s)	7.39	Avg. Vel. (ft/s)	2.54	12.27	9.29
ax Chl Dpth (ft)	9.85	Hydr. Depth (ft)	2.16	8.12	4.92
Conv. Total (cfs)	232027.3	Conv. (cfs)	39430.2	184476.8	8120.3
Length Wtd. (ft)	488.53	Wetted Per. (ft)	468.40	120.57	15.15
Min Ch El (ft)	2043.00	Shear (lb/sq ft)	0.56	2.12	0.98
Alpha	2.27	Stream Power (lb/ft s)	1.43	26.04	9.12
Frctn Loss (ft)	2.27	Cum Volume (acre-ft)	45.39	15.56	12.33
C & E Loss (ft)	0.07	Cum SA (acres)	19.80	2.99	2.54

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The 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 OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2055.88	Element			
Vel Head (ft)	3.03	Wt. n-Val.	0.065	0.032	0.025
W.S. Elev (ft)	2052.84	Reach Len. (ft)	465.00	500.00	515.00
Crit W.S. (ft)	2052.84	Flow Area (sq ft)	197.92	973.76	56.60
E.G. Slope (ft/ft)	0.005736	Area (sq ft)	197.92	973.76	56.60
Q Total (cfs)	15045.00	Flow (cfs)	478.19	13953.03	613.78
Top Width (ft)	250.50	Top Width (ft)	119.00	120.00	11.50
Vel Total (ft/s)	12.25	Avg. Vel. (ft/s)	2.42	14.33	10.84
Max Chl Dpth (ft)	9.84	Hydr. Depth (ft)	1.66	8.11	4.92
Conv. Total (cfs)	198654.4	Conv. (cfs)	6314.0	184236.0	8104.4
Length Wtd. (ft)	491.37	Wetted Per. (ft)	120.49	120.57	15.14
Min Ch El (ft)	2043.00	Shear (lb/sq ft)	0.59	2.89	1.34
Alpha	1.30	Stream Power (lb/ft s)	1.42	41.44	14.52
Frctn Loss (ft)	2.69	Cum Volume (acre-ft)	26.91	16.45	13.00
C & E Loss (ft)	0.34	Cum SA (acres)	9.83	2.99	2.28

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.13

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8515	2048	8945	2046.2	9041	2045.2	9141	2044.3	9248	2043.7
9284	2044.5	9293	2044.8	9299	2046.3	9312	2046.6	9326	2043.8
9402	2042.7	9419	2044.3	9438	2042.8	9459	2045	9519	2044.4
9587	2044.3	9635	2043.5	9692	2044	9724	2043.7	9748	2042.7
9813	2043.1	9869	2043.4	9928	2042.9	9963	2040	10000	2040
10026	2040	10044	2046.4	10064	2047.6	10126	2047.6	10200	2047.4
10225	2049.2	10307	2049.8	10380	2049.4	10442	2047.5	10486	2047.5
10519	2051.3	10579	2052.4	10643	2052.9	10712	2052	10770	2050.7
10831	2049.6	10935	2048.3						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8515	1	9438	.065	9963	.025	10044	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9963	10044	500	505	560	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2048.77	Element			
Vel Head (ft)	1.69	Wt. n-Val.	0.100	0.025	0.065
W.S. Elev (ft)	2047.08	Reach Len. (ft)	500.00	505.00	560.00
Crit W.S. (ft)	2047.08	Flow Area (sq ft)	3231.74	516.08	3.88
E.G. Slope (ft/ft)	0.005174	Area (sq ft)	3231.74	516.08	3.88
Q Total (cfs)	15045.00	Flow (cfs)	7526.98	7514.91	3.11
Top Width (ft)	1321.21	Top Width (ft)	1228.83	81.00	11.38
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)	2.33	14.56	0.80
Max Chl Dpth (ft)	7.08	Hydr. Depth (ft)	2.63	6.37	0.34
Conv. Total (cfs)	209161.4	Conv. (cfs)	104643.0	104475.1	43.3
Length Wtd. (ft)	518.72	Wetted Per. (ft)	1229.74	82.10	11.40
Min Ch El (ft)	2040.00	Shear (lb/sq ft)	0.85	2.03	0.11
Alpha	6.75	Stream Power (lb/ft s)	1.98	29.56	0.09
Frctn Loss (ft)	2.37	Cum Volume (acre-ft)	22.78	7.00	11.97
C & E Loss (ft)	0.35	Cum SA (acres)	10.75	1.84	2.40

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2049.14	Element			
Vel Head (ft)	1.91	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2047.23	Reach Len. (ft)	500.00	505.00	560.00
Crit W.S. (ft)	2047.23	Flow Area (sq ft)	1756.42	527.71	0.80
E.G. Slope (ft/ft)	0.005232	Area (sq ft)	1756.42	527.71	0.80
Q Total (cfs)	15045.00	Flow (cfs)	7201.03	7843.20	0.77
Top Width (ft)	545.00	Top Width (ft)	463.00	81.00	1.00
Vel Total (ft/s)	6.58	Avg. Vel. (ft/s)	4.10	14.86	0.97
Max Chl Dpth (ft)	7.23	Hydr. Depth (ft)	3.79	6.51	0.80
Conv. Total (cfs)	207988.6	Conv. (cfs)	99550.2	108427.8	10.7
Length Wtd. (ft)	516.96	Wetted Per. (ft)	465.79	82.10	1.77
Min Ch El (ft)	2040.00	Shear (lb/sq ft)	1.23	2.10	0.15
Alpha	2.84	Stream Power (lb/ft s)	5.05	31.21	0.14
Frctn Loss (ft)	1.84	Cum Volume (acre-ft)	16.48	7.83	12.66
C & E Loss (ft)	0.45	Cum SA (acres)	6.73	1.84	2.20

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.03

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8655	2044.5	8730	2044.4	8842	2043.7	8943	2043.3	9054	2042.6
9168	2041.8	9308	2041.3	9395	2040.7	9476	2040	9661	2039.5
9840	2038.7	10000	2038.2	10104	2038.1	10183	2037.4	10258	2037.1
10340	2036.2	10440	2036.2	10571	2034.8	10593	2033.5	10682	2032.3

10722 2047.5

aing's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8655	1	9476	.065	10104	.025	10340	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
10104	10340	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2040.65	Element			
Vel Head (ft)	0.51	Wt. n-Val.	0.065	0.025	0.065
W.S. Elev (ft)	2040.14	Reach Len. (ft)			
Crit W.S. (ft)	2038.54	Flow Area (sq ft)	736.83	691.75	1858.86
E.G. Slope (ft/ft)	0.004054	Area (sq ft)	736.83	691.75	1858.86
Q Total (cfs)	15045.00	Flow (cfs)	1369.37	5361.84	8313.79
Top Width (ft)	1242.84	Top Width (ft)	644.20	236.00	362.63
Vel Total (ft/s)	4.58	Avg. Vel. (ft/s)	1.86	7.75	4.47
Max Chl Dpth (ft)	7.84	Hydr. Depth (ft)	1.14	2.93	5.13
Conv. Total (cfs)	236279.6	Conv. (cfs)	21505.7	84207.0	130566.9
Length Wtd. (ft)		Wetted Per. (ft)	644.21	236.01	364.13
Min Ch El (ft)	2036.20	Shear (lb/sq ft)	0.29	0.74	1.29
Alpha	1.57	Stream Power (lb/ft s)	0.54	5.75	5.78
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2041.10	Element			
Vel Head (ft)	0.40	Wt. n-Val.	0.066	0.025	0.065
W.S. Elev (ft)	2040.70	Reach Len. (ft)			
Crit W.S. (ft)	2038.61	Flow Area (sq ft)	1115.68	823.89	1969.49
E.G. Slope (ft/ft)	0.002582	Area (sq ft)	1115.68	823.89	1969.49
Q Total (cfs)	15045.00	Flow (cfs)	1946.60	5726.60	7371.81
Top Width (ft)	1287.00	Top Width (ft)	709.00	236.00	342.00
Vel Total (ft/s)	3.85	Avg. Vel. (ft/s)	1.74	6.95	3.74
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)	1.57	3.49	5.76
Conv. Total (cfs)	296061.6	Conv. (cfs)	38305.9	112690.3	145065.4
Length Wtd. (ft)		Wetted Per. (ft)	709.01	236.01	350.45
Min Ch El (ft)	2036.20	Shear (lb/sq ft)	0.25	0.56	0.91
Alpha	1.73	Stream Power (lb/ft s)	0.44	3.91	3.39
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

file Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 2	0.42	15045.00	2051.40	2059.37	2058.79	2061.93	0.003692	13.06	1278.16	205.80	0.88
Reach 2	0.42	15045.00	2051.40	2059.37	2058.96	2062.22	0.003972	13.55	1119.92	162.61	0.91
Reach 2	0.47	14459.00	2053.40	2061.54	2061.54	2063.19	0.003524	12.44	2469.91	792.73	0.84
Reach 2	0.47	14459.00	2053.40	2061.66	2061.66	2063.67	0.003899	13.22	2023.71	547.26	0.89
Reach 2	0.5	14459.00	2055.50	2063.57	2063.57	2065.08	0.002934	11.74	2742.32	1053.16	0.78
Reach 2	0.5	14459.00	2055.50	2063.50	2063.50	2065.22	0.003263	12.30	2389.17	794.96	0.82
Reach 2	0.6	14459.00	2059.70	2067.69	2067.69	2069.17	0.002752	11.11	4227.24	1688.82	0.75
Reach 2	0.6	14459.00	2059.70	2067.81	2067.81	2069.75	0.003176	12.08	1998.98	712.20	0.81
Reach 2	0.69	14413.00	2064.20	2070.70	2070.70	2072.21	0.004735	13.91	2531.57	1249.95	0.98
Reach 2	0.69	14413.00	2064.20	2071.11	2071.11	2072.88	0.004373	13.95	1913.43	639.00	0.95
Reach 2	0.79	14413.00	2068.90	2074.92	2074.92	2076.41	0.004658	13.42	2050.66	967.78	0.96
Reach 2	0.79	14413.00	2068.90	2075.20	2075.20	2077.18	0.005013	14.36	1570.34	534.61	1.01
Reach 2	0.9	14413.00	2073.10	2078.58	2078.55	2079.63	0.007280	10.84	1962.97	1228.51	0.88
Reach 2	0.9	14413.00	2073.10	2079.12	2078.98	2080.39	0.006546	11.04	1694.62	681.00	0.85
Reach 2	1	14413.00	2078.10	2083.87	2083.87	2085.13	0.004603	12.30	2514.01	1606.47	0.94
Reach 2	1	14413.00	2078.10	2083.88	2083.88	2085.47	0.005123	12.98	1794.88	849.54	0.99
Reach 2	1.12	14413.00	2082.30	2088.39	2088.39	2089.82	0.004597	12.27	1961.50	880.09	0.94
Reach 2	1.12	14413.00	2082.30	2088.39	2088.39	2089.82	0.004583	12.26	1964.48	879.68	0.94
Reach 1	0.03	15045.00	2036.20	2040.14	2038.54	2040.65	0.004054	7.75	3287.44	1242.84	0.80
Reach 1	0.03	15045.00	2036.20	2040.70	2038.61	2041.10	0.002582	6.95	3909.06	1287.00	0.66
Reach 1	0.13	15045.00	2040.00	2047.08	2047.08	2048.77	0.005174	14.56	3751.71	1321.21	1.02
Reach 1	0.13	15045.00	2040.00	2047.23	2047.23	2049.14	0.005232	14.86	2284.92	545.00	1.03
Reach 1	0.22	15045.00	2043.00	2052.85	2052.85	2054.77	0.004204	12.27	2035.95	597.51	0.76
Reach 1	0.22	15045.00	2043.00	2052.84	2052.84	2055.88	0.005736	14.33	1228.28	250.50	0.89
Reach 1	0.36	15045.00	2048.40	2058.24	2058.24	2060.32	0.002688	13.73	2049.67	652.60	0.79
Reach 1	0.36	15045.00	2048.40	2058.07	2058.07	2061.00	0.003336	15.11	1168.88	214.61	0.88
Reach 1	0.40	15045.00	2050.60	2058.33	2058.33	2061.69	0.004724	14.89	1095.25	172.32	0.99
each 1	0.40	15045.00	2050.60	2058.48	2058.43	2061.95	0.004617	14.94	1016.26	142.81	0.99

Profile Output Table - Standard Table 2

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Reach 2	0.42	2061.93	2059.37	2.56			220.07	14494.95	329.98	205.80
Reach 2	0.42	2062.22	2059.37	2.85			5.28	15033.66	6.06	162.61
Reach 2	0.47	2063.19	2061.54	1.65	0.85	0.27		9682.64	4776.36	792.73
Reach 2	0.47	2063.67	2061.66	2.01	0.92	0.25		10466.78	3992.22	547.26
Reach 2	0.5	2065.08	2063.57	1.51	0.66	0.01	514.31	10020.12	3924.57	1053.16
Reach 2	0.5	2065.22	2063.50	1.72	0.73	0.03	85.68	10396.10	3977.22	794.96
Reach 2	0.6	2069.17	2067.69	1.48	1.44	0.00	1763.64	11114.40	1580.96	1688.82
Reach 2	0.6	2069.75	2067.81	1.94	1.63	0.07	296.83	12298.50	1863.67	712.20
Reach 2	0.69	2072.21	2070.70	1.52	1.78	0.01	5449.31	6719.69	2244.00	1249.95
Reach 2	0.69	2072.88	2071.11	1.77	1.87	0.02	4599.19	7190.78	2623.03	639.00
Reach 2	0.79	2076.41	2074.92	1.49	2.31	0.00	7536.46	6541.48	335.05	967.78
Reach 2	0.79	2077.18	2075.20	1.97	2.31	0.06	6686.40	7333.14	393.46	534.61
Reach 2	0.9	2079.63	2078.58	1.04	3.17	0.04	9158.51	5253.92	0.57	1228.51
Reach 2	0.9	2080.39	2079.12	1.27	3.15	0.07	8450.26	5961.54	1.20	681.00
Reach 2	1	2085.13	2083.87	1.25	3.23	0.06	7404.83	6976.80	31.37	1606.47
Reach 2	1	2085.47	2083.88	1.59	3.26	0.10	7014.42	7365.40	33.18	849.54
Reach 2	1.12	2089.82	2088.39	1.43	2.84	0.05	6177.47	7372.67	862.87	880.09
Reach 2	1.12	2089.82	2088.39	1.42	2.99	0.02	6179.96	7369.37	863.68	879.68
Reach 1	0.03	2040.65	2040.14	0.51			1369.37	5361.84	8313.79	1242.84
Reach 1	0.03	2041.10	2040.70	0.40			1946.60	5726.60	7371.81	1287.00
Reach 1	0.13	2048.77	2047.08	1.69	2.37	0.35	7526.98	7514.91	3.11	1321.21
Reach 1	0.13	2049.14	2047.23	1.91	1.84	0.45	7201.03	7843.20	0.77	545.00
Reach 1	0.22	2054.77	2052.85	1.92	2.27	0.07	2556.71	11961.75	526.54	597.51
Reach 1	0.22	2055.88	2052.84	3.03	2.69	0.34	478.19	13953.03	613.78	250.50
Reach 1	0.36	2060.32	2058.24	2.07	2.45	0.07	3816.32	9939.11	1289.57	652.60
Reach 1	0.36	2061.00	2058.07	2.92	3.24	0.03	2945.98	10741.59	1357.43	214.61
Reach 1	0.40	2061.69	2058.33	3.36	0.62	0.64	143.11	14656.70	245.19	172.32
Reach 1	0.40	2061.95	2058.48	3.46	0.68	0.27	5.36	15033.32	6.33	142.81

D.5 – Existing Conditions Model

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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: Sols Wash CLOMR
Project File : solsCLOMR.prj
Run Date and Time: 7/17/2002 3:58:47 PM

Project in English units

Project Description:
P & J Investors, Inc. - Goldmine Village CLOMR
Parcel is approximately 15
acres and is located along Sols Wash UpStrm of US Hwy 93
Floodplain Manager:
Skip Blunt - Building Inspector, Town of Wickenburg, Arizona

PLAN DATA

Plan Title: Existing Conditions - Weir Rating_SubC
Plan File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.p04

Geometry Title: Existing Conditions_weir rating
Geometry File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.g07

Flow Title : FIS Flow Data - ExCond_SubC
Flow File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.f03

n Summary Information:

Number of:	Cross Sections	= 15	Mulitple Openings	=	0
	Culverts	= 0	Inline Weirs	=	0
	Bridges	= 1			

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: Subcritical Flow

FLOW DATA

Flow Title: FIS Flow Data - ExCond_SubC
Flow File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.f03

Flow Data (cfs)

River	Reach	RS	PF 1
Sols Wash	Reach 1	1.12	14413
Sols Wash	Reach 1	0.61	14459
Sols Wash	Reach 1	0.48	15045
Sols Wash	Reach 1	0.22	17078.64

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Sols Wash	Reach 1	PF 1	Critical	Known WS = 2052.81

METRY DATA

eometry Title: Existing Conditions_weir rating

ometry File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.g07

3S SECTION RIVER: Sols Wash
.CH: Reach 1 RS: 1.12

INPUT
Description: Cross Section 1.12 from CBA Study
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9227	2092.5	9301	2092.6	9331	2083.3	9392	2082.2	9437	2087.5
9549	2088	9693	2087.7	9798	2087.2	9872	2086.6	9897	2086.4
9926	2087.3	9949	2083.4	9970	2082.3	10000	2082.5	10035	2083.4
10062	2084.9	10084	2086.4	10118	2086.1	10129	2086.6	10157	2086.6
10164	2086.2	10180	2085.1	10185	2085.1	10205	2091.9		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9227	.06	9331	.025	9392	.06	9949	.025	10062	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9949	10062	615	620	630	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2089.89	Element			
Vel Head (ft)	1.38	Wt. n-Val.	0.034	0.025	0.060
W.S. Elev (ft)	2088.51	Reach Len. (ft)	615.00	620.00	630.00
Crit W.S. (ft)	2088.51	Flow Area (sq ft)	1140.75	614.35	311.52
E.G. Slope (ft/ft)	0.004376	Area (sq ft)	1140.75	614.35	311.52
Q Total (cfs)	14413.00	Flow (cfs)	6051.38	7464.71	896.92
Top Width (ft)	880.83	Top Width (ft)	634.80	113.00	133.03
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	5.30	12.15	2.88
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)	1.80	5.44	2.34
Conv. Total (cfs)	217882.7	Conv. (cfs)	91479.2	112844.7	13558.8
Length Wtd. (ft)	618.08	Wetted Per. (ft)	636.26	113.08	133.70
Min Ch El (ft)	2082.30	Shear (lb/sq ft)	0.49	1.48	0.64
Alpha	1.83	Stream Power (lb/ft s)	2.60	18.03	1.83
Frctn Loss (ft)	3.67	Cum Volume (acre-ft)	138.73	86.57	40.27
C & E Loss (ft)	0.08	Cum SA (acres)	81.52	13.11	17.24

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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
rning: 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.
ning: 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: Sols Wash
REACH: Reach 1 RS: 1.00

INPUT
Description: Cross Section 1.10 from CBA Study
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8262	2097.2	8292	2089.4	8319	2086.6	8354	2084	8410	2083
8469	2082.8	8481	2083.3	8516	2082.6	8539	2081.7	8544	2082.3
8574	2081.7	8603	2082.5	8648	2082.7	8671	2082.1	8710	2082.8
8757	2083.1	8837	2083.5	8898	2083.9	8967	2084.1	9018	2083.6
9059	2083.4	9113	2082.8	9135	2082.2	9154	2082.2	9174	2082.9
9214	2082.5	9234	2083.2	9257	2077.8	9274	2076.6	9302	2076.6
9314	2078.6	9340	2079	9371	2082.7	9387	2083	9429	2083.4
9586	2083.1	9682	2083.1	9776	2083.4	9814	2082.7	9831	2083.6
9884	2083.2	9916	2081.6	9944	2078.9	9957	2078.3	10000	2078.1
10033	2078.1	10050	2082.1	10059	2082.6	10075	2087.1		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8262	1	8603	.065	9274	.025	9314	.065	9944	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9944	10050	570	560	565	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.42	Element			
Vel Head (ft)	2.22	Wt. n-Val.	0.040	0.025	0.065
W.S. Elev (ft)	2083.20	Reach Len. (ft)	570.00	560.00	565.00
Crit W.S. (ft)	2083.20	Flow Area (sq ft)	1037.23	495.61	8.27
E.G. Slope (ft/ft)	0.008498	Area (sq ft)	1037.23	495.61	8.27
Q Total (cfs)	14413.00	Flow (cfs)	6828.52	7570.26	14.22
Top Width (ft)	1092.53	Top Width (ft)	975.41	106.00	11.13
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)	6.58	15.27	1.72
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)	1.06	4.68	0.74
Conv. Total (cfs)	156345.3	Conv. (cfs)	74072.5	82118.6	154.2
Length Wtd. (ft)	565.06	Wetted Per. (ft)	976.79	106.48	11.22
Min Ch El (ft)	2078.10	Shear (lb/sq ft)	0.56	2.47	0.39
lpha	1.64	Stream Power (lb/ft s)	3.71	37.72	0.67
/rctn Loss (ft)	4.66	Cum Volume (acre-ft)	123.36	78.67	37.96
C & E Loss (ft)	0.27	Cum SA (acres)	70.15	11.55	16.19

ıing: 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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.90

INPUT
Description: Cross Section 0.90 from CBA Study
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8508	2090.8	8563	2083.3	8590	2084.6	8614	2084.2	8638	2083.6
8672	2079.1	8719	2079.1	8769	2077.5	8800	2075.4	8815	2072.8
8824	2072.8	8849	2077	8898	2077.2	8966	2077.4	9029	2077.5
9093	2077.8	9156	2078.3	9229	2078.6	9290	2078.7	9365	2078.4
9435	2078.3	9457	2075.2	9474	2074.3	9500	2071.1	9520	2071.1
9540	2075.7	9562	2077.8	9595	2078.6	9615	2077.9	9640	2078.4
9668	2077.7	9688	2078.5	9793	2078	9808	2077.2	9828	2074.5
9843	2077	9917	2078.6	9958	2077.7	9976	2073.5	10000	2073.1
10050	2073.1	10060	2078	10080	2083				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8508	1	8769	.065	9500	.025	9520	.065	9958	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9958	10060	540	565	575	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2080.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.	0.049	0.030	0.065
W.S. Elev (ft)	2078.92	Reach Len. (ft)	540.00	565.00	575.00
Crit W.S. (ft)	2078.30	Flow Area (sq ft)	1888.24	519.35	1.69
E.G. Slope (ft/ft)	0.008016	Area (sq ft)	1888.24	519.35	1.69
Q Total (cfs)	14413.00	Flow (cfs)	7761.75	6649.23	2.02
op Width (ft)	1339.06	Top Width (ft)	1233.38	102.00	3.68
.el Total (ft/s)	5.98	Avg. Vel. (ft/s)	4.11	12.80	1.20
Max Chl Dpth (ft)	7.82	Hydr. Depth (ft)	1.53	5.09	0.46
Conv. Total (cfs)	160979.3	Conv. (cfs)	86691.3	74265.5	22.6
Length Wtd. (ft)	552.02	Wetted Per. (ft)	1235.60	103.62	3.79
Min Ch El (ft)	2073.10	Shear (lb/sq ft)	0.76	2.51	0.22
Alpha	2.37	Stream Power (lb/ft s)	3.14	32.11	0.27
Frctn Loss (ft)	4.71	Cum Volume (acre-ft)	104.22	72.15	37.89
C & E Loss (ft)	0.02	Cum SA (acres)	55.70	10.22	16.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.79

INPUT
Description: Begin new cross sections using 2002 mapping
Cross section on same
alignment as CBA RM 0.79
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8956.81	2083.2	8961.84	2083.77	8970.87	2083.71	8978.94	2083.02	8979.19	2082.9
8988.39	2077.4	8990.81	2076.68	8991.69	2076.64	9004.42	2076.35	9010.63	2076.13
9019.09	2077.8	9019.48	2077.85	9030.16	2076.63	9054.56	2075.72	9060.94	2075.49
9063.56	2075.4	9083.02	2074.32	9083.35	2074.32	9098.69	2070.52	9111.43	2066.75
9131.47	2070	9147.5	2072.19	9158.97	2071.89	9164.33	2071.92	9178.63	2072.13
9211.28	2072.8	9217.01	2072.93	9224.73	2072.76	9244.96	2072.41	9254.37	2072.53
9270.51	2072.5	9282.41	2072.77	9291.72	2072.97	9295.92	2072.97	9330.65	2072.45
9332.83	2072.3	9362.38	2072.66	9368.67	2072.74	9371.25	2072.72	9378.07	2072.74
9391.59	2072.9	9401.78	2072.87	9416.01	2072.85	9427.16	2072.86	9441.69	2072.9
9445.75	2072.8	9461.88	2072.42	9465.75	2072.74	9478.68	2073.23	9510.62	2073.9
9517	2074.4	9527.09	2073.36	9528.83	2072.98	9531.05	2072.99	9538.32	2073.02
9549.12	2073.1	9556.06	2073.16	9566.15	2073.38	9572.78	2070.48	9580.24	2066.96
9593.86	2066.6	9596.05	2066.53	9596.87	2066.53	9609.62	2066.64	9611.57	2068.56
9612.84	2069.5	9618.6	2073.59	9628.69	2073.37	9639.24	2073.09	9655.86	2072.21
9661.29	2072	9663.28	2071.71	9674.38	2071.22	9677.76	2071	9686.11	2071.09
9695.82	2071	9713.96	2071.99	9715.82	2072.15	9716.86	2072.16	9739.74	2072.39
9753.98	2072.5	9755.15	2072.55	9755.84	2072.55	9775.19	2073.28	9778.84	2073.34
9799.77	2073.4	9806.01	2073.57	9825.27	2073.51	9827.43	2073.51	9835.63	2073.52
9852.4	2073.6	9872.04	2073.95	9883.99	2074.31	9902.07	2074.05	9912.03	2074.23
9919.78	2073.9	9925.04	2073.54	9939.15	2072.75	9954.82	2071.68	9971.15	2070
9972.27	2069.8	9973.8	2069.48	9981.21	2067.42	9988.08	2067.63	10000	2067.56
25.66	2067.42	10050.43	2070.51	10070.99	2073.92	10081.72	2076	10087.79	2076.31
88.16	2076.35	10090.05	2077.16	10093.02	2077.91	10097.45	2077.94		

ning's n Values			num=	8						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
56.81	.065	9098.69	.035	9147.5	1	9517	.065	9566.15	.035
,618.6	.065	9954.82	.031	0070.99	.065				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9954.82	10070.99	224	226	235	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2075.50	Element			
Vel Head (ft)	1.56	Wt. n-Val.	0.049	0.030	0.000
W.S. Elev (ft)	2073.94	Reach Len. (ft)	224.00	226.00	235.00
Crit W.S. (ft)	2073.94	Flow Area (sq ft)	1375.55	546.42	0.00
E.G. Slope (ft/ft)	0.009084	Area (sq ft)	1375.55	546.42	0.00
Q Total (cfs)	14413.00	Flow (cfs)	7208.47	7204.53	0.00
Top Width (ft)	928.41	Top Width (ft)	812.14	116.17	0.10
Vel Total (ft/s)	7.50	Avg. Vel. (ft/s)	5.24	13.18	0.10
Max Chl Dpth (ft)	7.41	Hydr. Depth (ft)	1.69	4.70	0.01
Conv. Total (cfs)	151224.0	Conv. (cfs)	75632.6	75591.3	0.0
Length Wtd. (ft)	225.14	Wetted Per. (ft)	817.66	117.07	0.10
Min Ch El (ft)	2067.42	Shear (lb/sq ft)	0.95	2.65	
Alpha	1.79	Stream Power (lb/ft s)	5.00	34.90	
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	83.99	65.23	37.88
C & E Loss (ft)	0.01	Cum SA (acres)	43.02	8.80	16.07

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.76

INPUT
Description:
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8966.41	2082.7	8982.11	2083.52	8982.86	2083.55	8983.12	2083.56	8983.45	2083.26
9984.82	2082.9	9000.97	2076.31	9003.37	2076.19	9031.72	2075.49	9034.78	2075.53
9035.72	2075.5	9036.98	2075.49	9039.52	2075.48	9057.72	2075.17	9070.38	2074.64
93.28	2074.2	9099.65	2074.1	9103.5	2074.01	9131.81	2073.42	9141.75	2073.24
.52.16	2071.3	9157.66	2070.21	9163.66	2070.08	9169.74	2070.47	9172.35	2071.04
9177.48	2070	9194.18	2066.88	9204.49	2065.09	9228.61	2069.71	9237.43	2071.32
9254.65	2071.2	9256.59	2071.2	9257.7	2071.21	9259.43	2071.19	9273.49	2071.18
9312.44	2071.5	9313	2071.46	9313.25	2071.46	9314.23	2071.46	9360.98	2071.07
9363.52	2071.1	9389.95	2071.18	9410.02	2071.25	9431.27	2071.3	9435.6	2071.44
9439.26	2071.5	9446.98	2071.79	9466.96	2072.39	9470.26	2072.34	9503	2071.54
9503.13	2071.5	9503.18	2071.54	9518.44	2071.61	9529.92	2071.62	9538.86	2071.83
9564	2071.9	9575	2071.85	9600.82	2071.74	9622.46	2071.7	9630.28	2071.6
9638.87	2071.6	9648.49	2071.37	9650.48	2070.28	9656.39	2066.19	9668.72	2066.16
9677	2065.8	9690.29	2066.2	9694.54	2066.21	9698.26	2067.94	9705.89	2070.58
9717.74	2070.5	9723.11	2070.46	9736.52	2070.78	9756.71	2070.87	9766.81	2071.27
9774.46	2071.5	9786.81	2071.96	9800.15	2072	9808.73	2071.87	9831.88	2071.62
9836.64	2071.6	9838.05	2071.59	9839.88	2071.55	9869.23	2072.05	9872.39	2072.1
9895.46	2071.8	9912.99	2071.63	9922.97	2071.78	9941.02	2070.67	9948.71	2070.25
9955.96	2069.3	9957.02	2069.18	9957.73	2069.04	9974.47	2066.6	9975.98	2066.44
9976.88	2066.4	9977.22	2066.32	9977.62	2066.14	9980.22	2066.06	10000	2065.89
10006.53	2065.84	10009.77	2065.91	0077.22	2066.96	10085.05	2067.11	0086.89	2067.24
10100.79	2070.08	10106.98	2071.21	0112.89	2071.38	10116.4	2071.41	0120.05	2071.91
10138.24	2074.08	10145.63	2073.81	0147.75	2074.06				

Manning's n Values			num=	8						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8966.41	.065	9177.48	.035	9237.43	1	9630.28	.065	9648.49	.035
9705.89	.065	9955.96	.031	0100.79	.065				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9955.96	10100.79	262	269	270	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2073.59	Element			
Vel Head (ft)	1.63	Wt. n-Val.	0.040	0.030	0.065
W.S. Elev (ft)	2071.96	Reach Len. (ft)	262.00	269.00	270.00
Crit W.S. (ft)	2071.96	Flow Area (sq ft)	899.13	751.50	15.32
E.G. Slope (ft/ft)	0.006661	Area (sq ft)	899.13	751.50	15.32
Q Total (cfs)	14413.00	Flow (cfs)	5307.38	9081.58	24.05
Top Width (ft)	905.44	Top Width (ft)	740.91	144.83	19.71
Vel Total (ft/s)	8.65	Avg. Vel. (ft/s)	5.90	12.08	1.57
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)	1.21	5.19	0.78
Conv. Total (cfs)	176600.5	Conv. (cfs)	65030.6	111275.3	294.6
Length Wtd. (ft)	266.35	Wetted Per. (ft)	744.87	145.39	19.85
Min Ch El (ft)	2065.84	Shear (lb/sq ft)	0.50	2.15	0.32
Alpha	1.40	Stream Power (lb/ft s)	2.96	25.97	0.50
Frctn Loss (ft)	1.50	Cum Volume (acre-ft)	78.14	61.87	37.84
C & E Loss (ft)	0.15	Cum SA (acres)	39.03	8.12	16.02

rning: 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.
.ning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.71

INPUT
Description:
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8861.5	2084.2	8864.48	2084.22	8867.75	2084.21	8870.81	2083.35	8887.52	2078.19
8896.29	2078	8913.39	2076.05	8914.15	2076.04	8914.91	2075.99	8929.42	2076.52
8937.54	2076.4	8946.72	2076.01	8954.01	2075.46	8956.91	2075.59	8960.12	2075.61
8979.3	2075.9	8989.9	2073.94	8998.11	2074.64	9009.22	2074.06	9016.26	2072.43
9021.02	2071.4	9031.07	2071.23	9044.91	2071.01	9050.85	2069.61	9051.79	2069.35
9064.19	2069.2	9087.51	2068.79	9098.21	2068.81	9107.64	2068.87	9126.03	2068.85
9148.49	2068.9	9149.98	2068.88	9154.4	2068.88	9179.2	2068.93	9188.16	2068.94
9217.25	2068.8	9219.44	2068.77	9222.7	2068.75	9258.29	2068.79	9267.25	2068.9
9282.3	2068.8	9295.73	2069.2	9298.07	2069.18	9299.52	2069.2	9300.86	2069.16
9313.56	2068.8	9328.8	2068.56	9336.86	2068.43	9356.93	2068.07	9357.34	2068.08
9358.8	2068.1	9394.29	2068.7	9411.36	2068.8	9429.62	2068.59	9444.36	2068.6
9456.47	2068.5	9468.9	2068.11	9474.67	2067.99	9477.64	2067.69	9503.81	2064.5
9523.69	2066.5	9532.86	2067.85	9539.23	2068.74	9550.22	2068.88	9559.65	2068.85
9578.93	2068.7	9610.32	2069.08	9618.4	2069.34	9666.63	2069.59	9678.09	2069.75
9698.54	2068.9	9716.29	2068.87	9723.16	2068.3	9734.24	2064.98	9734.51	2064.9
9735.02	2064.9	9758.68	2064.37	9765.74	2064.46	9770.61	2066.37	9780.87	2069.93
9791.24	2069.2	9794.5	2069.12	9801.2	2069.02	9812.94	2069.26	9824.82	2069.54
9838.16	2069.8	9848.69	2069.52	9858.04	2069.44	9879.06	2069.05	9884.02	2068.99
9888.38	2069.1	9904.2	2069.04	9918.25	2068.84	9922.81	2068.64	9926.76	2068.55
9938.77	2068.1	9954.07	2067.08	9960.01	2066.78	9964.65	2066.04	9973.7	2064.13
9989.73	2064.1	10000	2064.161	0000.84	2064.161	0023.57	2064.361	0039.89	2064.04
10057.9	2063.891	0073.74	2063.91	0082.51	2066.41	10088.1	2067.921	0119.29	2067.66
10120.3	2067.641	0120.64	2067.71	0133.59	2067.541	0144.07	2071.381	0147.31	2072.71
10155.85	2071.191	0159.47	2070.331	0187.46	2069.461	0191.24	2069.311	0192.58	2069.2
10197.88	2069.011	0229.72	2068.211	0236.79	2068.33	10261	2068.411	0261.16	2068.4
10270.37	2067.81	0275.64	2067.461	0293.75	2070.651	0297.08	2071.531	0299.78	2072
10303.43	2072.681	0305.32	2073.251	0308.73	2073.271	0314.91	2073.311	0319.25	2072.8
0322.05	2072.25								

nning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8861.5	.065	9411.36	1	9477.64	.035	9532.86	.065	9716.29	.035
9780.87	.065	9964.65	.03	10088.1	.065				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9964.65	10088.1	254	256	246	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2071.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.	0.048	0.030	0.065
W.S. Elev (ft)	2070.23	Reach Len. (ft)	254.00	256.00	246.00
Crit W.S. (ft)	2070.23	Flow Area (sq ft)	1588.03	721.17	308.98
E.G. Slope (ft/ft)	0.004804	Area (sq ft)	1588.03	721.17	308.98
Q Total (cfs)	14413.00	Flow (cfs)	5698.54	7997.76	716.70
Top Width (ft)	1221.36	Top Width (ft)	916.43	123.45	181.48
Vel Total (ft/s)	5.50	Avg. Vel. (ft/s)	3.59	11.09	2.32
Max Chl Dpth (ft)	6.34	Hydr. Depth (ft)	1.73	5.84	1.70
Conv. Total (cfs)	207948.9	Conv. (cfs)	82217.8	115390.7	10340.4
Length Wtd. (ft)	254.90	Wetted Per. (ft)	918.72	124.21	182.27
Min Ch El (ft)	2063.89	Shear (lb/sq ft)	0.52	1.74	0.51
Alpha	2.43	Stream Power (lb/ft s)	1.86	19.31	1.18
Frctn Loss (ft)	1.32	Cum Volume (acre-ft)	70.66	57.32	36.84
C & E Loss (ft)	0.03	Cum SA (acres)	34.04	7.30	15.40

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 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: Sols Wash
REACH: Reach 1 RS: 0.66

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8909.42	2073.2	8921	2073.26	8929.09	2072.57	8947.17	2071.42	8953.03	2071.22
8959.27	2071.3	8969.85	2070.72	8972.01	2070.52	8973	2070.48	8978	2070.06
88.12	2069.2	8990.12	2068.99	9004.2	2069.02	9021.29	2068	9025.56	2067.66
33.97	2067.2	9049.36	2066.2	9052.58	2066.32	9065.96	2066.79	9066.79	2066.68
9071.42	2066.5	9073.23	2066.5	9089.64	2066.56	9097.4	2066.66	9104.07	2066.67

24.86	2066.6	9140.22	2066.49	9154.52	2066.42	9172.67	2066.73	9178.12	2066.82
81.96	2066.9	9204.7	2066.55	9224.11	2066.45	9230.91	2066.6	9267.56	2066.79
70.58	2066.8	9305.51	2066.73	9312.07	2066.72	9312.97	2066.71	9314.61	2066.7
355.5	2066.6	9382.55	2066.48	9392.06	2066.47	9399.86	2066.69	9426.85	2066.9
9446.31	2066.5	9449.86	2066.56	9459.64	2066.7	9484.42	2067.09	9507.86	2066.94
9525.25	2066.7	9546.42	2066.97	9567.66	2067.23	9596.15	2067.55	9614.11	2067.7
9643.34	2067	9662.26	2067.16	9676.86	2067.47	9687.24	2067.08	9697.58	2066.72
9704.63	2066.6	9712.29	2066.37	9730.64	2066.58	9742.83	2066.7	9773.06	2066.04
9773.57	2066	9773.81	2066.01	9795.64	2066.14	9812.17	2063.71	9812.25	2063.7
9812.34	2063.7	9812.47	2063.69	9813.67	2063.65	9835.13	2062.96	9837.18	2063.02
9839.99	2064	9851.79	2067.58	9858.46	2067.77	9872.03	2068.02	9881.07	2067.98
9894.51	2068.1	9902.81	2068.01	9915.73	2067.44	9919.56	2067.21	9923.8	2066.99
9943.25	2066.1	9954.58	2065.65	9964.3	2065.39	9971.19	2063.52	9977.89	2062.05
10000	2062.09	10005.32	2062.11	10007.11	2062.11	10036.89	2062.67	10041	2062.63
10077.17	2061.79	10089.2	2064.61	0094.19	2065.22	10098.32	2065.53	10104.94	2066.19
10105.96	2066.31	0129.95	2068.21	0136.84	2068.41	10139.65	2068.35	10149.41	2067.98
10159.1	2068.07	10190.84	2068.21	0196.79	2068.21	10204.14	2068.24	10230.37	2068.17
10250.61	2067.98	10255.85	2067.91	0262.24	2067.87	10280	2068.11	0291.54	2068.32
10307.52	2068.71	0320.55	2068.81	0325.83	2068.91	10336.17	2068.68	10356.5	2067.86
10357.24	2067.93	10373.69	2068.11	0391.29	2067.61	0396.46	2067.55	10410.31	2066.32
10417.11	2065.61	10421.95	2066.71	0449.64	2072				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8909.42	.065	9795.64	.035	9851.79	.065	9964.3	.03	10089.2	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9964.3	10089.2	256	248	245	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2069.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.48	Wt. n-Val.	0.054	0.030	0.065
W.S. Elev (ft)	2068.42	Reach Len. (ft)	256.00	248.00	245.00
Crit W.S. (ft)		Flow Area (sq ft)	1639.92	740.96	205.98
E.G. Slope (ft/ft)	0.005621	Area (sq ft)	1639.92	740.96	205.98
Q Total (cfs)	14413.00	Flow (cfs)	5147.97	8981.06	283.97
Top Width (ft)	1369.65	Top Width (ft)	950.02	124.90	294.73
Vel Total (ft/s)	5.57	Avg. Vel. (ft/s)	3.14	12.12	1.38
Max Chl Dpth (ft)	6.63	Hydr. Depth (ft)	1.73	5.93	0.70
Conv. Total (cfs)	192245.7	Conv. (cfs)	68665.4	119792.5	3787.7
Length Wtd. (ft)	250.37	Wetted Per. (ft)	951.13	125.65	295.31
Min Ch El (ft)	2061.79	Shear (lb/sq ft)	0.61	2.07	0.24
Alpha	3.06	Stream Power (lb/ft s)	1.90	25.08	0.34
Prctn Loss (ft)	1.15	Cum Volume (acre-ft)	61.25	53.02	35.38
C & E Loss (ft)	0.11	Cum SA (acres)	28.60	6.57	14.05

.ning: 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.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.61

INPUT
Description:
Station Elevation Data num= 151

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8736.05	2076.1	8743.1	2076.13	8788.01	2072	8790.17	2071.9	8792.32	2071.65
8818.02	2070.4	8824.74	2071.29	8827.59	2071.69	8834.13	2071.56	8835.33	2071.48
8840.86	2071	8852.41	2069.93	8867.58	2069.83	8873.58	2070.06	8879.82	2069.82
8892.97	2069.8	8908.3	2069.72	8931.53	2069.63	8937.82	2066.98	8943.08	2064.5
8958.22	2064.4	8977.84	2064.24	8982.09	2064.14	8990.26	2064.21	9005.77	2064.18
9019.59	2064.2	9027.78	2064.23	9029.88	2064.09	9052.4	2064.29	9052.74	2064.29
9052.85	2064.3	9085.89	2064.62	9095.31	2064.86	9102.27	2064.79	9130.69	2064.49
9147.72	2064.7	9161.96	2064.79	9173.92	2064.7	9195.3	2064.61	9205.45	2064.63
9228.72	2064.8	9232.42	2064.81	9234.33	2064.83	9267.86	2064.86	9276.16	2064.83
9295.98	2064.8	9319.6	2064.77	9343.68	2064.64	9345.48	2064.66	9366.03	2064.6
9367.18	2064.6	9376.79	2064.68	9395.1	2064.47	9409.81	2064.96	9412.73	2064.92
9416.5	2065	9431.19	2064.9	9459.67	2064.87	9466.73	2064.85	9481.66	2064.83
9493.18	2064.9	9502.44	2064.84	9530.77	2065.44	9545.89	2065.63	9573.19	2065.78
9595.07	2066.1	9616.71	2066.23	9633.29	2066.34	9648.58	2066.4	9678.57	2066.35
9678.99	2066.4	9679.38	2066.35	9723.78	2066.52	9760.6	2065.85	9763.2	2065.82
9766.14	2065.8	9782.98	2065.95	9786.52	2065.71	9791.9	2065.41	9795.68	2065.42
9805.76	2065.2	9823.67	2065.25	9828.63	2065.54	9836.98	2065.58	9837.92	2065.57
9845.38	2065.6	9879.15	2065.76	9890.67	2065.81	9902.96	2065.71	9933.56	2064.92
9939.65	2063.9	9950.27	2061.93	9952.04	2061.3	9957.24	2060.44	9960.1	2060.35
9962.67	2060.3	9990.24	2059.97	9995.14	2059.91	10000	2059.93	10015.68	2060.03
10039.69	2060.08	10049.92	2061.91	0065.47	2064.87	10085.77	2066.28	10090.55	2066.59
10096.35	2066.52	10115.89	2066.21	0128.98	2066	10146.79	2066	10168	2065.66
10178.93	2065.54	10181.81	2065.71	0189.48	2065.79	10208.98	2065.93	10232.43	2066.04
10234.72	2066.02	10236.29	2066	10266.65	2066.08	10286.04	2066.07	10291.52	2066.08
10302	2066.21	0319.18	2066.51	0330.45	2066.71	0343.99	2067.41	0354.21	2066.87
10366.61	2066.87	10369.97	2066.81	0373.56	2066.76	10399.09	2066.21	0421.31	2066.4
10425.07	2066.48	10428.36	2066.5	10432.1	2066.35	10441.38	2066.31	10444.77	2066.02
10450.23	2066.14	10472.74	2066.61	0477.45	2066.21	10478.91	2065.97	10487.68	2064.8
10506.42	2064.71	10506.62	2064.71	0506.87	2064.71	10506.94	2064.71	0526.34	2062.96
10544.37	2068.86	10553.74	2071.61	0562.61	2071.74	10563.1	2071.76	10563.4	2071.7
10564.1	2071.54								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
36.05	.1	9267.86	.1	9836.98	.065	9933.56	.03	10065.47	.065

nk Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9933.5	610065.47	270	241	240	.1	.3

/SS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2068.64	Element			
Vel Head (ft)	1.12	Wt. n-Val.	0.096	0.030	0.065
W.S. Elev (ft)	2067.52	Reach Len. (ft)	270.00	241.00	240.00
Crit W.S. (ft)	2067.52	Flow Area (sq ft)	2346.59	858.38	716.47
E.G. Slope (ft/ft)	0.003813	Area (sq ft)	2346.59	858.38	716.47
Q Total (cfs)	14459.00	Flow (cfs)	4021.02	9109.46	1328.52
Top Width (ft)	1603.75	Top Width (ft)	997.03	131.91	474.81
Vel Total (ft/s)	3.69	Avg. Vel. (ft/s)	1.71	10.61	1.85
Max Chl Dpth (ft)	7.61	Hydr. Depth (ft)	2.35	6.51	1.51
Conv. Total (cfs)	234162.1	Conv. (cfs)	65120.0	147526.8	21515.3
Length Wtd. (ft)	248.43	Wetted Per. (ft)	997.79	132.80	475.87
Min Ch El (ft)	2059.91	Shear (lb/sq ft)	0.56	1.54	0.36
Alpha	5.30	Stream Power (lb/ft s)	0.96	16.33	0.66
Frctn Loss (ft)	0.97	Cum Volume (acre-ft)	49.53	48.47	32.79
C & E Loss (ft)	0.00	Cum SA (acres)	22.88	5.84	11.89

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: Sols Wash
REACH: Reach 1 RS: 0.57

INPUT
Description:
Station Elevation Data num= 160

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8697.69	2069.1	8710.61	2068.32	8716.79	2068.25	8721.08	2068.02	8734.42	2067.57
8748.02	2066.9	8759.52	2066.66	8764.49	2066.66	8770.68	2066.3	8783.24	2066.03
8783.27	2066	8783.31	2066.03	8816.1	2065.38	8834.01	2063.93	8835.48	2063.88
8837.28	2063.9	8851.8	2064.51	8869.48	2064.17	8879.25	2063.69	8888.93	2063.6
8925.85	2063.2	8937.71	2063.18	8951	2062.99	8961.94	2063.01	8966.4	2062.91
8967.8	2062.9	8973.5	2062.45	8974.78	2062.35	8975.26	2062.33	8976.88	2062.38
8992.69	2062.7	8995.37	2062.76	9003.74	2062.71	9023.15	2062.7	9042.97	2062.88
9066.56	2063	9070.66	2063.09	9073.99	2063.12	9105.26	2062.67	9118.49	2062.51
9150.19	2063.1	9162.58	2063.32	9181.05	2063.35	9207.35	2063.33	9222.95	2063.37
9243.87	2063.2	9251.58	2062.98	9258.05	2063.01	9292.59	2062.15	9297.46	2062.01
98.81	2062	9301.26	2062.05	9332.57	2062.35	9344.72	2062.36	9353.19	2062.28
,67.22	2062.3	9387.06	2062.36	9391.68	2062.31	9395.05	2062.18	9399.19	2062.25
9407.36	2062.4	9429.17	2063.02	9431.94	2063.1	9433.72	2063.12	9484.2	2063.46
9488.55	2063.5	9527.15	2063.54	9534.98	2063.54	9535.66	2063.54	9540.03	2063.55
9580.02	2063.6	9588.16	2063.54	9626.17	2063.3	9645.75	2063.27	9652.81	2063.26
9687.93	2063.3	9702.32	2063.33	9703.06	2063.35	9704.43	2063.35	9710.43	2063.43
9717.05	2063.5	9720.42	2063.05	9723.34	2062.78	9741.76	2063.03	9755.39	2063.2
9764.63	2063.2	9768.09	2063.27	9775.25	2063.3	9776.34	2063.33	9776.76	2063.33
9777.99	2063.3	9786.01	2063.43	9849.74	2064.17	9859.08	2064.2	9863.77	2064.16
9883.37	2063.9	9907.71	2063.57	9918.24	2063.49	9927.66	2063.82	9933.62	2063.02
9963.87	2058.3	9981.25	2057.95	9991.79	2058.08	9997.76	2058	100002	2057.976
10027.09	2057.6	910041.49	2058	10062.83	2061.7	10064.28	2061.96	10068.27	2061.97
10079.29	2061.9	310082.65	2062	10087.9	2062.31	10101.11	2063.22	10109.61	2063.99
10122.48	2063.92	10131.73	2063.8	10150.69	2063.8	10158.13	2063.88	10162.98	2063.88
10187.79	2063.95	10214.46	2064.1	10217.51	2064.12	10220.41	2064.23	10241.16	2065.56
10247.88	2065.3	10252.71	2065.1	10262.47	2064.78	10272.17	2064.48	10285.48	2064.72
10294.08	2064.98	10310.03	2069.1	10312.15	2069.54	10325.97	2066.48	10331.16	2065.6
10340.32	2065.69	10354.9	2066	10358.67	2066.04	10370.11	2065.69	10381.02	2064.83
10382.68	2064.68	10383.5	2064.6	10387.57	2064.58	10400.24	2064.27	10426.37	2063.51
10448.13	2063.05	10466.26	2062	10486.19	2061.3	10500.25	2061.65	10524.81	2062.62
10534.92	2063.58	10546.06	2064.5	10571.91	2062.21	10575.15	2061.95	10577.42	2061.74
10594.94	2068	10603.38	2072.2	10609.42	2072.41	10611.63	2072.41	10611.64	2072.4

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8697.69	.1	9162.58	.1	9849.74	.065	9933.62	.03	10064.28	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9933.6	210064.28	180	215	220	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	T		

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2066.53	Element			
Vel Head (ft)	1.16	Wt. n-Val.	0.097	0.030	0.065
W.S. Elev (ft)	2065.37	Reach Len. (ft)	180.00	215.00	220.00
Crit W.S. (ft)	2065.37	Flow Area (sq ft)	2114.62	841.70	815.96
E.G. Slope (ft/ft)	0.003995	Area (sq ft)	2412.46	841.70	815.96
Q Total (cfs)	14459.00	Flow (cfs)	3496.02	9089.56	1873.42
Top Width (ft)	1684.91	Top Width (ft)	1117.40	130.66	436.85
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)	1.65	10.80	2.30
Max Chl Dpth (ft)	7.68	Hydr. Depth (ft)	2.23	6.44	1.87
Conv. Total (cfs)	228760.1	Conv. (cfs)	55311.5	143808.6	29640.0
ength Wtd. (ft)	207.68	Wetted Per. (ft)	950.16	131.38	437.99
in Ch El (ft)	2057.69	Shear (lb/sq ft)	0.56	1.60	0.46
Alpha	5.08	Stream Power (lb/ft s)	0.92	17.26	1.07

Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	34.78	43.77	28.57
C & H Loss (ft)	0.21	Cum SA (acres)	16.33	5.11	9.38

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 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: Sols Wash
REACH: Reach 1 RS: 0.52

INPUT
Description: Begin lateral weir overflow at Left OB. Weir section extends to bridge.
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9205.68	2064.7	9215.24	2064.65	9215.75	2064.64	9216.87	2064.6	9243.34	2063.78
9250.32	2063.5	9255.1	2063.45	9259.43	2063.42	9292.43	2063.08	9298.66	2063.04
9319.04	2063.2	9322.59	2063.11	9324.11	2062.68	9325.94	2062.49	9330.03	2061.62
9335.19	2063.8	9335.7	2063.88	9338.93	2063.35	9348.07	2062.02	9352.22	2061.96
9382.51	2062.7	9401.81	2062.11	9403.33	2062.1	9450.98	2062.15	9462.3	2062.36
9484.83	2062.7	9513.77	2062.31	9515.51	2062.28	9526.7	2062.18	9556.79	2061.92
9561.91	2061.9	9590.51	2062.14	9603.79	2061.93	9617.84	2061.91	9642.5	2061.85
9652.03	2062.2	9653.72	2062.27	9655	2062.22	9659.12	2062.04	9671.31	2061.75
9684.89	2062.1	9691.7	2062.11	9702.49	2062.34	9702.83	2062.35	9725.41	2061.77
9729.82	2061.7	9737.08	2061.67	9769.38	2061.65	9788.51	2061.69	9790.11	2061.7
9814	2061.9	9833.8	2062.01	9863.88	2061.61	9867.8	2061.59	9871.34	2061.6
9904.59	2061.8	9938.15	2060.44	9946.42	2060.21	9960.22	2059.05	9971.03	2056.21
9997.82	2055.5	10000	2055.61	10009.87	2056.01	10019.76	2056.26	10045.14	2056.36
10051.85	2058	10056.99	2058.19	10059.8	2058.66	10090.41	2059.21	10096.59	2059.4
10102.77	2060.21	10120.15	2062.86	10151.88	2062.82	10155.06	2062.77	10156.92	2062.78
10181.05	2062.61	10199.75	2062.87	10209.44	2062.99	10229.1	2062.82	10237.87	2062.73
10245.67	2062.61	10268.42	2062.58	10290.99	2062.38	10292.74	2062.36	10294.89	2062.35
10318.73	2062.41	10328.72	2062.17	10365.9	2062.45	10372.01	2062.53	10391.44	2062.28
10413.67	2062.31	10417.56	2062.31	10422.61	2062.42	10443.57	2062.74	10459.24	2062.8
10463.82	2062.8	10469.82	2062.77	10489.89	2062.45	10510.63	2062.52	10516.22	2062.5
10521.87	2062.61	10545.23	2062.64	10565.56	2063.31	10573.43	2063.27	10584.57	2063.05
10588.81	2063	10593.12	2062.82	10603.27	2062.29	10615.76	2062.49	10623.93	2062.8
10631.1	2062.61	10635.85	2062.85	10639.15	2064.24	10650.65	2074.07	10658.08	2074.05
10660.52	2074	10665.18	2073.31						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9205.68	.065	9814	.065	9938.15	.03	10102.77	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9938.15	10102.77	750	242	250	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888			T

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2065.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.065	0.030	0.065
W.S. Elev (ft)	2064.56	Reach Len. (ft)	750.00	242.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)	1522.68	1144.05	1056.55
E.G. Slope (ft/ft)	0.002183	Area (sq ft)	1687.45	1144.05	1056.55
Q Total (cfs)	14459.00	Flow (cfs)	3075.23	9612.80	1770.97
Top Width (ft)	1421.37	Top Width (ft)	720.00	164.62	536.76
Vel Total (ft/s)	3.88	Avg. Vel. (ft/s)	2.02	8.40	1.68
Max Chl Dpth (ft)	9.06	Hydr. Depth (ft)	2.59	6.95	1.97
Conv. Total (cfs)	309467.4	Conv. (cfs)	65819.4	205743.8	37904.2
Length Wtd. (ft)	303.94	Wetted Per. (ft)	588.20	165.36	537.43
Min Ch El (ft)	2055.50	Shear (lb/sq ft)	0.35	0.94	0.27
Alpha	3.19	Stream Power (lb/ft s)	0.71	7.92	0.45
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	26.31	38.87	23.84
C & H Loss (ft)	0.14	Cum SA (acres)	12.53	4.38	6.92

LATERAL RATING CURVE RIVER: Sols Wash
REACH: Reach 1 RS: 0.51

INPUT
Description: US 93/89 Weir Rating Curve
Lateral rating curve position = Left overbank
Rating Curve num = 24

Flow	Elev	Flow	Elev	Flow	Elev	Flow	Elev	Flow	Elev
.28	2062.4	5.31	2062.5	20.06	2062.6	49.8	2062.7	96.34	2062.8
156.36	2062.9	231.04	2063	327.35	2063.1	456.63	2063.2	616.81	2063.3
805.35	2063.4	1020.27	2063.5	1259.18	2063.6	1520.85	2063.7	1804.48	2063.8
2110.35	2063.9	2437.37	2064	2784.71	2064.1	3152.55	2064.2	3544.06	2064.3
3958.16	2064.4	4393.59	2064.5	4849.93	2064.6	5326.74	2064.7		

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.48

INPUT
Description: Lateral Weir Overflow at Left OB

```
ation Elevation Data     num=      88
   Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 02.33  2062.6 9817.48 2062.73 9837.25 2062.55 9865.49 2062.27 9874.91 2062.45
 93.67  2062.3 9915.14 2062.14  9921.2 2062.23 9927.07 2062.34 9949.99 2062.12
9955.12  2062.1 9970.01 2058.52 9986.93 2053.61 9998.66 2053.52   10000 2053.51
10005.63 2053.5110037.94  2054.210045.48 2054.5210052.17 2055.7310066.28  2059.5
10074.12 2060.4310077.38  2060.6 10077.5 2060.5810079.59 2060.9310079.96 2060.96
10087.07 2059.6310089.12  2059.310089.39 2059.2610105.85     2059 10112.5 2058.94
10132.21 2059.1410137.13  2059.310151.85  2059.710155.04 2059.7410160.48 2059.76
10167.15 2059.7910169.88  2060.710173.96 2061.6410178.16  2061.410198.98 2060.78
10206.81 2060.3810212.32  2060.410231.08 2060.2310240.69  2060.410248.27 2060.44
10261.92 2060.2710275.69  2060.110291.45 2059.93 10300.4 2059.9210308.36  2059.6
10330.62 2058.6510340.49  2058.610350.02 2057.5410357.33 2056.48 10365.7 2057.74
10367.69 2058.0310386.92  2058.210391.19 2058.1710392.47 2058.2310393.61 2058.23
10418.41 2058.8910438.37  2058.910446.67 2059.1910454.33  2058.610455.34 2058.44
10456.56 2058.3810462.78  2058.310483.99 2058.4610488.38 2058.5610495.81  2058.6
10517.11 2058.8710534.81  2059.210535.28 2059.2110536.58  2059.210575.29 2059.27
10590.38 2059.1610600.93  2059.310614.32 2059.4210628.82 2059.6910637.17 2059.62
10654.71 2059.8110664.21  2060.210677.73 2060.9410688.07 2061.23 10699.3 2070.65
10705.57  2074.610708.39    207510725.09 2076.52

Manning's n Values          num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 9802.33      .1 9927.07    .065 9970.01     .0310079.59    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      9970.0110079.96                 270     235     380              .6       .8
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
888        T
888        T

CROSS SECTION OUTPUT    Profile #PF 1

  E.G. Elev (ft)          2064.39   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.22   Wt. n-Val.                0.077      0.030      0.065
  W.S. Elev (ft)          2063.17   Reach Len. (ft)          270.00     235.00     380.00
  Crit W.S. (ft)                    Flow Area (sq ft)        162.59     839.71    1304.28
  E.G. Slope (ft/ft)      0.003067  Area (sq ft)             163.16     839.71    2313.81
  Q Total (cfs)           13011.36  Flow (cfs)               183.95    8864.80    3962.61
  Top Width (ft)            888.05  Top Width (ft)           167.68     109.95     610.42
  Vel Total (ft/s)           5.64   Avg. Vel. (ft/s)           1.13      10.56       3.04
  Max Chl Dpth (ft)          9.66   Hydr. Depth (ft)           0.98       7.64       3.73
  Conv. Total (cfs)       234929.6  Conv. (cfs)              3321.4   160060.5   71547.8
  Length Wtd. (ft)          257.33  Wetted Per. (ft)         167.10     111.36     350.88
  Min Ch El (ft)          2053.51   Shear (lb/sq ft)           0.19       1.44       0.71
  Alpha                      2.48   Stream Power (lb/ft s)     0.21      15.24       2.16
  rctn Loss (ft)             0.39   Cum Volume (acre-ft)      10.38      33.36      14.17
  & E Loss (ft)              0.30   Cum SA (acres)             4.89       3.62       3.62

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION           RIVER: Sols Wash
REACH: Reach 1             RS: 0.43

INPUT
Description: First Cross Section US of US Hwy 93 Bridge
Station Elevation Data     num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
6827.504 2063.296867.647 2063.436898.287 2063.716932.708  2063.86938.881 2062.72
6948.328 2063.186962.202 2063.376975.375 2063.066984.758  2063.16989.496 2063.23
6995.012 2063.386999.423 2063.027000.965 2063.037013.559    20587020.897 2057.45
 7020.99 2057.477023.557 2057.047025.755 2052.957033.534  2052.87037.678 2052.68
7040.019 2051.927047.592 2051.927056.486 2052.097068.423  2051.87071.068 2051.78
7123.557 2051.367125.006 2051.277149.854 2051.497160.997 2051.387165.827  2051.6
7169.462 2051.627171.031 2051.657178.053 2051.587183.526 2051.877191.078  2053.3
 7194.09 2053.427203.198 2053.94 7209.42 2054.627226.815 2055.727229.636     2056
7231.383 2056.067254.173 2056.81 7256.86 2056.997287.888 2058.367341.261 2063.44

Manning's n Values          num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
6827.504      .16995.012    .0657023.557     .037191.078    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      7023.5577191.078                 146     146     146              .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
888        F
888        F
Skew Angle = 45

CROSS SECTION OUTPUT    Profile #PF 1

  E.G. Elev (ft)          2063.71   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.85   Wt. n-Val.                          0.030
  W.S. Elev (ft)          2062.85   Reach Len. (ft)            9.32      9.32       9.32
  Crit W.S. (ft)          2057.62   Flow Area (sq ft)                  1757.57
  E.G. Slope (ft/ft)      0.000899  Area (sq ft)              82.24    1852.39     759.89
  Q Total (cfs)           13011.36  Flow (cfs)                        13011.36
  Top Width (ft)            337.22  Top Width (ft)            25.67     167.52     144.03
  Vel Total (ft/s)           7.40   Avg. Vel. (ft/s)                    7.40
  Max Chl Dpth (ft)         11.58   Hydr. Depth (ft)                   11.14
```

Conv. Total (cfs)	433947.6	Conv. (cfs)		433947.6		
Length Wtd. (ft)	9.32	Wetted Per. (ft)		157.92		
Min Ch El (ft)	2051.27	Shear (lb/sq ft)		0.62		
Alpha	1.00	Stream Power (lb/ft s)		4.62		
Frctn Loss (ft)		Cum Volume (acre-ft)	9.62	26.10	0.76	
C & E Loss (ft)		Cum SA (acres)	4.29	2.87	0.33	

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

BRIDGE RIVER: Sols Wash
REACH: Reach 1 RS: 0.42

INPUT
Description:
Distance from Upstream XS = 9.32
Deck/Roadway Width = 131
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew = 45
Upstream Deck/Roadway Coordinates
num= 34

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
6930	2063.8		7015.45	2063.81		7015.45	2067.21	
7018.98	2067.21		7018.98	2065.71		7026.7	2065.07	2060.95
7031	2065.07	2061.35	7047.32	2065.09	2061.35	7051.62	2065.09	2060.95
7052.87	2065.09	2060.95	7057.17	2065.09	2061.35	7073.82	2065.14	2061.35
7078.13	2065.14	2060.95	7079.38	2065.14	2060.95	7083.68	2065.14	2061.35
7099.95	2065.08	2061.35	7104.25	2065.08	2060.95	7105.5	2065.08	2060.95
7109.8	2065.08	2061.35	7126.77	2065.08	2061.35	7131.07	2065.08	2060.95
7132.32	2065.08	2060.95	7136.62	2065.08	2061.35	7153.21	2065.08	2061.35
7157.5	2065.08	2060.95	7158.76	2065.08	2060.95	7163.06	2065.08	2061.35
7179.38	2065.16	2061.35	7183.67	2065.16	2060.95	7214.53	2065.92	
7214.53	2067.42		7218.06	2067.42		7218.06	2064.02	
7434.86	2066							

Upstream Bridge Cross Section Data
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6827.5	2063.29	6867.65	2063.43	6898.29	2063.71	6932.71	2063.8	6938.88	2062.72
6948.33	2063.18	6962.2	2063.37	6975.38	2063.06	6984.76	2063.1	6989.5	2063.23
6995.01	2063.38	6999.42	2063.02	7000.97	2063.03	7013.56	2058	7020.9	2057.45
7020.99	2057.47	7023.56	2057.04	7025.76	2052.95	7033.53	2052.8	7037.68	2052.68
7040.02	2051.92	7047.59	2051.92	7056.49	2052.09	7068.42	2051.8	7071.07	2051.78
7123.56	2051.36	7125.01	2051.27	7149.85	2051.49	7161	2051.38	7165.83	2051.6
7169.46	2051.62	7171.03	2051.65	7178.05	2051.58	7183.53	2051.87	7191.08	2053.3
7194.09	2053.42	7203.2	2053.94	7209.42	2054.62	7226.82	2055.72	7229.64	2056
31.38	2056.06	7254.17	2056.81	7256.86	2056.99	7287.89	2058.36	7341.26	2063.44

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6827.5	.045	7023.56	.025	7191.08	.045

Bank Sta: Left	Right	Coeff Contr.	Expan.
7023.56	7191.08	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888		F	
888		F	

Skew Angle = 45

Downstream Deck/Roadway Coordinates
num= 36

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
6363.96	2061		6747.82	2062		7006.3	2063.57	
7006.3	2066.97		7009.84	2066.97		7009.84	2065.47	
7017.28	2065.12	2060.95	7021.58	2065.12	2061.35	7039.5	2065.16	2061.35
7043.8	2065.16	2060.95	7045.05	2065.16	2060.95	7049.35	2065.16	2061.35
7068.24	2065.13	2061.35	7072.54	2065.13	2060.95	7073.79	2065.13	2060.95
7078.09	2065.13	2061.35	7094.53	2065.2	2061.35	7098.83	2065.2	2060.95
7100.08	2065.2	2060.95	7104.38	2065.2	2061.35	7120.96	2065.17	2061.35
7125.26	2065.17	2060.95	7126.51	2065.17	2060.95	7130.81	2065.17	2061.35
7147.32	2065.16	2061.35	7151.62	2065.16	2060.95	7152.87	2065.16	2060.95
7157.17	2065.16	2061.35	7174.12	2065.09	2061.35	7178.41	2065.09	2060.95
7185.75	2065.75		7185.75	2067.25		7189.29	2067.25	
7189.29	2063.85		7218.06	2064		7434.86	2066	

Downstream Bridge Cross Section Data
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6761.84	2059.25	6822.35	2058.46	6857.82	2060.31	6885.57	2058.16	6922.79	2056.96
6939.86	2056.36	6940.76	2056.33	6965.1	2056.49	6966.32	2056.6	6968.69	2056.67
6987.44	2056.65	6988.51	2056.65	7005.4	2057.32	7008.34	2057.8	7011.93	2057.66
7015.38	2056.94	7015.88	2056.57	7018.04	2056.9	7018.04	2060.5	7018.51	2060.5
7018.98	2054.5	7023.15	2054.22	7027.16	2053.7	7038.43	2051.63	7041.69	2050.34
7055.79	2050.2	7062.4	2050.21	7071.07	2050.17	7091.2	2050.08	7142.5	2049.58
7151.54	2049.45	7163.73	2049.4	7172.93	2049.33	7180.08	2057.29	7189.13	2059.62
7190.57	2058.85	7195.16	2058.9	7204.37	2060.48	7213.18	2060.71	7225.1	2057.63
7289.26	2061.37	7322.32	2064.88						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
61.84	.045	7018.51	.025	7180.08	.045

Bank Sta: Left Right Coeff Contr. Expan.

```
     7018.98 7180.08              .3        .5
ffective Flow      num=        2
 Sta L   Sta R    Elev  Permanent
 d        F
888       F
Left Levee      Station=7018.508      Elevation=  2060.5
Skew Angle = 45

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           =2065.083
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  5

Pier Data
Pier Station     Upstream=7052.245    Downstream=7044.431
Upstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95
Downstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95

Pier Data
Pier Station     Upstream=7078.747    Downstream=7073.167
Upstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95
Downstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95

Pier Data
Pier Station     Upstream=7104.867    Downstream=7099.458
Upstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95
Downstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95

ier Data
er Station     Upstream=7131.695    Downstream=7125.882
tream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95
Downstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95

Pier Data
Pier Station     Upstream=7158.134    Downstream=7152.244
Upstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95
Downstream     num=        2
    Width   Elev    Width   Elev
    1.24  1949.5    1.24 2060.95

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
        Energy
        Momentum                Cd   =       2
        Yarnell                 KVal =     .95
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
        Pressure and Weir flow
            Submerged Inlet Cd          =
            Submerged Inlet + Outlet Cd =       .8
            Max Low Cord                =

Additional Bridge Parameters
        Add Friction component to Momentum
        Do not add Weight component to Momentum
        Class B flow critical depth computations use critical depth
            inside the bridge at the upstream end
        Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT    Profile #PF 1
Opening : Single BR

  E.G. US. (ft)              2063.71    Element                 Inside BR US  Inside BR DS
  W.S. US. (ft)              2062.85    E.G. Elev (ft)             2063.71       2060.82
  Q Total (cfs)             13011.36    W.S. Elev (ft)             2061.35       2059.62
  Q Bridge (cfs)            13011.36    Crit W.S. (ft)             2057.87       2056.51
  Q Weir (cfs)                          Max Chl Dpth (ft)            10.08         10.29
   eir Sta Lft (ft)                     Vel Total (ft/s)              9.03          9.23
  Weir Sta Rgt (ft)                     Flow Area (sq ft)          1441.64       1410.29
  Weir Submerg                          Froude # Chl                 0.04          0.04
```

Weir Max Depth (ft)		Specif Force (cu ft)	10654.08	10344.71
Min El Weir Flow (ft)	2065.08	Hydr Depth (ft)	123020.20	9.18
Min El Prs (ft)	2061.35	W.P. Total (ft)	403.20	253.27
Delta EG (ft)	2.88	Conv. Total (cfs)	200357.9	266649.7
Delta WS (ft)	3.24	Top Width (ft)	0.01	153.63
BR Open Area (sq ft)	1441.64	Frctn Loss (ft)		
BR Open Vel (ft/s)	9.03	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.94	0.83
Br Sel Method	Press Only	Power Total (lb/ft s)	8.50	7.64

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.40

INPUT
Description: First Cross Section Downstream of US Hwy 93 Bridge
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6761.843	2059.25	6822.35	2058.466857.818		2060.316885.565		2058.166922.787		2056.96
6939.863	2056.366940.762		2056.336965.101		2056.496966.324		2056.66968.686		2056.67
6987.437	2056.656988.505		2056.657005.398		2057.327008.339		2057.87011.933		2057.66
7015.375	2056.947015.877		2056.577018.035		2056.97018.035		2060.57018.508		2060.5
7018.981	2054.57023.154		2054.227027.164		2053.77038.428		2051.637041.694		2050.34
7055.794	2050.27062.399		2050.217071.068		2050.177091.199		2050.08	7142.5	2049.58
7151.543	2049.457163.727		2049.47172.926		2049.337180.083		2057.297189.126		2059.62
7190.569	2058.857195.158		2058.97204.371		2060.487213.175		2060.717225.104		2057.63
7289.26	2061.377322.324		2064.88						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
6761.843	.16	857.818	.065	7018.035	.02	7018.981	.03	7180.083	.065
7204.371	1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7018.98	7180.083	254	254	254	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888	F		F

Left Levee Station=7018.508 Elevation= 2060.5
Skew Angle = 45

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2060.82	Element			
Vel Head (ft)	1.21	Wt. n-Val.	0.020	0.030	0.000
W.S. Elev (ft)	2059.62	Reach Len. (ft)	254.00	254.00	254.00
Crit W.S. (ft)	2056.34	Flow Area (sq ft)	1.03	1474.70	0.01
E.G. Slope (ft/ft)	0.001712	Area (sq ft)	1.03	1474.70	57.38
Q Total (cfs)	13011.36	Flow (cfs)	1.09	13010.25	0.02
Top Width (ft)	222.48	Top Width (ft)	0.40	161.10	60.97
Vel Total (ft/s)	8.82	Avg. Vel. (ft/s)	1.06	8.82	1.63
Max Chl Dpth (ft)	10.29	Hydr. Depth (ft)	2.56	9.15	2.32
Conv. Total (cfs)	314435.3	Conv. (cfs)	26.3	314408.5	0.5
Length Wtd. (ft)	254.00	Wetted Per. (ft)	5.13	165.13	0.01
Min Ch El (ft)	2049.33	Shear (lb/sq ft)	0.02	0.95	
Alpha	1.00	Stream Power (lb/ft s)	0.02	8.42	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	9.61	21.27	0.67
C & E Loss (ft)	0.61	Cum SA (acres)	4.29	2.60	0.31

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.35

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9004.6	2054.7	9037.01	2054.43	9055.7	2054.37	9073.46	2054.72	9079.68	2054.85
9082.12	2054.8	9112.29	2054.39	9113.48	2054.4	9113.75	2054.39	9117.28	2054.63
9150.59	2054.5	9151.82	2054.51	9154.48	2054.5	9182.49	2054.47	9199.41	2054.49
32.36	2054.3	9252.84	2054.16	9262.13	2054.1	9285.56	2053.56	9288.9	2053.61
95.84	2053.6	9323.28	2053.53	9344.85	2053.5	9356.58	2053.47	9376.76	2053.55
9392.82	2053.8	9409.73	2053.84	9430.13	2053.82	9454.41	2054	9473.58	2054.1

9481.6	2054.2	9485.74	2054.19	9509.72	2054.22	9512.14	2054.23	9512.25	2054.23
514.61	2054.3	9516.4	2054.29	9517.13	2054.29	9531.15	2054.26	9548.94	2054.18
564.4	2054.2	9574.43	2054.04	9624.13	2054.41	9627.48	2054.46	9655.84	2054.5
77.61	2054.4	9687.51	2054.46	9719.71	2054.49	9723.28	2054.5	9724.31	2054.5
9751.81	2054.6	9775.07	2054.65	9797.95	2054.99	9810.26	2055.15	9831.93	2055.69
9861.64	2056.4	9874.98	2055.56	9878.47	2055.14	9882.68	2055.99	9882.68	2057.39
9883.35	2057.39	9884.02	2055.99	9884.02	2055.43	9885.35	2054.85	9890.37	2054.7
9894.06	2054.73	9914.29	2054.49	9918.17	2053.88	9922.95	2053.28	9940.98	2051.6
9943.79	2050.82	9955.31	2049.51	9964.38	2048.13	9970.37	2047.79	9988.72	2047.7
9992.67	2047.69	9997.16	2047.68	10000	2047.6810016.92		2047.6810025.29		2047.78
10041.72	204810044.77		2049.6310050.85		2053.87 10058.8		2058.2910064.51		2059.41
10066.55	2059.610071.91		2059.6910079.59		2059.7810100.43		2059.8910117.21		2060.41
10131.35	2060.510132.36		2060.5910144.29		2060.9210154.85		2062.5710163.27		2064.01

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9004.6	.1	9516.4	.065	9882.68	.02	9884.02	.065	9940.98	.03
10050.85	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9940.9	10050.85	686	686	686	.3	.5

Left Levee Station= 9883.35 Elevation= 2057.39

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2059.48	Element			
Vel Head (ft)	3.25	Wt. n-Val.	0.065	0.030	0.065
W.S. Elev (ft)	2056.23	Reach Len. (ft)	686.00	686.00	686.00
Crit W.S. (ft)	2056.23	Flow Area (sq ft)	136.23	855.79	5.02
E.G. Slope (ft/ft)	0.005847	Area (sq ft)	136.23	855.79	5.02
Q Total (cfs)	13011.36	Flow (cfs)	421.65	12580.74	8.97
Top Width (ft)	171.20	Top Width (ft)	57.08	109.87	4.25
Vel Total (ft/s)	13.05	Avg. Vel. (ft/s)	3.10	14.70	1.79
Max Chl Dpth (ft)	8.55	Hydr. Depth (ft)	2.39	7.79	1.18
Conv. Total (cfs)	170162.2	Conv. (cfs)	5514.4	164530.6	117.3
Length Wtd. (ft)	686.00	Wetted Per. (ft)	58.08	111.91	4.86
Min Ch El (ft)	2047.68	Shear (lb/sq ft)	0.86	2.79	0.38
Alpha	1.23	Stream Power (lb/ft s)	2.65	41.04	0.67
Frctn Loss (ft)	3.29	Cum Volume (acre-ft)	9.21	14.47	0.49
C & E Loss (ft)	0.68	Cum SA (acres)	4.12	1.81	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
rning: 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.
ning: 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: Sols Wash
REACH: Reach 1 RS: 0.22

INPUT
Description: Cross Section 0.22 from CBA Study
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9433	2050.5	9473	2049.6	9508	2049.7	9516	2050.4	9590	2050.4
9669	2050.4	9726	2051.5	9799	2051.3	9899	2051	9938	2044.6
9963	2043	10000	2043	10019	2043	10037	2058.4	10170	2059.3
10292	2060.6	10331	2061.6	10381	2061.4	10430	2057.8	10485	2056.9
10541	2056.4	10573	2058.5	10625	2060.4	10628	2063.4	10671	2063.4
10732	2062	10788	2061.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9433	.065	9963	.025	10037	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9899	10019	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2054.80	Element			
Vel Head (ft)	1.89	Wt. n-Val.	0.065	0.032	0.025
W.S. Elev (ft)	2052.91	Reach Len. (ft)			
Crit W.S. (ft)	2052.91	Flow Area (sq ft)	1033.44	982.02	57.40
E.G. Slope (ft/ft)	0.004103	Area (sq ft)	1033.44	982.02	57.40
Q Total (cfs)	15045.00	Flow (cfs)	2564.47	11951.65	528.87
Top Width (ft)	597.58	Top Width (ft)	466.00	120.00	11.58
Vel Total (ft/s)	7.26	Avg. Vel. (ft/s)	2.48	12.17	9.21
Max Chl Dpth (ft)	9.91	Hydr. Depth (ft)	2.22	8.18	4.96
Conv. Total (cfs)	234875.3	Conv. (cfs)	40035.4	186583.5	8256.5
Length Wtd. (ft)		Wetted Per. (ft)	468.46	120.57	15.24
Min Ch El (ft)	2043.00	Shear (lb/sq ft)	0.57	2.09	0.96
Alpha	2.31	Stream Power (lb/ft s)	1.40	25.39	8.89
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: User specified water surface is not possible for the specified flow regime. The program used

critical depth as the starting water surface.

file Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	0.22	15045.00	2043.00	2052.91	2052.91	2054.80	0.004103	12.17	2072.86	597.58	0.75
Reach 1	0.35	13011.36	2047.68	2056.23	2056.23	2059.48	0.005847	14.70	997.04	171.20	0.93
Reach 1	0.40	13011.36	2049.33	2059.62	2056.34	2060.82	0.001712	8.82	1475.75	222.48	0.51
Reach 1	0.42	Bridge									
Reach 1	0.43	13011.36	2051.27	2062.85	2057.62	2063.71	0.000899	7.40	1757.57	337.22	0.39
Reach 1	0.48	13011.36	2053.51	2063.17		2064.39	0.003067	10.56	2306.58	888.05	0.67
Reach 1	0.51	Lat. RC									
Reach 1	0.52	14459.00	2055.50	2064.56		2065.31	0.002183	8.40	3723.28	1421.37	0.56
Reach 1	0.57	14459.00	2057.69	2065.37	2065.37	2066.53	0.003995	10.80	3772.27	1684.91	0.75
Reach 1	0.61	14459.00	2059.91	2067.52	2067.52	2068.64	0.003813	10.61	3921.44	1603.75	0.73
Reach 1	0.66	14413.00	2061.79	2068.42		2069.90	0.005621	12.12	2586.86	1369.65	0.88
Reach 1	0.71	14413.00	2063.89	2070.23	2070.23	2071.37	0.004804	11.09	2618.17	1221.36	0.81
Reach 1	0.76	14413.00	2065.84	2071.96	2071.96	2073.59	0.006661	12.08	1665.95	905.44	0.93
Reach 1	0.79	14413.00	2067.42	2073.94	2073.94	2075.50	0.009084	13.18	1921.97	928.41	1.07
Reach 1	0.90	14413.00	2073.10	2078.92	2078.30	2080.24	0.008016	12.80	2409.28	1339.06	1.00
Reach 1	1.00	14413.00	2078.10	2083.20	2083.20	2085.42	0.008498	15.27	1541.10	1092.53	1.24
Reach 1	1.12	14413.00	2082.30	2088.51	2088.51	2089.89	0.004376	12.15	2066.62	880.83	0.92

Profile Output Table - Standard Table 2

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Reach 1	0.22	2054.80	2052.91	1.89			2564.47	11951.65	528.87	597.58
Reach 1	0.35	2059.48	2056.23	3.25	3.29	0.68	421.65	12580.74	8.97	171.20
Reach 1	0.40	2060.82	2059.62	1.21	0.73	0.61	1.09	13010.25	0.02	222.48
Reach 1	0.42	Bridge								
Reach 1	0.43	2063.71	2062.85	0.85				13011.36		337.22
Reach 1	0.48	2064.39	2063.17	1.22	0.39	0.30	183.95	8864.80	3962.61	888.05
Reach 1	0.51	Lat. RC								
Reach 1	0.52	2065.31	2064.56	0.75	0.77	0.14	3075.23	9612.80	1770.97	1421.37
Reach 1	0.57	2066.53	2065.37	1.16	0.60	0.21	3496.02	9089.56	1873.42	1684.91
Reach 1	0.61	2068.64	2067.52	1.12	0.97	0.00	4021.02	9109.46	1328.52	1603.75
Reach 1	0.66	2069.90	2068.42	1.48	1.15	0.11	5147.97	8981.06	283.97	1369.65
Reach 1	0.71	2071.37	2070.23	1.14	1.32	0.03	5698.54	7997.76	716.70	1221.36
Reach 1	0.76	2073.59	2071.96	1.63	1.50	0.15	5307.38	9081.58	24.05	905.44
Reach 1	0.79	2075.50	2073.94	1.56	1.74	0.01	7208.47	7204.53	0.00	928.41
Reach 1	0.90	2080.24	2078.92	1.32	4.71	0.02	7761.75	6649.23	2.02	1339.06
Reach 1	1.00	2085.42	2083.20	2.22	4.66	0.27	6828.52	7570.26	14.22	1092.53
each 1	1.12	2089.89	2088.51	1.38	3.67	0.08	6051.38	7464.71	896.92	880.83

D.6 – Developed Conditions Model

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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: Sols Wash CLOMR
Project File : solsCLOMR.prj
Run Date and Time: 7/17/2002 3:59:53 PM

Project in English units

Project Description:
P & J Investors, Inc. - Goldmine Village CLOMR
Parcel is approximately 15
acres and is located along Sols Wash UpStrm of US Hwy 93
Floodplain Manager:
Skip Blunt - Building Inspector, Town of Wickenburg, Arizona

PLAN DATA

Plan Title: Developed Conditions - Weir Rating_SubC
Plan File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.p02

Geometry Title: Developed Conditions_weir rating
Geometry File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.g08

Flow Title : FIS Flow Data - DevCond_SubC
Flow File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.f02

an Summary Information:
Number of: Cross Sections = 15 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 1

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 = 0.05

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: Subcritical Flow

FLOW DATA

Flow Title: FIS Flow Data - DevCond_SubC
Flow File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.f02

Flow Data (cfs)

River	Reach	RS	PF 1
Sols Wash	Reach 1	1.12	14413
Sols Wash	Reach 1	0.61	14459
Sols Wash	Reach 1	0.48	15045
Sols Wash	Reach 1	0.22	16537.47

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Sols Wash	Reach 1	PF 1	Critical	Known WS = 2052.81

METRY DATA

Geometry Title: Developed Conditions_weir rating

ometry File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.g08

SS SECTION RIVER: Sols Wash
CH: Reach 1 RS: 1.12

INPUT
Description: Cross Section 1.12 from CBA Study
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9227	2092.5	9301	2092.6	9331	2083.3	9392	2082.2	9437	2087.5
9549	2088	9693	2087.7	9798	2087.2	9872	2086.6	9897	2086.4
9926	2087.3	9949	2083.4	9970	2082.3	10000	2082.5	10035	2083.4
10062	2084.9	10084	2086.4	10118	2086.1	10129	2086.6	10157	2086.6
10164	2086.2	10180	2085.1	10185	2085.1	10205	2091.9		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9227	.06	9331	.025	9392	.06	9949	.025	10062	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9949	10062	615	620	630	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2089.89	Element			
Vel Head (ft)	1.38	Wt. n-Val.	0.034	0.025	0.060
W.S. Elev (ft)	2088.51	Reach Len. (ft)	615.00	620.00	630.00
Crit W.S. (ft)	2088.51	Flow Area (sq ft)	1140.75	614.35	311.52
E.G. Slope (ft/ft)	0.004376	Area (sq ft)	1140.75	614.35	311.52
Q Total (cfs)	14413.00	Flow (cfs)	6051.38	7464.71	896.92
Top Width (ft)	880.83	Top Width (ft)	634.80	113.00	133.03
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	5.30	12.15	2.88
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)	1.80	5.44	2.34
Conv. Total (cfs)	217882.7	Conv. (cfs)	91479.2	112844.7	13558.8
Length Wtd. (ft)	618.08	Wetted Per. (ft)	636.26	113.08	133.70
Min Ch El (ft)	2082.30	Shear (lb/sq ft)	0.49	1.48	0.64
Alpha	1.83	Stream Power (lb/ft s)	2.60	18.03	1.83
Frctn Loss (ft)	3.67	Cum Volume (acre-ft)	128.75	96.14	3.21
C & E Loss (ft)	0.08	Cum SA (acres)	80.88	14.36	1.62

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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
rning: 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.
ning: 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: Sols Wash
REACH: Reach 1 RS: 1.00

INPUT
Description: Cross Section 1.10 from CBA Study
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8262	2097.2	8292	2089.4	8319	2086.6	8354	2084	8410	2083
8469	2082.8	8481	2083.3	8516	2082.6	8539	2081.7	8544	2082.3
8574	2081.7	8603	2082.5	8648	2082.7	8671	2082.1	8710	2082.8
8757	2083.1	8837	2083.5	8898	2083.9	8967	2084.1	9018	2083.6
9059	2083.4	9113	2082.8	9135	2082.2	9154	2082.2	9174	2082.9
9214	2082.5	9234	2083.2	9257	2077.8	9274	2076.6	9302	2076.6
9314	2078.6	9340	2079	9371	2082.7	9387	2083	9429	2083.4
9586	2083.1	9682	2083.1	9776	2083.4	9814	2082.7	9831	2083.6
9884	2083.2	9916	2081.6	9944	2078.9	9957	2078.3	10000	2078.1
10033	2078.1	10050	2082.1	10059	2082.6	10075	2087.1		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8262	1	8603	.065	9274	.025	9314	.065	9944	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9944	10050	570	560	565	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.42	Element			
Vel Head (ft)	2.22	Wt. n-Val.	0.040	0.025	0.065
W.S. Elev (ft)	2083.20	Reach Len. (ft)	570.00	560.00	565.00
Crit W.S. (ft)	2083.20	Flow Area (sq ft)	1037.23	495.61	8.27
E.G. Slope (ft/ft)	0.008498	Area (sq ft)	1037.23	495.61	8.27
Q Total (cfs)	14413.00	Flow (cfs)	6828.52	7570.26	14.22
Top Width (ft)	1092.53	Top Width (ft)	975.41	106.00	11.13
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)	6.58	15.27	1.72
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)	1.06	4.68	0.74
Conv. Total (cfs)	156345.3	Conv. (cfs)	74072.5	82118.6	154.2
Length Wtd. (ft)	565.06	Wetted Per. (ft)	976.79	106.48	11.22
Min Ch El (ft)	2078.10	Shear (lb/sq ft)	0.56	2.47	0.39
lpha	1.64	Stream Power (lb/ft s)	3.71	37.72	0.67
rctn Loss (ft)	4.66	Cum Volume (acre-ft)	113.38	88.24	0.90
C & E Loss (ft)	0.27	Cum SA (acres)	69.52	12.80	0.58

ning: 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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.90

INPUT
Description: Cross Section 0.90 from CBA Study
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8508	2090.8	8563	2083.3	8590	2084.6	8614	2084.2	8638	2083.6
8672	2079.1	8719	2079.1	8769	2077.5	8800	2075.4	8815	2072.8
8824	2072.8	8849	2077	8898	2077.2	8966	2077.4	9029	2077.5
9093	2077.8	9156	2078.3	9229	2078.6	9290	2078.7	9365	2078.4
9435	2078.3	9457	2075.2	9474	2074.3	9500	2071.1	9520	2071.1
9540	2075.7	9562	2077.8	9595	2078.6	9615	2077.9	9640	2078.4
9668	2077.7	9688	2078.5	9793	2078	9808	2077.2	9828	2074.5
9843	2077	9917	2078.6	9958	2077.7	9976	2073.5	10000	2073.1
10050	2073.1	10060	2078	10080	2083				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8508	1	8769	.065	9500	.025	9520	.065	9958	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9958	10060	540	565	575	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2080.24	Element			
Vel Head (ft)	1.32	Wt. n-Val.	0.049	0.030	0.065
W.S. Elev (ft)	2078.92	Reach Len. (ft)	540.00	565.00	575.00
Crit W.S. (ft)	2078.30	Flow Area (sq ft)	1888.24	519.35	1.69
E.G. Slope (ft/ft)	0.008016	Area (sq ft)	1888.24	519.35	1.69
Q Total (cfs)	14413.00	Flow (cfs)	7761.75	6649.23	2.02
Top Width (ft)	1339.06	Top Width (ft)	1233.38	102.00	3.68
Vel Total (ft/s)	5.98	Avg. Vel. (ft/s)	4.11	12.80	1.20
Max Chl Dpth (ft)	7.82	Hydr. Depth (ft)	1.53	5.09	0.46
Conv. Total (cfs)	160979.3	Conv. (cfs)	86691.3	74265.5	22.6
Length Wtd. (ft)	552.02	Wetted Per. (ft)	1235.60	103.62	3.79
Min Ch El (ft)	2073.10	Shear (lb/sq ft)	0.76	2.51	0.22
Alpha	2.37	Stream Power (lb/ft s)	3.14	32.11	0.27
Frctn Loss (ft)	4.71	Cum Volume (acre-ft)	94.24	81.72	0.84
C & E Loss (ft)	0.02	Cum SA (acres)	55.07	11.47	0.48

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: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.79

INPUT
Description: Begin new cross sections using 2002 mapping
Cross section on same alignment as CBA RM 0.79
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8956.81	2083.2	8961.84	2083.77	8970.87	2083.71	8978.94	2083.02	8979.19	2082.9
8988.39	2077.4	8990.81	2076.68	8991.69	2076.64	9004.42	2076.35	9010.63	2076.13
9019.09	2077.8	9019.48	2077.85	9030.16	2076.63	9054.56	2075.72	9060.94	2075.49
9063.56	2075.4	9083.02	2074.32	9083.35	2074.32	9098.69	2070.52	9111.43	2066.75
9131.47	2070	9147.5	2072.19	9158.97	2071.89	9164.33	2071.92	9178.63	2072.13
9211.28	2072.8	9217.01	2072.93	9224.73	2072.76	9244.96	2072.41	9254.37	2072.53
9270.51	2072.5	9282.41	2072.77	9291.72	2072.97	9295.92	2072.97	9330.65	2072.45
9332.83	2072.3	9362.38	2072.66	9368.67	2072.74	9371.25	2072.72	9378.07	2072.74
9391.59	2072.9	9401.78	2072.87	9416.01	2072.85	9427.16	2072.86	9441.69	2072.9
9445.75	2072.8	9461.88	2072.42	9465.75	2072.74	9478.68	2073.23	9510.62	2073.9
9517	2074.4	9527.09	2073.36	9528.83	2072.98	9531.05	2072.99	9538.32	2073.02
9549.12	2073.1	9556.06	2073.16	9566.15	2073.38	9572.78	2070.48	9580.24	2066.96
9593.86	2066.6	9596.05	2066.53	9596.87	2066.53	9609.62	2066.64	9611.57	2068.56
9612.84	2069.5	9618.6	2073.59	9628.69	2073.37	9639.24	2073.09	9655.86	2072.21
9661.29	2072	9663.28	2071.71	9674.38	2071.22	9677.76	2071	9686.11	2071.09
9695.82	2071	9713.96	2071.99	9715.82	2072.15	9716.86	2072.16	9739.74	2072.39
9753.98	2072.5	9755.15	2072.55	9755.84	2072.55	9775.19	2073.28	9778.84	2073.34
9799.77	2073.4	9806.01	2073.57	9825.27	2073.51	9827.43	2073.51	9835.63	2073.52
9852.4	2073.6	9872.04	2073.95	9883.99	2074.31	9902.07	2074.05	9912.03	2074.23
9919.78	2073.9	9925.04	2073.54	9939.15	2072.75	9954.82	2071.68	9971.15	2070
9972.27	2069.8	9973.8	2069.48	9981.21	2067.42	9988.08	2067.63	10000	2067.56
25.66	2067.42	10050.43	2070.51	10070.99	2073.92	10081.72	2076	10087.79	2076.31
88.16	2076.35	10090.05	2077.16	10093.02	2077.9	10097.45	2077.94		

nning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
56.81	.065	9098.69	.035	9147.5	1	9517	.065	9566.15	.035
618.6	.065	9954.82	.031	0070.99	.065				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9954.82	10070.99	224	226	235	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2075.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.56	Wt. n-Val.	0.049	0.030	0.000
W.S. Elev (ft)	2073.94	Reach Len. (ft)	224.00	226.00	235.00
Crit W.S. (ft)	2073.94	Flow Area (sq ft)	1375.55	546.42	0.00
E.G. Slope (ft/ft)	0.009084	Area (sq ft)	1375.55	546.42	0.00
Q Total (cfs)	14413.00	Flow (cfs)	7208.47	7204.53	0.00
Top Width (ft)	928.41	Top Width (ft)	812.14	116.17	0.10
Vel Total (ft/s)	7.50	Avg. Vel. (ft/s)	5.24	13.18	0.10
Max Chl Dpth (ft)	7.41	Hydr. Depth (ft)	1.69	4.70	0.01
Conv. Total (cfs)	151224.0	Conv. (cfs)	75632.6	75591.3	0.0
Length Wtd. (ft)	225.14	Wetted Per. (ft)	817.66	117.07	0.10
Min Ch El (ft)	2067.42	Shear (lb/sq ft)	0.95	2.65	
Alpha	1.79	Stream Power (lb/ft s)	5.00	34.90	
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	74.01	74.81	0.83
C & E Loss (ft)	0.01	Cum SA (acres)	42.39	10.05	0.46

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 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: Sols Wash
REACH: Reach 1 RS: 0.76

INPUT
Description:
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8966.41	2082.7	8982.11	2083.52	8982.86	2083.55	8983.12	2083.56	8983.45	2083.26
8984.82	2082.9	9000.97	2076.31	9003.37	2076.19	9031.72	2075.49	9034.78	2075.53
035.72	2075.5	9036.98	2075.49	9039.52	2075.48	9057.72	2075.17	9070.38	2074.64
93.28	2074.2	9099.65	2074.1	9103.5	2074.01	9131.81	2073.42	9141.75	2073.24
.52.16	2071.3	9157.66	2070.21	9163.66	2070.08	9169.74	2070.47	9172.35	2071.04
9177.48	2070	9194.18	2066.88	9204.49	2065.09	9228.61	2069.71	9237.43	2071.32
9254.65	2071.2	9256.59	2071.2	9257.7	2071.21	9259.43	2071.19	9273.49	2071.18
9312.44	2071.5	9313	2071.46	9313.25	2071.46	9314.23	2071.46	9360.98	2071.07
9363.52	2071.1	9389.95	2071.18	9410.02	2071.25	9431.27	2071.3	9435.6	2071.44
9439.26	2071.5	9446.98	2071.79	9466.96	2072.39	9470.26	2072.34	9503	2071.54
9503.13	2071.5	9503.18	2071.54	9518.44	2071.61	9529.92	2071.62	9538.86	2071.83
9564	2071.9	9575	2071.85	9600.82	2071.74	9622.46	2071.7	9630.28	2071.6
9638.87	2071.6	9648.49	2071.37	9650.48	2070.28	9656.39	2066.19	9668.72	2066.16
9677	2065.8	9690.29	2066.2	9694.54	2066.21	9698.26	2067.94	9705.89	2070.58
9717.74	2070.5	9723.11	2070.46	9736.52	2070.78	9756.71	2070.87	9766.81	2071.27
9774.46	2071.5	9786.81	2071.96	9800.15	2072	9808.73	2071.87	9831.88	2071.62
9836.64	2071.6	9838.05	2071.59	9839.88	2071.55	9869.23	2072.05	9872.39	2072.1
9895.46	2071.8	9912.99	2071.63	9922.97	2071.78	9941.02	2070.67	9948.71	2070.25
9955.96	2069.3	9957.02	2069.18	9957.73	2069.04	9974.47	2066.6	9975.98	2066.44
9976.88	2066.4	9977.22	2066.32	9977.62	2066.14	9980.22	2066.06	10000	2065.89
10006.53	2065.84	10009.77	2065.91	0077.22	2066.96	10085.05	2067.11	0086.89	2067.24
10100.79	2070.08	10106.98	2071.21	0112.89	2071.38	10116.4	2071.41	0120.05	2071.91
10138.24	2074.08	10145.63	2073.81	0147.75	2074.06				

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8966.41	.065	9177.48	.035	9237.43	1	9630.28	.065	9648.49	.035
9705.89	.065	9955.96	.031	0100.79	.065				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9955.96	10100.79	262	269	270	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2073.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.	0.040	0.030	0.065
W.S. Elev (ft)	2071.96	Reach Len. (ft)	262.00	269.00	270.00
Crit W.S. (ft)	2071.96	Flow Area (sq ft)	899.13	751.50	15.32
E.G. Slope (ft/ft)	0.006661	Area (sq ft)	899.13	751.50	15.32
Q Total (cfs)	14413.00	Flow (cfs)	5307.38	9081.58	24.05
Top Width (ft)	905.44	Top Width (ft)	740.91	144.83	19.71
Vel Total (ft/s)	8.65	Avg. Vel. (ft/s)	5.90	12.08	1.57
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)	1.21	5.19	0.78
Conv. Total (cfs)	176600.5	Conv. (cfs)	65030.6	111275.3	294.6
Length Wtd. (ft)	266.41	Wetted Per. (ft)	744.87	145.39	19.85
Min Ch El (ft)	2065.84	Shear (lb/sq ft)	0.50	2.15	0.32
Alpha	1.40	Stream Power (lb/ft s)	2.96	25.97	0.50
Frctn Loss (ft)	1.50	Cum Volume (acre-ft)	68.16	71.44	0.78
& E Loss (ft)	0.12	Cum SA (acres)	38.39	9.38	0.41

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 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: Sols Wash
REACH: Reach 1 RS: 0.71

INPUT
Description:
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8861.5	2084.2	8864.48	2084.22	8867.75	2084.21	8870.81	2083.35	8887.52	2078.19
8896.29	2078	8913.39	2076.05	8914.15	2076.04	8914.91	2075.99	8929.42	2076.52
8937.54	2076.4	8946.72	2076.01	8954.01	2075.46	8956.91	2075.59	8960.12	2075.61
8979.3	2075.9	8989.9	2073.94	8998.11	2074.64	9009.22	2074.06	9016.26	2072.43
9021.02	2071.4	9031.07	2071.23	9044.91	2071.01	9050.85	2069.61	9051.79	2069.35
9064.19	2069.2	9087.51	2068.79	9098.21	2068.81	9107.64	2068.87	9126.03	2068.85
9148.49	2068.9	9149.98	2068.88	9154.4	2068.88	9179.2	2068.93	9188.16	2068.94
9217.25	2068.8	9219.44	2068.77	9222.7	2068.75	9258.29	2068.79	9267.25	2068.9
9282.3	2068.8	9295.73	2069.2	9298.07	2069.18	9299.52	2069.2	9300.86	2069.16
9313.56	2068.8	9328.8	2068.56	9336.86	2068.43	9356.93	2068.07	9357.34	2068.08
9358.8	2068.1	9394.29	2068.7	9411.36	2068.8	9429.62	2068.59	9444.36	2068.6
9456.47	2068.5	9468.9	2068.11	9474.67	2067.99	9477.64	2067.69	9503.81	2064.5
9523.69	2066.5	9532.86	2067.85	9539.23	2068.74	9550.22	2068.88	9559.65	2068.85
9578.93	2068.7	9610.32	2069.08	9618.4	2069.34	9666.63	2069.59	9678.09	2069.75
9698.54	2068.9	9716.29	2068.87	9723.16	2068.3	9734.24	2064.98	9734.51	2064.9
9735.02	2064.9	9758.68	2064.37	9765.74	2064.46	9770.61	2066.37	9780.87	2069.93
9791.24	2069.2	9794.5	2069.12	9801.2	2069.02	9812.94	2069.26	9824.82	2069.54
9838.16	2069.8	9848.69	2069.52	9858.04	2069.44	9879.06	2069.05	9884.02	2068.99
9888.38	2069.1	9904.2	2069.04	9918.25	2068.84	9922.81	2068.64	9926.76	2068.55
9938.77	2068.1	9954.07	2067.08	9960.01	2066.78	9964.65	2066.04	9973.7	2064.13
9989.73	2064.1	10000	2064.161	0000.84	2064.161	0023.57	2064.361	0039.89	2064.04
10057.9	2063.891	0073.74	2063.9	10096.1	206410109.81		2070.991	0297.08	2071.53
10299.78	207210303.43		2072.681	0305.32	2073.251	0308.73	2073.271	0314.91	2073.31
10319.25	2072.810322.05		2072.25						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8861.5	.065	9411.36	1	9477.64	.035	9532.86	.065	9716.29	.035
9780.87	.065	9964.65	.03						

k Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff Contr.	Expan.
9964.65	10109.81			254	256	246	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2071.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.	0.047	0.030	
W.S. Elev (ft)	2070.14	Reach Len. (ft)	254.00	256.00	246.00
Crit W.S. (ft)	2070.14	Flow Area (sq ft)	1505.04	824.99	
E.G. Slope (ft/ft)	0.004829	Area (sq ft)	1505.04	824.99	
Q Total (cfs)	14413.00	Flow (cfs)	5370.03	9042.97	
Top Width (ft)	1059.53	Top Width (ft)	916.04	143.49	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)	3.57	10.96	
Max Chl Dpth (ft)	6.25	Hydr. Depth (ft)	1.64	5.75	
Conv. Total (cfs)	207402.7	Conv. (cfs)	77274.7	130128.1	
Length Wtd. (ft)	255.27	Wetted Per. (ft)	918.33	145.17	
Min Ch El (ft)	2063.89	Shear (lb/sq ft)	0.49	1.71	
Alpha	2.09	Stream Power (lb/ft s)	1.76	18.78	
Prctn Loss (ft)	1.17	Cum Volume (acre-ft)	60.93	66.57	0.74
C & E Loss (ft)	0.02	Cum SA (acres)	33.41	8.48	0.34

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.66

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8909.42	2073.2	8921	2073.26	8929.09	2072.57	8947.17	2071.42	8953.03	2071.22
8959.27	2071.3	8969.85	2070.72	8972.01	2070.52	8973	2070.48	8978	2070.06
8988.12	2069.2	8990.12	2068.99	9004.2	2069.02	9021.29	2068	9025.56	2067.66
9033.97	2067.2	9049.36	2066.2	9052.58	2066.32	9065.96	2066.79	9066.79	2066.68
9071.42	2066.5	9073.23	2066.5	9089.64	2066.56	9097.4	2066.66	9104.07	2066.67
9124.86	2066.6	9140.22	2066.49	9154.52	2066.42	9172.67	2066.73	9178.12	2066.82
9181.96	2066.9	9204.7	2066.55	9224.11	2066.45	9230.91	2066.6	9267.56	2066.79
70.58	2066.8	9305.51	2066.73	9312.07	2066.72	9312.97	2066.71	9314.61	2066.7
355.5	2066.6	9382.55	2066.48	9392.06	2066.47	9399.86	2066.69	9426.85	2066.9
9446.31	2066.5	9449.86	2066.56	9459.64	2066.7	9484.42	2067.09	9507.86	2066.94

525.25	2066.7	9546.42	2066.97	9567.66	2067.23	9596.15	2067.55	9614.11	2067.7
43.34	2067	9662.26	2067.16	9676.86	2067.47	9687.24	2067.08	9697.58	2066.72
04.63	2066.6	9712.29	2066.37	9730.64	2066.58	9742.83	2066.7	9773.06	2066.04
73.57	2066	9773.81	2066.01	9795.64	2066.14	9812.17	2063.71	9812.25	2063.7
812.34	2063.7	9812.47	2063.69	9813.67	2063.65	9835.13	2062.96	9837.18	2063.02
9839.99	2064	9851.79	2067.58	9858.46	2067.77	9872.03	2068.02	9881.07	2067.98
9894.51	2068.1	9902.81	2068.01	9915.73	2067.44	9919.56	2067.21	9923.8	2066.99
9943.25	2066.1	9954.58	2065.65	9964.3	2065.39	9971.19	2063.52	9977.89	2062.05
10000	2062.09	10005.32	2062.11	10007.11	2062.11	10036.89	2062.67	10041	2062.63
10077.17	2061.79	10094.86	2061.8	10110	2069.41	10445	2070	10449.64	2072

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8909.42	.065	9795.64	.035	9851.79	.065	9964.3	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9964.3	10110	256	248	245	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2069.77	Element			
Vel Head (ft)	1.19	Wt. n-Val.	0.055	0.030	
W.S. Elev (ft)	2068.59	Reach Len. (ft)	256.00	248.00	245.00
Crit W.S. (ft)	2068.59	Flow Area (sq ft)	1800.42	863.14	
E.G. Slope (ft/ft)	0.004369	Area (sq ft)	1800.42	863.14	
Q Total (cfs)	14413.00	Flow (cfs)	5177.98	9235.03	
Top Width (ft)	1096.91	Top Width (ft)	952.84	144.06	
Vel Total (ft/s)	5.41	Avg. Vel. (ft/s)	2.88	10.70	
Max Chl Dpth (ft)	6.80	Hydr. Depth (ft)	1.89	5.99	
Conv. Total (cfs)	218054.4	Conv. (cfs)	78337.7	139716.8	
Length Wtd. (ft)		Wetted Per. (ft)	953.97	146.10	
Min Ch El (ft)	2061.79	Shear (lb/sq ft)	0.51	1.61	
Alpha	2.61	Stream Power (lb/ft s)	1.48	17.24	
Frctn Loss (ft)		Cum Volume (acre-ft)	51.29	61.61	0.74
C & E Loss (ft)		Cum SA (acres)	27.96	7.64	0.34

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.61

INPUT
Description:
tion Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8736.05	2076.1	8743.1	2076.13	8788.01	2072	8790.17	2071.9	8792.32	2071.65
8818.02	2070.4	8824.74	2071.29	8827.59	2071.69	8834.13	2071.56	8835.33	2071.48
8840.86	2071	8852.41	2069.93	8867.58	2069.83	8873.58	2070.06	8879.82	2069.82
8892.97	2069.8	8908.3	2069.72	8931.53	2069.63	8937.82	2066.98	8943.08	2064.5
8958.22	2064.4	8977.84	2064.24	8982.09	2064.14	8990.26	2064.21	9005.77	2064.18
9019.59	2064.2	9027.78	2064.23	9029.88	2064.09	9052.4	2064.29	9052.74	2064.29
9052.85	2064.3	9085.89	2064.62	9095.31	2064.86	9102.27	2064.79	9130.69	2064.49
9147.72	2064.7	9161.96	2064.79	9173.92	2064.7	9195.3	2064.61	9205.45	2064.63
9228.72	2064.8	9232.42	2064.81	9234.33	2064.83	9267.86	2064.86	9276.16	2064.83
9295.98	2064.8	9319.6	2064.77	9343.68	2064.64	9345.48	2064.66	9366.03	2064.6
9367.18	2064.6	9376.79	2064.68	9395.1	2064.47	9409.81	2064.96	9412.73	2064.92
9416.5	2065	9431.19	2064.9	9459.67	2064.87	9466.73	2064.85	9481.66	2064.83
9493.18	2064.9	9502.44	2064.84	9530.77	2065.44	9545.89	2065.63	9573.19	2065.78
9595.07	2066.1	9616.71	2066.23	9633.29	2066.34	9648.58	2066.4	9678.57	2066.35
9678.99	2066.4	9679.38	2066.35	9723.78	2066.52	9760.6	2065.85	9763.2	2065.82
9766.14	2065.8	9782.98	2065.95	9786.52	2065.71	9791.9	2065.41	9795.68	2065.42
9805.76	2065.2	9823.67	2065.25	9828.63	2065.54	9836.98	2065.58	9837.92	2065.57
9845.38	2065.6	9879.15	2065.76	9890.67	2065.81	9902.96	2065.71	9933.56	2064.92
9939.65	2063.9	9950.27	2061.93	9952.04	2061.3	9957.24	2060.44	9960.1	2060.35
9962.67	2060.3	9990.24	2059.97	9995.14	2059.91	10000	2059.93	10015.68	2060.03
10039.69	2060.08	10090	2060.1	10106.8	2068.51	0544.37	2068.86	10553.74	2071.6
10562.61	2071.74	10563.1	2071.76	10563.4	2071.7	10564.1	2071.54		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8736.05	.1	9267.86	.1	9836.98	.065	9933.56	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9933.56	10106.8	270	241	240	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2068.49	Element			
Vel Head (ft)	1.46	Wt. n-Val.	0.097	0.030	
W.S. Elev (ft)	2067.03	Reach Len. (ft)	270.00	241.00	240.00
Crit W.S. (ft)	2067.03	Flow Area (sq ft)	1854.46	1071.90	
E.G. Slope (ft/ft)	0.004171	Area (sq ft)	1854.46	1071.90	
Q Total (cfs)	14459.00	Flow (cfs)	2864.60	11594.40	
Top Width (ft)	1166.15	Top Width (ft)	995.86	170.30	
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)	1.54	10.82	
Max Chl Dpth (ft)	7.12	Hydr. Depth (ft)	1.86	6.29	
Conv. Total (cfs)	223883.3	Conv. (cfs)	44355.5	179527.8	
Length Wtd. (ft)	246.31	Wetted Per. (ft)	996.51	172.38	
in Ch El (ft)	2059.91	Shear (lb/sq ft)	0.48	1.62	
lpha	3.86	Stream Power (lb/ft s)	0.75	17.51	
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	40.55	56.10	0.74

C & E Loss (ft)	0.00	Cum SA (acres)	22.24	6.74	0.34

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: Sols Wash
REACH: Reach 1 RS: 0.57

INPUT
Description:
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8697.69	2069.1	8710.61	2068.32	8716.79	2068.25	8721.08	2068.02	8734.42	2067.57
8748.02	2066.9	8759.52	2066.66	8764.49	2066.66	8770.68	2066.3	8783.24	2066.03
8783.27	2066	8783.31	2066.03	8816.1	2065.38	8834.01	2063.93	8835.48	2063.88
8837.28	2063.9	8851.8	2064.51	8869.48	2064.17	8879.25	2063.69	8888.93	2063.6
8925.85	2063.2	8937.71	2063.18	8951	2062.99	8961.94	2063.01	8966.4	2062.91
8967.8	2062.9	8973.5	2062.45	8974.78	2062.35	8975.26	2062.33	8976.88	2062.38
8992.69	2062.7	8995.37	2062.76	9003.74	2062.71	9023.15	2062.7	9042.97	2062.88
9066.56	2063	9070.66	2063.09	9073.99	2063.12	9105.26	2062.67	9118.49	2062.51
9150.19	2063.1	9162.58	2063.32	9181.05	2063.35	9207.35	2063.33	9222.95	2063.37
9243.87	2063.2	9251.58	2062.98	9258.05	2063.01	9292.59	2062.15	9297.46	2062.01
9298.81	2062	9301.26	2062.05	9332.57	2062.35	9344.72	2062.36	9353.19	2062.28
9367.22	2062.3	9387.06	2062.36	9391.68	2062.31	9395.05	2062.18	9399.19	2062.25
9407.36	2062.4	9429.17	2063.02	9431.94	2063.1	9433.72	2063.12	9484.2	2063.46
9488.55	2063.5	9527.15	2063.54	9534.98	2063.54	9535.66	2063.54	9540.03	2063.55
9580.02	2063.6	9588.16	2063.54	9626.17	2063.3	9645.75	2063.27	9652.81	2063.26
9687.93	2063.3	9702.32	2063.33	9703.06	2063.35	9704.43	2063.35	9710.43	2063.43
9717.05	2063.5	9720.42	2063.05	9723.34	2062.78	9741.76	2063.03	9755.39	2063.2
9764.63	2063.2	9768.09	2063.27	9775.25	2063.3	9776.34	2063.33	9776.76	2063.33
9777.99	2063.3	9786.01	2063.43	9849.74	2064.17	9859.08	2064.2	9863.77	2064.16
9883.37	2063.9	9907.71	2063.57	9918.24	2063.49	9927.66	2063.82	9933.62	2063.02
9963.87	2058.3	9981.25	2057.95	9991.79	2058.08	9997.76	2058	10000	2057.976
10027.09	2057.69	10041.49	2058	10100	2058	10116.8	2066.4	10585	2067
10594.94	2068	10603.38	2072.21	0609.42	2072.41	10611.63	2072.41	0611.64	2072.4

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8697.69	.1	9162.58	.1	9849.74	.065	9933.62	.03

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

9933.62	10116.8	180	215	220	.3	.5

Effective Flow num= 1

Sta L	Sta R	Elev	Permanent
888		T	

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2066.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.49	Wt. n-Val.	0.098	0.030	
W.S. Elev (ft)	2064.92	Reach Len. (ft)	180.00	215.00	220.00
Crit W.S. (ft)	2064.92	Flow Area (sq ft)	1682.53	1122.13	
E.G. Slope (ft/ft)	0.004148	Area (sq ft)	1905.51	1122.13	
Q Total (cfs)	14459.00	Flow (cfs)	2432.19	12026.81	
Top Width (ft)	1291.99	Top Width (ft)	1111.78	180.21	
Vel Total (ft/s)	5.16	Avg. Vel. (ft/s)	1.45	10.72	
Max Chl Dpth (ft)	7.23	Hydr. Depth (ft)	1.77	6.23	
Conv. Total (cfs)	224495.3	Conv. (cfs)	37763.0	186732.3	
Length Wtd. (ft)		Wetted Per. (ft)	950.16	182.22	
Min Ch El (ft)	2057.69	Shear (lb/sq ft)	0.46	1.59	
Alpha	3.61	Stream Power (lb/ft s)	0.66	17.09	
Prctn Loss (ft)		Cum Volume (acre-ft)	28.90	50.04	0.74
C & E Loss (ft)		Cum SA (acres)	15.70	5.78	0.34

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.52

INPUT
Description: Begin lateral weir overflow at Left OB. Weir section extends to bridge.
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9205.68	2064.7	9215.24	2064.65	9215.75	2064.64	9216.87	2064.6	9243.34	2063.78
9250.32	2063.5	9255.1	2063.45	9259.43	2063.42	9292.43	2063.08	9298.66	2063.04
9319.04	2063.2	9322.59	2063.11	9324.11	2062.68	9325.94	2062.49	9330.03	2061.62
9335.19	2063.8	9335.7	2063.88	9338.93	2063.35	9348.07	2062.02	9352.22	2061.96
9382.51	2062.7	9401.81	2062.11	9403.33	2062.1	9450.98	2062.15	9462.3	2062.36
9484.83	2062.7	9513.77	2062.31	9515.51	2062.28	9526.7	2062.18	9556.79	2061.92
9561.91	2061.9	9590.51	2062.14	9603.79	2061.93	9617.84	2061.91	9642.5	2061.85
9652.03	2062.2	9653.72	2062.27	9655	2062.22	9659.12	2062.04	9671.31	2061.75
9684.89	2062.1	9691.7	2062.11	9702.49	2062.34	9702.83	2062.35	9725.41	2061.77
9729.82	2061.7	9737.08	2061.67	9769.38	2061.65	9788.51	2061.69	9790.11	2061.7
9814	2061.9	9833.8	2062.01	9863.88	2061.61	9867.8	2061.59	9871.34	2061.6

```
904.59  2061.8 9938.15 2060.44 9946.42 2060.21 9960.22 2059.05 9971.03 2056.21
97.82  2055.5   10000  2055.610009.87 2056.0110019.76 2056.2610045.14 2056.36
10110  2056.4 10126.6    2065   10635  2065.710658.08 2074.0510660.52    2074
65.18 2073.31

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 9205.68    .065    9814    .065 9938.15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9938.15 10126.6               750     242     250             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
888        T
```

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2065.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.	0.065	0.030	
W.S. Elev (ft)	2063.97	Reach Len. (ft)	750.00	242.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)	1173.77	1293.85	
E.G. Slope (ft/ft)	0.002785	Area (sq ft)	1265.98	1293.85	
Q Total (cfs)	14459.00	Flow (cfs)	2255.42	12203.58	
Top Width (ft)	887.30	Top Width (ft)	700.85	186.46	
Vel Total (ft/s)	5.86	Avg. Vel. (ft/s)	1.92	9.43	
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)	2.00	6.94	
Conv. Total (cfs)	274003.4	Conv. (cfs)	42741.1	231262.3	
Length Wtd. (ft)	284.23	Wetted Per. (ft)	588.20	188.74	
Min Ch El (ft)	2055.50	Shear (lb/sq ft)	0.35	1.19	
Alpha	2.20	Stream Power (lb/ft s)	0.67	11.24	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	22.35	44.07	0.74
C & E Loss (ft)	0.05	Cum SA (acres)	11.96	4.87	0.34

```
LATERAL RATING CURVE   RIVER: Sols Wash
REACH: Reach 1            RS: 0.51

INPUT
Description: US 93/89 Weir Rating Curve
Lateral rating curve position = Left overbank
 Rating Curve  num =        24
    Flow    Elev    Flow    Elev    Flow    Elev    Flow    Elev    Flow    Elev
     .28  2062.4    5.31  2062.5   20.06  2062.6   49.8  2062.7   96.34  2062.8
  156.36  2062.9  231.04    2063  327.35  2063.1  456.63  2063.2  616.81  2063.3
  805.35  2063.4 1020.27  2063.5 1259.18  2063.6 1520.85  2063.7 1804.48  2063.8
 2110.35  2063.9 2437.37    2064 2784.71  2064.1 3152.55  2064.2 3544.06  2064.3
 958.16  2064.4 4393.59  2064.5 4849.93  2064.6 5326.74  2064.7

SS SECTION           RIVER: Sols Wash
REACH: Reach 1            RS: 0.48

INPUT
Description: Lateral Weir Overflow at Left OB
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9802.33  2062.6 9817.48 2062.73 9837.25 2062.55 9865.49 2062.27 9874.91 2062.45
 9893.67  2062.3 9915.14 2062.14  9921.2 2062.23 9927.07 2062.34 9944.35 2053.79
 9986.93 2053.61 9998.66 2053.52   10000 2053.5110005.63 2053.5110041.53  2053.6
10091.52 2054.0110111.74    2064   10680  2065.1 10699.3 2070.6510705.57  2074.6
10708.39    207510725.09 2076.52

Manning's n Values          num=       2
     Sta   n Val     Sta   n Val
 9802.33      .1 9927.07     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9927.0710111.74               270     235     380             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        T
888        T
```

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2064.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.	0.100	0.030	
W.S. Elev (ft)	2063.41	Reach Len. (ft)	270.00	235.00	380.00
Crit W.S. (ft)		Flow Area (sq ft)	123.20	1614.22	
E.G. Slope (ft/ft)	0.001613	Area (sq ft)	124.02	1614.22	
Q Total (cfs)	13552.53	Flow (cfs)	73.31	13479.22	
Top Width (ft)	308.22	Top Width (ft)	124.74	183.48	
Vel Total (ft/s)	7.80	Avg. Vel. (ft/s)	0.60	8.35	
Max Chl Dpth (ft)	9.90	Hydr. Depth (ft)	1.00	8.80	
Conv. Total (cfs)	337457.6	Conv. (cfs)	1825.4	335632.2	
Length Wtd. (ft)	235.09	Wetted Per. (ft)	123.74	187.68	
Min Ch El (ft)	2053.51	Shear (lb/sq ft)	0.10	0.87	
Alpha	1.14	Stream Power (lb/ft s)	0.06	7.23	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	10.38	35.99	0.74
C & E Loss (ft)	0.16	Cum SA (acres)	4.85	3.84	0.34

```
arning: The cross-section end points had to be extended vertically for the computed water surface.

SS SECTION           RIVER: Sols Wash
ACH: Reach 1              RS: 0.43
```

```
UT
:ription: First Cross Section US of US Hwy 93 Bridge
tion Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
6827.504 2063.296867.647 2063.436898.287 2063.716932.708  2063.86938.881 2062.72
6948.328 2063.186962.202 2063.376975.375 2063.066984.758  2063.16989.496 2063.23
6995.012 2063.386999.423 2063.027000.965 2063.037013.559    20587020.897 2057.45
 7020.99 2057.477023.557 2057.047025.755 2052.957033.534  2052.87037.678 2052.68
7040.019 2051.927047.592 2051.927056.486 2052.097068.423  2051.87071.068 2051.78
7123.557 2051.367125.005 2051.277149.854 2051.497160.997 2051.387165.827  2051.6
7169.462 2051.627171.031 2051.657178.053 2051.58    7184  2051.8  7201.3    2064
    7345  2064.2

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
6827.504      .16995.012    .0657023.557     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      7023.557  7201.3              146     146     146              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F
Skew Angle = 45

CROSS SECTION OUTPUT    Profile #PF 1

  E.G. Elev (ft)          2064.05    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              0.87    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2063.18    Reach Len. (ft)             7.00       7.00       7.00
  Crit W.S. (ft)          2057.85    Flow Area (sq ft)                    1809.14
  E.G. Slope (ft/ft)     0.000886    Area (sq ft)               93.84    1924.35
  Q Total (cfs)          13552.53    Flow (cfs)                          13552.53
  Top Width (ft)           232.08    Top Width (ft)             55.50     176.58
  Vel Total (ft/s)           7.49    Avg. Vel. (ft/s)                       7.49
  Max Chl Dpth (ft)         11.91    Hydr. Depth (ft)                      11.47
  Conv. Total (cfs)      455386.8    Conv. (cfs)                         455386.8
  Length Wtd. (ft)           7.00    Wetted Per. (ft)                     157.91
  Min Ch El (ft)          2051.27    Shear (lb/sq ft)                       0.63
  Alpha                      1.00    Stream Power (lb/ft s)                 4.75
  Frctn Loss (ft)                    Cum Volume (acre-ft)        9.71      26.45       0.74
  C & E Loss (ft)                    Cum SA (acres)              4.29       2.87       0.34

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

 .DGE                    RIVER: Sols Wash
REACH: Reach 1              RS: 0.42

INPUT
Description:
Distance from Upstream XS =       7
Deck/Roadway Width        =     132
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =      45
Upstream  Deck/Roadway Coordinates
    num=      34
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
6932.475  2063.8         7015.454  2064.5         7015.454 2067.21
7018.982 2067.21         7018.982 2065.71         7026.704 2065.07 2060.95
7031.003 2065.07 2061.357047.323 2065.09 2061.357051.622 2065.09 2060.95
7052.874 2065.09 2060.957057.173 2065.09 2061.357073.818 2065.14 2061.35
7078.132 2065.14 2060.957079.376 2065.14 2060.957083.682 2065.14 2061.35
7099.953 2065.08 2061.357104.252 2065.08 2060.957105.497 2065.08 2060.95
7109.803 2065.08 2061.357126.766 2065.08 2061.357131.073 2065.08 2060.95
7132.317 2065.08 2060.957136.624 2065.08 2061.357153.212 2065.08 2061.35
7157.498 2065.08 2060.957158.756 2065.08 2060.957163.062 2065.08 2061.35
7179.382 2065.16 2061.357183.667 2065.16 2060.957214.532 2065.92
7214.532 2067.42         7218.061 2067.42         7218.061 2064.02
 7434.86    2066

Upstream Bridge Cross Section Data
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  6827.5 2063.296867.649 2063.43 6898.29 2063.716932.709  2063.86938.879 2062.72
 6948.33 2063.18  6962.2 2063.37 6975.38 2063.066984.759  2063.1  6989.5 2063.23
 6995.01 2063.38 6999.42 2063.02 7000.97 2063.03 7013.56    2058  7020.9 2057.45
 7020.99 2057.47 7023.56 2057.04 7025.76 2052.95 7033.53  2052.8 7037.68 2052.68
 7040.02 2051.927047.589 2051.92 7056.49 2052.097068.419  2051.8 7071.07 2051.78
 7123.56 2051.367125.009 2051.27 7149.85 2051.49    7161 2051.38 7165.83  2051.6
 7169.46 2051.627171.029 2051.657178.049 2051.587183.529 2051.87 7191.08  2053.3
7194.089 2053.42  7203.2 2053.947209.419 2054.62 7226.82 2055.72 7229.64    2056
7231.379 2056.067254.169 2056.817256.859 2056.99 7287.89 2058.36 7341.26 2063.44

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  6827.5    .025 7023.56    .022 7191.08    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
      7023.56 7191.08              .3       .5
   ffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
```

```
98        F
ew Angle = 45

nstream  Deck/Roadway Coordinates
  num=      36
    Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
6363.961    2061        6747.821    2062        7006.297 2063.57
7006.297 2066.97        7009.839 2066.97        7009.839 2065.47
7017.278 2065.12 2060.957021.577 2065.12 2061.357039.503 2065.16 2061.35
7043.802 2065.16 2060.957045.053 2065.16 2060.957049.353 2065.16 2061.35
7068.239 2065.13 2061.357072.539 2065.13 2060.95 7073.79 2065.13 2060.95
7078.089 2065.13 2061.357094.529  2065.2 2061.357098.829  2065.2 2060.95
7100.081  2065.2 2060.95 7104.38  2065.2 2061.357120.961 2065.17 2061.35
 7125.26 2065.17 2060.957126.512 2065.17 2060.957130.812 2065.17 2061.35
7147.322 2065.16 2061.357151.621 2065.16 2060.957152.873 2065.16 2060.95
7157.172 2065.16 2061.357174.122 2065.09 2061.357178.406 2065.09 2060.95
7185.746 2065.75        7185.746 2067.25        7189.289 2067.25
7189.289 2063.85        7218.061    2064         7434.86    2066

Downstream Bridge Cross Section Data
Station Elevation Data     num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 6761.84 2059.25 6822.35 2058.46 6857.82 2060.316885.569 2058.16 6922.79 2056.96
6939.859 2056.36 6940.76 2056.33  6965.1 2056.49 6966.32  2056.6 6968.69 2056.67
 6987.44 2056.65 6988.51 2056.65  7005.4 2057.327008.339  2057.8 7011.93 2057.66
7015.379 2056.947015.879 2056.57 7018.04  2056.9 7018.04  2060.5 7018.51  2060.5
 7018.98  2054.57023.149 2054.22 7027.16  2053.7 7038.43 2051.637041.689 2050.34
 7055.79  2050.27062.399 2050.21 7071.07 2050.17  7091.2 2050.08  7142.5 2049.58
 7151.54 2049.45 7163.73  2049.4 7172.93 2049.33 7180.08 2057.29 7189.13 2059.62
7190.569 2058.85 7195.16  2058.9 7204.37 2060.48 7213.18 2060.71  7225.1 2057.63
 7289.26 2061.37 7322.32 2064.88

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 6761.84    .025 7018.04    .022 7180.08    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
       7018.98 7180.08              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F
Left Levee      Station=7018.508      Elevation=  2060.5
Skew Angle = 45

Upstream Embankment side slope                 =       0 horiz. to 1.0 vertical
ownstream Embankment side slope                =       0 horiz. to 1.0 vertical
  imum allowable submergence for weir flow =      .95
 vation at which weir flow begins              =2065.083
nergy head used in spillway design             =
Spillway height used in design                 =
Weir crest shape                               = Broad Crested

Number of Piers =  5

Pier Data
Pier Station     Upstream=7052.245    Downstream=7044.431
Upstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95
Downstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95

Pier Data
Pier Station     Upstream=7078.747    Downstream=7073.167
Upstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95
Downstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95

Pier Data
Pier Station     Upstream=7104.867    Downstream=7099.458
Upstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95
Downstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95

Pier Data
Pier Station     Upstream=7131.694    Downstream=7125.881
Upstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95
Downstream     num=       2
    Width   Elev    Width   Elev
    1.25  1949.5    1.25 2060.95

Pier Data
 r Station     Upstream=7158.134    Downstream=7152.244
 tream     num=       2
    Width   Elev    Width   Elev
```

```
  1.25  1949.5    1.25 2060.95
 nstream     num=        2
  Width   Elev    Width   Elev
  1.25  1949.5    1.25 2060.95

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
      Momentum                Cd   =       2
      Yarnell                 KVal =     .95
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
      Pressure and Weir flow
          Submerged Inlet Cd          =
          Submerged Inlet + Outlet Cd =       .8
          Max Low Cord                =

Additional Bridge Parameters
      Add Friction component to Momentum
      Do not add Weight component to Momentum
      Class B flow critical depth computations use critical depth
          inside the bridge at the upstream end
      Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT    Profile #PF 1
Opening : Single BR

  E.G. US. (ft)                 2064.05    Element                  Inside BR US  Inside BR DS
  W.S. US. (ft)                 2063.18    E.G. Elev (ft)              2064.05       2061.12
  Q Total (cfs)                13552.53    W.S. Elev (ft)              2061.35       2059.88
  Q Bridge (cfs)               13552.53    Crit W.S. (ft)              2058.05       2056.69
  Q Weir (cfs)                             Max Chl Dpth (ft)             10.08         10.55
  Weir Sta Lft (ft)                        Vel Total (ft/s)               9.40          9.34
  Weir Sta Rgt (ft)                        Flow Area (sq ft)           1441.13       1450.90
  Weir Submerg                             Froude # Chl                   0.04          0.04
  Weir Max Depth (ft)                      Specif Force (cu ft)        10962.59      10928.85
  Min El Weir Flow (ft)         2065.08    Hydr Depth (ft)            122976.50          9.45
  Min El Prs (ft)               2061.35    W.P. Total (ft)               383.92        236.55
  Delta EG (ft)                    2.93    Conv. Total (cfs)          235098.0      333044.6
  Delta WS (ft)                    3.30    Top Width (ft)                 0.01        153.60
  BR Open Area (sq ft)          1441.13    Frctn Loss (ft)
  BR Open Vel (ft/s)               9.40    C & E Loss (ft)
  Coef of Q                                Shear Total (lb/sq ft)         0.78          0.63
  Br Sel Method              Press Only    Power Total (lb/ft s)          7.32          5.92

 .e:     Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.
         The Yarnell answer has been disregarded.
Note:    Momentum answer is not valid if the water surface is above the low chord or if there is weir
         flow.  The momentum answer has been disregarded.
Note:    The downstream water surface is below the minimum elevation for pressure flow.  The sluice
         gate equations were used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION            RIVER: Sols Wash
REACH: Reach 1              RS: 0.40

INPUT
Description: First Cross Section Downstream of US Hwy 93 Bridge
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
6761.842 2059.25 6822.35 2058.466857.818 2060.316885.565 2058.166922.787 2056.96
6939.863 2056.366940.762 2056.336965.101 2056.496966.324  2056.66968.686 2056.67
6987.437 2056.656988.505 2056.657005.398 2057.327008.339  2057.87011.933 2057.66
7015.375 2056.947015.877 2056.577018.035  2056.97018.035  2060.57018.508  2060.5
7018.981  2054.57023.154 2054.227027.164  2053.77038.428 2051.637041.694 2050.34
7055.794  2050.27062.399 2050.217071.068 2050.177091.199 2050.08  7142.5 2049.58
7151.542 2049.457163.727  2049.47172.926 2049.337180.083 2057.297189.125 2059.62
7190.569 2058.857195.158  2058.97204.371 2060.487213.175 2060.717225.104 2057.63
 7289.26 2061.377322.324 2064.88

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
6761.842      .16857.818    .0657018.035     .027018.981     .037180.083     .065
7204.371       1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      7018.9817180.083              254     254     254             .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F
Left Levee      Station=7018.508      Elevation=  2060.5
Skew Angle = 45

CROSS SECTION OUTPUT    Profile #PF 1

  .G. Elev (ft)            2061.12    Element                  Left OB    Channel   Right OB
  el Head (ft)                1.24    Wt. n-Val.                0.020      0.030     0.000
  W.S. Elev (ft)           2059.88    Reach Len. (ft)          254.00     254.00    254.00
```

Crit W.S. (ft)	2056.51	Flow Area (sq ft)	1.14	1517.81	0.01
E.G. Slope (ft/ft)	0.001688	Area (sq ft)	1.14	1517.81	74.66
Q Total (cfs)	13552.53	Flow (cfs)	1.24	13551.27	0.02
Top Width (ft)	229.71	Top Width (ft)	0.42	161.10	68.18
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)	1.08	8.93	1.74
Max Chl Dpth (ft)	10.55	Hydr. Depth (ft)	2.69	9.42	2.59
Conv. Total (cfs)	329905.7	Conv. (cfs)	30.1	329875.0	0.5
Length Wtd. (ft)	254.00	Wetted Per. (ft)	5.40	165.13	0.01
Min Ch El (ft)	2049.33	Shear (lb/sq ft)	0.02	0.97	
Alpha	1.00	Stream Power (lb/ft s)	0.02	8.65	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	9.70	21.86	0.73
C & E Loss (ft)	0.64	Cum SA (acres)	4.29	2.60	0.34

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.35

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9004.6	2054.7	9037.01	2054.43	9055.7	2054.37	9073.46	2054.72	9079.68	2054.85
9082.12	2054.8	9112.29	2054.39	9113.48	2054.4	9113.75	2054.39	9117.28	2054.63
9150.59	2054.5	9151.82	2054.51	9154.48	2054.5	9182.49	2054.47	9199.41	2054.49
9232.36	2054.3	9252.84	2054.16	9262.13	2054.1	9285.56	2053.56	9288.9	2053.61
9295.84	2053.6	9323.28	2053.53	9344.85	2053.5	9356.58	2053.47	9376.76	2053.55
9392.82	2053.8	9409.73	2053.84	9430.13	2053.82	9454.41	2054	9473.58	2054.1
9481.6	2054.2	9485.74	2054.19	9509.72	2054.22	9512.14	2054.23	9512.25	2054.23
9514.61	2054.3	9516.4	2054.29	9517.13	2054.29	9531.15	2054.26	9548.94	2054.18
9564.4	2054.2	9574.43	2054.04	9624.13	2054.41	9627.48	2054.46	9655.84	2054.5
9677.61	2054.4	9687.51	2054.46	9719.71	2054.49	9723.28	2054.5	9724.31	2054.5
9751.81	2054.6	9775.07	2054.65	9797.95	2054.99	9810.26	2055.15	9831.93	2055.69
9861.64	2056.4	9874.98	2055.56	9878.47	2055.14	9882.68	2055.99	9882.68	2057.39
9883.35	2057.39	9884.02	2055.99	9884.02	2055.43	9885.35	2054.85	9890.37	2054.7
9894.06	2054.73	9914.29	2054.49	9918.17	2053.88	9922.95	2053.28	9940.98	2051.6
9943.79	2050.82	9955.31	2049.51	9964.38	2048.13	9970.37	2047.79	9988.72	2047.7
9992.67	2047.69	9997.16	2047.68	10000	2047.68	10016.92	2047.68	10025.29	2047.78
11.72	2048	10044.77	2049.63	10050.85	2053.87	10058.8	2058.29	10064.51	2059.41
56.55	2059.61	10071.91	2059.69	10079.59	2059.78	10100.43	2059.89	10117.21	2060.41
10131.35	2060.51	10132.36	2060.59	10144.29	2060.92	10154.85	2062.57	10163.27	2064.01

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9004.6	.1	9516.4	.065	9882.68	.02	9884.02	.065	9940.98	.03
10050.85	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9940.98	10050.85	686	686	686	.3	.5

Left Levee Station= 9883.35 Elevation= 2057.39

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2059.75	Element			
Vel Head (ft)	3.38	Wt. n-Val.	0.065	0.030	0.065
W.S. Elev (ft)	2056.37	Reach Len. (ft)	686.00	686.00	686.00
Crit W.S. (ft)	2056.37	Flow Area (sq ft)	144.27	871.24	5.64
E.G. Slope (ft/ft)	0.005949	Area (sq ft)	144.27	871.24	5.64
Q Total (cfs)	13552.53	Flow (cfs)	467.84	13074.14	10.55
Top Width (ft)	171.52	Top Width (ft)	57.14	109.87	4.50
Vel Total (ft/s)	13.27	Avg. Vel. (ft/s)	3.24	15.01	1.87
Max Chl Dpth (ft)	8.69	Hydr. Depth (ft)	2.52	7.93	1.25
Conv. Total (cfs)	175713.5	Conv. (cfs)	6065.7	169511.0	136.8
Length Wtd. (ft)	686.00	Wetted Per. (ft)	58.23	111.91	5.15
Min Ch El (ft)	2047.68	Shear (lb/sq ft)	0.92	2.89	0.41
Alpha	1.24	Stream Power (lb/ft s)	2.98	43.39	0.76
Frctn Loss (ft)	3.33	Cum Volume (acre-ft)	9.27	14.59	0.50
C & E Loss (ft)	0.74	Cum SA (acres)	4.12	1.81	0.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.22

INPUT

Description: Cross Section 0.22 from CBA Study

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9433	2050.5	9473	2049.6	9508	2049.7	9516	2050.4	9590	2050.4
9669	2050.4	9726	2051.5	9799	2051.3	9899	2051	9938	2044.6
9963	2043	10000	2043	10019	2043	10037	2058.4	10170	2059.3
10292	2060.6	10331	2061.6	10381	2061.4	10430	2057.8	10485	2056.9
10541	2056.4	10573	2058.5	10625	2060.4	10628	2063.4	10671	2063.4
10732	2062	10788	2061.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9433	.065	9963	.025	10037	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9899	10019	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2054.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.89	Wt. n-Val.	0.065	0.032	0.025
W.S. Elev (ft)	2052.91	Reach Len. (ft)			
Crit W.S. (ft)	2052.91	Flow Area (sq ft)	1033.44	982.02	57.40
E.G. Slope (ft/ft)	0.004103	Area (sq ft)	1033.44	982.02	57.40
Q Total (cfs)	15045.00	Flow (cfs)	2564.48	11951.65	528.87
Top Width (ft)	597.58	Top Width (ft)	466.00	120.00	11.58
Vel Total (ft/s)	7.26	Avg. Vel. (ft/s)	2.48	12.17	9.21
Max Chl Dpth (ft)	9.91	Hydr. Depth (ft)	2.22	8.18	4.96
Conv. Total (cfs)	234875.3	Conv. (cfs)	40035.4	186583.5	8256.5
Length Wtd. (ft)		Wetted Per. (ft)	468.46	120.57	15.24
Min Ch El (ft)	2043.00	Shear (lb/sq ft)	0.57	2.09	0.96
Alpha	2.31	Stream Power (lb/ft s)	1.40	25.39	8.89
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: User specified water surface is not possible for the specified flow regime. The program used critical depth as the starting water surface.

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	0.22	15045.00	2043.00	2052.91	2052.91	2054.80	0.004103	12.17	2072.86	597.58	0.75
Reach 1	0.35	13552.53	2047.68	2056.37	2056.37	2059.75	0.005949	15.01	1021.14	171.52	0.94
Reach 1	0.40	13552.53	2049.33	2059.88	2056.51	2061.12	0.001688	8.93	1518.96	229.71	0.51
Reach 1	0.42	Bridge									
Reach 1	0.43	13552.53	2051.27	2063.18	2057.85	2064.05	0.000886	7.49	1809.14	232.08	0.39
Reach 1	0.48	13552.53	2053.51	2063.41		2064.49	0.001613	8.35	1737.42	308.22	0.50
Reach 1	0.51	Lat. RC									
Reach 1	0.52	14459.00	2055.50	2063.97		2065.14	0.002785	9.43	2467.63	887.30	0.63
Reach 1	0.57	14459.00	2057.69	2064.92	2064.92	2066.40	0.004148	10.72	2804.66	1291.99	0.76
Reach 1	0.61	14459.00	2059.91	2067.03	2067.03	2068.49	0.004171	10.82	2926.35	1166.15	0.76
Reach 1	0.66	14413.00	2061.79	2068.59	2068.59	2069.77	0.004369	10.70	2663.56	1096.91	0.77
Reach 1	0.71	14413.00	2063.89	2070.14	2070.14	2071.38	0.004829	10.96	2330.02	1059.53	0.81
Reach 1	0.76	14413.00	2065.84	2071.96	2071.96	2073.59	0.006661	12.08	1665.95	905.44	0.93
Reach 1	0.79	14413.00	2067.42	2073.94	2073.94	2075.50	0.009084	13.18	1921.97	928.41	1.07
Reach 1	0.90	14413.00	2073.10	2078.92	2078.30	2080.24	0.008016	12.80	2409.28	1339.06	1.00
Reach 1	1.00	14413.00	2078.10	2083.20	2083.20	2085.42	0.008498	15.27	1541.10	1092.53	1.24
Reach 1	1.12	14413.00	2082.30	2088.51	2088.51	2089.89	0.004376	12.15	2066.62	880.83	0.92

Profile Output Table - Standard Table 2

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Reach 1	0.22	2054.80	2052.91	1.89			2564.48	11951.65	528.87	597.58
Reach 1	0.35	2059.75	2056.37	3.38	3.33	0.74	467.84	13074.14	10.55	171.52
Reach 1	0.40	2061.12	2059.88	1.24	0.73	0.64	1.24	13551.27	0.02	229.71
Reach 1	0.42	Bridge								
Reach 1	0.43	2064.05	2063.18	0.87				13552.53		232.08
Reach 1	0.48	2064.49	2063.41	1.08	0.27	0.16	73.31	13479.22		308.22
Reach 1	0.51	Lat. RC								
Reach 1	0.52	2065.14	2063.97	1.17	0.60	0.05	2255.42	12203.58		887.30
Reach 1	0.57	2066.40	2064.92	1.49			2432.19	12026.81		1291.99
Reach 1	0.61	2068.49	2067.03	1.46	1.02	0.00	2864.60	11594.40		1166.15
Reach 1	0.66	2069.77	2068.59	1.19			5177.98	9235.03		1096.91
Reach 1	0.71	2071.38	2070.14	1.24	1.17	0.02	5370.03	9042.97		1059.53
Reach 1	0.76	2073.59	2071.96	1.63	1.50	0.12	5307.38	9081.58	24.05	905.44
Reach 1	0.79	2075.50	2073.94	1.56	1.74	0.01	7208.47	7204.53	0.00	928.41
Reach 1	0.90	2080.24	2078.92	1.32	4.71	0.02	7761.75	6649.23	2.02	1339.06
Reach 1	1.00	2085.42	2083.20	2.22	4.66	0.27	6828.52	7570.26	14.22	1092.53
Reach 1	1.12	2089.89	2088.51	1.38	3.67	0.08	6051.38	7464.71	896.92	880.83

D.7 – Developed Conditions Floodplain/Floodway Model

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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: Sols Wash CLOMR
Project File : solsCLOMR.prj
Run Date and Time: 7/17/2002 4:00:34 PM

Project in English units

Project Description:
P & J Investors, Inc. - Goldmine Village CLOMR
Parcel is approximately 15
acres and is located along Sols Wash UpStrm of US Hwy 93
Floodplain Manager:
Skip Blunt - Building Inspector, Town of Wickenburg, Arizona

PLAN DATA

Plan Title: Dev Cond-FP_FW-No Weir- Set Qs
Plan File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.p07

Geometry Title: Developed Conditions_ NO WEIR
Geometry File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.g01

Flow Title : FIS Flow Data - Dev-FPFW_NO WEIR
Flow File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.f08

Plan Summary Information:
Number of: Cross Sections = 15 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 1

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: Subcritical Flow

Encroachment Data
Equal Conveyance = False
Left Offset = 0
Right Offset = 0

River = Sols Wash Reach = Reach 1

RS	Profile	Method	Value1	Value2
1.12	PF 2	1	9315	10195
1.00	PF 2	1	9214	10075
0.90	PF 2	1	9380	10061
0.79	PF 2	1	9041	10080
0.76	PF 2	1	9094	10120
0.71	PF 2	1	9268	10110
0.66	PF 2	1	9480	10110
0.61	PF 2	1	9638	10107
0.57	PF 2	1	9780	10117
0.52	PF 2	1	9806	10127
0.48	PF 2	1	9927	10112
0.43	PF 2	1	7015	7205
0.42	PF 2	1	7020	7185
0.40	PF 2	1	7008	7188
0.35	PF 2	1	9860	10060
0.22	PF 2	1	9760	10170

OW DATA

'ow Title: FIS Flow Data - Dev-PPFW_NO WEIR
w File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.f08

ow Data (cfs)

River	Reach	RS	PF 1	PF 2
Sols Wash	Reach 1	1.12	14413	14413
Sols Wash	Reach 1	0.61	14459	14459
Sols Wash	Reach 1	0.48	13553	15045
Sols Wash	Reach 1	0.22	15045	15045

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Sols Wash	Reach 1	PF 1	Critical	Known WS = 2052.81
Sols Wash	Reach 1	PF 2	Critical	Known WS = 2052.82

GEOMETRY DATA

Geometry Title: Developed Conditions_ NO WEIR
Geometry File : x:\projects\Consult\P_JInvst\hec-ras\solsCLOMR.g01

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 1.12

INPUT
Description: Cross Section 1.12 from CBA Study
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9227	2092.5	9301	2092.6	9331	2083.3	9392	2082.2	9437	2087.5
9549	2088	9693	2087.7	9798	2087.2	9872	2086.6	9897	2086.4
9926	2087.3	9949	2083.4	9970	2082.3	10000	2082.5	10035	2083.4
10062	2084.9	10084	2086.4	10118	2086.1	10129	2086.6	10157	2086.6
10164	2086.2	10180	2085.1	10185	2085.1	10205	2091.9		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9227	.06	9331	.025	9392	.06	9949	.025	10062	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9949	10062	615	620	630	.1	.3

SS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2089.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.38	Wt. n-Val.	0.034	0.025	0.060
W.S. Elev (ft)	2088.51	Reach Len. (ft)	615.00	620.00	630.00
Crit W.S. (ft)	2088.51	Flow Area (sq ft)	1140.75	614.35	311.52
E.G. Slope (ft/ft)	0.004376	Area (sq ft)	1140.75	614.35	311.52
Q Total (cfs)	14413.00	Flow (cfs)	6051.38	7464.71	896.92
Top Width (ft)	880.83	Top Width (ft)	634.80	113.00	133.03
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	5.30	12.15	2.88
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)	1.80	5.44	2.34
Conv. Total (cfs)	217882.7	Conv. (cfs)	91479.2	112844.7	13558.8
Length Wtd. (ft)	618.08	Wetted Per. (ft)	636.26	113.08	133.70
Min Ch El (ft)	2082.30	Shear (lb/sq ft)	0.49	1.48	0.64
Alpha	1.83	Stream Power (lb/ft s)	2.60	18.03	1.83
Frctn Loss (ft)	3.67	Cum Volume (acre-ft)	127.68	95.87	3.21
C & E Loss (ft)	0.08	Cum SA (acres)	80.77	14.36	1.62

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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2089.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.38	Wt. n-Val.	0.034	0.025	0.060
W.S. Elev (ft)	2088.51	Reach Len. (ft)	615.00	620.00	630.00
Crit W.S. (ft)	2088.51	Flow Area (sq ft)	1140.65	614.35	311.52
E.G. Slope (ft/ft)	0.004374	Area (sq ft)	1140.65	614.35	311.52
Q Total (cfs)	14413.00	Flow (cfs)	6052.81	7463.36	896.83
Top Width (ft)	880.00	Top Width (ft)	634.00	113.00	133.00
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	5.31	12.15	2.88
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)	1.80	5.44	2.34
Conv. Total (cfs)	217922.0	Conv. (cfs)	91517.4	112844.7	13559.9
Length Wtd. (ft)		Wetted Per. (ft)	635.67	113.08	133.68
Min Ch El (ft)	2082.30	Shear (lb/sq ft)	0.49	1.48	0.64
Alpha	1.82	Stream Power (lb/ft s)	2.60	18.02	1.83
'rctn Loss (ft)		Cum Volume (acre-ft)	79.68	100.13	3.07
' & E Loss (ft)		Cum SA (acres)	42.19	14.39	1.41

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The 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: Sols Wash
REACH: Reach 1 RS: 1.00

INPUT
Description: Cross Section 1.10 from CBA Study
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8262	2097.2	8292	2089.4	8319	2086.6	8354	2084	8410	2083
8469	2082.8	8481	2083.3	8516	2082.6	8539	2081.7	8544	2082.3
8574	2081.7	8603	2082.5	8648	2082.7	8671	2082.1	8710	2082.8
8757	2083.1	8837	2083.5	8898	2083.9	8967	2084.1	9018	2083.6
9059	2083.4	9113	2082.8	9135	2082.2	9154	2082.2	9174	2082.9
9214	2082.5	9234	2083.2	9257	2077.8	9274	2076.6	9302	2076.6
9314	2078.6	9340	2079	9371	2082.7	9387	2083	9429	2083.4
9586	2083.1	9682	2083.1	9776	2083.4	9814	2082.7	9831	2083.6
9884	2083.2	9916	2081.6	9944	2078.9	9957	2078.3	10000	2078.1
10033	2078.1	10050	2082.1	10059	2082.6	10075	2087.1		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8262	1	8603	.065	9274	.025	9314	.065	9944	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9944	10050	570	560	565	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.22	Wt. n-Val.	0.040	0.025	0.065
W.S. Elev (ft)	2083.20	Reach Len. (ft)	570.00	560.00	565.00
Crit W.S. (ft)	2083.20	Flow Area (sq ft)	1037.23	495.61	8.27
E.G. Slope (ft/ft)	0.008498	Area (sq ft)	1037.23	495.61	8.27
Q Total (cfs)	14413.00	Flow (cfs)	6828.52	7570.26	14.22
Top Width (ft)	1092.53	Top Width (ft)	975.41	106.00	11.13
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)	6.58	15.27	1.72
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)	1.06	4.68	0.74
Conv. Total (cfs)	156345.3	Conv. (cfs)	74072.5	82118.6	154.2
Length Wtd. (ft)	565.06	Wetted Per. (ft)	976.79	106.48	11.22
Min Ch El (ft)	2078.10	Shear (lb/sq ft)	0.56	2.47	0.39
Alpha	1.64	Stream Power (lb/ft s)	3.71	37.72	0.67
Frctn Loss (ft)	4.66	Cum Volume (acre-ft)	112.30	87.97	0.90
C & E Loss (ft)	0.27	Cum SA (acres)	69.40	12.80	0.58

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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.	0.037	0.025	0.065
W.S. Elev (ft)	2083.20	Reach Len. (ft)	570.00	560.00	565.00
Crit W.S. (ft)	2083.20	Flow Area (sq ft)	748.34	495.61	8.27
E.G. Slope (ft/ft)	0.008782	Area (sq ft)	748.34	495.61	8.27
Q Total (cfs)	14413.00	Flow (cfs)	6703.20	7695.35	14.45
Top Width (ft)	585.49	Top Width (ft)	468.36	106.00	11.13
Vel Total (ft/s)	11.51	Avg. Vel. (ft/s)	8.96	15.53	1.75
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)	1.60	4.68	0.74
Conv. Total (cfs)	153803.8	Conv. (cfs)	71531.1	82118.6	154.2
Length Wtd. (ft)	564.79	Wetted Per. (ft)	470.32	106.48	11.22
Min Ch El (ft)	2078.10	Shear (lb/sq ft)	0.87	2.55	0.40
Alpha	1.25	Stream Power (lb/ft s)	7.81	39.62	0.71
Frctn Loss (ft)	4.49	Cum Volume (acre-ft)	66.34	92.23	0.76
C & E Loss (ft)	0.31	Cum SA (acres)	34.41	12.83	0.37

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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.
ning: 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: Sols Wash
REACH: Reach 1 RS: 0.90

INPUT
Description: Cross Section 0.90 from CBA Study
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8508	2090.8	8563	2083.3	8590	2084.6	8614	2084.2	8638	2083.6
8672	2079.1	8719	2079.1	8769	2077.5	8800	2075.4	8815	2072.8
8824	2072.8	8849	2077	8898	2077.2	8966	2077.4	9029	2077.5
9093	2077.8	9156	2078.3	9229	2078.6	9290	2078.7	9365	2078.4
9435	2078.3	9457	2075.2	9474	2074.3	9500	2071.1	9520	2071.1
9540	2075.7	9562	2077.8	9595	2078.6	9615	2077.9	9640	2078.4
9668	2077.7	9688	2078.5	9793	2078	9808	2077.2	9828	2074.5
9843	2077	9917	2078.6	9958	2077.7	9976	2073.5	10000	2073.1
10050	2073.1	10060	2078	10080	2083				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8508	1	8769	.065	9500	.025	9520	.065	9958	.025
10050	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9958	10060	540	565	575	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2080.24	Wt. n-Val.	0.049	0.030	0.065
Vel Head (ft)	1.32	Reach Len. (ft)	540.00	565.00	575.00
W.S. Elev (ft)	2078.92	Flow Area (sq ft)	1888.24	519.35	1.69
Crit W.S. (ft)	2078.30	Area (sq ft)	1888.24	519.35	1.69
E.G. Slope (ft/ft)	0.008016	Flow (cfs)	7761.75	6649.23	2.02
Q Total (cfs)	14413.00	Top Width (ft)	1233.38	102.00	3.68
Top Width (ft)	1339.06	Avg. Vel. (ft/s)	4.11	12.80	1.20
Vel Total (ft/s)	5.98	Hydr. Depth (ft)	1.53	5.09	0.46
Max Chl Dpth (ft)	7.82	Conv. (cfs)	86691.3	74265.5	22.6
Conv. Total (cfs)	160979.3	Wetted Per. (ft)	1235.60	103.62	3.79
Length Wtd. (ft)	552.02	Shear (lb/sq ft)	0.76	2.51	0.22
Min Ch El (ft)	2073.10	Stream Power (lb/ft s)	3.14	32.11	0.27
Alpha	2.37	Cum Volume (acre-ft)	93.16	81.45	0.83
Frctn Loss (ft)	4.71	Cum SA (acres)	54.95	11.46	0.48
C & E Loss (ft)	0.02				

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: 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, water surface was used.

CROSS SECTION OUTPUT Profile #PF 2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2080.92	Wt. n-Val.	0.046	0.030	0.065
Vel Head (ft)	1.53	Reach Len. (ft)	540.00	565.00	575.00
W.S. Elev (ft)	2079.38	Flow Area (sq ft)	1305.48	566.62	1.26
Crit W.S. (ft)	2079.38	Area (sq ft)	1305.48	566.62	1.26
E.G. Slope (ft/ft)	0.007230	Flow (cfs)	7110.21	7301.09	1.70
Q Total (cfs)	14413.00	Top Width (ft)	578.00	102.00	1.00
Top Width (ft)	681.00	Avg. Vel. (ft/s)	5.45	12.89	1.35
Vel Total (ft/s)	7.69	Hydr. Depth (ft)	2.26	5.56	1.26
Max Chl Dpth (ft)	8.28	Conv. (cfs)	83623.3	85868.3	20.0
Conv. Total (cfs)	169511.7	Wetted Per. (ft)	580.55	103.62	2.16
Length Wtd. (ft)	552.58	Shear (lb/sq ft)	1.01	2.47	0.26
Min Ch El (ft)	2073.10	Stream Power (lb/ft s)	5.53	31.80	0.36
Alpha	1.67	Cum Volume (acre-ft)	52.91	85.40	0.69
Frctn Loss (ft)	4.46	Cum SA (acres)	27.57	11.49	0.29
C & E Loss (ft)	0.00				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The 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: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.79

INPUT
Description: Begin new cross sections using 2002 mapping
Cross section on same
alignment as CBA RM 0.79
tion Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8956.81	2083.2	8961.84	2083.77	8970.87	2083.71	8978.94	2083.02	8979.19	2082.9

8988.39	2077.4	8990.81	2076.68	8991.69	2076.64	9004.42	2076.35	9010.63	2076.13
9019.09	2077.8	9019.48	2077.85	9030.16	2076.63	9054.56	2075.72	9060.94	2075.49
9083.56	2075.4	9083.02	2074.32	9083.35	2074.32	9098.69	2070.52	9111.43	2066.75
9131.47	2070	9147.5	2072.19	9158.97	2071.89	9164.33	2071.92	9178.63	2072.13
9211.28	2072.8	9217.01	2072.93	9224.73	2072.76	9244.96	2072.41	9254.37	2072.53
9270.51	2072.5	9282.41	2072.77	9291.72	2072.97	9295.92	2072.97	9330.65	2072.45
9332.83	2072.3	9362.38	2072.66	9368.67	2072.74	9371.25	2072.72	9378.07	2072.74
9391.59	2072.9	9401.78	2072.87	9416.01	2072.85	9427.16	2072.86	9441.69	2072.9
9445.75	2072.8	9461.88	2072.42	9465.75	2072.74	9478.68	2073.23	9510.62	2073.9
9517	2074.4	9527.09	2073.36	9528.83	2072.98	9531.05	2072.99	9536.32	2073.02
9549.12	2073.1	9556.06	2073.16	9566.15	2073.38	9572.78	2070.48	9580.24	2066.96
9593.86	2066.6	9596.05	2066.53	9596.87	2066.53	9609.62	2066.64	9611.57	2068.56
9612.84	2069.5	9618.6	2073.59	9628.69	2073.37	9639.24	2073.09	9655.86	2072.21
9661.29	2072	9663.28	2071.71	9674.38	2071.22	9677.76	2071	9686.11	2071.09
9695.82	2071	9713.96	2071.99	9715.82	2072.15	9716.86	2072.16	9739.74	2072.39
9753.98	2072.5	9755.15	2072.55	9755.84	2072.55	9775.19	2073.28	9778.84	2073.34
9799.77	2073.4	9806.01	2073.57	9825.27	2073.51	9827.43	2073.51	9835.63	2073.52
9852.4	2073.6	9872.04	2073.95	9883.99	2074.31	9902.07	2074.05	9912.03	2074.23
9919.78	2073.9	9925.04	2073.54	9939.15	2072.75	9954.82	2071.68	9971.15	2070
9972.27	2069.8	9973.8	2069.48	9981.21	2067.42	9988.08	2067.63	10000	2067.56
10025.66	2067.42	10050.43	2070.51	10070.99	2073.92	10081.72	2076	10087.79	2076.31
10088.16	2076.35	10090.05	2077.16	10093.02	2077.9	10097.45	2077.94		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8956.81	.065	9098.69	.035	9147.5	1	9517	.065	9566.15	.035
9618.6	.065	9954.82	.03	10070.99	.065				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9954.82	10070.99	224	226	235	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2075.50	Element			
Vel Head (ft)	1.56	Wt. n-Val.	0.049	0.030	0.000
W.S. Elev (ft)	2073.94	Reach Len. (ft)	224.00	226.00	235.00
Crit W.S. (ft)	2073.94	Flow Area (sq ft)	1375.55	546.42	0.00
E.G. Slope (ft/ft)	0.009084	Area (sq ft)	1375.55	546.42	0.00
Q Total (cfs)	14413.00	Flow (cfs)	7208.47	7204.53	0.00
Top Width (ft)	928.41	Top Width (ft)	812.14	116.17	0.10
Vel Total (ft/s)	7.50	Avg. Vel. (ft/s)	5.24	13.18	0.10
Max Chl Dpth (ft)	7.41	Hydr. Depth (ft)	1.69	4.70	0.01
Conv. Total (cfs)	151224.0	Conv. (cfs)	75632.6	75591.3	0.0
Length Wtd. (ft)	225.14	Wetted Per. (ft)	817.66	117.07	0.10
Min Ch El (ft)	2067.42	Shear (lb/sq ft)	0.95	2.65	
Alpha	1.79	Stream Power (lb/ft s)	5.00	34.90	
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	72.93	74.53	0.82
C & E Loss (ft)	0.01	Cum SA (acres)	42.27	10.05	0.46

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 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 OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2075.50	Element			
Vel Head (ft)	1.56	Wt. n-Val.	0.049	0.030	0.000
W.S. Elev (ft)	2073.94	Reach Len. (ft)	224.00	226.00	235.00
Crit W.S. (ft)	2073.94	Flow Area (sq ft)	1379.31	546.96	0.00
E.G. Slope (ft/ft)	0.009050	Area (sq ft)	1379.31	546.96	0.00
Q Total (cfs)	14413.00	Flow (cfs)	7210.16	7202.84	0.00
Top Width (ft)	928.92	Top Width (ft)	812.63	116.17	0.12
Vel Total (ft/s)	7.48	Avg. Vel. (ft/s)	5.23	13.17	0.11
Max Chl Dpth (ft)	7.41	Hydr. Depth (ft)	1.70	4.71	0.01
Conv. Total (cfs)	151508.2	Conv. (cfs)	75792.6	75715.6	0.0
Length Wtd. (ft)	225.14	Wetted Per. (ft)	818.16	117.07	0.12
Min Ch El (ft)	2067.42	Shear (lb/sq ft)	0.95	2.64	
Alpha	1.79	Stream Power (lb/ft s)	4.98	34.76	
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	36.26	78.18	0.69
C & E Loss (ft)	0.01	Cum SA (acres)	18.95	10.08	0.29

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 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: Sols Wash
REACH: Reach 1 RS: 0.76

UT
Description:
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
66.41	2082.7	8982.11	2083.52	8982.86	2083.55	8983.12	2083.56	8983.45	2083.26
84.82	2082.9	9000.97	2076.31	9003.37	2076.19	9031.72	2075.49	9034.78	2075.53
035.72	2075.5	9036.98	2075.49	9039.52	2075.48	9057.72	2075.17	9070.38	2074.64
9093.28	2074.2	9099.65	2074.1	9103.5	2074.01	9131.81	2073.42	9141.75	2073.24
9152.16	2071.3	9157.66	2070.21	9163.66	2070.08	9169.74	2070.47	9172.35	2071.04
9177.48	2070	9194.18	2066.88	9204.49	2065.09	9228.61	2069.71	9237.43	2071.32
9254.65	2071.2	9256.59	2071.2	9257.7	2071.21	9259.43	2071.19	9273.49	2071.18
9312.44	2071.5	9313	2071.46	9313.25	2071.46	9314.23	2071.46	9360.98	2071.07
9363.52	2071.1	9389.95	2071.18	9410.02	2071.25	9431.27	2071.3	9435.6	2071.44
9439.26	2071.5	9446.98	2071.79	9466.96	2072.39	9470.26	2072.34	9503	2071.54
9503.13	2071.5	9503.18	2071.54	9518.44	2071.61	9529.92	2071.62	9538.86	2071.83
9564	2071.9	9575	2071.85	9600.82	2071.74	9622.46	2071.7	9630.28	2071.6
9638.87	2071.6	9648.49	2071.37	9650.48	2070.28	9656.39	2066.19	9668.72	2066.16
9677	2065.8	9690.29	2066.2	9694.54	2066.21	9698.26	2067.94	9705.89	2070.58
9717.74	2070.5	9723.11	2070.46	9736.52	2070.78	9756.71	2070.87	9766.81	2071.27
9774.46	2071.5	9786.81	2071.96	9800.15	2072	9808.73	2071.87	9831.88	2071.62
9836.64	2071.6	9838.05	2071.59	9839.88	2071.55	9869.23	2072.05	9872.39	2072.1
9895.46	2071.8	9912.99	2071.63	9922.97	2071.78	9941.02	2070.67	9948.71	2070.25
9955.96	2069.3	9957.02	2069.18	9957.73	2069.04	9974.47	2066.6	9975.98	2066.44
9976.88	2066.4	9977.22	2066.32	9977.62	2066.14	9980.22	2066.06	10000	2065.89
10006.53	2065.84	10009.77	2065.91	0077.22	2066.96	10085.05	2067.11	0086.89	2067.24
10100.79	2070.08	10106.98	2071.21	0112.89	2071.38	10116.4	2071.41	0120.05	2071.91
10138.24	2074.08	10145.63	2073.81	0147.75	2074.06				

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8966.41	.065	9177.48	.035	9237.43	1	9630.28	.065	9648.49	.035
9705.89	.065	9955.96	.03	10100.79	.065				

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9955.96	10100.79	262	269	270	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2073.59	Element			
Vel Head (ft)	1.63	Wt. n-Val.	0.040	0.030	0.065
W.S. Elev (ft)	2071.96	Reach Len. (ft)	262.00	269.00	270.00
Crit W.S. (ft)	2071.96	Flow Area (sq ft)	899.13	751.50	15.32
E.G. Slope (ft/ft)	0.006661	Area (sq ft)	899.13	751.50	15.32
Q Total (cfs)	14413.00	Flow (cfs)	5307.38	9081.58	24.05
Top Width (ft)	905.44	Top Width (ft)	740.91	144.83	19.71
Vel Total (ft/s)	8.65	Avg. Vel. (ft/s)	5.90	12.08	1.57
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)	1.21	5.19	0.78
Conv. Total (cfs)	176600.5	Conv. (cfs)	65030.6	111275.3	294.6
Length Wtd. (ft)	266.41	Wetted Per. (ft)	744.87	145.39	19.85
Min Ch El (ft)	2065.84	Shear (lb/sq ft)	0.50	2.15	0.32
Alpha	1.40	Stream Power (lb/ft s)	2.96	25.97	0.50
Frctn Loss (ft)	1.50	Cum Volume (acre-ft)	67.08	71.17	0.78
C & E Loss (ft)	0.12	Cum SA (acres)	38.28	9.37	0.40

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 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 OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2073.59	Element			
Vel Head (ft)	1.63	Wt. n-Val.	0.040	0.030	0.065
W.S. Elev (ft)	2071.96	Reach Len. (ft)	262.00	269.00	270.00
Crit W.S. (ft)	2071.96	Flow Area (sq ft)	898.95	751.46	15.30
E.G. Slope (ft/ft)	0.006662	Area (sq ft)	898.95	751.46	15.30
Q Total (cfs)	14413.00	Flow (cfs)	5307.22	9081.43	24.36
Top Width (ft)	904.80	Top Width (ft)	740.76	144.83	19.21
Vel Total (ft/s)	8.65	Avg. Vel. (ft/s)	5.90	12.08	1.59
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)	1.21	5.19	0.80
Conv. Total (cfs)	176589.6	Conv. (cfs)	65024.6	111266.6	298.4
Length Wtd. (ft)	266.42	Wetted Per. (ft)	744.72	145.39	19.41
Min Ch El (ft)	2065.84	Shear (lb/sq ft)	0.50	2.15	0.33
Alpha	1.40	Stream Power (lb/ft s)	2.96	25.98	0.52
Frctn Loss (ft)	1.40	Cum Volume (acre-ft)	30.41	74.81	0.64
C & E Loss (ft)	0.14	Cum SA (acres)	14.95	9.40	0.23

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 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: Sols Wash
REACH: Reach 1 RS: 0.71

INPUT

scription:
tion Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8861.5	2084.2	8864.48	2084.22	8867.75	2084.21	8870.81	2083.35	8887.52	2078.19
8896.29	2078	8913.39	2076.05	8914.15	2076.04	8914.91	2075.99	8929.42	2076.52
8937.54	2076.4	8946.72	2076.01	8954.01	2075.46	8956.91	2075.59	8960.12	2075.61
8979.3	2075.9	8989.9	2073.94	8998.11	2074.64	9009.22	2074.06	9016.26	2072.43
9021.02	2071.4	9031.07	2071.23	9044.91	2071.01	9050.85	2069.61	9051.79	2069.35
9064.19	2069.2	9087.51	2068.79	9098.21	2068.81	9107.64	2068.87	9126.03	2068.85
9148.49	2068.9	9149.98	2068.88	9154.4	2068.88	9179.2	2068.93	9188.16	2068.94
9217.25	2068.8	9219.44	2068.77	9222.7	2068.75	9258.29	2068.79	9267.25	2068.9
9282.3	2068.8	9295.73	2069.2	9298.07	2069.18	9299.52	2069.2	9300.86	2069.16
9313.56	2068.8	9328.8	2068.56	9336.86	2068.43	9356.93	2068.07	9357.34	2068.08
9358.8	2068.1	9394.29	2068.7	9411.36	2068.8	9429.62	2068.59	9444.36	2068.6
9456.47	2068.5	9468.9	2068.11	9474.67	2067.99	9477.64	2067.69	9503.81	2064.5
9523.69	2066.5	9532.86	2067.85	9539.23	2068.74	9550.22	2068.88	9559.65	2068.85
9578.93	2068.7	9610.32	2069.08	9618.4	2069.34	9666.63	2069.59	9678.09	2069.75
9698.54	2068.9	9716.29	2068.87	9723.16	2068.3	9734.24	2064.98	9734.51	2064.9
9735.02	2064.9	9758.68	2064.37	9765.74	2064.46	9770.61	2066.37	9780.87	2069.93
9791.24	2069.2	9794.5	2069.12	9801.2	2069.02	9812.94	2069.26	9824.82	2069.54
9838.16	2069.8	9848.69	2069.52	9858.04	2069.44	9879.06	2069.05	9884.02	2068.99
9888.38	2069.1	9904.2	2069.04	9918.25	2068.84	9922.81	2068.64	9926.76	2068.55
9938.77	2068.1	9954.07	2067.08	9960.01	2066.78	9964.65	2066.04	9973.7	2064.13
9989.73	2064.1	10000	2064.16	10000.84	2064.16	10023.57	2064.36	10039.89	2064.04
10057.9	2063.89	10073.74	2063.9	10096.1	2064	10109.81	2070.99	10297.08	2071.53
10299.78	2072	10303.43	2072.68	10305.32	2073.25	10308.73	2073.27	10314.91	2073.31
10319.25	2072.8	10322.05	2072.25						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8861.5	.065	9411.36	1	9477.64	.035	9532.86	.065	9716.29	.035
9780.87	.065	9964.65	.03						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9964.65	10109.81	254	256	246	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2071.38	Element			
Vel Head (ft)	1.24	Wt. n-Val.	0.047	0.030	
W.S. Elev (ft)	2070.14	Reach Len. (ft)	254.00	256.00	246.00
Crit W.S. (ft)	2070.14	Flow Area (sq ft)	1505.04	824.99	
E.G. Slope (ft/ft)	0.004829	Area (sq ft)	1505.04	824.99	
Q Total (cfs)	14413.00	Flow (cfs)	5370.03	9042.97	
Top Width (ft)	1059.53	Top Width (ft)	916.04	143.49	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)	3.57	10.96	
Max Chl Dpth (ft)	6.25	Hydr. Depth (ft)	1.64	5.75	
Conv. Total (cfs)	207402.7	Conv. (cfs)	77274.7	130128.1	
Length Wtd. (ft)	255.27	Wetted Per. (ft)	918.33	145.17	
Min Ch El (ft)	2063.89	Shear (lb/sq ft)	0.49	1.71	
Alpha	2.09	Stream Power (lb/ft s)	1.76	18.78	
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)	59.85	66.30	0.73
C & E Loss (ft)	0.02	Cum SA (acres)	33.29	8.48	0.34

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2071.56	Element			
Vel Head (ft)	1.17	Wt. n-Val.	0.047	0.030	
W.S. Elev (ft)	2070.39	Reach Len. (ft)	254.00	256.00	246.00
Crit W.S. (ft)		Flow Area (sq ft)	1411.48	861.69	
E.G. Slope (ft/ft)	0.004235	Area (sq ft)	1411.48	861.69	
Q Total (cfs)	14413.00	Flow (cfs)	5330.32	9082.68	
Top Width (ft)	840.64	Top Width (ft)	696.65	143.99	
Vel Total (ft/s)	6.34	Avg. Vel. (ft/s)	3.78	10.54	
Max Chl Dpth (ft)	6.50	Hydr. Depth (ft)	2.03	5.98	
Conv. Total (cfs)	221463.5	Conv. (cfs)	81903.2	139560.3	
Length Wtd. (ft)	255.31	Wetted Per. (ft)	700.33	145.73	
Min Ch El (ft)	2063.89	Shear (lb/sq ft)	0.53	1.56	
Alpha	1.87	Stream Power (lb/ft s)	2.01	16.48	
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	23.46	69.83	0.60
C & E Loss (ft)	0.04	Cum SA (acres)	10.63	8.51	0.17

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.66

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8909.42	2073.2	8921	2073.26	8929.09	2072.57	8947.17	2071.42	8953.03	2071.22
8959.27	2071.3	8969.85	2070.72	8972.01	2070.52	8973	2070.48	8978	2070.06
88.12	2069.2	8990.12	2068.99	9004.2	2069.02	9021.29	2068	9025.56	2067.66
33.97	2067.2	9049.36	2066.2	9052.58	2066.32	9065.96	2066.79	9066.79	2066.68
9071.42	2066.5	9073.23	2066.5	9089.64	2066.56	9097.4	2066.66	9104.07	2066.67

124.86	2066.6	9140.22	2066.49	9154.52	2066.42	9172.67	2066.73	9178.12	2066.82
81.96	2066.9	9204.7	2066.55	9224.11	2066.45	9230.91	2066.6	9267.56	2066.79
70.58	2066.8	9305.51	2066.73	9312.07	2066.72	9312.97	2066.71	9314.61	2066.7
9355.5	2066.6	9382.55	2066.48	9392.06	2066.47	9399.86	2066.69	9426.85	2066.9
9446.31	2066.5	9449.86	2066.56	9459.64	2066.7	9484.42	2067.09	9507.86	2066.94
9525.25	2066.7	9546.42	2066.97	9567.66	2067.23	9596.15	2067.55	9614.11	2067.7
9643.34	2067	9662.26	2067.16	9676.86	2067.47	9687.24	2067.08	9697.58	2066.72
9704.63	2066.6	9712.29	2066.37	9730.64	2066.58	9742.83	2066.7	9773.06	2066.04
9773.57	2066	9773.81	2066.01	9795.64	2066.14	9812.17	2063.71	9812.25	2063.7
9812.34	2063.7	9812.47	2063.69	9813.67	2063.65	9835.13	2062.96	9837.18	2063.02
9839.99	2064	9851.79	2067.58	9858.46	2067.77	9872.03	2068.02	9881.07	2067.98
9894.51	2068.1	9902.81	2068.01	9915.73	2067.44	9919.56	2067.21	9923.8	2066.99
9943.25	2066.1	9954.58	2065.65	9964.3	2065.39	9971.19	2063.52	9977.89	2062.05
10000	2062.09	10005.32	2062.11	10007.11	2062.11	10036.89	2062.67	10041	2062.63
10077.17	2061.79	10094.86	2061.8	10110	2069.41	10445	2070	10449.64	2072

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8909.42	.065	9795.64	.035	9851.79	.065	9964.3	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9964.3	10110	256	248	245	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2069.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.	0.055	0.030	
W.S. Elev (ft)	2068.59	Reach Len. (ft)	256.00	248.00	245.00
Crit W.S. (ft)	2068.59	Flow Area (sq ft)	1800.42	863.14	
E.G. Slope (ft/ft)	0.004369	Area (sq ft)	1800.42	863.14	
Q Total (cfs)	14413.00	Flow (cfs)	5177.98	9235.03	
Top Width (ft)	1096.91	Top Width (ft)	952.84	144.06	
Vel Total (ft/s)	5.41	Avg. Vel. (ft/s)	2.88	10.70	
Max Chl Dpth (ft)	6.80	Hydr. Depth (ft)	1.89	5.99	
Conv. Total (cfs)	218054.4	Conv. (cfs)	78337.7	139716.8	
Length Wtd. (ft)		Wetted Per. (ft)	953.97	146.10	
Min Ch El (ft)	2061.79	Shear (lb/sq ft)	0.51	1.61	
Alpha	2.61	Stream Power (lb/ft s)	1.48	17.24	
Frctn Loss (ft)		Cum Volume (acre-ft)	50.22	61.34	0.73
C & E Loss (ft)		Cum SA (acres)	27.84	7.64	0.34

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.

SS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2070.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.	0.052	0.030	
W.S. Elev (ft)	2069.58	Reach Len. (ft)	256.00	248.00	245.00
Crit W.S. (ft)		Flow Area (sq ft)	1400.93	1007.24	
E.G. Slope (ft/ft)	0.002978	Area (sq ft)	1400.93	1007.24	
Q Total (cfs)	14413.00	Flow (cfs)	4639.73	9773.27	
Top Width (ft)	630.00	Top Width (ft)	484.30	145.70	
Vel Total (ft/s)	5.99	Avg. Vel. (ft/s)	3.31	9.70	
Max Chl Dpth (ft)	7.79	Hydr. Depth (ft)	2.89	6.91	
Conv. Total (cfs)	264103.1	Conv. (cfs)	85018.2	179084.9	
Length Wtd. (ft)	249.47	Wetted Per. (ft)	487.86	148.10	
Min Ch El (ft)	2061.79	Shear (lb/sq ft)	0.53	1.26	
Alpha	1.88	Stream Power (lb/ft s)	1.77	12.27	
Frctn Loss (ft)	0.97	Cum Volume (acre-ft)	15.26	64.34	0.60
C & E Loss (ft)	0.12	Cum SA (acres)	7.19	7.66	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The 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: Sols Wash
REACH: Reach 1 RS: 0.61

INPUT
Description:
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8736.05	2076.1	8743.1	2076.13	8788.01	2072	8790.17	2071.9	8792.32	2071.65
8818.02	2070.4	8824.74	2071.29	8827.59	2071.69	8834.13	2071.56	8835.33	2071.48
8840.86	2071	8852.41	2069.93	8867.58	2069.83	8873.58	2070.06	8879.82	2069.82
8892.97	2069.8	8908.3	2069.72	8931.53	2069.63	8937.82	2066.98	8943.08	2064.5
8958.22	2064.4	8977.84	2064.24	8982.09	2064.14	8990.26	2064.21	9005.77	2064.18
9019.59	2064.2	9027.78	2064.23	9029.88	2064.09	9052.4	2064.29	9052.74	2064.29
9052.85	2064.3	9085.89	2064.62	9095.31	2064.86	9102.27	2064.79	9130.69	2064.49
9147.72	2064.7	9161.96	2064.79	9173.92	2064.7	9195.3	2064.61	9205.45	2064.63
9228.72	2064.8	9232.42	2064.81	9234.33	2064.83	9267.86	2064.86	9276.16	2064.83
9295.98	2064.8	9319.6	2064.77	9343.68	2064.64	9345.48	2064.66	9366.03	2064.6
9367.18	2064.6	9376.79	2064.68	9395.1	2064.47	9409.81	2064.96	9412.73	2064.92
9416.5	2065	9431.19	2064.9	9459.67	2064.87	9466.73	2064.85	9481.66	2064.83
9493.18	2064.9	9502.44	2064.84	9530.77	2065.44	9545.89	2065.63	9573.19	2065.78
9595.07	2066.1	9616.71	2066.23	9633.29	2066.34	9648.58	2066.4	9678.57	2066.35
78.99	2066.4	9679.38	2066.35	9723.78	2066.52	9760.6	2065.85	9763.2	2065.82
66.14	2065.8	9782.98	2065.95	9786.52	2065.71	9791.9	2065.41	9795.68	2065.42
9805.76	2065.2	9823.67	2065.25	9828.63	2065.54	9836.98	2065.58	9837.92	2065.57

45.38	2065.6	9879.15	2065.76	9890.67	2065.81	9902.96	2065.71	9933.56	2064.92
9.65	2063.9	9950.27	2061.93	9952.04	2061.3	9957.24	2060.44	9960.1	2060.35
2.67	2060.3	9990.24	2059.97	9995.14	2059.91	10000	2059.93	10015.68	2060.03
039.69	2060.08	10090	2060.1	10106.8	2068.51	0544.37	2068.86	10553.74	2071.6
10562.61	2071.74	10563.1	2071.76	10563.4	2071.7	10564.1	2071.54		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8736.05	.1	9267.86	.1	9836.98	.065	9933.56	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9933.56	10106.8	270	241	240	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2068.49	Element			
Vel Head (ft)	1.46	Wt. n-Val.	0.097	0.030	
W.S. Elev (ft)	2067.03	Reach Len. (ft)	270.00	241.00	240.00
Crit W.S. (ft)	2067.03	Flow Area (sq ft)	1854.46	1071.90	
E.G. Slope (ft/ft)	0.004171	Area (sq ft)	1854.46	1071.90	
Q Total (cfs)	14459.00	Flow (cfs)	2864.60	11594.40	
Top Width (ft)	1166.15	Top Width (ft)	995.86	170.30	
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)	1.54	10.82	
Max Chl Dpth (ft)	7.12	Hydr. Depth (ft)	1.86	6.29	
Conv. Total (cfs)	223883.3	Conv. (cfs)	44355.5	179527.8	
Length Wtd. (ft)	246.31	Wetted Per. (ft)	996.51	172.38	
Min Ch El (ft)	2059.91	Shear (lb/sq ft)	0.48	1.62	
Alpha	3.86	Stream Power (lb/ft s)	0.75	17.51	
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	39.48	55.83	0.73
C & E Loss (ft)	0.00	Cum SA (acres)	22.12	6.74	0.34

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 OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2069.54	Element			
Vel Head (ft)	2.28	Wt. n-Val.	0.080	0.030	
W.S. Elev (ft)	2067.25	Reach Len. (ft)	270.00	241.00	240.00
Crit W.S. (ft)	2067.25	Flow Area (sq ft)	405.24	1110.16	
E.G. Slope (ft/ft)	0.005263	Area (sq ft)	405.24	1110.16	
Q Total (cfs)	14459.00	Flow (cfs)	677.62	13781.38	
Top Width (ft)	466.31	Top Width (ft)	295.56	170.75	
Vel Total (ft/s)	9.54	Avg. Vel. (ft/s)	1.67	12.41	
Max Chl Dpth (ft)	7.34	Hydr. Depth (ft)	1.37	6.50	
Conv. Total (cfs)	199305.9	Conv. (cfs)	9340.5	189965.5	
Length Wtd. (ft)	241.92	Wetted Per. (ft)	296.51	172.89	
Min Ch El (ft)	2059.91	Shear (lb/sq ft)	0.45	2.11	
Alpha	1.61	Stream Power (lb/ft s)	0.75	26.19	
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	9.95	58.31	0.60
C & E Loss (ft)	0.02	Cum SA (acres)	4.90	6.75	0.17

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: Sols Wash
REACH: Reach 1 RS: 0.57

INPUT
Description:
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8697.69	2069.1	8710.61	2068.32	8716.79	2068.25	8721.08	2068.02	8734.42	2067.57
8748.02	2066.9	8759.52	2066.66	8764.49	2066.66	8770.68	2066.3	8783.24	2066.03
8783.27	2066	8783.31	2066.03	8816.1	2065.38	8834.01	2063.93	8835.48	2063.88
8837.28	2063.9	8851.8	2064.51	8869.48	2064.17	8879.25	2063.69	8888.93	2063.6
8925.85	2063.2	8937.71	2063.18	8951	2062.99	8961.94	2063.01	8966.4	2062.91
8967.8	2062.9	8973.5	2062.45	8974.78	2062.35	8975.26	2062.33	8976.88	2062.38
8992.69	2062.7	8995.37	2062.76	9003.74	2062.71	9023.15	2062.7	9042.97	2062.88
9066.56	2063	9070.66	2063.09	9073.99	2063.12	9105.26	2062.67	9118.49	2062.51
9150.19	2063.1	9162.58	2063.32	9181.05	2063.35	9207.35	2063.33	9222.95	2063.37
9243.87	2063.2	9251.58	2062.98	9258.05	2063.01	9292.59	2062.15	9297.46	2062.01
9298.81	2062	9301.26	2062.05	9332.57	2062.35	9344.72	2062.36	9353.19	2062.28
9367.22	2062.3	9387.06	2062.36	9391.68	2062.31	9395.05	2062.18	9399.19	2062.25
9407.36	2062.4	9429.17	2063.02	9431.94	2063.1	9433.72	2063.12	9484.2	2063.46
9488.55	2063.5	9527.15	2063.54	9534.98	2063.54	9535.66	2063.54	9540.03	2063.55
9580.02	2063.6	9588.16	2063.54	9626.17	2063.3	9645.75	2063.27	9652.81	2063.26
9687.93	2063.3	9702.32	2063.33	9703.06	2063.35	9704.43	2063.35	9710.43	2063.43
9717.05	2063.5	9720.42	2063.05	9723.34	2062.78	9741.76	2063.03	9755.39	2063.2
9764.63	2063.2	9768.09	2063.27	9775.25	2063.3	9776.34	2063.33	9776.76	2063.33
77.99	2063.3	9786.01	2063.43	9849.74	2064.17	9859.08	2064.2	9863.77	2064.16
83.37	2063.9	9907.71	2063.57	9918.24	2063.49	9927.66	2063.82	9933.62	2063.02
9963.87	2058.3	9981.25	2057.95	9991.79	2058.08	9997.76	2058	10000	2057.976

```
10027.09 2057.6910041.49    2058   10100    2058 10116.8  2066.4   10585    2067
594.94    206810603.38  2072.210609.42 2072.4110611.63  2072.410611.64  2072.4

Manning's n Values          num=       4
    Sta   n Val     Sta    n Val     Sta    n Val     Sta    n Val
 8697.69      .1 9162.58      .1 9849.74    .065 9933.62     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9933.62 10116.8              180     215     220            .3        .5
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
888        T
```

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2066.40	Element			
Vel Head (ft)	1.49	Wt. n-Val.	0.098	0.030	
W.S. Elev (ft)	2064.92	Reach Len. (ft)	180.00	215.00	220.00
Crit W.S. (ft)	2064.92	Flow Area (sq ft)	1682.53	1122.13	
E.G. Slope (ft/ft)	0.004148	Area (sq ft)	1905.51	1122.13	
Q Total (cfs)	14459.00	Flow (cfs)	2432.19	12026.81	
Top Width (ft)	1291.99	Top Width (ft)	1111.78	180.21	
Vel Total (ft/s)	5.16	Avg. Vel. (ft/s)	1.45	10.72	
Max Chl Dpth (ft)	7.23	Hydr. Depth (ft)	1.77	6.23	
Conv. Total (cfs)	224495.3	Conv. (cfs)	37763.0	186732.3	
Length Wtd. (ft)	209.49	Wetted Per. (ft)	950.16	182.22	
Min Ch El (ft)	2057.69	Shear (lb/sq ft)	0.46	1.59	
Alpha	3.61	Stream Power (lb/ft s)	0.66	17.09	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	27.82	49.76	0.73
C & E Loss (ft)	0.12	Cum SA (acres)	15.59	5.77	0.34

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 OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2067.35	Element			
Vel Head (ft)	2.52	Wt. n-Val.	0.078	0.030	
W.S. Elev (ft)	2064.83	Reach Len. (ft)	180.00	215.00	220.00
Crit W.S. (ft)	2064.83	Flow Area (sq ft)	159.35	1107.27	
E.G. Slope (ft/ft)	0.006053	Area (sq ft)	159.35	1107.27	
Q Total (cfs)	14459.00	Flow (cfs)	240.67	14218.33	
Top Width (ft)	333.67	Top Width (ft)	153.62	180.05	
Vel Total (ft/s)	11.42	Avg. Vel. (ft/s)	1.51	12.84	
Max Chl Dpth (ft)	7.14	Hydr. Depth (ft)	1.04	6.15	
Conv. Total (cfs)	185844.1	Conv. (cfs)	3093.4	182750.7	
Length Wtd. (ft)	213.68	Wetted Per. (ft)	155.19	182.03	
Min Ch El (ft)	2057.69	Shear (lb/sq ft)	0.39	2.30	
Alpha	1.24	Stream Power (lb/ft s)	0.59	29.52	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	8.20	52.18	0.60
C & E Loss (ft)	0.52	Cum SA (acres)	3.50	5.78	0.17

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.52

INPUT
Description: Begin lateral weir overflow at Left OB. Weir section extends to bridge.
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9205.68	2064.7	9215.24	2064.65	9215.75	2064.64	9216.87	2064.6	9243.34	2063.78
9250.32	2063.5	9255.1	2063.45	9259.43	2063.42	9292.43	2063.08	9298.66	2063.04
9319.04	2063.2	9322.59	2063.11	9324.11	2062.68	9325.94	2062.49	9330.03	2061.62
9335.19	2063.8	9335.7	2063.88	9338.93	2063.35	9348.07	2062.02	9352.22	2061.96
9382.51	2062.7	9401.81	2062.11	9403.33	2062.1	9450.98	2062.15	9462.3	2062.36
9484.83	2062.7	9513.77	2062.31	9515.51	2062.28	9526.7	2062.18	9556.79	2061.92
9561.91	2061.9	9590.51	2062.14	9603.79	2061.93	9617.84	2061.91	9642.5	2061.85
9652.03	2062.2	9653.72	2062.27	9655	2062.22	9659.12	2062.04	9671.31	2061.75
9684.89	2062.1	9691.7	2062.11	9702.49	2062.34	9702.83	2062.35	9725.41	2061.77
9729.82	2061.7	9737.08	2061.67	9769.38	2061.65	9788.51	2061.69	9790.11	2061.7
9814	2061.9	9833.8	2062.01	9863.88	2061.61	9867.8	2061.59	9871.34	2061.6
9904.59	2061.8	9938.15	2060.44	9946.42	2060.21	9960.22	2059.05	9971.03	2056.21
9997.82	2055.5	10000	2055.61	10009.87	2056.01	10019.76	2056.26	10045.14	2056.36
10110	2056.4	10126.6	2065	10635	2065.71	0658.08	2074.05	10660.52	2074
65.18	2073.31								

Manning's n Values num= 3

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    Sta   n Val     Sta   n Val     Sta   n Val
 9805.68    .065    9814    .065 9938.15     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9938.15 10126.6               750     242     250            .3        .5
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
888        T

CROSS SECTION OUTPUT    Profile #PF 1

  E.G. Elev (ft)          2065.10   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.26   Wt. n-Val.                0.065      0.030
  W.S. Elev (ft)          2063.85   Reach Len. (ft)          750.00     242.00     250.00
  Crit W.S. (ft)                    Flow Area (sq ft)       1102.84    1271.38
  E.G. Slope (ft/ft)      0.003014  Area (sq ft)            1181.70    1271.38
  Q Total (cfs)          14459.00   Flow (cfs)              2116.38   12342.62
  Top Width (ft)           882.76   Top Width (ft)           696.54     186.22
  Vel Total (ft/s)           6.09   Avg. Vel. (ft/s)           1.92       9.71
  Max Chl Dpth (ft)          8.35   Hydr. Depth (ft)           1.88       6.83
  Conv. Total (cfs)      263362.9   Conv. (cfs)             38548.8   224814.1
  Length Wtd. (ft)         281.46   Wetted Per. (ft)         588.20     188.48
  Min Ch El (ft)         2055.50    Shear (lb/sq ft)           0.35       1.27
  Alpha                      2.18   Stream Power (lb/ft s)     0.68      12.32
  Frctn Loss (ft)            0.63   Cum Volume (acre-ft)      21.45      43.85       0.73
  C & E Loss (ft)            0.07   Cum SA (acres)            11.85       4.87       0.34

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT    Profile #PF 2

  E.G. Elev (ft)          2065.79   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.47   Wt. n-Val.                0.065      0.030
  W.S. Elev (ft)          2064.32   Reach Len. (ft)          750.00     242.00     250.00
  Crit W.S. (ft)                    Flow Area (sq ft)        356.81    1359.84
  E.G. Slope (ft/ft)      0.002949  Area (sq ft)             356.81    1359.84
  Q Total (cfs)          14459.00   Flow (cfs)               851.69   13607.31
  Top Width (ft)           319.29   Top Width (ft)           132.15     187.14
  Vel Total (ft/s)           8.42   Avg. Vel. (ft/s)           2.39      10.01
  Max Chl Dpth (ft)          8.82   Hydr. Depth (ft)           2.70       7.27
  Conv. Total (cfs)      266256.2   Conv. (cfs)             15683.5   250572.7
  Length Wtd. (ft)         256.66   Wetted Per. (ft)         134.67     189.51
  Min Ch El (ft)         2055.50    Shear (lb/sq ft)           0.49       1.32
  Alpha                      1.33   Stream Power (lb/ft s)     1.16      13.22
  Frctn Loss (ft)            0.56   Cum Volume (acre-ft)       7.14      46.09       0.60
  C & E Loss (ft)            0.13   Cum SA (acres)             2.91       4.88       0.17

CROSS SECTION          RIVER: Sols Wash
REACH: Reach 1            RS: 0.48

INPUT
Description: Lateral Weir Overflow at Left OB
Station Elevation Data     num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 9802.33  2062.6 9817.48 2062.73 9837.25 2062.55 9865.49 2062.27 9874.91 2062.45
 9893.67  2062.3 9915.14 2062.14  9921.2 2062.23 9927.07 2062.34 9944.35 2053.79
 9986.93 2053.61 9998.66 2053.52   10000 2053.5110005.63 2053.5110041.53  2053.6
10091.52 2054.0110111.74    2064   10680  2065.1 10699.3 2070.6510705.57  2074.6
10708.39    207510725.09 2076.52

Manning's n Values         num=       2
     Sta   n Val     Sta   n Val
 9802.33      .1 9927.07     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9927.0710111.74               270     235     380            .6        .8
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
888        T
888        T

CROSS SECTION OUTPUT    Profile #PF 1

  E.G. Elev (ft)          2064.40   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.11   Wt. n-Val.                0.100      0.030
  W.S. Elev (ft)          2063.28   Reach Len. (ft)          270.00     235.00     380.00
  Crit W.S. (ft)                    Flow Area (sq ft)        107.07    1590.31
  E.G. Slope (ft/ft)      0.001695  Area (sq ft)             107.76    1590.31
  Q Total (cfs)          13553.00   Flow (cfs)                59.48   13493.52
  Top Width (ft)           307.96   Top Width (ft)           124.74     183.22
  Vel Total (ft/s)           7.98   Avg. Vel. (ft/s)           0.56       8.48
  Max Chl Dpth (ft)          9.77   Hydr. Depth (ft)           0.87       8.68
  Conv. Total (cfs)      329178.6   Conv. (cfs)              1444.7   327733.9
  Length Wtd. (ft)         235.08   Wetted Per. (ft)         123.74     187.39
  Min Ch El (ft)         2053.51    Shear (lb/sq ft)           0.09       0.90
  Alpha                      1.12   Stream Power (lb/ft s)     0.05       7.62
  Frctn Loss (ft)            0.29   Cum Volume (acre-ft)      10.34      35.91       0.73
  C & E Loss (ft)            0.18   Cum SA (acres)             4.78       3.84       0.34

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION OUTPUT    Profile #PF 2
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.G. Elev (ft)	2065.10	Element	Left OB	Channel	Right OB
l Head (ft)	1.21	Wt. n-Val.	0.100	0.030	
.S. Elev (ft)	2063.89	Reach Len. (ft)	270.00	235.00	380.00
Crit W.S. (ft)		Flow Area (sq ft)	0.11	1701.12	
E.G. Slope (ft/ft)	0.001700	Area (sq ft)	0.11	1701.12	
Q Total (cfs)	15045.00	Flow (cfs)	0.01	15044.99	
Top Width (ft)	184.51	Top Width (ft)	0.07	184.44	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)	0.10	8.84	
Max Chl Dpth (ft)	10.38	Hydr. Depth (ft)	1.55	9.22	
Conv. Total (cfs)	364904.4	Conv. (cfs)	0.3	364904.2	
Length Wtd. (ft)	235.00	Wetted Per. (ft)	1.62	188.75	
Min Ch El (ft)	2053.51	Shear (lb/sq ft)	0.01	0.96	
Alpha	1.00	Stream Power (lb/ft s)	0.00	8.46	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	4.06	37.59	0.60
C & E Loss (ft)	0.18	Cum SA (acres)	1.77	3.85	0.17

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.43

INPUT
Description: First Cross Section US of US Hwy 93 Bridge
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6827.504	2063.29	6867.647	2063.43	6898.287	2063.71	6932.708	2063.86	6938.881	2062.72
6948.328	2063.18	6962.202	2063.37	6975.375	2063.06	6984.758	2063.16	6989.496	2063.23
6995.012	2063.38	6999.423	2063.02	7000.965	2063.03	7013.559	20587	020.897	2057.45
7020.99	2057.47	7023.557	2057.04	7025.755	2052.95	7033.534	2052.87	037.678	2052.68
7040.019	2051.92	7047.592	2051.92	7056.486	2052.09	7068.423	2051.87	071.068	2051.78
7123.557	2051.36	7125.005	2051.27	7149.854	2051.49	7160.997	2051.38	7165.827	2051.6
7169.462	2051.62	7171.031	2051.65	7178.053	2051.58	7184	2051.8	7201.3	2064
7345	2064.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
6827.504	.16	995.012	.065	7023.557	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7023.557	7201.3	146	146	146	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888			F
889			F

Skew Angle = 45

OSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2063.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.030	
W.S. Elev (ft)	2063.04	Reach Len. (ft)	7.00	7.00	7.00
Crit W.S. (ft)	2057.84	Flow Area (sq ft)		1786.99	
E.G. Slope (ft/ft)	0.000923	Area (sq ft)	87.51	1899.57	
Q Total (cfs)	13553.00	Flow (cfs)		13553.00	
Top Width (ft)	209.13	Top Width (ft)	32.75	176.38	
Vel Total (ft/s)	7.58	Avg. Vel. (ft/s)		7.58	
Max Chl Dpth (ft)	11.77	Hydr. Depth (ft)		11.33	
Conv. Total (cfs)	446133.1	Conv. (cfs)		446133.1	
Length Wtd. (ft)	7.00	Wetted Per. (ft)		157.91	
Min Ch El (ft)	2051.27	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)		4.94	
Frctn Loss (ft)		Cum Volume (acre-ft)	9.74	26.49	0.73
C & E Loss (ft)		Cum SA (acres)	4.29	2.87	0.34

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2064.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.030	
W.S. Elev (ft)	2063.64	Reach Len. (ft)	7.00	7.00	7.00
Crit W.S. (ft)	2058.29	Flow Area (sq ft)		1881.13	
E.G. Slope (ft/ft)	0.000958	Area (sq ft)	52.13	2005.07	
Q Total (cfs)	15045.00	Flow (cfs)		15045.00	
Top Width (ft)	185.78	Top Width (ft)	8.56	177.23	
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)		8.00	
Max Chl Dpth (ft)	12.37	Hydr. Depth (ft)		11.92	
Conv. Total (cfs)	485987.2	Conv. (cfs)		485987.2	
Length Wtd. (ft)	7.00	Wetted Per. (ft)		157.91	
Min Ch El (ft)	2051.27	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)		5.70	
Frctn Loss (ft)		Cum Volume (acre-ft)	3.90	27.59	0.60
C & E Loss (ft)		Cum SA (acres)	1.75	2.87	0.17

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

BRIDGE RIVER: Sols Wash
REACH: Reach 1 RS: 0.42

PUT
Description:

```
stance from Upstream XS =        7
k/Roadway Width         =      132
r Coefficient           =      2.6
idge Deck/Roadway Skew  =       45
Upstream  Deck/Roadway Coordinates
   num=      34
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
6932.475  2063.8         7015.454  2064.5         7015.454 2067.21
7018.982 2067.21         7018.982 2065.71         7026.704 2065.07 2060.95
7031.003 2065.07 2061.357047.323 2065.09 2061.357051.622 2065.09 2060.95
7052.874 2065.09 2060.957057.173 2065.09 2061.357073.818 2065.14 2061.35
7078.132 2065.14 2060.957079.376 2065.14 2060.957083.682 2065.14 2061.35
7099.953 2065.08 2061.357104.252 2065.08 2060.957105.497 2065.08 2060.95
7109.803 2065.08 2061.357126.766 2065.08 2061.357131.073 2065.08 2060.95
7132.317 2065.08 2060.957136.624 2065.08 2061.357153.212 2065.08 2061.35
7157.498 2065.08 2060.957158.756 2065.08 2060.957163.062 2065.08 2061.35
7179.382 2065.16 2061.357183.667 2065.16 2060.957214.532 2065.92
7214.532 2067.42         7218.061 2067.42         7218.061 2064.02
 7434.86    2066

Upstream Bridge Cross Section Data
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  6827.5 2063.296867.649 2063.43 6898.29 2063.716932.709  2063.86938.879 2062.72
 6948.33 2063.18  6962.2 2063.37 6975.38 2063.066984.759  2063.1  6989.5 2063.23
 6995.01 2063.38 6999.42 2063.02 7000.97 2063.03 7013.56    2058  7020.9 2057.45
 7020.99 2057.47 7023.56 2057.04 7025.76 2052.95 7033.53  2052.8 7037.68 2052.68
 7040.02 2051.927047.589 2051.92 7056.49 2052.097068.419  2051.8 7071.07 2051.78
 7123.56 2051.367125.009 2051.27 7149.85 2051.49     7161 2051.38 7165.83  2051.6
 7169.46 2051.627171.029 2051.657178.049 2051.587183.529 2051.87 7191.08  2053.3
7194.089 2053.42  7203.2 2053.947209.419 2054.62 7226.82 2055.72 7229.64    2056
7231.379 2056.067254.169 2056.817256.859 2056.99 7287.89 2058.36 7341.26 2063.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  6827.5    .025 7023.56    .022 7191.08    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
       7023.56 7191.08            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F
Skew Angle = 45

Downstream  Deck/Roadway Coordinates
   num=      36
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
63.961    2061         6747.821    2062         7006.297 2063.57
7006.297 2066.97         7009.839 2066.97         7009.839 2065.47
7017.278 2065.12 2060.957021.577 2065.12 2061.357039.503 2065.16 2061.35
7043.802 2065.16 2060.957045.053 2065.16 2060.957049.353 2065.16 2061.35
7068.239 2065.13 2061.357072.539 2065.13 2060.95 7073.79 2065.13 2060.95
7078.089 2065.13 2061.357094.529  2065.2 2061.357098.829  2065.2 2060.95
7100.081  2065.2 2060.95 7104.38  2065.2 2061.357120.961 2065.17 2061.35
 7125.26 2065.17 2060.957126.512 2065.17 2060.957130.812 2065.17 2061.35
7147.322 2065.16 2061.357151.621 2065.16 2060.957152.873 2065.16 2060.95
7157.172 2065.16 2061.357174.122 2065.09 2061.357178.406 2065.09 2060.95
7185.746 2065.75         7185.746 2067.25         7189.289 2067.25
7189.289 2063.85         7218.061    2064          7434.86    2066

Downstream Bridge Cross Section Data
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 6761.84 2059.25 6822.35 2058.46 6857.82 2060.316885.569 2058.16 6922.79 2056.96
6939.859 2056.36 6940.76 2056.33  6965.1 2056.49 6966.32  2056.6 6968.69 2056.67
 6987.44 2056.65 6988.51 2056.65  7005.4 2057.327008.339  2057.8 7011.93 2057.66
7015.379 2056.947015.879 2056.57 7018.04  2056.9 7018.04  2060.5 7018.51  2060.5
 7018.98  2054.57023.149 2054.22 7027.16  2053.7 7038.43 2051.637041.689 2050.34
 7055.79  2050.27062.399 2050.21 7071.07 2050.17  7091.2 2050.08  7142.5 2049.58
 7151.54 2049.45 7163.73  2049.4 7172.93 2049.33 7180.08 2057.29 7189.13 2059.62
7190.569 2058.85 7195.16  2058.9 7204.37 2060.48 7213.18 2060.71  7225.1 2057.63
 7289.26 2061.37 7322.32 2064.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 6761.84    .025 7018.04    .022 7180.08    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
       7018.98 7180.08            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F
Left Levee      Station=7018.508      Elevation=  2060.5
Skew Angle = 45

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         =2065.083
nergy head used in spillway design          =
: llway height used in design               =
.r crest shape                              = Broad Crested
```

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

BRIDGE OUTPUT Profile #PF 2
Opening : Single BR

			Inside BR US	Inside BR DS
E.G. US. (ft)	2064.63	Element		
W.S. US. (ft)	2063.64	E.G. Elev (ft)	2064.63	2061.84
Q Total (cfs)	15045.00	W.S. Elev (ft)	2061.35	2060.50
Q Bridge (cfs)	15045.00	Crit W.S. (ft)	2058.49	2057.10
Q Weir (cfs)		Max Chl Dpth (ft)	10.08	11.17
Weir Sta Lft (ft)		Vel Total (ft/s)	10.44	9.78
Weir Sta Rgt (ft)		Flow Area (sq ft)	1441.13	1538.26
Weir Submerg		Froude # Chl	0.04	0.04
Weir Max Depth (ft)		Specif Force (cu ft)	11882.35	12469.26
Min El Weir Flow (ft)	2065.10	Hydr Depth (ft)	122976.50	10.11
Min El Prs (ft)	2061.35	W.P. Total (ft)	383.92	235.07
Delta EG (ft)	2.78	Conv. Total (cfs)	235098.0	363483.1
Delta WS (ft)	3.13	Top Width (ft)	0.01	152.16
BR Open Area (sq ft)	1441.13	Frctn Loss (ft)		
BR Open Vel (ft/s)	10.44	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.96	0.70
Br Sel Method	Press Only	Power Total (lb/ft s)	10.02	6.85

Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.40

INPUT
Description: First Cross Section Downstream of US Hwy 93 Bridge
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
61.842	2059.25	6822.35	2058.466857.818		2060.316885.565		2058.166922.787		2056.96
9.863	2056.366940.762		2056.336965.101		2056.496966.324		2056.66968.686		2056.67
87.437	2056.656988.505		2056.657005.398		2057.327008.339		2057.87011.933		2057.66
7015.375	2056.947015.877		2056.577018.035		2056.97018.035		2060.57018.508		2060.5
7018.981	2054.57023.154		2054.227027.164		2053.77038.428		2051.637041.694		2050.34
7055.794	2050.27062.399		2050.217071.068		2050.177091.199		2050.08	7142.5	2049.58
7151.542	2049.457163.727		2049.47172.926		2049.337180.083		2057.297189.125		2059.62
7190.569	2058.857195.158		2058.97204.371		2060.487213.175		2060.717225.104		2057.63
7289.26	2061.377322.324		2064.88						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
6761.842	.16	857.818	.065	7018.035	.02	7018.981	.03	7180.083	.065
7204.371	1								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
7018.98	7180.083	254	254	254	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
888			F
888			F

Left Levee Station=7018.508 Elevation= 2060.5
Skew Angle = 45

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2061.10	Element			
Vel Head (ft)	1.24	Wt. n-Val.	0.020	0.030	0.000
W.S. Elev (ft)	2059.86	Reach Len. (ft)	254.00	254.00	254.00
Crit W.S. (ft)	2056.46	Flow Area (sq ft)	1.13	1513.60	0.01
E.G. Slope (ft/ft)	0.001703	Area (sq ft)	1.13	1513.60	72.89
Q Total (cfs)	13553.00	Flow (cfs)	1.23	13551.75	0.02
Top Width (ft)	229.01	Top Width (ft)	0.42	161.10	67.48
Vel Total (ft/s)	8.95	Avg. Vel. (ft/s)	1.09	8.95	1.73
Max Chl Dpth (ft)	10.53	Hydr. Depth (ft)	2.68	9.40	2.57
Conv. Total (cfs)	328382.2	Conv. (cfs)	29.8	328351.9	0.5
Length Wtd. (ft)	254.00	Wetted Per. (ft)	5.37	165.13	0.01
Min Ch El (ft)	2049.33	Shear (lb/sq ft)	0.02	0.97	
Alpha	1.00	Stream Power (lb/ft s)	0.02	8.73	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	9.73	21.61	0.73
C & E Loss (ft)	0.62	Cum SA (acres)	4.29	2.60	0.34

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

section. This may indicate the need for additional cross sections.
e: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2061.84	Element			
Vel Head (ft)	1.34	Wt. n-Val.	0.020	0.030	0.000
W.S. Elev (ft)	2060.50	Reach Len. (ft)	254.00	254.00	254.00
Crit W.S. (ft)	2056.95	Flow Area (sq ft)	1.42	1617.36	0.02
E.G. Slope (ft/ft)	0.001683	Area (sq ft)	33.33	1617.36	17.34
Q Total (cfs)	15045.00	Flow (cfs)	1.65	15043.32	0.03
Top Width (ft)	180.00	Top Width (ft)	10.98	161.10	7.92
Vel Total (ft/s)	9.29	Avg. Vel. (ft/s)	1.16	9.30	2.00
Max Chl Dpth (ft)	11.17	Hydr. Depth (ft)	3.00	10.04	3.21
Conv. Total (cfs)	366757.7	Conv. (cfs)	40.3	366716.7	0.8
Length Wtd. (ft)	254.00	Wetted Per. (ft)	6.02	165.13	0.01
Min Ch El (ft)	2049.33	Shear (lb/sq ft)	0.02	1.03	
Alpha	1.00	Stream Power (lb/ft s)	0.03	9.57	
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	3.89	22.54	0.60
C & E Loss (ft)	0.66	Cum SA (acres)	1.75	2.60	0.17

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

CROSS SECTION RIVER: Sols Wash
REACH: Reach 1 RS: 0.35

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9004.6	2054.7	9037.01	2054.43	9055.7	2054.37	9073.46	2054.72	9079.68	2054.85
9082.12	2054.8	9112.29	2054.39	9113.48	2054.4	9113.75	2054.39	9117.28	2054.63
9150.59	2054.5	9151.82	2054.51	9154.48	2054.5	9182.49	2054.47	9199.41	2054.49
9232.36	2054.3	9252.84	2054.16	9262.13	2054.1	9285.56	2053.56	9288.9	2053.61
9295.84	2053.6	9323.28	2053.53	9344.85	2053.5	9356.58	2053.47	9376.76	2053.55
9392.82	2053.8	9409.73	2053.84	9430.13	2053.82	9454.41	2054	9473.58	2054.1
9481.6	2054.2	9485.74	2054.19	9509.72	2054.22	9512.14	2054.23	9512.25	2054.23
9514.61	2054.3	9516.4	2054.29	9517.13	2054.29	9531.15	2054.26	9548.94	2054.18
564.4	2054.2	9574.43	2054.04	9624.13	2054.41	9627.48	2054.46	9655.84	2054.5
377.61	2054.4	9687.51	2054.46	9719.71	2054.49	9723.28	2054.5	9724.31	2054.5
9751.81	2054.6	9775.07	2054.65	9797.95	2054.99	9810.26	2055.15	9831.93	2055.69
9861.64	2056.4	9874.98	2055.56	9878.47	2055.14	9882.68	2055.99	9882.68	2057.39
9883.35	2057.39	9884.02	2055.99	9884.02	2055.43	9885.35	2054.85	9890.37	2054.7
9894.06	2054.73	9914.29	2054.49	9918.17	2053.88	9922.95	2053.28	9940.98	2051.6
9943.79	2050.82	9955.31	2049.51	9964.38	2048.13	9970.37	2047.79	9988.72	2047.7
9992.67	2047.69	9997.16	2047.68	10000	2047.68	10016.92	2047.68	10025.29	2047.78
10041.72	2048	10044.77	2049.63	10050.85	2053.87	10058.8	2058.29	10064.51	2059.41
10066.55	2059.61	0071.91	2059.69	10079.59	2059.78	10100.43	2059.89	10117.21	2060.41
10131.35	2060.51	0132.36	2060.59	10144.29	2060.92	10154.85	2062.57	10163.27	2064.01

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9004.6	.1	9516.4	.065	9882.68	.02	9884.02	.065	9940.98	.03
10050.85	.065								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9940.98	10050.85	686	686	686	.3	.5

Left Levee Station= 9883.35 Elevation= 2057.39

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2059.75	Element			
Vel Head (ft)	3.33	Wt. n-Val.	0.065	0.030	0.065
W.S. Elev (ft)	2056.43	Reach Len. (ft)	686.00	686.00	686.00
Crit W.S. (ft)	2056.43	Flow Area (sq ft)	147.31	877.09	5.88
E.G. Slope (ft/ft)	0.005808	Area (sq ft)	147.31	877.09	5.88
Q Total (cfs)	13553.00	Flow (cfs)	478.59	13063.38	11.03
Top Width (ft)	171.64	Top Width (ft)	57.17	109.87	4.60
Vel Total (ft/s)	13.15	Avg. Vel. (ft/s)	3.25	14.89	1.88
Max Chl Dpth (ft)	8.75	Hydr. Depth (ft)	2.58	7.98	1.28
Conv. Total (cfs)	177836.0	Conv. (cfs)	6279.8	171411.5	144.7
Length Wtd. (ft)	686.00	Wetted Per. (ft)	58.29	111.91	5.26
Min Ch El (ft)	2047.68	Shear (lb/sq ft)	0.92	2.84	0.41
Alpha	1.24	Stream Power (lb/ft s)	2.98	42.33	0.76
Frctn Loss (ft)	3.29	Cum Volume (acre-ft)	9.30	14.64	0.50
C & E Loss (ft)	0.72	Cum SA (acres)	4.12	1.81	0.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates

that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2060.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.53	Wt. n-Val.	0.065	0.030	0.065
W.S. Elev (ft)	2056.94	Reach Len. (ft)	686.00	686.00	686.00
Crit W.S. (ft)	2056.94	Flow Area (sq ft)	176.82	933.68	8.49
E.G. Slope (ft/ft)	0.005717	Area (sq ft)	176.82	933.68	8.49
Q Total (cfs)	15045.00	Flow (cfs)	643.11	14384.04	17.85
Top Width (ft)	172.81	Top Width (ft)	57.42	109.87	5.53
Vel Total (ft/s)	13.45	Avg. Vel. (ft/s)	3.64	15.41	2.10
Max Chl Dpth (ft)	9.26	Hydr. Depth (ft)	3.08	8.50	1.54
Conv. Total (cfs)	198982.0	Conv. (cfs)	8505.6	190240.3	236.1
Length Wtd. (ft)	686.00	Wetted Per. (ft)	58.86	111.91	6.32
Min Ch El (ft)	2047.68	Shear (lb/sq ft)	1.07	2.98	0.48
Alpha	1.26	Stream Power (lb/ft s)	3.90	45.87	1.01
Frctn Loss (ft)	3.83	Cum Volume (acre-ft)	3.28	15.11	0.52
C & E Loss (ft)	0.31	Cum SA (acres)	1.55	1.81	0.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth 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: Sols Wash
REACH: Reach 1 RS: 0.22

INPUT
Description: Cross Section 0.22 from CBA Study
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9433	2050.5	9473	2049.6	9508	2049.7	9516	2050.4	9590	2050.4
9669	2050.4	9726	2051.5	9799	2051.3	9899	2051	9938	2044.6
9963	2043	10000	2043	10019	2043	10037	2058.4	10170	2059.3
10292	2060.6	10331	2061.6	10381	2061.4	10430	2057.8	10485	2056.9
10541	2056.4	10573	2058.5	10625	2060.4	10628	2063.4	10671	2063.4
10732	2062	10788	2061.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9433	.065	9963	.025	10037	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9899	10019	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2054.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.89	Wt. n-Val.	0.065	0.032	0.025
W.S. Elev (ft)	2052.91	Reach Len. (ft)			
Crit W.S. (ft)	2052.91	Flow Area (sq ft)	1033.44	982.02	57.40
E.G. Slope (ft/ft)	0.004103	Area (sq ft)	1033.44	982.02	57.40
Q Total (cfs)	15045.00	Flow (cfs)	2564.48	11951.65	528.87
Top Width (ft)	597.58	Top Width (ft)	466.00	120.00	11.58
Vel Total (ft/s)	7.26	Avg. Vel. (ft/s)	2.48	12.17	9.21
Max Chl Dpth (ft)	9.91	Hydr. Depth (ft)	2.22	8.18	4.96
Conv. Total (cfs)	234875.3	Conv. (cfs)	40035.4	186583.5	8256.5
Length Wtd. (ft)		Wetted Per. (ft)	468.46	120.57	15.24
Min Ch El (ft)	2043.00	Shear (lb/sq ft)	0.57	2.09	0.96
Alpha	2.31	Stream Power (lb/ft s)	1.40	25.39	8.89
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: User specified water surface is not possible for the specified flow regime. The program used critical depth as the starting water surface.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2055.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.90	Wt. n-Val.	0.065	0.032	0.025
W.S. Elev (ft)	2052.93	Reach Len. (ft)			
Crit W.S. (ft)	2052.93	Flow Area (sq ft)	239.88	984.74	57.66
E.G. Slope (ft/ft)	0.005466	Area (sq ft)	239.88	984.74	57.66
Q Total (cfs)	15045.00	Flow (cfs)	579.06	13851.82	614.12
Top Width (ft)	270.61	Top Width (ft)	139.00	120.00	11.61
Vel Total (ft/s)	11.73	Avg. Vel. (ft/s)	2.41	14.07	10.65
Max Chl Dpth (ft)	9.93	Hydr. Depth (ft)	1.73	8.21	4.97
Conv. Total (cfs)	203499.3	Conv. (cfs)	7832.4	187360.3	8306.6
Length Wtd. (ft)		Wetted Per. (ft)	140.53	120.57	15.28
Min Ch El (ft)	2043.00	Shear (lb/sq ft)	0.58	2.79	1.29
Alpha	1.36	Stream Power (lb/ft s)	1.41	39.20	13.71
Frctn Loss (ft)		Cum Volume (acre-ft)			

C & E Loss (ft) Cum SA (acres)

Warning: User specified water surface is not possible for the specified flow regime. The program used critical depth as the starting water surface.

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach 1	0.22	15045.00	2043.00	2052.91	2052.91	2054.80	0.004103	12.17	2072.86	597.58	0.75
Reach 1	0.22	15045.00	2043.00	2052.93	2052.93	2055.84	0.005466	14.07	1282.28	270.61	0.87
Reach 1	0.35	13553.00	2047.68	2056.43	2056.43	2059.75	0.005808	14.89	1030.27	171.64	0.93
Reach 1	0.35	15045.00	2047.68	2056.94	2056.94	2060.47	0.005717	15.41	1118.99	172.81	0.93
Reach 1	0.40	13553.00	2049.33	2059.86	2056.46	2061.10	0.001703	8.95	1514.74	229.01	0.51
Reach 1	0.40	15045.00	2049.33	2060.50	2056.95	2061.84	0.001683	9.30	1618.79	180.00	0.52
Reach 1	0.42	Bridge									
Reach 1	0.43	13553.00	2051.27	2063.04	2057.84	2063.93	0.000923	7.58	1786.99	209.13	0.40
Reach 1	0.43	15045.00	2051.27	2063.64	2058.29	2064.63	0.000958	8.00	1881.13	185.78	0.41
Reach 1	0.48	13553.00	2053.51	2063.28		2064.40	0.001695	8.48	1697.39	307.96	0.51
Reach 1	0.48	15045.00	2053.51	2063.89		2065.10	0.001700	8.84	1701.23	184.51	0.51
Reach 1	0.52	14459.00	2055.50	2063.85		2065.10	0.003014	9.71	2374.22	882.76	0.65
Reach 1	0.52	14459.00	2055.50	2064.32		2065.79	0.002949	10.01	1716.65	319.29	0.65
Reach 1	0.57	14459.00	2057.69	2064.92	2064.92	2066.40	0.004148	10.72	2804.66	1291.99	0.76
Reach 1	0.57	14459.00	2057.69	2064.83	2064.83	2067.35	0.006053	12.84	1266.62	333.67	0.91
Reach 1	0.61	14459.00	2059.91	2067.03	2067.03	2068.49	0.004171	10.82	2926.35	1166.15	0.76
Reach 1	0.61	14459.00	2059.91	2067.25	2067.25	2069.54	0.005263	12.41	1515.40	466.31	0.86
Reach 1	0.66	14413.00	2061.79	2068.59	2068.59	2069.77	0.004369	10.70	2663.56	1096.91	0.77
Reach 1	0.66	14413.00	2061.79	2069.58		2070.63	0.002978	9.70	2408.17	630.00	0.65
Reach 1	0.71	14413.00	2063.89	2070.14	2070.14	2071.38	0.004829	10.96	2330.02	1059.53	0.81
Reach 1	0.71	14413.00	2063.89	2070.39		2071.56	0.004235	10.54	2273.17	840.64	0.76
Reach 1	0.76	14413.00	2065.84	2071.96	2071.96	2073.59	0.006661	12.08	1665.95	905.44	0.93
Reach 1	0.76	14413.00	2065.84	2071.96	2071.96	2073.59	0.006662	12.08	1665.71	904.80	0.93
Reach 1	0.79	14413.00	2067.42	2073.94	2073.94	2075.50	0.009084	13.18	1921.97	928.41	1.07
Reach 1	0.79	14413.00	2067.42	2073.94	2073.94	2075.50	0.009050	13.17	1926.28	928.92	1.07
Reach 1	0.90	14413.00	2073.10	2078.92	2078.30	2080.24	0.008016	12.80	2409.28	1339.06	1.00
Reach 1	0.90	14413.00	2073.10	2079.38	2079.38	2080.92	0.007230	12.89	1873.35	681.00	0.96
Reach 1	1.00	14413.00	2078.10	2083.20	2083.20	2085.42	0.008498	15.27	1541.10	1092.53	1.24
Reach 1	1.00	14413.00	2078.10	2083.20	2083.20	2085.78	0.008782	15.53	1252.21	585.49	1.27
Reach 1	1.12	14413.00	2082.30	2088.51	2088.51	2089.89	0.004376	12.15	2066.62	880.83	0.92
Reach 1	1.12	14413.00	2082.30	2088.51	2088.51	2089.89	0.004374	12.15	2066.51	880.00	0.92

Profile Output Table - Encroachment 3

Reach	River Sta		Top Wdth Act (ft)	Area (sq ft)	Vel Total (ft/s)	W.S. Elev (ft)	Base WS (ft)	Prof Delta WS (ft)
Reach 1	0.22		597.58	2072.86	7.26	2052.91	2052.91	
Reach 1	0.22		270.61	1282.28	11.73	2052.93	2052.91	0.02
Reach 1	0.35		171.64	1030.27	13.15	2056.43	2056.43	
Reach 1	0.35		172.81	1118.99	13.45	2056.94	2056.43	0.52
Reach 1	0.40		161.53	1587.62	8.95	2059.86	2059.86	
Reach 1	0.40		161.58	1668.03	9.29	2060.50	2059.86	0.64
Reach 1	0.42	BR D	153.60	1446.88	9.37	2059.86	2059.86	
Reach 1	0.42	BR D	152.16	1538.26	9.78	2060.50	2059.86	0.64
Reach 1	0.42	BR U	0.01	1442.83	9.40	2061.35	2061.35	
Reach 1	0.42	BR U	0.01	1442.83	10.44	2061.35	2061.35	0.00
Reach 1	0.43		157.77	1987.08	7.58	2063.04	2063.04	
Reach 1	0.43		157.77	2057.20	8.00	2063.64	2063.04	0.60
Reach 1	0.48		306.95	1698.07	7.98	2063.28	2063.28	
Reach 1	0.48		184.51	1701.23	8.84	2063.89	2063.28	0.60
Reach 1	0.52		774.33	2453.08	6.09	2063.85	2063.85	
Reach 1	0.52		319.29	1716.65	8.42	2064.32	2063.85	0.47
Reach 1	0.57		1130.20	3027.64	5.16	2064.92	2064.92	
Reach 1	0.57		333.67	1266.62	11.42	2064.83	2064.92	-0.08
Reach 1	0.61		1166.15	2926.35	4.94	2067.03	2067.03	
Reach 1	0.61		466.31	1515.40	9.54	2067.25	2067.03	0.22
Reach 1	0.66		1096.91	2663.56	5.41	2068.59	2068.59	

Reach 1	0.66	630.00	2408.17	5.99	2069.58	2068.59	0.99
Reach 1	0.71	1059.53	2330.02	6.19	2070.14	2070.14	
Reach 1	0.71	840.64	2273.17	6.34	2070.39	2070.14	0.26
Reach 1	0.76	905.44	1665.95	8.65	2071.96	2071.96	
Reach 1	0.76	904.80	1665.71	8.65	2071.96	2071.96	0.00
Reach 1	0.79	928.41	1921.97	7.50	2073.94	2073.94	
Reach 1	0.79	928.92	1926.28	7.48	2073.94	2073.94	0.00
Reach 1	0.90	1339.06	2409.28	5.98	2078.92	2078.92	
Reach 1	0.90	681.00	1873.35	7.69	2079.38	2078.92	0.46
Reach 1	1.00	1092.53	1541.10	9.35	2083.20	2083.20	
Reach 1	1.00	585.49	1252.21	11.51	2083.20	2083.20	0.00
Reach 1	1.12	880.83	2066.62	6.97	2088.51	2088.51	
Reach 1	1.12	880.00	2066.51	6.97	2088.51	2088.51	0.00

Appendix E

FEMA MT2 Forms Supporting Documentation

GENERAL

Most of the documentation for the data presented in the MT2 forms is summarized in the body and Appendices of the TDN. Reference will be made to the appropriate section as applicable.

MT2 FORM 4

Section 3 – See TDN Section 5.1 for discussion of starting WSEL

Section 4 – See TDN Section 5.5 for overall discussion of each item

Section 5.1.c – The downstream floodway width is increased by 20 feet based on limiting the encroachment to create no more than a 1.0 foot rise in the energy grade elevation as opposed to the water surface elevation. This is due to the default to critical depth at this location.

Section 5.2 – Profile is provided for 100-year flood only and is included at the back of this appendix.

MT2 FORM 5

Section 1.1 – The ocean is approximately 500 miles away and is not a part of this study.

Section 1.4 – The annotated FIRM is included at the end of this appendix and reflects revisions to 100-year boundary only.

Section 2.3 – Fill is proposed at this time and is planned to be constructed at the minimum compaction density required. No certification of the fill is available for this CLOMR, but will be provided with the follow-up LOMR and as-builts.

MT2 FORM 6

General – The proposed improvements for Goldmine Village include expanding the main channel capacity by moving the right bank southerly into the site and providing revetment of the banks to protect against erosion. The project is not a complete channelization of Sols Wash. The bank revetment material has not been designed at this time, but will be sized to withstand the 100-year flood, including sufficient toe-down treatment to protect against long- and short-term scour. Those designs and calculations will be provided with the follow-up LOMR for this project.

6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193

Section 1 – See Figure 1.3 in TDN for limits of improvement.

Section 2 – The moving of the right bank will transition into existing bank protection at the upstream and downstream ends. The upstream end will tie into the existing shotcrete lining adjacent to the railroad embankment. The downstream end will tie into the abutment area of the US 93/89 bridge. The new banks will be graded at a slope of 2H:1V and will be completely protected by bank revetment.

Section 4 – See the Concept Grading Plan in Appendix F

Section 5.3 – See the discussion in Section 5.5.6 of the TDN

Section 6 – No sediment transport analysis have been conducted at this time, however, analysis will be performed with the final design of the bank revetment.

MT2 FORM 7

Section 2 – The bridge was constructed by the Arizona Department of Transportation and there are no certified as-built records available. The bridge was surveyed by a registered land surveyor to obtain as-built data tied to the datum for this project. The results of that survey and portions of the ADOT construction drawings are included in Appendix C.

Section 3 – No sediment transport analyses have been conducted at this time.

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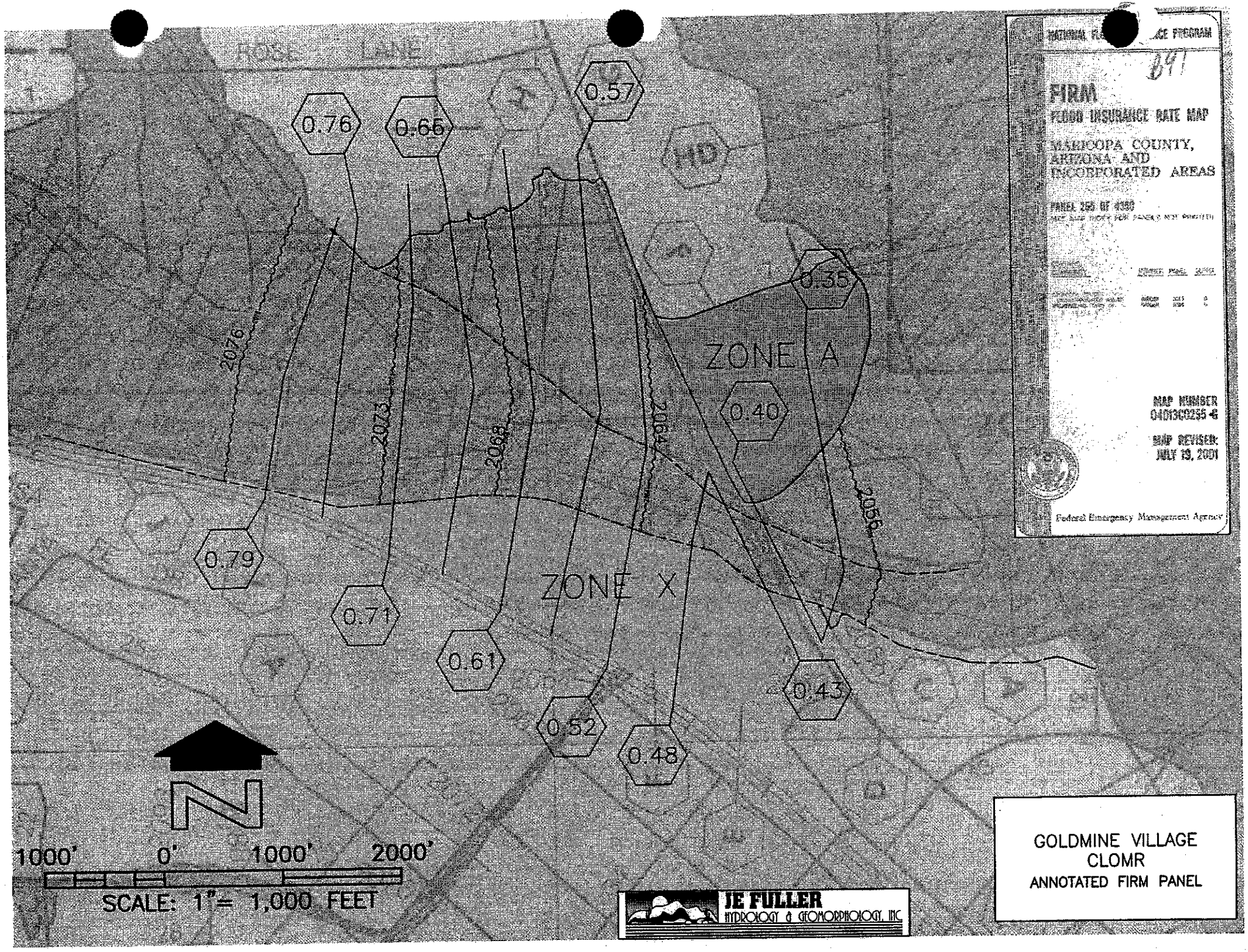
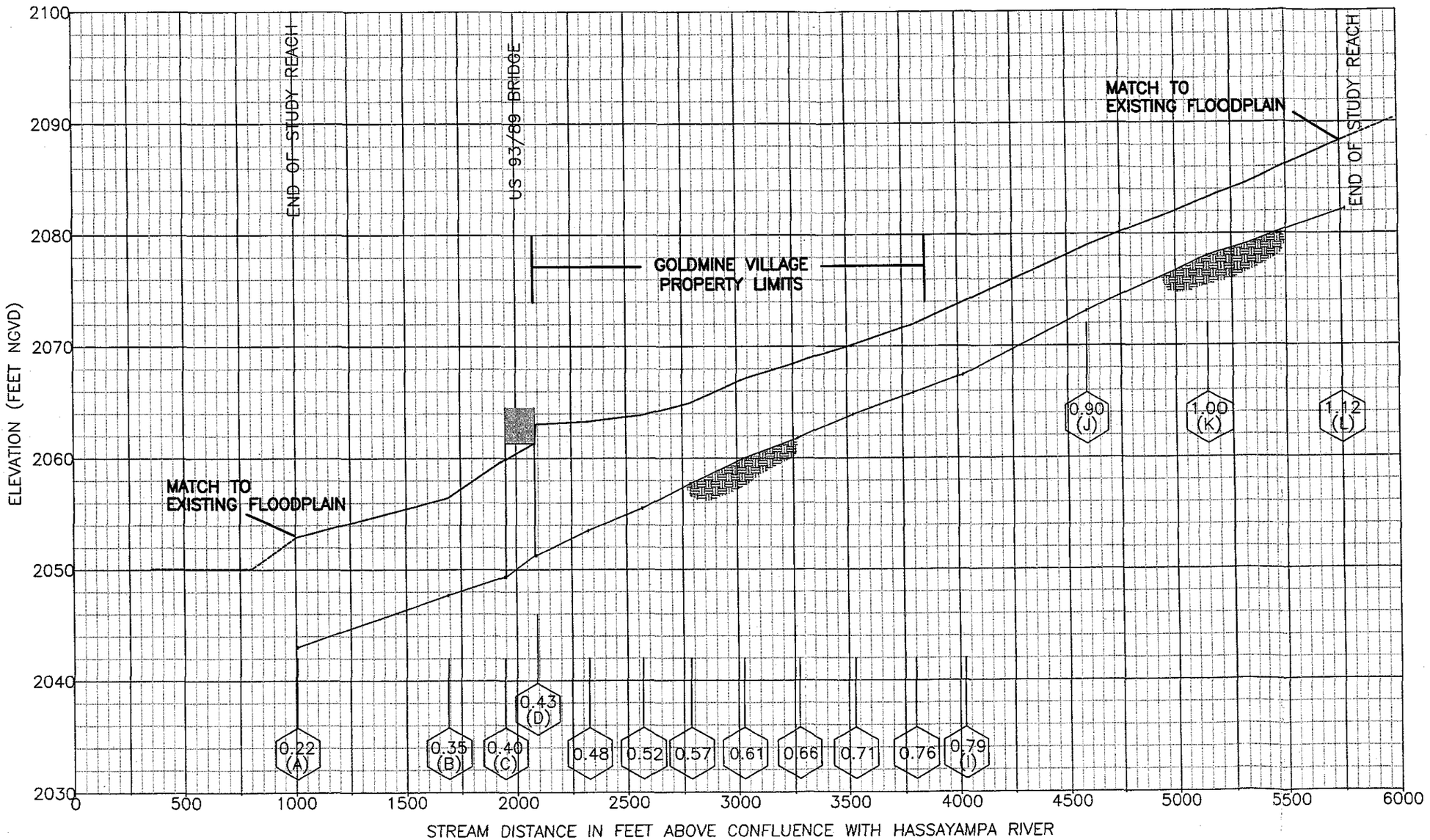


GOLDMINE VILLAGE
CLOMR
ANNOTATED FIRM PANEL



100-YEAR FLOOD PROFILE

SOLS WASH

TOWN OF WICKENBURG, AZ AND
UN-INCORPORATED MARICOPA COUNTY, AZ

Appendix F

Concept Grading Plan

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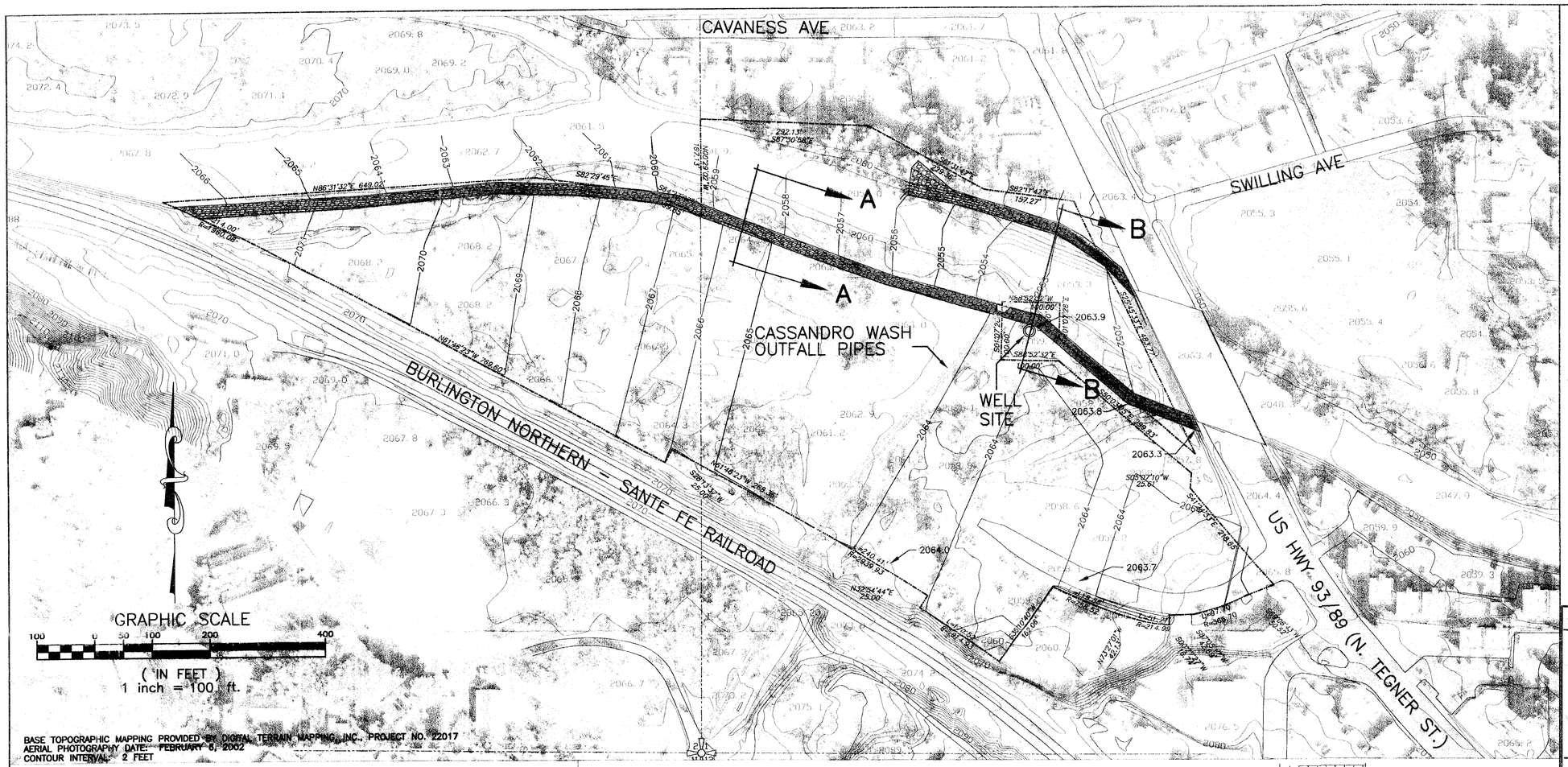


BASE TOPOGRAPHIC MAPPING PROVIDED BY DIGITAL TERRAIN MAPPING, INC., PROJECT NO. 22017
AERIAL PHOTOGRAPHY DATE: FEBRUARY 6, 2002
CONTOUR INTERVAL: 2 FEET

GENERAL NOTES

ALL FILL SHALL BE PLACED AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY OBTAINABLE.

REVETMENT TOE-DOWN DEPTH AND LINING MATERIAL TO BE DETERMINED AT A LATER DATE. ALL LININGS WILL BE DESIGNED TO WITHSTAND 100-YEAR FLOODING.

TOWN OF WICKENBURG WELL TO BE ADJUSTED BY TOWN. WELL-HEAD SHALL BE RAISED IN PLACE TO MATCH THE PROPOSED FILL ELEVATION. WELL HOUSE SHALL BE RE-ORIENTED TO BE PARALLEL TO WASH.

GRADES AND ELEVATIONS SHOWN ARE PRELIMINARY AND ARE NOT FOR CONSTRUCTION.

CASANDRO WASH OUTFALL PIPES AND HEADWALL TO BE RELOCATED TO NEW BANK LOCATION.

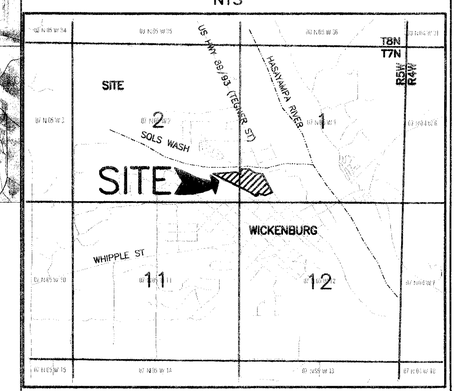
LEGEND

P & J INVESTORS, INC. PROPERTY BOUNDARY

SECTION LINE

VICINITY MAP

NTS



PRELIMINARY–NOT FOR CONSTRUCTION

CONCEPT GRADING PLAN

FOR

P & J INVESTORS, INC.

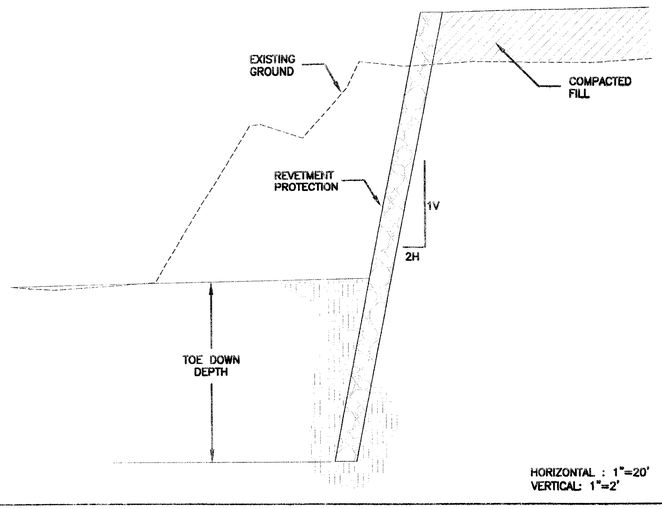
GOLDMINE VILLAGE CLOMR

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.

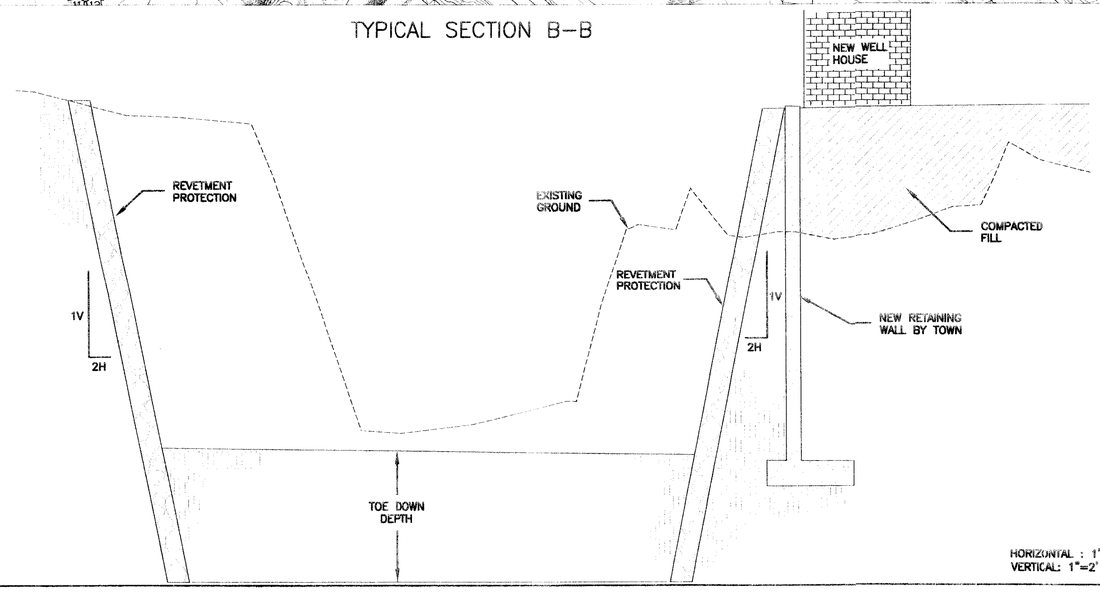
6101 S. RURAL ROAD, STE 110
TEMPE, ARIZONA 85283
480-752-2124

2881 N. SILVER SPUR DRIVE
TUCSON, ARIZONA 85745
520-623-3112

TYPCIAL SECTION A–A

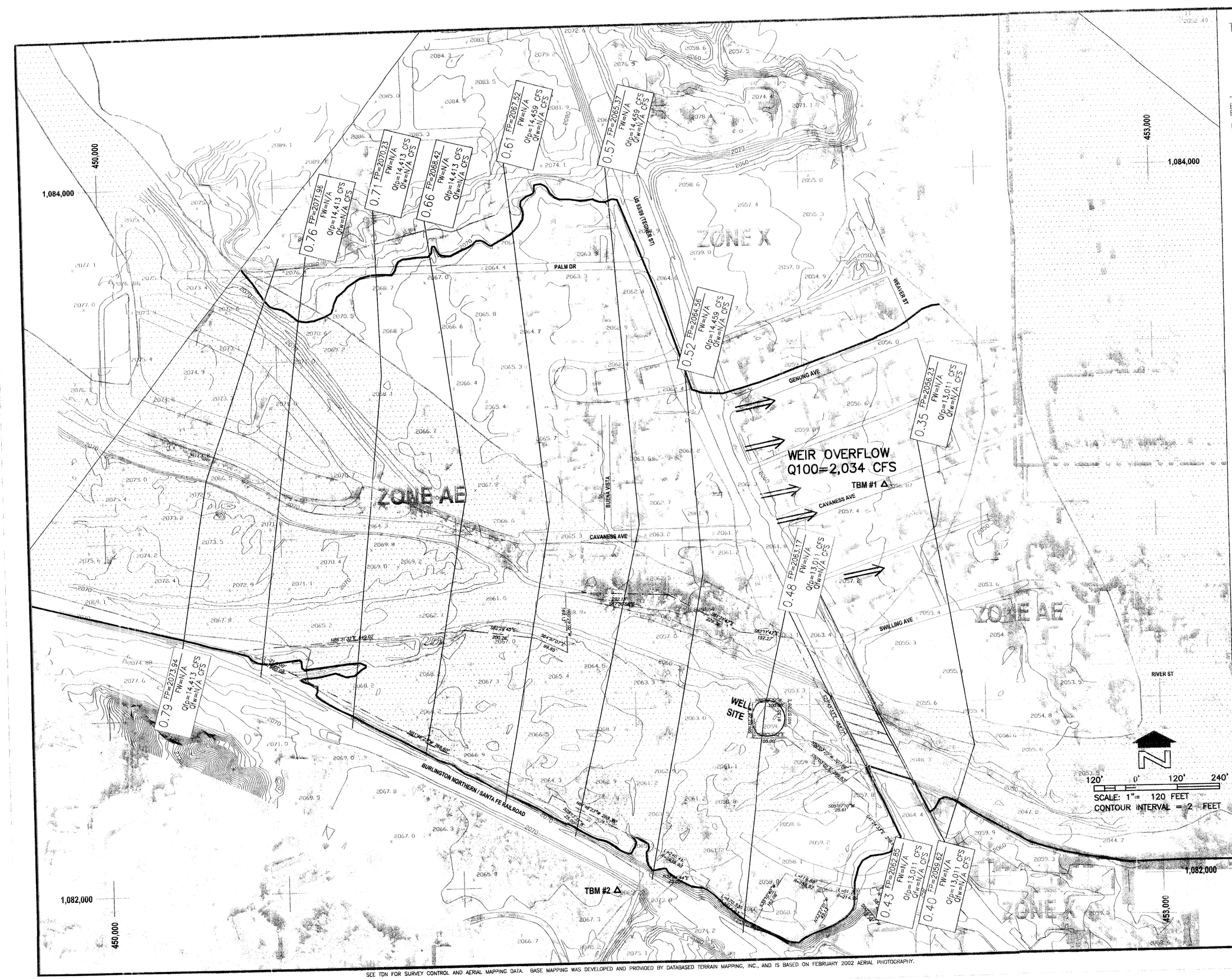


TYPICAL SECTION B–B



PLATES

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 South Rural Road, Suite 110, Tempe, Arizona 85283
Phone: 480-752-2124 Fax: 480-839-2193



TOWN OF WICKENBURG, ARIZONA

FEMA FIRM PANEL 04013C0255G

EFFECTIVE DATE: JULY 19,2001

LEGEND

EFFECTIVE FIS 100-YR FLOODPLAIN BOUNDARY

EFFECTIVE FIS 100-YR FLOODWAY BOUNDARY

CLOMR 100-YR FLOODPLAIN BOUNDARY

CLOMR 100-YR FLOODWAY BOUNDARY

CROSS SECTION — 0.10 FP= 1888.74 / FW= 1889.54 / Qfp=xxx CFS / Qfw=xxx CFS

TEMPORARY BENCH MARK — TBM XXX

CLOMR BASE FLOOD ELEVATIONS — 1221

HYDRAULIC BASELINE (THALWEG)

EFFECTIVE FIS FLOOD HAZARD ZONE DESIGNATIONS — ZONE AE

CLOMR FLOOD HAZARD ZONE DESIGNATIONS — ZONE AE

P&J INVESTORS, INC. PROPERTY LIMITS

NAD 83 STATE PLANE COORDINATES (ARIZONA, CENTRAL ZONE) — 453,000 / 1,084,000

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 FOR ALL SECTIONS EXCEPT THE BRIDGE AND SECTIONS 0.40 AND 0.43 WHICH ARE ADJUSTED FOR SKEW.

2- FLOODPLAIN AND FLOODWAY SHARE A COMMON BOUNDARY WHERE NO SEPARATE FLOODPLAIN LINE IS SHOWN

TEMPORARY BENCH MARKS (TBM)

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION TO NORTH AMERICAN VERTICAL DATUM OF 1988 IS AS FOLLOWS:

NGVD29 + 2.26 FEET = NAVD88

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
TBM #1	2056.87	MANHOLE IN CENTER OF CAVANESS STREET N: 1083741.02 E: 450035.27
TBM #2	2065.20	COTTON PICKER SPINDLE FLUSH BETWEEN 2 MNHLS N: 1081984.23 E: 451435.59

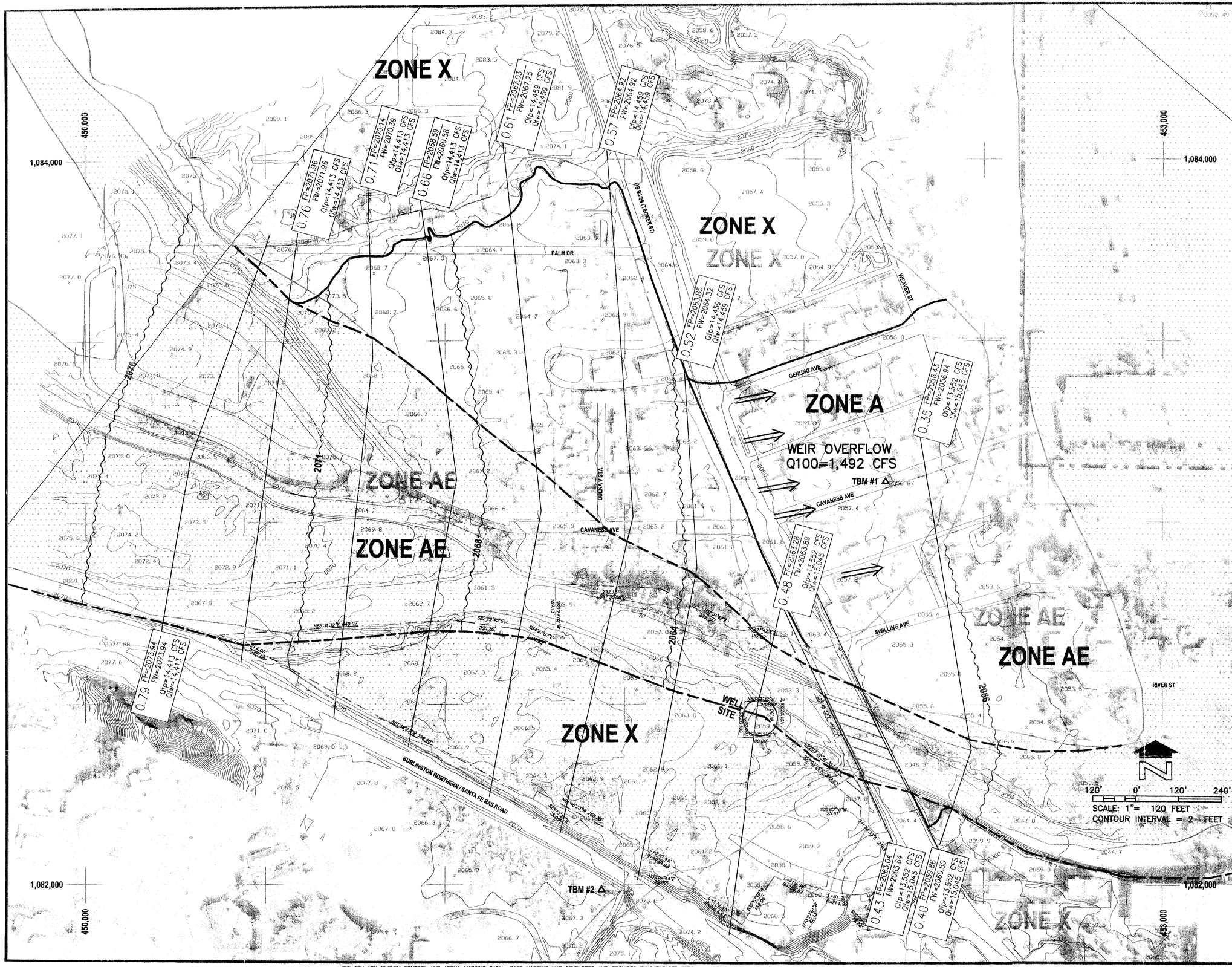
JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC
6101 SOUTH RURAL RD, STE 110, TEMPE, AZ 85283 PHN: 480-752-2124, FAX: 480-639-2193

P&J INVESTORS, INC.
GOLDMINE VILLAGE PROJECT

PLATE 2

EXISTING CONDITONS WORKMAP

SEE TDN FOR SURVEY CONTROL AND AERIAL MAPPING DATA. BASE MAPPING WAS DEVELOPED AND PROVIDED BY DATABASED TERRAIN MAPPING, INC., AND IS BASED ON FEBRUARY 2002 AERIAL PHOTOGRAPHY.



TOWN OF WICKENBURG, ARIZONA

FEMA FIRM PANEL 04013C0255G

EFFECTIVE DATE: JULY 19,2001

LEGEND

EFFECTIVE FIS 100-YR FLOODPLAIN BOUNDARY

EFFECTIVE FIS 100-YR FLOODWAY BOUNDARY

CLOMR 100-YR FLOODPLAIN BOUNDARY

CLOMR 100-YR FLOODWAY BOUNDARY

CROSS SECTION — 0.10 FP= 1888.74 / FW= 1889.54 / Qfp=xxx CFS / Qfw=xxx CFS

TEMPORARY BENCH MARK — TBM XXX

CLOMR BASE FLOOD ELEVATIONS — 1221

HYDRAULIC BASELINE (THALWEG)

EFFECTIVE FIS FLOOD HAZARD ZONE DESIGNATIONS — ZONE AE

CLOMR FLOOD HAZARD ZONE DESIGNATIONS — ZONE AE

P&J INVESTORS, INC. PROPERTY LIMITS

NAD 83 STATE PLANE COORDINATES (ARIZONA, CENTRAL ZONE) — 453,000 / 1,084,000

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 FOR ALL SECTIONS EXCEPT THE BRIDGE AND SECTIONS 0.40 AND 0.43 WHICH ARE ADJUSTED FOR SKEW.

2- FLOODPLAIN AND FLOODWAY SHARE A COMMON BOUNDARY WHERE NO SEPARATE FLOODPLAIN LINE IS SHOWN

TEMPORARY BENCH MARKS (TBM)

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. CONVERSION TO NORTH AMERICAN VERTICAL DATUM OF 1988 IS AS FOLLOWS:

NGVD29 + 2.26 FEET = NAVD88

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
TBM #1	2056.87	MANHOLE IN CENTER OF CAVANESS STREET N: 1083741.02 E: 450035.27
TBM #2	2065.20	COTTON PICKER SPINDLE FLUSH BETWEEN 2 MNHLS N: 1081984.23 E: 451435.59

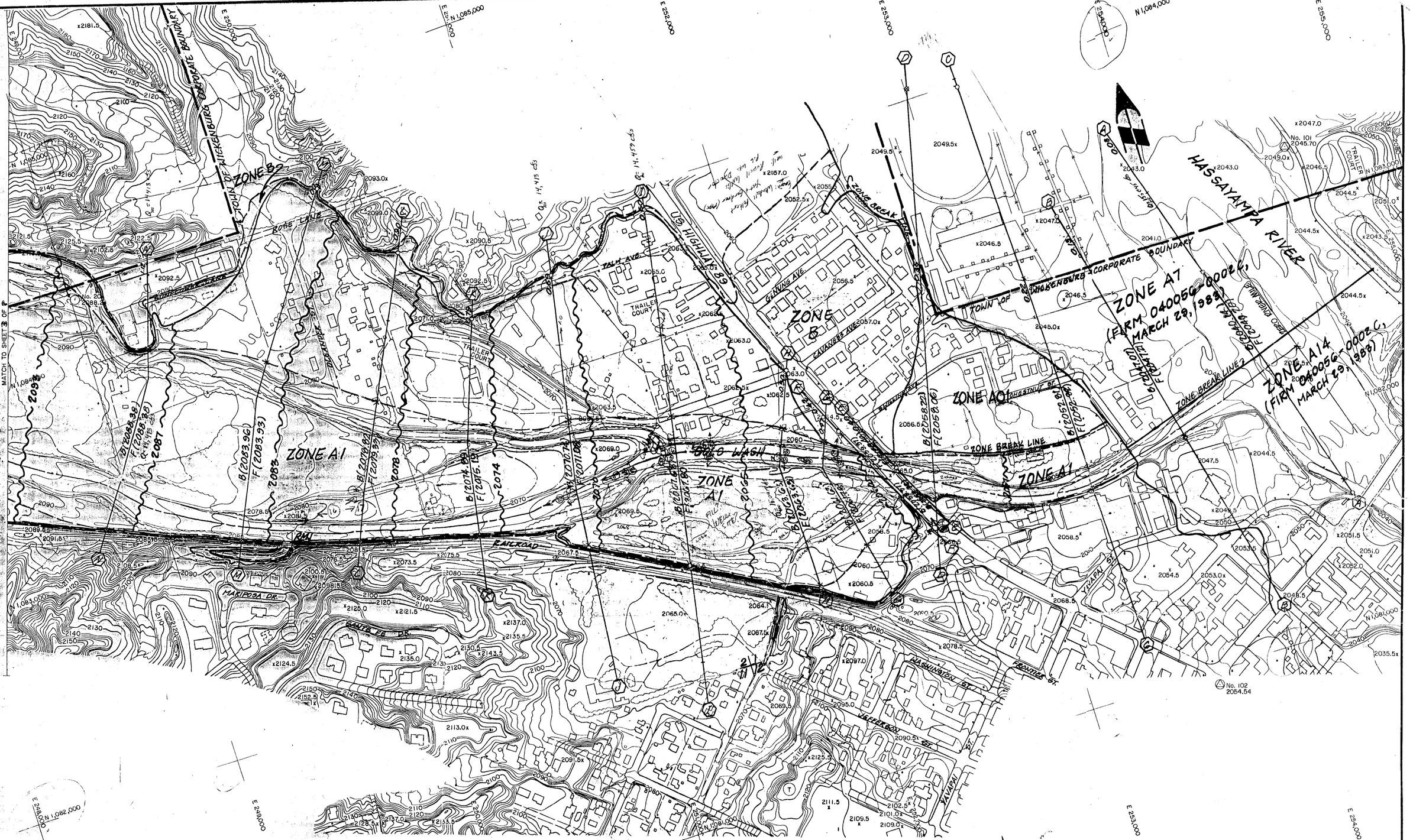
JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC
6101 SOUTH RURAL RD, STE 110, TEMPE, AZ 85283 PHN: 480-752-2124, FAX: 480-639-2193

P&J INVESTORS, INC.
GOLDMINE VILLAGE PROJECT

PLATE 3

DEVELOPED CONDITONS WORKMAP

SEE TON FOR SURVEY CONTROL AND AERIAL MAPPING DATA. BASE MAPPING WAS DEVELOPED AND PROVIDED BY DATABASED TERRAIN MAPPING, INC., AND IS BASED ON FEBRUARY 2002 AERIAL PHOTOGRAPHY.



LEGEND

⬡——⬡	CROSS SECTION
B(2083.99)	BASE FLOOD ELEVATION
F(2088.38)	FLOODWAY ELEVATION
~2083~	BASE FLOOD ELEVATION
———	100-YEAR FLOOD BOUNDARY
— — —	500-YEAR FLOOD BOUNDARY
— — —	FLOODWAY BOUNDARY
ZONE A1	FLOOD INSURANCE RATE ZONE

SCALE: 1" = 200' 0 100 200 400 600

CONTOUR INTERVAL = 2 FEET

MAPPING BY: COOPER AERIAL SURVEY CO.

FLOWN: MARCH 13, 1986

CORPORATE LIMITS

SHEET MAP INDEX

1 MILE

CELLA BARR ASSOCIATES
5062 North 19th Avenue
Phoenix, Arizona 85015 (602) 242-2999

	BY	DATE
CALCULATIONS		
CALC. CHECK		
MAPPING		
MAP CHECK		
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

SOLS WASH FLOODPLAIN DELINEATION

HASSAYAMPA RIVER TO MARICOPA COUNTY LINE

RECOMMENDED BY: DATE

APPROVED BY: DATE

FLOODPLAIN ADMINISTRATOR

SHEET 2 OF 8

40915-01